HIGH STAKES

FIXED ODDS SPORTS BETTING

The Essential Guide

JOSEPH BUCHDAHL

Published in 2003 by
High Stakes Publishing,
21 Great Ormond Street, London, WC1N 3JB
www.highstakes.co.uk

A CIP catalogue record for this book is available from the British Library.

ISBN 1-84344-019 9 Fixed Odds Sports Betting

2 4 6 8 10 9 7 5 3 1

Printed by Cox & Wyman

Acknowledgements

I would like to thank Andrew O'Hara for his assistance in proofreading the first draft, Mike Shor, of Gametheory.net, for his material contribution, and Paul Ross, Mark Hodson, Andy Baxter, Ian Blair and Kevin Kelly, without whose encouragement and insights this book would not have been completed.

Contents

Sports Betting as a Form of Investment

Wha

One , the
idea s of
inve and
prop s, to
a gr ent.
Thes the
inve s the
price es at
£5 e d his
capi has
halv on a
stoc : will
char that
oper estor
want ents
that ssful
one. than
lose

Cert A let
prop size
of th pital
inve ,000
each s on
a sto ze of
divid are.
Perh gh a
bank l be
dete may
choc ere it
is. S row.

One ing?
After has
gambling got to do with investing? The answer to these questions will

depend to a large extent on the aims and interests of the sports bettor. Whether he considers his sports betting to be gambling or investing will be gove ment, the l w of what

Wha

To h one prov will forfe ther. Spor the spec le a foott ace. Hors ling, with ther. Incre rnet gam ling, swin ball, are

Spor test, stror ents too, the elem e on the ome incre wers becc yers they and conf ard, is a

Spo

Gam ke a profi nces of m age. Perh and

investing concerns the level of exposure to risk as a result of any speculation to gain an advantage. For most fixed odds bets,[1] the risk is infin rast, the i e to with ttor, howe ation prov n for stan can only e is extre ce or capit

Anot s the peric s of inve s or year olves no n bling migh reas tradi ce of this ough spor stify placi the spec and the total capit ving man risk, beca

The onal inve wing exan in a FTS ches as th nd of this been mad d, or

[1] Cert
[2] The til the result
[3] In re ity.
[4] Ante post betting involves betting on an event weeks, months or even years in advance.

£10 every day that the value of the FTSE100 tracker fund will rise. If he is correct, he wins £10. If he is incorrect, he loses his £10 wagered. During the g £10 profi ıbler has e 20 more sing all n ı the profi over is or ed to the £

Wha their capit f the valu ghly unlik ered a ver king 1% c 100 more arly, durir ce is low, ises by £ ould see ıave lost y £5 but ning, whei

Clea pital inves that pres l-life inves ı the exce ıg a com orts betti at a third ofits, there king. Neve and, more turn appa This book ı the punt

What Are Odds?

When a bet is placed between two parties on a specified event, the total amount risked by both is usually agreed before the outcome of the event. The most basic of bets might involve two friends, Paul and Mark, having a wager on the outcome of an England football game. Paul might offer Mark £10 if England win, whilst Mark will pay Paul £10 if England fail to win. Provided that England has roughly a 50-50 chance of winning, then this would be a fair wager. If, however, England were playing San Marino, a realistic chance of an England win might be 95%. In this case, Mark would have a distinct advantage over Paul, since the chances of him losing £10 are much less than those of him winning £10. Consequently, Paul and Mark might agree to change the terms of the bet, with Paul paying Mark £10 if England win, but Mark paying Paul £200 if they do not. Since the chances of San Marino drawing or beating England are very small, Mark must risk a much larger sum in order to gain his potential reward from Paul, if Paul is to accept the bet. To ensure that any bet between Paul and Mark is fair and acceptable to both, the relative proportions of the amount risked by the two parties will be dependent upon the expected probability of England winning their game. The amount risked or wagered by each party is known as the stake.

Table 2.1 details some potential wagers, with accompanying stakes, that Paul and Mark might have together over a number of England matches played on neutral territory in a World Cup. In each case, Paul is offering to reward Mark if England win, whilst Mark is offering to reward Paul if England fail to win.

Table 2.1. Wagers and odds

Match	Paul's stake	Mark's stake	Ratio	Estimated chance of England win
England v Brazil	100	25	4/1	20%
England v Germany	100	100	1/1	50%
England v Poland	100	150	2/3	60%
England v Scotland	100	400	1/4	80%
England v Malta	100	900	1/9	90%

The ratio of Paul's stake to Mark's stake is known as the odds. In the England v Brazil game, for every £1 that Mark stakes on an England win, Paul ... the Engl ... take back ... two stak ... their gam ... that Engl ... will be 8 ... ll be 400. ... land failin ... tting outc ... bility.

Who ...

Loos ... as a book ... bove coul ... in a frien ... that prov ... r all poss ... the book ... s to the r ... rofit over ... k" is simp ... nade with ...

Unlik ... will neve ... tting outc ... each betti ... bove 100% ... ke a profi ... n is som ... cept deve ... odds are ... 19th cent ... the book ... ively profe ...

Fractional versus Decimal Odds

The pher UK s very wind spor 6/4, muc 8/15 £15 odds A wi high lowe pote roug

In E betti 5/4 a of oc of s winn inclu stak won, less agai

It is f beca a wi

For f by:

$$(9/4) + 1 = (9/4) + (4/4) = (13/4) = 3.25$$

Usually, decimal odds are rounded to the nearest 2 or at most 3 decimal places. Consequently, fractional odds of 10/11 would be rounded to 1.91 (sinc

Conv nore
prob into
fract mple
fract olest
way

Ther one
hanc rofit
with for a
muc nany
man 7/3,
11/6 uote
deci also
cons aker
may 8....
2.85 ften,
this most
signi arts,
howe r the
deve

Tabl able
with

Table

Fra	ıal
c	s

Fractional odds	Decimal odds	Fractional odds	Decimal odds	Fractional odds	Decimal odds
1/4	1.25	2/1	3	11/1	12
3/10	1.3	11/5	3.2	12/1	13
1/3	1.33	9/4	3.25	14/1	15
4/9	1.44	12/5	3.4	16/1	17
1/2	1.5	5/2	3.5	20/1	21
8/15	1.53	13/5	3.6	25/1	26
4/7	1.57	11/4	3.75	33/1	34
8/13	1.62	14/5	3.8	50/1	51
4/6	1.67	3/1	4	66/1	67
8/11	1.73	100/30	4.33	100/1	101
4/5	1.8	7/2	4.5	150/1	151
5/6	1.83	4/1	5	200/1	201
9/10	1.9	9/2	5.5	500/1	501
10/11	1.91	5/1	6	1000/1	1001

Why Are They Called Fixed Odds?

The history of fixed odds dates back to the 19th century and the origins of football gambling. During the 1880s, newspapers started offering fixed prizes for correctly predicting the outcome of games. These prizes became known as "fixed odds".

Today, licensed bookmakers still offer fixed odds "prizes" for correct football match prediction. The term "fixed odds" is perhaps more appropriate for the high street bookmaker, who publishes a long list of football matches and their accompanying betting odds for the coming weekend several days in advance. This is an expensive process and cannot be repeated if mistakes are made or if the bookmaker needs to alter a price in response to customer demand. Consequently, once the list goes to print, the betting odds become fixed.

An Internet bookmaker has more flexibility in this respect and can change a price to manage his projected liability. Nevertheless, with the exception of the most popular football leagues like the English Premiership, betting odds for the majority of matches remain unchanged up until kick-off. Even for high profile games like Manchester United versus Arsenal, where bookmakers can expect to see a large turnover, the odds available for the standard home/draw/away market may not fluctuate by more than about

10% from the original prices. Prices for other fixed odds football betting, including correct score, double result and total goals rarely change at all.

Spre ***ad Betting versus Fixed Odds***

This oling
in th e to
com gins
in th oday
cont arket
indic er a
"pric l for
this

Spor e on
a pa ade
avail the
spre odds
whe ofit,[5]
the a nt or
wror that
Man then
deci that
Man [6] 82
poin ester
Unite nts x
£10
poin ts is
simp oint.
If Ma er, a
profi e.

Spre / the
sam If a
parti mply
raise rket.
With nt is

[5] Retu
[6] The terms "buy" and "sell" in spread betting come direct from the language of financial trading.

not available in fixed odds betting. Furthermore, since price changes are easily accommodated, one can continue to both spread bet throughout a spor Test matc uited to sp er of runs

Of c they simp aged to b ould mak ces, simil ence betw this gene night be a s. If Man who mair se.

Ther nber bets are deci hich winn oints in ru ason poin oints spre x.

Indiv ne in com total num able, whe one team lace beca 0.3. The ame finis hilst selli

[7] In-ru singly popul t, and offers a few Intern usually football and tennis.

Where points, runs, goals and lengths are not suitable to measure success, a performance index is generally used, which enables quotes on a va oints are n. A perf in a foott red card with poin

In cc thrill of nc win. This f the bet, this is w n of gam kets, spre e of gam ns of mon thier clien the pros y at 300 n his usua ds at 11/1 bet, howe l.

Fixe

Ther most are s The mos arlier disc e of wag ning odds lose depe ar in foott any winn f the mat win will r mes

known as 1X2 betting. On fixed odd coupons, a "1" denotes the home team, with the away team represented by a "2" and the draw by an X.

Occa... match to 2, ...ce is offer... ...ns; if the t... ...s no poss... ...n for both ... ...ither outc...

Head... one team... , if a matc... ...ird if there... ...cing. Head... are avail... ...hole betti... ...g on the r... ...ngly, book...

An i... ...ting, som... bet avail... this remo... ...mes. Som... ...lliam Hill ... ...tly 2 goal... ...ore, altho... ...ook. Othe... ...g in Ame... ...mes betti...

Corr... ...nber of ty... ...ority of o... ...s of corre... very slim... two team... ...ome, woul... , 7/2

to beat Manchester United at home, would be around 10/1 to win 1-0. Bolton are perceived as having a much smaller chance of winning than Arse, are grea first goal

Som also rugb esult only. half- time tting poss mply back dds. Obvi 9 as com odds are t m to be v utes. Typi can be e

In s rter- price ent, parti night be a ning som s are actu are settl win odds. This fraction will vary by sport and event, and will always be displ ents, the , for plac tball tourn y be settl y bet on E rofit woul op 2 at 5/ from the p

For s with virtu d be expe ky to

find odds of even 1.01. By introducing a points handicap, this increases the chances of being able to win the bet by backing Holland. The idea, as with ce of winn :

Both lly a little rgin. Here hilst the land lose king Holla f the victo e as the s no poss ting. The r the othe s the sam orts.

For n the exce nario may -way hous into the b r the bet i t the sam

Asia icap betti g. In addi icap foott a ¾ goal the face that beat start. How

As f nead start ame mag nber

of the handicap will be added to the real number of goals. Where no handicap is awarded (0:0 handicap), a drawn game will result in a tied bet and win, whils (0:1) and n ½ ball et is impo then any f the stak lf on the h half the f as thou ball hanc by ½ or m falls withi onal hanc ives half ed at odds fit of £4.7 has only

Tabl sian hanc f the punt s are retur ding to sp

Table 2.3. Bet settlements for Asian handicap

Handicap	Result 0:0	1:0	0:1	2:0	1:1	0:2
0:0	Tie	Win	Loss	Win	Loss	Loss
0:¼	Win ½	Win	Loss	Win ½	Loss	Loss
0:½	Win	Win	Loss	Win	Loss	Loss
0:¾	Win	Win	Loss ½	Win	Loss ½	Loss
0:1	Win	Win	Loss	Win	Tie	Loss
0:1¼	Win	Win ½	Loss	Win	Loss ½	Loss
0:1½	Win	Win	Loss	Win	Loss	Loss
0:1¾	Win	Win	Loss	Win	Loss	Loss ½
0:2	Win	Win	Loss	Win	Loss	Loss

In an attempt to attract spread bettors into fixed odds gambling, some online bookmakers have started to offer specialised markets, particularly for f ners and e, or the t n the spre bling that

All t term marl e of the rnet book ually live s on spor Such bets

The n the hors until the ost," whe orts bets the Pren and so o g the inter ed is incre ible, and g of their market to reduce the chances of the odds moving against them. The mair ntial win. ewer bets h or hanc

Diffe

Know f bet can able, altho tting marl

The simplest of all bets is the single. With a single bet on a sports event, only one outcome is backed, and the bet can generally either win or lose, altho win/l typic 2/1. or lo almo away Olyn

Prior their print (1X2 as a mus wins sele a sir or a reas expe inclu look retur

Mult new becc invol succ mult obvi bets

E
N

[8] Som

for the majority of football matches are now available on the printed coupon.

The odds for a Birmingham/Newcastle double are (6/4) multiplied by (4/5). Initially, it is not exactly obvious what the odds for the double should be. Inste or or com 2.5, whils

Desp now allov rting even not be a hers may urns. Som in a mult bet. Stori ns in an a the betti tiple bet,

Ther what have r the follo

E
L
S

First ndly, there ying toge here are he 3 selec or a "Trix

E
E
L
E

[9] Odd 1.8 is 9/5 as odds expressed in fractional notation are then (90/20) -1 = 70/20 or 7/2.

Strictly speaking, the 3 double bets that form part of the Patent are "combinations" of doubles taken from 3 available selections, because the orde true perm tting slip

The the num urse, restr re 6 com e, in addi l the fourf ee", whils

Ther can choc n" is a se g of 10 d nt to link bles and after the o be the be), with five- time otal. For win for th rger com form bette ll be expl each way,

Unle may som from "n" s ed to form with an "C, button, where "n" is the total number of selections, i.e. 6, and "r" is the d for "Cor ult of 20. m 6 selec This

calculation can also be performed on a computer with a spreadsheet or statistics software application. In Excel, for example, entering =CO hose with

whe 720. 3! is can calc

In 1 gular arra d in flipp of n indis row corr e, in mat g no tea tting per by 1 for e cal's trian ing r sele 3) to the r s us there sing Pas ions of b nd 1 sixfo

It is want to de and right or of

the Triangle is the sum of the two numbers directly above it. Consequently, the next two rows of numbers would be:

1 7 21 35 35 21 7 1 n=7
1 8 28 56 70 56 28 8 1 n=8

The Age of the Internet

Prior to the 1990s almost all licensed fixed odds sports betting was controlled by the high street bookmakers. In Britain, this concerned a few very large betting firms like Ladbrokes, William Hill and Coral, who all had established reputations. If someone wanted to have a wager, this usually involved strolling down to the local betting shop and filling in the coupon. If successful, a return trip was necessary to collect the winnings. For those betting more regularly this could become a rather tiresome and time-consuming exercise, although others, particularly those more interested in racing, would (and still do) treat the visit to the betting shop as integral to the whole gambling experience.

In the last decade or so, however, sports betting has found the Internet to be an excellent medium within which to take place, and there are now possibly a 100 or more online sportsbooks ready and waiting to take punters' money. The large UK high street firms now have considerable market turnover through their online enterprises, but there are also some very reputable online bookmakers who essentially exist only in cyberspace, including Sportingbet and SportingOdds from the UK, Interwetten and Bet&Win from Europe, and Gamebookers from the Americas. Whilst some punters still prefer to deal in cash with their local bookie there are a number of distinct advantages to sports betting online.

The most obvious advantage of online gambling is one of convenience. With the Internet, a bet can be placed in a matter of seconds simply by sitting at a computer in the comfort of one's own home. Furthermore, with almost all online bookmakers, bets can be placed 24 hours a day, 7 days a week, 365 days a year. It is a simple matter of opening a betting account with an online bookmaker, usually requiring nothing more than a credit or debit card, and occasionally further evidence of identification. Online accounts can be opened within minutes and used immediately. For punters with little to spend, initial deposits of only £10 are permitted with some bookmakers, with minimum stakes of as little as 50 pence or less.

Frequently, online firms will have attractive offers of free bets or deposit bonuses for newly opened accounts to attract custom. Winnings are usua ount mon ck of the r

A se eater avail treet book rrect scor tting coup offer a po ose from ngly popu read betto the majo UK have tball long the wide

Perh s the avail ight be tw ave an a ays in th ince the t that they aker, howe s the corre here may at it becc kers and f the even gain more

[10] In October 2001, the Government abolished tax on high street betting in the UK. Before then, every akers opera g tax reven was a major r – a win/win situation for all concerned.

Despite the advantages of Internet betting, there are a few downsides that the punter ought to be aware of. Firstly, there are sometimes currency and trans om a betti n the UK eign book o be limit cted num low, punt veen acco ting.

Secc take or w lly a signi , for som s in resp nuch redu only foun gher. Neve may be ra unity at th num allov can circu

Fina less repu le to choc the more iling book ts. If bank his mon used with ulent betti l the term volve genu

Desp ng is defir n the near ernet and

Odd

Fixe w in
Cha eries
are f the
betti they
are are
supp coin,
whe each
outc actly
what coin
flipp ce of
one first
princ can
only nce,
and Test
matc the
weat esult
occu ip, 9
mon n, be
even

In a f the
expe xact
calc odds
for e the
mist

Tabl dds,
in fra mply
the i , the
prob

Table 3.1. Odds and their probabilities

Fractional odds	Decimal odds	Probability	Fractional odds	Decimal odds	Probability
1/10	1.1	90.9%	9/4	3.25	30.8%
1/9	1.11	90.0%	12/5	3.4	29.4%
1/8	1.13	88.8%	5/2	3.5	28.6%
1/7	1.14	87.5%	13/5	3.6	27.8%
2/13	1.15	86.7%	11/4	3.75	26.7%
1/6	1.17	85.7%	14/5	3.8	26.3%
2/11	1.18	84.6%	3/1	4	25.0%
1/5	1.2	83.3%	100/30	4.33	23.1%
2/9	1.22	81.8%	7/2	4.5	22.2%
1/4	1.25	80.0%	4/1	5	20.0%
3/10	1.3	76.9%	9/2	5.5	18.2%
1/3	1.33	75.0%	5/1	6	16.7%
4/9	1.44	69.2%	11/2	6.5	15.4%
1/2	1.5	66.7%	6/1	7	14.3%
8/15	1.53	65.2%	13/2	7.5	13.3%
4/7	1.57	63.6%	7/1	8	12.5%
8/13	1.62	61.9%	15/2	8.5	11.8%
4/6	1.67	60.0%	8/1	9	11.1%
8/11	1.73	57.9%	17/2	9.5	10.5%
4/5	1.8	55.6%	9/1	10	10.0%
5/6	1.83	54.5%	10/1	11	9.1%
9/10	1.9	52.6%	11/1	12	8.3%
10/11	1.91	52.4%	12/1	13	7.7%
Evens	2	50.0%	14/1	15	6.7%
11/10	2.1	47.6%	16/1	17	5.9%
6/5	2.2	45.5%	20/1	21	4.8%
5/4	2.25	44.4%	25/1	26	3.8%
11/8	2.38	42.1%	33/1	34	2.9%
6/4	2.5	40.0%	50/1	51	2.0%
13/8	2.62	38.1%	66/1	67	1.5%
7/4	2.75	36.4%	100/1	101	1.0%
15/8	2.88	34.8%	150/1	151	0.7%
2/1	3	33.3%	200/1	201	0.5%
11/5	3.2	31.3%	500/1	501	0.2%

The Bookmakers' Profit Margin – the Overround

Bets between friends, like Paul and Max in Chapter 2, may involve fair odds. For professional bookmakers, however, there would be very little

DOWNLOAD FULL VERSION HERE: https://bettingbooks.org/8

point in their offering a betting service if they weren't making a profit themselves. In spread betting, betting firms secure their revenue via the spre the finar l by man

The of 52 are 5 , the sum 1 or 100 hose odds their assc true char or all card y, of cour 00%. The lities repr tage over ok is over ound is 1(ut to punt % on turn d at 48/1 and the ts in winn it of 6.1% as a perc mple relat cted loss,

whei

If a of a stan nd a punt

Sinc are mat nfair

odds offered by a bookmaker. Initially he may be lucky, but over the long term the mathematics would conspire against him, leaving him at a loss, the r ove equa still happ e is achi ions will his know vent occu nany punt are prep und. For l de a mist this disa

Typi

With ently high e, in parti sible outc d on thes may go a ues. Cons tball coup

Table 3.2. Typical fixed odds for 10 Premiership matches

Mat	Home	Draw	Away	Overround
Ars				
Birr	2.3	3.2	2.7	111.8%
Blac	2.1	3.25	3	111.7%
Che				
Lee				
Live				
Mar	1.66	3.4	4.5	111.9%
Nev				
We				
We				

Calculating the overround for any book is a simple task of summing the inverse of the home, draw and away odds and multiplying by 100%. Here, the inverse of the decimal odds for one result, of course, is the bookmaker's estimation of the probability of that result occurring, after manipulation to include his advantage. It is not initially obvious whether the bookmaker has focused more of his expected profit margin on one of the results, or has spread it more evenly over the three, since the overround only provides a measure of the bookmaker's expected return for the book. For now we will assume the latter, although a strong case (presented in Chapter 8) can be made for the alternative. Accordingly, the bookmaker's estimations for the chance of each result occurring are shown in Table 3.3, in conjunction with what the bookmaker must have initially considered the true (fair) chances to be, that is before he has built in his profit margin.

Table 3.3. Bookmaker's unfair and fair estimations for 10 Premiership matches

Match	**Bookmaker's unfair estimations**				**Bookmaker's fair estimations**		
	H%	**D%**	**A%**	**Total%**	**H%**	**D%**	**A%**
Arsenal v Tottenham	65.4	28.6	18.2	112.1	58.3	25.5	16.2
Birmingham v Fulham	43.5	31.3	37.0	111.8	38.9	28.0	33.1
Blackburn v Everton	47.6	30.8	33.3	111.7	42.6	27.5	29.8
Chelsea v Middlesbrough	58.1	31.3	22.2	111.6	52.1	28.0	19.9
Leeds v Bolton	66.7	28.6	16.7	111.9	59.6	25.5	14.9
Liverpool v Sunderland	73.5	25.0	13.3	111.9	65.7	22.3	11.9
Man City v Charlton	60.2	29.4	22.2	111.9	53.8	26.3	19.9
Newcastle v Southampton	62.1	29.4	20.0	111.5	55.7	26.4	17.9
West Brom v Aston Villa	38.2	33.3	40.0	111.5	34.2	29.9	35.9
West Ham v Man Utd	25.0	30.8	55.6	111.3	22.5	27.6	49.9

Of course, whether the bookmaker's idea is accurate about what exactly the true chance of a particular result occurring is, is open to debate by his customers. If both parties disagree, there may be an opportunity for the punter to make a profit, provided he is more accurate in estimating the true chance of an outcome than the bookmaker. Nevertheless, it is worth noting that the average percentages for the bookmaker's fair estimations for the home wins, draws and away wins across the 10 matches are 48.3%, 26.7% and 24.9% respectively, very similar to the long-term average spread of home wins, draws and away wins for the English Premiership. On average, then, this bookmaker must be doing something right.

DOWNLOAD FULL VERSION HERE: https://bettingbooks.org/8

Finally, it is a simple procedure of inverting the fair estimations to calculate what the bookmaker considers to be the fair odds. These are shown below and ...aker. Novi ...ker's actu...

Table ...

Mat...	...way
Arse...	...17
Birm...	...02
Blac...	...35
Chel...	...02
Leec...	...71
Live...	...39
Man ...	...03
New ...	...58
Wes...	...79
Wes...	...00

Othe... ...case that ...nt or one ...rrect scor... ...ch to bet. ...30 to 160... ...nt to cons...y, no matt... ...odds of 5/... ...n the book... ...sible to pl... ...ain a profi...

To s... ...otect the b... ...west odds ... an unfa... ...esult in a ... less pers... ...than

[11] It is also worth noting that approximately 10% of games in the English Premiership finish 1-0.

they might be in the 4/6 odds available for the Manchester City home win. A payout of £5, instead of 66 pence, for a £1 stake will always look more attra ately mea even thou

In c here there 2.5 goal the sam s for total odds mak hide behi close to 5(per cent

Table

Mat			und
Ars			%
Birr			%
Blac			%
Che			%
Lee			%
Live			%
Mar			%
Nev			%
We			%
We			%

Punt to a mini ties. Asia low over tting and nd in fact offer exce tting in Ar nave som 103

[12] In a total goal options, with 3, 4 and sometimes more available.

or 104%. With such opportunities available across the Internet, it is a wonder that many punters still enjoy a visit to their local high street book tball gam s the lure

Dou

At th the over all, frequ lator bets t on the et us cons

Table

Mat			
Hor			
Dra			
Aw			

Match 1 = Arsenal v Tottenham
Match 2 = Birmingham v Fulham

The sible doub am, Arse raw, Drav and Totte sed). Tabl he 9 poss s are show

Table 3.7. Bookmaker's estimations for a double

Mat				
H%				
D%				
A%				
Tot				

Match 1 = Arsenal v Tottenham
Match 2 = Birmingham v Fulham

The book cons inde whe Fulh acc two 1.12 over folds Can over punt incre of ar

Of c the anal to o the a that matc accu pock gene sing doub Cha

Table 3.8. The effect of overround on profit[13]

Typ bo						oss rofit
Sin	1.91	2.10	110.0%	0.91	1.10	4%
Dou						4%
Tre						9%
4-f						4%
5-f	25.36	40.84	161.1%	24.36	39.84	9%
6-f						1%
7-f						0%
8-f						5%
9-f	336.85	794.28	235.8%	335.85	793.28	7%
10-						5%

Find

Onc ning
the b are
unfa ound
impo in at
fixed kers,
parti ces,
estin rofit
marg

Neve e, in
the s nple
laws lette
and on a
Euro how
can the
worl nces
are, the
book

Unfo and
expe rket,

[13] After the 12Xpert: http://members.aol.com/the12Xpert/

and a familiarity with the way bookmakers set their odds. The good news, however, is that whilst bookmakers are very good at setting odds for spor very glari ut a mon 00/1 on F the oper n at Kuus ying com n in prev er to 10/1 won, and Cup there aller prici nt of gam

Punt tting "kno sing ratin nes. This pend hour n as muc iews abou hers base lying on a are punt bing to or

Ther tely, the rofit. How ding "valu that estin the impc ners, not beat Sunc g on Sunc cted Livel nply, are t

This analysis is confused because the punter has failed to assess Liverpool's chance of a win in probabilistic terms, but instead rather simply by w t win all th The impo true char airly (in h ed it to be n the punt tting valu r, of cour

A va dog, or p t win (und s. A valu with a 15 spite belie e fair odds er is right land each s. By cont . He migh does the b aker has t the valu

Sinc ay to beat , but if he t be enou t the appl one. The bout findi profit with the book odds the b and estal so or just bout unde of a

sporting win, and there may be profitable opportunities waiting at the bookmakers. As Geoff Harvey says in his book *Profitable Football Betting*, "Find

Com

One ch a
punt The
coro er of
book rting
outc aker
with are
crea treet
book irms
with

Toda ernet
book haps
100 ith a
new with
man £20.
Freq und.
Ever here
you onal
book

The etter
than odds
have hem.
Neve the
next. hest
price 3.9a,
3.9b and
Crys

---

[14] Per major
sporti often
super s and
layers of bets. The exchange then deducts a small commission, usually 5%, from winning bets.

Table 3.9a. Variation in bookmakers' prices: odds

Bookmaker	Odds		
	Home	*Draw*	*Away*
Canbet	2.04	3.2	3.6
BetInternet	1.9	3.25	3.5
Centrebet	1.88	3.4	3.75
Gamebookers	1.88	3.35	4.05
Bet&Win	1.85	3.15	3.75
Internet1x2	1.85	3.25	3.75
Interwetten	1.85	3	3.7
Paddy Power	1.8	3.4	3.75
Eurobet	1.8	3.25	3.85
Sportingbet	1.8	3.3	4
Expekt	1.75	3.3	4.1
Bet 365	1.727	3.5	4
Average	1.826	3.286	3.856

Table 3.9b. Variation in bookmakers' prices: estimations

Bookmaker	Bookmaker's unfair estimations			Overround		Bookmaker's fair estimations[15]		
	Home	*Draw*	*Away*	*Decimal*	*%*	*Home*	*Draw*	*Away*
Canbet	49%	31%	28%	1.08	108%	45%	29%	26%
BetInternet	53%	31%	29%	1.12	112%	47%	27%	26%
Centrebet	53%	29%	27%	1.09	109%	49%	27%	24%
Gamebookers	53%	30%	25%	1.08	108%	49%	28%	23%
Bet&Win	54%	32%	27%	1.12	112%	48%	28%	24%
Internet1x2	54%	31%	27%	1.11	111%	48%	28%	24%
Interwetten	54%	33%	27%	1.14	114%	47%	29%	24%
Paddy Power	56%	29%	27%	1.12	112%	50%	26%	24%
Eurobet	56%	31%	26%	1.12	112%	49%	27%	23%
Sportingbet	56%	30%	25%	1.11	111%	50%	27%	23%
Expekt	57%	30%	24%	1.12	112%	51%	27%	22%
Bet 365	58%	29%	25%	1.11	111%	52%	26%	22%
Average	55%	30%	26%	1.11	111%	49%	27%	23%

In Table 3.9b, each bookmaker's assessment of the true chance of a home win, draw and away win has been calculated by dividing each of the

15 The sum of the average fair estimations equals 100%, although due to rounding this is not quite the case in Table 3.9b.

bookmaker's actual (unfair) estimations by their decimal overround for the book. By assuming, firstly, that a bookmaker's overround (or advantage) is spread proportionally across each result, and secondly, that the average of all bookmakers' fair estimations represents a close approximation to the true chances,[16] it becomes possible to determine a more realistic value of a bookmaker's expected profit margin for each home, draw and away odds, or rather, what we should predict it to be based on this comparison analysis. These values are shown in Table 3.10.

Table 3.10. Realistic profit margins for the bookmaker on home, draw and away odds, based on an odds comparison analysis

Bookmaker	**Realistic value of bookmaker's profit margin**			**Edge**		
	Home	*Draw*	*Away*	*Home*	*Draw*	*Away*
Canbet	-0.4%	14.2%	18.5%	1.004	0.875	0.844
BetInternet	7.0%	12.5%	21.9%	0.935	0.889	0.821
Centrebet	8.1%	7.5%	13.7%	0.925	0.930	0.879
Gamebookers	8.1%	9.1%	5.5%	0.925	0.916	0.950
Bet&Win	9.9%	16.0%	13.7%	0.910	0.862	0.879
Internet1x2	9.9%	12.5%	13.7%	0.910	0.889	0.879
Interwetten	9.9%	21.8%	15.3%	0.910	0.821	0.868
Paddy Power	12.9%	7.5%	13.7%	0.886	0.930	0.879
Eurobet	12.9%	12.5%	10.8%	0.886	0.889	0.903
Sportingbet	12.9%	10.8%	6.6%	0.886	0.903	0.938
Expekt	16.2%	10.8%	4.0%	0.861	0.903	0.961
Bet 365	17.7%	4.4%	6.6%	0.850	0.957	0.938

Canbet offered odds of 2.04 for a Norwich home win, or a win expectancy of 49.0%. Since the average fair estimation for this result across the 12 bookmakers was 49.2%, these odds may realistically offer a very small edge[17] to the punter. Whether or not this edge is real is dependent upon the validity of the two core assumptions used for this odds comparison

[16] Although the true chance of a sporting result can never be known exactly, it is surely reasonable to assume that the common view of a number of bookmakers will frequently provide a close approximation to this value, provided a common error in the pricing assessment has not been made.

[17] The *edge* here may be defined quantitatively as the true chance of a result divided by the bookmaker's expectancy of this result, with his profit margin built in. It provides an accessible measure of a punter's expectation to make a profit. Where the edge is over 1, the bet is a value bet and is potentially a profitable one, according to the analysis that went into determining it in the first place. An equivalent and simpler means of calculating it is to divide the bookmaker's odds by the fair odds.

analysis. If correct, and the match was played 1,000 times, a punter could reasonably expect to profit by nearly £4 from 1,000 £1 stakes. Not much, one rast, takir y for betti ison anal the book sual 11 o

Ther ning leng nt to bet c

Betb Tip-e Odd Betb

Betb the hypc n an odds this type

A pu form any g an odds and it is from arith that unde nese assu

read that r of the bookmakers frequently represents a close approximation to the "true" price.

Of c of a spor irely

substantiated. However, it is probably the first assumption that will have the greater influence, at least from the perspective of trying to profit from this [illegible]y by inve[illegible]

Fron[illegible]0/01 seas[illegible]th at least[illegible] to a typic[illegible]kers. Drav[illegible]aker was[illegible] the book[illegible] the data[illegible] had "valu[illegible]alue" hom[illegible]

The[illegible]f the grea[illegible]nore corre[illegible]e up of av[illegible]kers are[illegible]f the three[illegible]o so may[illegible]ok's total[illegible]is of the i[illegible] this migh[illegible]asily with[illegible]lysis fails[illegible]ross hom[illegible]at he has[illegible]

A le[illegible]ove. The[illegible]ison anal[illegible]ount bet ([illegible]11% that[illegible]aker,

[18] A p[illegible]5/1. In actual[illegible] for a winnir[illegible] less important than for a move from evens to 8/11.

but hugely uninspiring, given that the analysis model had predicted a profit of +6% (since the average edge of each bet was 1.06). However, upon further inspection, we can see exactly where the problems have arisen. Breaking the sample into home wins and away wins reveals the relatively poorer performance of the away win prices. Since these make up 84% of the total sample, this has obviously dragged down the overall performance. More crucially, a breakdown according to the betting price reveals that the best performing bets are those with the lower odds. Bets (whether home or away) where the odds were less than 7/2 actually returned a profit of nearly 1%. Including additional wagers up to (but not including) odds of 6/1 restricted the loss to only 3.4%, compared to a loss of 14.3% for odds 6/1 and above. This was despite the average edge for odds 6/1 and greater being over twice as large as that for the lower odds group. Clearly, although this odds comparison model is predicting a better performance for the higher prices market, this is not actually happening. The most rational explanation for this is that bookmakers are introducing a much greater profit margin into their higher prices than could have been initially predicted on the basis of the overround for each book. Why? Partly to limit liabilities on the bigger payout, and partly because he knows the punter won't know or care. It may come as no surprise, then, that the majority of so-called value bets found by Betbrain and Tip-ex with this analysis involve fairly high prices. Many of these, clearly, will actually contain no value at all.

Table 3.11. A profit analysis for arithmetic value betting, European football league matches 2000/01

	Number of bets	% of total bets	Average odds	Average edge	Level stakes profit	Profit over turnover
Home wins	364	16%	4.05	1.05	-17.5	-4.8%
Away wins	1982	84%	6.16	1.06	-127.2	-6.7%
All bets odds <7	1636	73%	4.57	1.05	-56.0	-3.4%
All bets odds ≥7	620	27%	9.13	1.11	-88.8	-14.3%
All bets odds <3.5	308	14%	2.92	1.03	+2.8	+0.9%
All bets odds ≥3.5	1948	86%	6.28	1.07	-147.6	-7.6%
All bets	2256	100%	5.82	1.06	-144.7	-6.4%

Arbitrage

Over BOOK PREVIEW al to help nore accu ound acro able retur at a profi

From BOOK PREVIEW have seen draw and a bet can hree book teed what king the over said to b age, sure

Cons BOOK PREVIEW and Irela ning fixed

Table BOOK PREVIEW

Bookmaker	Home win	Draw	Away win
Canbet	2.39	3.15	2.89
Centrebet	2.3	3	2.85
Tattersall's	2.45	3.15	2.75

BOOK PREVIEW

The es is 4.9% the draw and Canl ly in resp odds leng

BOOK PREVIEW

BOOK PREVIEW

Table 3.12b. Shifted prices for Greece v Ireland

Boo			
Car			
Cer			
Tatt			

Now and
Canl With
appr utlay
of £9 may
be s erred
stan

Table

Boo			
Bes			
Stal			
Pro			
Los			
Ove			

Natu e is
relat the
gene ough
over book
in a 100 or fewer is overbroke and capable of yielding an arbitrage
oppo ents
avail nber
of su

Arbit the
punt mes
risk- even
arbit g so
is p are
num o eat
into

The first issue to consider with arbitrage betting is stake size. The majority of arbitrage opportunities are limited to only a few per cent at best. Cons able profi was requ akes woul nt a prob h to plac first diffic num size rger than nple, may y to disc the draw f the matc atch finis

Perh ts of depc ction cost r of inter can amo tage profi rofit that t the num take sizes le to bene niest of pu nline acco 1 or 2%, m at leas nline acco niest punt extra pour

A fu Most onlir nds, US aller book ency usec rs, a

very careful calculation of currency conversion will be required to ensure that the appropriate stakes are used to secure the arbitrage profit. Of cour akes mad can eat i

Fina rtain circu few days d on thes and conc and reop riate to le n be left v ffers a dif rage may

Ever ke in the p rage oppc 10% retur ome alon vant book extra mon hted here nefit repe ome.

Sinc ased activ their accc ase. Sinc own, and ating large ng a subs

Qua

Valu uring
a lor w all
odds aker
may may
inves y for
an a tting
edge s, or
ratin

As v ls or
roule ever
be c say,
howe g or
pred and
prefe uries
list, ning
even edge
of ea long
term and
effec g an
asse the
iden

A nu odds
spor most
effec both
quar ch a
punt able,
with ne of
the ould
cons ather
may and

[19] A r effect on the outcome of another leg. Bookmakers do not permit such bets.

cricket, which are permissible by the bookmaker but provide an obvious and significant advantage to the punter. Derek McGovern takes us through som nis, snoc their work and the ol in valu

Ana

The each resu ce of throv ction arise nber of ra d its posit ces, som key dete ce of any n for an n ng it man nt to this ed it from

Defi vent, how ever, is a completely different ball game, if you will pardon the expr ession, because there are so many key influencing factors that dete at is not t nber of va ation impo irical obse the poss each resu er of time ults. Of the impo unter intui two play vant

point in this context, however, is that such descriptive analysis can be used quantitatively to estimate the probability function that characterises each

n as ratin

Prior

nd's Rugl

mes. With

th of the s

night still

basic assu

the likeli

land wins

% of their

ould pred

Of c

land enjo

land win

rical reco

mes prev

993, 1983

enue prior

nore favo

the bette

nt. In the

New Zeal

that prob

nt to draw

past infor

es of a pa

sult. Rem

vent, we

one wort

Of c

n or anot

have seen

the

[20] On

away from home soil.

recent strength and confidence of the English side, were far more influential in determining the result than the historical head-to-head record. Neve ports betti s an exce n the basi y to gain ding bette urate forec

Som

A rat ority of o Such supe ects of p acks cont had over ings mod s 15 diffe atch pred y is calc for a forth side from oints ratin ance invol uses eithe ored, whils stics inclu such data

For ck in time head reco ctory over ch in 200 been play y, 1 defe d-to- head ce of

victory, higher than both the original probability estimates that were based on the full head-to-head record extending back to 1905.

Of c head perfc few matc may have ther. Und little relev mes, and half this was in th ome a big the lowe head ratin likely outc

For f the oppc for exan the two nder exan er it is sc t the lowly the wort m it was ount for l aker side win, 3 lo ather unim been agai stle, one m in their been agai Vest Bron

A us the *Rate* the oppc This syste *yers*,

which in turn was adapted for UK football by Tony Drapkin and Richard Forsyth in their book *The Punter's Revenge*. As football matches are play Bill Hunt form are t

1. rrent
2. nt at
3. kitty;
4.
5.

Typi l 5% of th ages repre und, so if . For each s for othe ating prov ne of matc

Man ham City, atch is +1 te of the l on is mad will intui ould be e 188 poin (36 poin llect the 1 ints.

Ther ints. Whe will rece way from side, more nefit. Man (188

points minus 152 points). Birmingham's rating, by contrast, increases by 152 points after a win (188 points minus 36 points). This is because Manchester United have so much more to lose than Birmingham City, since United at Old Trafford are expected to win this game. If drawn, Birmingham will still collect 58 points overall (94 points minus 36 points), whilst United will lose 58 points (94 points minus 152 points). An away draw is proportionally better than a home draw, particularly if the home side is rated more strongly. In this way, a team's rating at any point in the season provides a reflection not just of the number of games it has won, drawn or lost, but also of the strength of the opposition it has beaten, drawn with or lost to. Ratings may also be carried forward from one season to the next, allowing forecasts to be made at the beginning of each season, a feature not available in many recent form rating systems.

Ratings and Probability

Once a set of ratings for a match has been calculated, the next step is to estimate from them the chances of each result occurring, from which betting predictions can then be made. To achieve this, a match rating must in some way be translated into a probability distribution for the possible results in a sporting contest. For England's record against the All Blacks Rugby Union side, this was an obvious and simple procedure, following the assumption that the percentage of historical England wins would provide an estimate of the likelihood of the next win. For more developed rating systems, it becomes necessary to analyse an awful lot of historical data. The following paragraphs describe, for a recent goals superiority rating system, how this may be accomplished.

Goal difference provides one measure of the dominance of one football side over another in a match. The assumption for a goals superiority rating system, then, is that teams who score more goals and concede fewer over the course of a number of matches are more likely to win their next game. That is to say, their match form, in terms of scoring and conceding goals, is potentially better than those teams with a lower rating by this reckoning. The number of past matches for which a goals superiority rating may be calculated is not entirely arbitrary, requiring a judgement by the punter on what constitutes the best choice for the number of matches to describe recent form from the perspective of determining the best forecasting model for match prediction. Of course, without running the analysis several

times, the best choice can only be guessed at. To save us time, Paul Steele, in *Profitable Football Betting*, has indicated that using the 6 most rece… the mos… 3, 4 and 5 football matches. The reader may wish to review this for himself.

To s… the follo…/hite Hart… Lane, played on 24th November 2002. The last 6 matches for both sides…

Table 4.1: Recent form of Tottenham Hotspur and Leeds United

Mat…		
1	Arsenal 2:0 Tottenham	Leeds 2:4 Everton
2	Sunderland 2:0 Tottenham	West Ham 3:4 Leeds
3	Tottenham 0:0 Chelsea	Leeds 0:1 Everton
4	Liverpool 2:1 Tottenham	Middlesbrough 2:2 Leeds
5	Tottenham 1:1 Fulham	Leeds 2:1 Liverpool
6	Blackburn 1:2 Tottenham	Aston Villa 0:0 Leeds

In th… ed 9. With… irely unsu… d 11 goal… ority ratin… ng is simp… and for tl… pect a dra… ns of their… goal supremacy.[21]

Yet … we needn't just rely on intuition. Provided we have enough suitable data… we can translate this match rating into a home-win, draw, away-win prob… s for one… ok to see how frequently a match with a goals superiority rating of 0 finishes with a home win, a draw and an away win.

[21] Of … during their … a, but without recourse to a more powerful rating system like Rateform, which takes into account the strength of the opposition, we will have to ignore this factor.

Using results data for the English Premiership and Divisions 1, 2, and 3 for seasons 1993/94 to 2000/01, goal supremacy ratings based on the most recent 6 matches played by every team were calculated. Of the 16,272 matches played during these 8 seasons, 14,002 of them were eligible for a rating calculation, with the matches played in the first 6 rounds of each season obviously unsuitable for this recent form analysis. Of these games, 46.2% finished with a home win, 28.1% with a draw, and 25.7% with an away win. It is immediately apparent that playing at home offers an undeniable advantage, with close to half of all games ending with the visitors leaving empty-handed. Such an average home-win, draw, away-win results distribution is commonly reproduced in each English division season after season.

Table 4.2 shows the spread of goal supremacy match ratings for the 14,002 matches, and the number and percentage of home wins, draws and away wins for each rating figure. Of the games, 94% have a rating of between -12 and +12 and 51% between -5 and +5. Obviously, there are far fewer games with large rating values, either positive, indicating a dominant home side, or negative, where the away side is an overwhelming favourite. The precise distribution of games according to their match rating is shown in Figure 4.1. Anyone with a background in statistics will immediately recognise the shape of the histogram as an approximation of the normal distribution.

Table 4.2 Goal supremacy match ratings and historical result percentages

Match rating	No. of home wins	No. of draws	No. of away wins	% of total matches	% of home wins	% of home draws	% of away wins
-26	0	1	1	0.01%	0.0%	50.0%	50.0%
-23	0	0	2	0.01%	0.0%	0.0%	100.0%
-22	0	0	3	0.02%	0.0%	0.0%	100.0%
-21	0	2	4	0.04%	0.0%	33.3%	66.7%
-20	2	2	7	0.08%	18.2%	18.2%	63.6%
-19	1	1	3	0.04%	20.0%	20.0%	60.0%
-18	5	7	9	0.15%	23.8%	33.3%	42.9%
-17	7	9	12	0.20%	25.0%	32.1%	42.9%
-16	6	14	21	0.29%	14.6%	34.1%	51.2%
-15	25	12	19	0.40%	44.6%	21.4%	33.9%
-14	32	30	51	0.81%	28.3%	26.5%	45.1%
-13	43	38	58	0.99%	30.9%	27.3%	41.7%
-12	51	50	64	1.18%	30.9%	30.3%	38.8%

Match rating	No. of home wins	No. of draws	No. of away wins	% of total matches	% of home wins	% of home draws	% of away wins
-11	75	54	91	1.57%	34.1%	24.5%	41.4%
-10	84	94	91	1.92%	31.2%	34.9%	33.8%
-9	123	91	112	2.33%	37.7%	27.9%	34.4%
-8	171	113	124	2.91%	41.9%	27.7%	30.4%
-7	190	121	170	3.44%	39.5%	25.2%	35.3%
-6	242	202	191	4.54%	38.1%	31.8%	30.1%
-5	279	212	197	4.91%	40.6%	30.8%	28.6%
-4	293	219	215	5.19%	40.3%	30.1%	29.6%
-3	374	246	229	6.06%	44.1%	29.0%	27.0%
-2	372	233	214	5.85%	45.4%	28.4%	26.1%
-1	375	251	222	6.06%	44.2%	29.6%	26.2%
0	414	259	235	6.48%	45.6%	28.5%	25.9%
1	412	243	212	6.19%	47.5%	28.0%	24.5%
2	401	220	189	5.78%	49.5%	27.2%	23.3%
3	395	224	175	5.67%	49.7%	28.2%	22.0%
4	391	177	137	5.03%	55.5%	25.1%	19.4%
5	297	180	102	4.14%	51.3%	31.1%	17.6%
6	260	146	131	3.84%	48.4%	27.2%	24.4%
7	236	98	83	2.98%	56.6%	23.5%	19.9%
8	197	94	56	2.48%	56.8%	27.1%	16.1%
9	158	86	32	1.97%	57.2%	31.2%	11.6%
10	125	57	42	1.60%	55.8%	25.4%	18.8%
11	113	34	33	1.29%	62.8%	18.9%	18.3%
12	90	30	22	1.01%	63.4%	21.1%	15.5%
13	61	23	17	0.72%	60.4%	22.8%	16.8%
14	48	15	11	0.53%	64.9%	20.3%	14.9%
15	38	21	8	0.48%	56.7%	31.3%	11.9%
16	30	9	2	0.29%	73.2%	22.0%	4.9%
17	20	8	2	0.21%	66.7%	26.7%	6.7%
18	15	1	1	0.12%	88.2%	5.9%	5.9%
19	8	4	1	0.09%	61.5%	30.8%	7.7%
20	5	1	0	0.04%	83.3%	16.7%	0.0%
21	1	0	0	0.01%	100.0%	0.0%	0.0%
22	1	0	1	0.01%	50.0%	0.0%	50.0%
23	1	0	0	0.01%	100.0%	0.0%	0.0%
27	1	0	0	0.01%	100.0%	0.0%	0.0%
Total	*6468*	*3932*	*3602*	*100.00%*	*46.2%*	*28.1%*	*25.7%*

Figure 4.1. Percentage of games with each match rating

The ating
of 0 % of
gam the
grea % of
the t ution
of hc 3%),
is ve

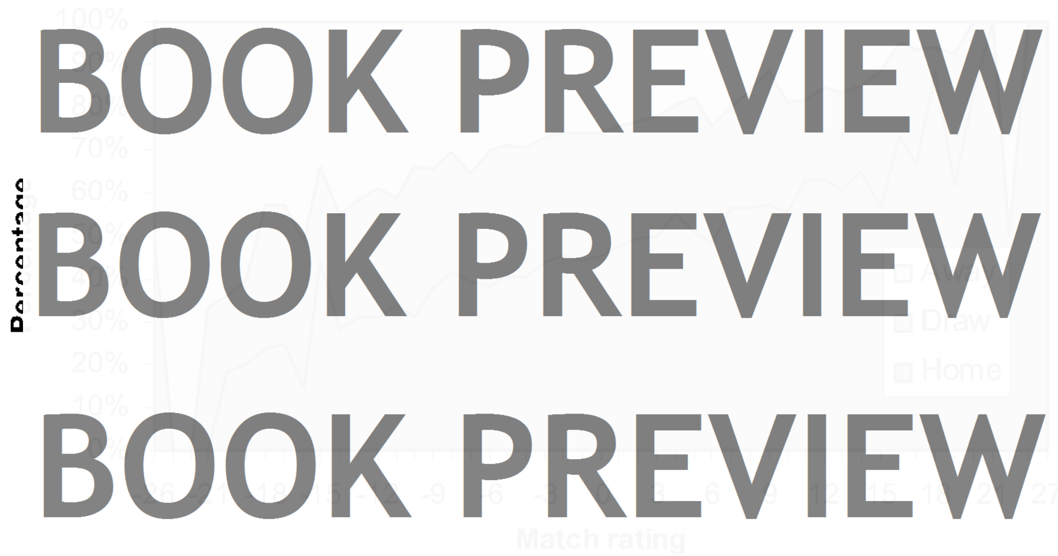
Equi the
likeli am–
Leec ates
Totte use,
of th ame
ratin ding
expe

Sinc atch
ratin esult
for a ason
in or ating
of +1 win,
whils 39%
expe gher
the r , the

lower the rating, the greater the chance for an away win. It is initially not obvious how the match rating influences the likelihood of a drawn game.

But what about a rating of +15? Surely one might expect the chance of a home win to be greater than that for a match rating of +12, and yet only 57% of games rated +15 finished with such a result. Similarly, only 34% of games rated -15 finished with an away success. Of course, these discrepancies arise because the relationship between the match rating and the home-win, draw, away-win probability distribution is inherently "noisy" and imperfect – we have only so much historical data with which to work. Such discrepancies become more apparent for the extreme ratings for which, owing to the limited amount of match data, one or two results have a much greater influence on the results probability distribution, as illustrated in Figure 4.2. To accommodate this variance, we need to standardise our forecasting model. By doing so, we can then make a practical attempt at defining the fair odds for a football game.

Figure 4.2 Results distribution by match rating (data from Table 4.2)

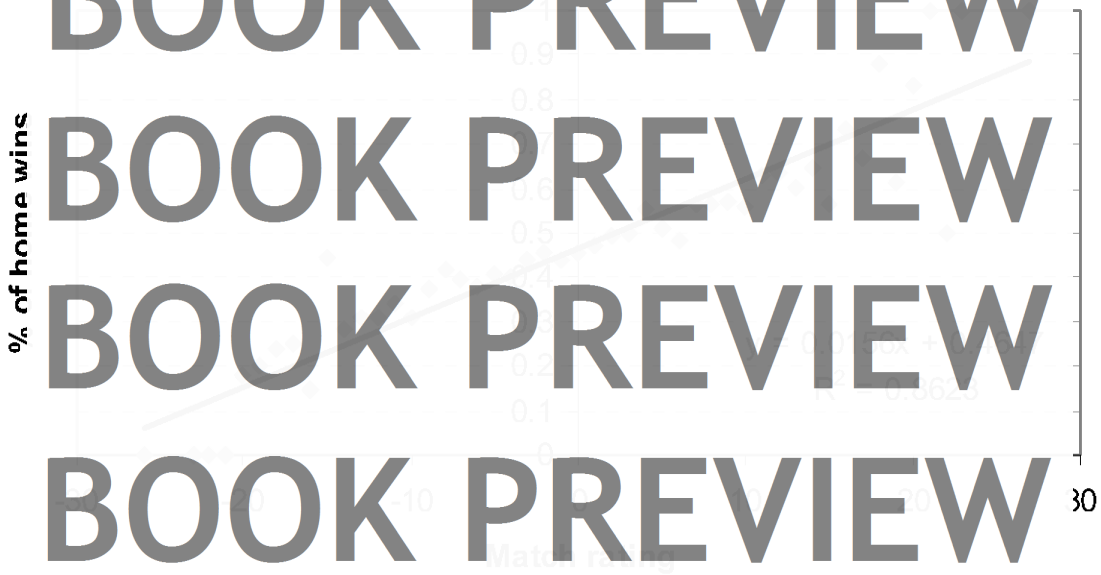


Defining the Fair Odds

The first task is to consider each result independently, and identify the "best-fit" relationship with the match ratings. The easiest way to determine this best-fit relationship is to redraw the graph in Figure 4.2 as three scatter plots, one for each result, as shown in Figures 4.3 to 4.5. For each scatter plot, the best-fit line has been superimposed on the data points,

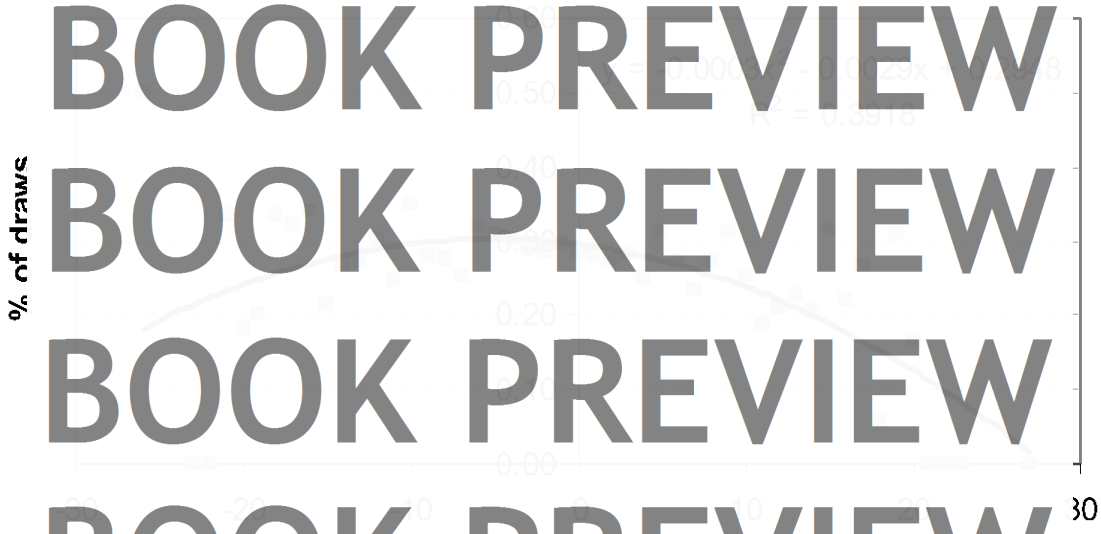
representing what would statistically be considered to be the best relationship between match rating and result probability, graphically illust

Figur



Figur

Figure 4.5. Draws distribution by match rating (data from Table 4.2)



The with
appr own
for e esult
occu atch
ratin ight-
line and
draw the
ideal uded
in ea ognise
thes e left
cold l the
work veen
matc are
simp esult
as a n for
each / the
real hip is
denc veen
the r f the
varia s, by

contrast, the relationship is much weaker. As much as 62% of the variation in the draws data cannot be described by this ratings model.[22]

Wha sider
the r win.
The

whe ction
of 1, mine
the have
calc ame,
whe 4647
or 46 se to
the p ome
win st-fit
relat 523).
The l the
infor y for
othe), for
exan one
rate l we
nee

With efine
the f ntly,
the f , are
2.15 draw
in th aws,
altho d be
ques larly
for d fact,
neve , we
can for a
sele 2.15,
3.39

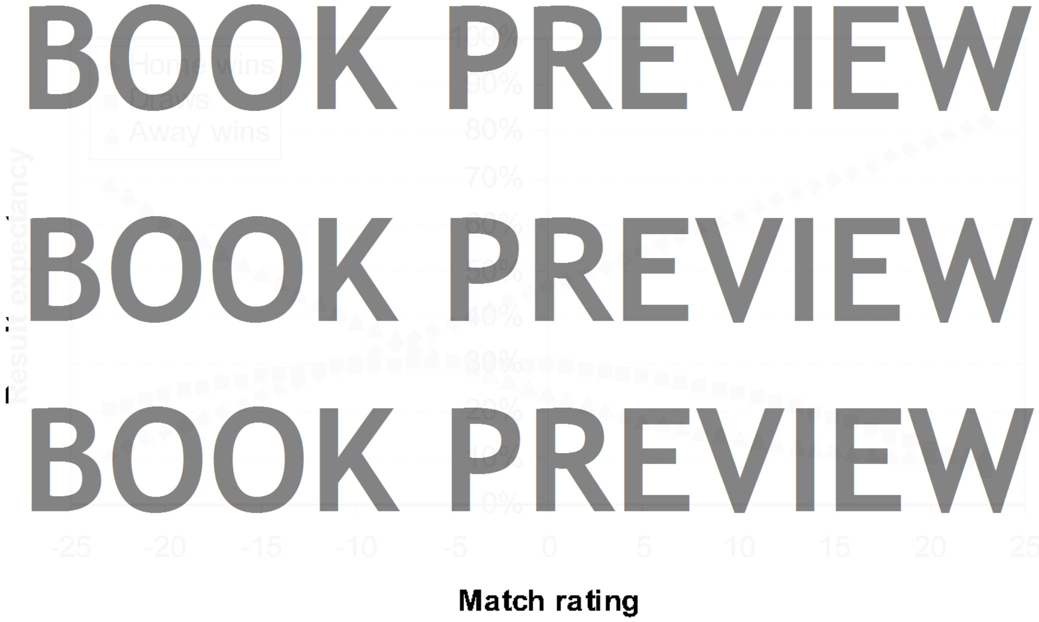
[22] Pur is no surprise, therefore, that the pools are based entirely around their prediction.

Table 4.3. Calculation of fair odds from the ratings model

Match rating	Home expectancy	Draw expectancy	Away expectancy	Total	Fair home odds	Fair draw odds	Fair away odds
-16	22%	26%	52%	100%	4.65	3.78	1.94
-14	25%	28%	47%	100%	4.06	3.62	2.11
-12	28%	29%	43%	100%	3.60	3.49	2.31
-10	31%	29%	39%	100%	3.24	3.40	2.54
-8	34%	30%	36%	100%	2.94	3.35	2.80
-6	37%	30%	32%	100%	2.69	3.32	3.09
-4	40%	30%	29%	100%	2.49	3.32	3.42
-2	43%	30%	26%	100%	2.31	3.34	3.80
0	46%	29%	24%	100%	2.15	3.39	4.23
2	50%	29%	21%	100%	2.02	3.47	4.71
4	53%	28%	19%	100%	1.90	3.59	5.25
6	56%	27%	17%	100%	1.79	3.75	5.84
8	59%	25%	15%	100%	1.70	3.96	6.49
10	62%	24%	14%	100%	1.61	4.24	7.17
12	65%	22%	13%	100%	1.53	4.61	7.86
14	68%	20%	12%	100%	1.46	5.12	8.51
16	71%	17%	11%	100%	1.40	5.83	9.08

We could of course plot this information graphically, as in Figure 4.6. This only confirms the shape of the regression curves in Figures 4.3 to 4.5, as described by the 3 regression equations. The data in Table 4.3, of course, are based on those equations.

Figure 4.6. Idealised match prediction curves for goal supremacy ratings



Onc iest.
By c mine
whet s are
supe ided
that nore
appr e the
book d is
offer / fair
odds one
shou esult
expe alue
betti edict
the r s, we
mus nk of
the c n as
simp

Unfc cing
foott ting,
parti ntly,
the t of
infor ggle
to dc f the
singl the
majc

Let Odds
from

Table 4.4. Odds for Tottenham v Leeds

Boo			
Bet			
Gar			
Inte			
Lad			
Spc			
Spc			
Will			

Recall that our fair odds, as estimated by the goal supremacy forecast model, are 2.15, 3.39 and 4.23 for the home win, draw and away win resp ey in the h r the draw tion, a pu ould also

At 2 %.[23] Assu / are offer eeds have hilst Totte del, howe way win, the spoil age, and as it happ

Befo nber that e to be 5 this, the g n for Leec it is alwa g an appa have won each time s.

Bac

Befo d be teste ed a valu ides no r any syste , for

[23] 2.2/2.15 (bookmaker's odds divided by fair odds) = 1.023

example over the course of a full season, and preferably before any real money is introduced.

Tabl the rece s for Engl ,746 gam usly ineli ed. It migh d for betti hich their e of unce l or med n in Figu erent matc n of aver kers is m

Table odel, home wins

	ome ins
Num	46
Profi	.76
Yield	2%
Profi	20
Yield	3%

The ge is omit s the atter is all abou bout max nds, expl pt of yield may unde tlay, expr

The take the best odds, our rating system returns a profit. This is limited to a 2.10%

yield for all ratings, but becomes progressively higher for the more restricted ranges. For matches rated between -2 and +2, over £1.10 is returned for every £1 stake. This compares to a -3.73% return betting on every home win, and -8.12% if only the average odds are taken.

Unfortunately, the record for away wins (Table 4.6) is not as successful. In fact, it performs significantly worse than if a punter simply bet on every away win blindly, where he may expect to lose by the equivalent of the bookmaker's overround.

Table 4.6: Profit analysis for the goal supremacy match ratings forecast model, away wins

	All ratings	Ratings -10 to +10	Ratings -5 to +5	Ratings -2 to +2	All away wins
Number of bets	407	332	217	98	1746
Profit from average odds	-95.55	-109.62	-90.27	-43.77	-295.46
Yield from average odds	-23.48%	-33.02%	-41.60%	-44.67%	-16.92%
Profit from best odds	-61.01	-82.47	-72.90	-38.00	-178.49
Yield from best odds	-14.99%	-24.84%	-33.59%	-38.78%	-10.22%

It is entirely plausible that the inherently greater uncertainty attributed to the away win forecasting equation may account for its failure to offer a profitable forecasting model. It should be remembered that the best-fit equation for the relationship between match rating and away win expectancy failed to account for as much as one quarter of the variability in the historical results. For the home wins relationship, this was only one eighth. Also feasible is the proposition that the away win betting record for the 2001/02 season was anomalous, and unrepresentative of a longer-term perspective. Remember, the ratings equations used to predict results from the 2001/02 season were developed from data that did not include results from that season. Of course, the converse may be true of the home wins record, which may have outperformed itself during the season under investigation. Unfortunately, this is just speculation, verifiable only by increasing the length of the betting record to 2 or even 3 seasons.

Perhaps the most likely but least palatable indication is that this rating system simply fails to offer a successful and profitable forecast model for match prediction. This is not to say that the analytical methods reviewed in this chapter are unsuitable, rather that we might actually need to find a better system of rating matches. Many rating system models, the goal

supremacy forecast model included, may simply be replicating what we, and more importantly the bookmaker, already know, making it unfeasible to b ssful betti nd a forec sults than , for it es . To acc any quar tudy of a ot to plac

Befo awn to th ting, that that the tting resp s for the b pical singl apter 3 tha win price add furth or a favo cting a be , we can less of a that a su etter oppo

Why

Spor nce, and nent, amo With the e ation is cc ose, and ense that

Look f the follo ften cons t, by cont ning chap sting are r nake mon real diffe inks abou k all the t onal finar d by each ough spor this divis nters man

Rath etter to in ding more bout it. C ng a char sses of id rally char s.

1.
2.
3. What is the chance of the hazard occurring?

4. Can the risk level be reduced?

Fron will face nore fami the char the prob case scen cing it. If we know how likely we are to lose all of our betting funds, we can choc s the proc

With that in mind, there are 3 important principles that are fundamental to ansv t no unne you want to win, but rather, only what you can afford to lose. Unlike many life-impa onal diver cess shou seek to ta ng – more book atter and judg y for fixed been ansv e the bene orts betti and man tially be a

Aspects of Risk Management for Sports Betting

Seri n the sens ng a posit plain Engl ome Asia lves a ful k all of one's available bankroll on just one wager. Instead, the gambler

spreads the risk across a series of bets, with each stake a small proportion of the total funds at his disposal.

For ated risky edge for than £1,0 sian hanc ses. Neve (P), expr e (s) and wing equa

Put one expe ount that rting figur ction of 1. our profi e we have . On the c eater than

We low:

Just

Whe = 0.

[24] We ulated exactl ctively after many similar contests.

We can also express the profit expectancy instead as the return expectancy, R, where the return is just stake plus profit. Hence:

Whe ake;
whe ker's
odds eater
than ately
lose the
book

Wha have
posit le to
devi long
run sses
throu n the
long arge
loss line
is: b

With sport
betti irely
devo bout
his s ve or
bank from
pote n, is
reall

The

The ... nk or
bank ... has
beer ... ever
be m ... le to
set a ... on: *If*
I los ... the
answ ..., do
not g ...

Ever ... his
bank ... ter's
prefe ... be
inves ... take
as a ... after
eithe ... volve
less ... the
char ... one,
that ... ome
arou ... will
natu ... e is
acce ...

Trad ... s the
prim ... e by
spor ... e for
their ... son",
"288 ... are
just ... lent.
For ... ngful
infor ... akes
were ... swer
thes ... ield,
som ... over,
and ...

In fir ...ent, and ...age. In be ...fit to the ... over turnc ...urse, canr ... are paid ...uate cont ...ess. Furtl ...cycle profi ...itial betti ... the betti ...ess, beca ... the book ...nd if so h ...ples of va ...sion of be ...tage a pu ...gles, he h ...ch of thes ... the edge ...e be close ...n of £90(...dds. For ...s no coin ...ker's typic ...

The ...re of the s ...ngly, want ...g a spec ...s the punt ...d to anal ... the doub ...g his betti ... the gam ... the

[25] Since $\sqrt{1.10} = 1.0488$ and $\sqrt[3]{1.10} = 1.0323$

size that his stakes should be in order to realise his goal. From this, it is possible to assess his risks.

The for a
serie For
this ified
perc e, by
the t nitial
bank ime.
Perc s will
be e ed to
as le nple,
are has
an a

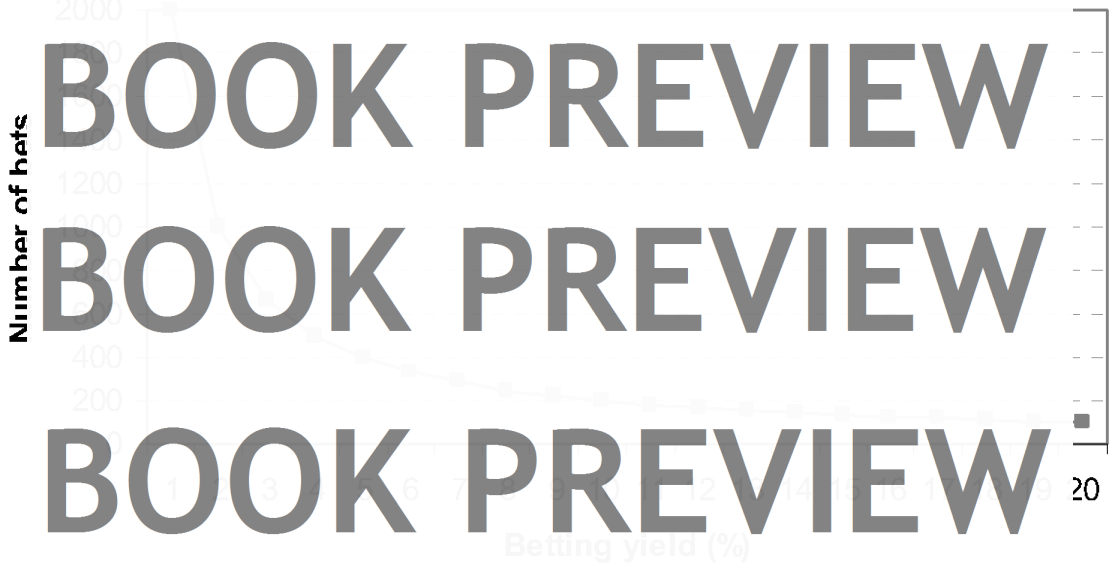
Table 6.1. Relationship between singles betting yield, level stake size and the numb

Yiel									
%	1	2	3	4	5	6	7	8	9	10
1										000
2										500
3										333
4	2500	1250	833	625	500	417	357	313	278	250
5	2000	1000	667	500	400	333	286	250	222	200
6										167
7										143
8	1250	625	417	313	250	208	179	156	139	125
9	1111	556	370	278	222	185	159	139	123	111
10										100
11										91
12										83
13	769	385	256	192	154	128	110	96	85	77
14	714	357	238	179	143	119	102	89	79	71
15										67
16										63
17										59
18	556	278	185	139	111	93	79	69	62	56
19	526	263	175	132	105	88	75	66	58	53
20										50

[26] The me, it will be £1, for others, £10, £100 or even £1,000.

It is clear from Table 6.1 that the number of bets required to double a bankroll increases as the betting yield falls towards zero. In fact the bet num level stak nber of be ated in Fi tting yield rsely prop ation desc r, N, stak re F denc d as a pe

Figur ith 5-point



Obvi an unsu any signi n. A succ e for ever ll be the s hilst thos lysis

does allow a successful value bettor to introduce an element of organisation and structure to his betting strategy, allowing him to predict his f the choi ne it will ting, quar ome of a can prov gers. Equi his strat

Qua

Stud here woul 100, mere n for takir r the size ce of "ban ong. Five ate a bank have affor will seen sing stak irely unac size may kely, exan

A bc wing tails an is for t m of 1,00 each wag time they a big risk w to winn that beca n 10 penc st be very take

him approximately 1,000 flips of the coin to reach the target. He will have to give up Sunday morning to accomplish the task, but for £100 he reck but prefe t, on the c n to the p one flip c ails, drink ke a char

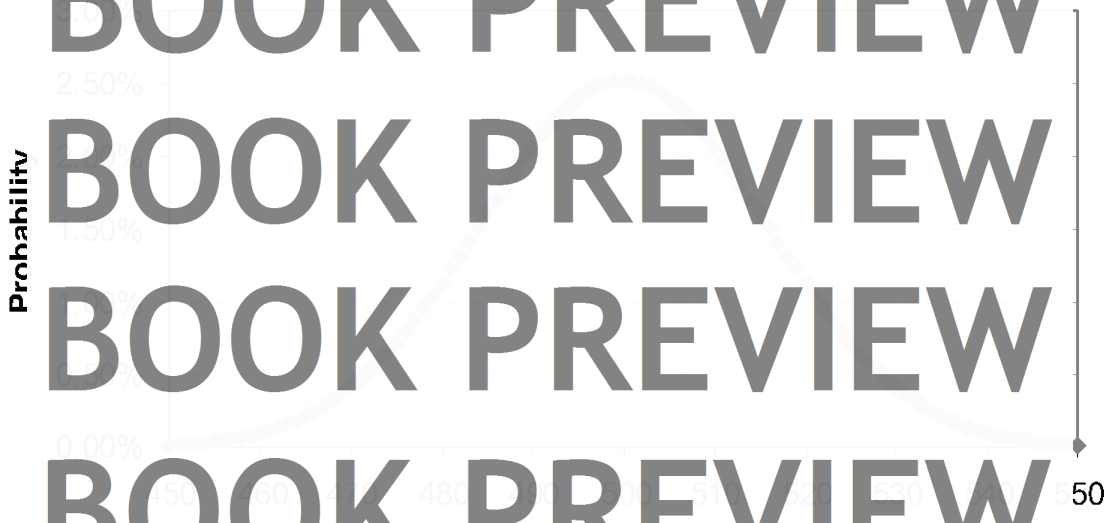
It is ws a tails, ntly, he h risk, even hile, Ian i bets but ome bank antly outn the bank ll be after d by mea

The ty of throv "n", ever The prefi mes for e mial prob ount perm ty is give

wher s of the tails durir ot of unne form the e of throv 0 at £2 s likely

of outcomes, as Ian had calculated, with the probability of throwing fewer or more tails less than this, as illustrated by Figure 6.2, which nicely reve

Figur

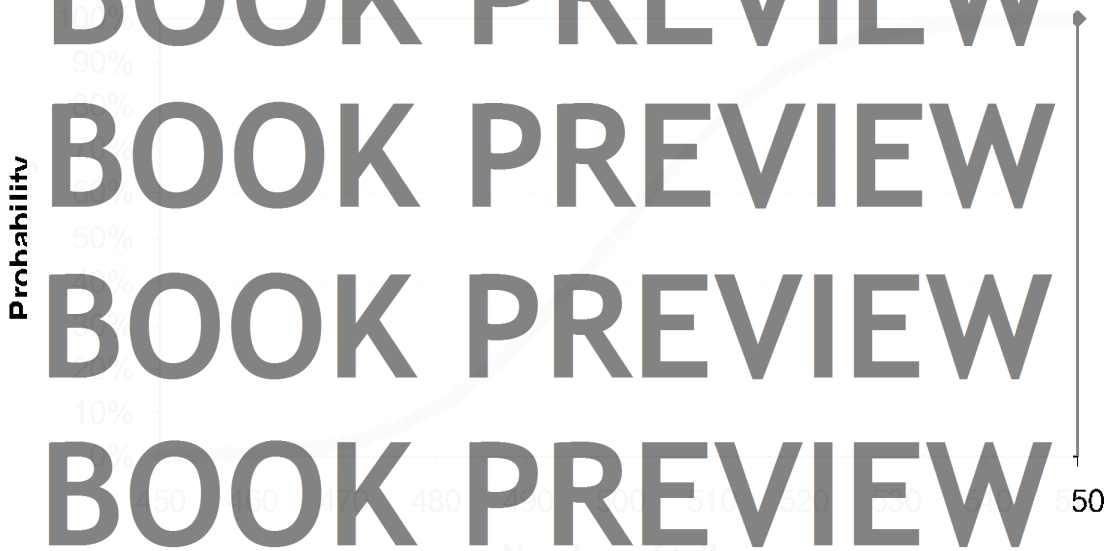


The of all poss n no head only the 550 head of all matl e for each an's bank

Figu which desc ng r num with =BIN rms the mial prob r, or a 48

[27] Negative bankrolls are, of course, rather meaningless in a real betting context.

Figure 6.3. Cumulative binomial probability for throwing up to r tails during 1,000 coin flips



It is coin. In th inue betti the exac fore, is nc mine eithe fore bank have outn at it is lik att's risk ated thou tion.

The onte Carl s or syste sible outc ally. This the unde lt to dete now that

Ther tion. The first step is to write a program to describe the process or system,

using the underlying probabilities to define its boundaries. For the flipping of a coin it is straightforward enough to use a spreadsheet with a random num, the func ulate the b s the spre the rand an or equa ence can r the first ofits grow 100 and

Table

Coi	n flip	Random number	Result	Profit/loss	Bank
1					
2					
3					
4		0.156843	Tails	£2.2	100.4
5		0.252537	Tails	£2.2	102.6
6					
7					
8		0.839079	Heads	-£2	100.8
9		0.723895	Heads	-£2	98.8
10					
11					
12					
13		0.599034	Heads	-£2	99.2
14		0.32546	Tails	£2.2	101.4
15					
16					
17		0.261543	Tails	£2.2	103.6
18		0.820935	Heads	-£2	101.8
19		0.616608	Heads	-£2	99.8
20					

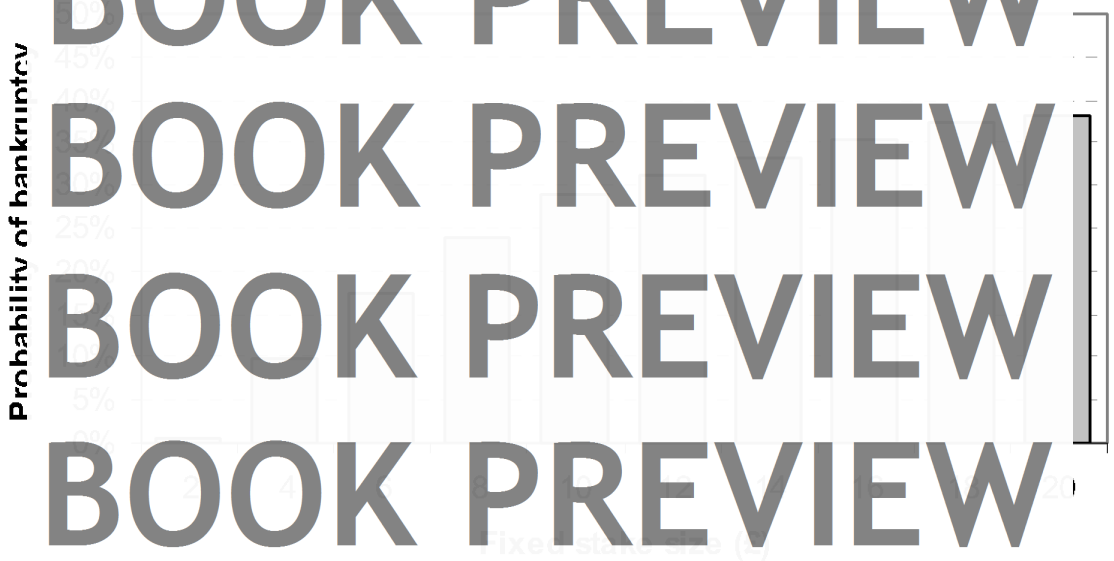
Figure 6.4. The progression of Ian's bankroll growth for one model run

The many time ating expe Excel will g a com dom conc ation as n , the more

For e e he has kroll secu coin 1,00 this expe lost or lo here were the prob

A M any prefe ptcy durin ses. For kroll was lost before 1,000 throws were made, the run was truncated.

Figure 6.5. Relationship of level stake size to the probability of bankruptcy in the coin-flipping challenge



It is 100, the owly, towa e of bank e of this nly 4 poin d to acce ively secu level stak ised as s elds grea ut at subs r to redu k for a be r to build level stak king abou viser to b lose early

Singles versus Multiples: a Risk Assessment

Desp nber
of se es of
winn less
than tially
appa or to
singl will
com rage
achi

Bill H ancy
of si ets.
The d at
even take
for e

Table

Pr diction s	Singles		Doubles		t
10%	10%	-80	1%	-96	
20%	20%	-60	4%	-84	
30%	30%	-40	9%	-64	
40%	40%	-20	16%	-36	
50%	50%	0	25%	0	
60%	60%	20	36%	44	
70%	70%	40	49%	96	
80%	80%	60	64%	156	
90%	90%	80	81%	224	
100%	100%	100	100%	300	

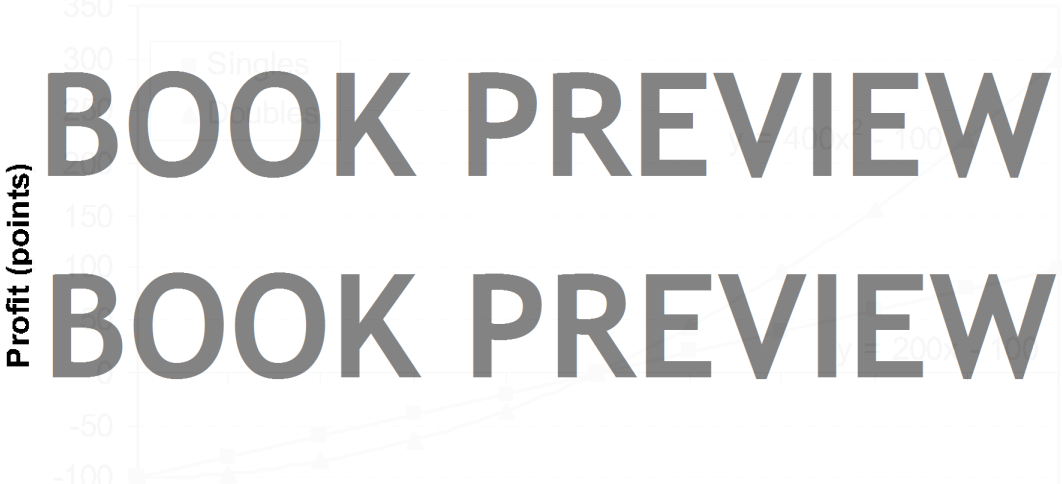
Whe lose
mon ge is
the s ction
succ f 40.
Mea .3 =
0.09 es is
displ y 36
poin tage

over the punter is 1.667, or 0.5/0.3. For doubles it is 2.778 ($0.5^2/0.3^2$), which is the square of 1.667.

Conv aker
will b s for
doub it is
prop the
pred the
squa the
sam ens,
Figu ips.
The

or w is 0
sinc ither
singl

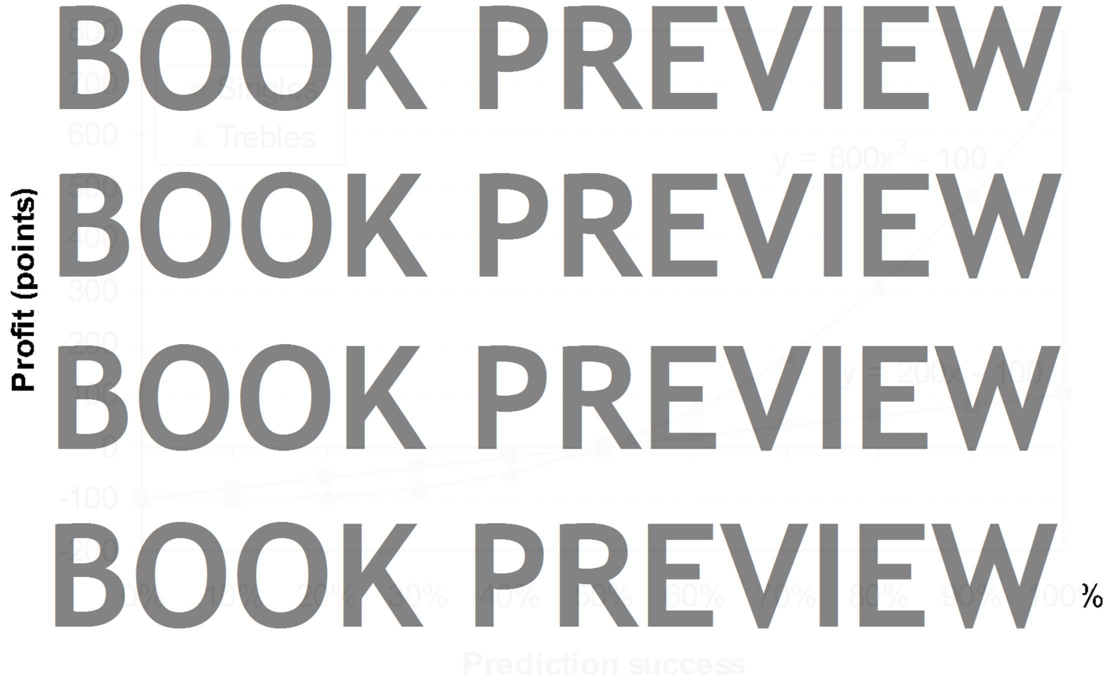
Figur ersus
doub



Whe d an
edge le to

singles. By the same token, trebles will perform better still, with profit proportional to the cube of prediction success, as illustrated in Figure 6.7. As a general rule, the size of expected betting return will be proportional to the n^{th} power of the betting edge, where n is the number of selections in an accumulator, assuming that each selection has the same edge.

Figure 6.7. The relationship between profit and prediction success: singles versus trebles



A punter should be cautious, however, before imagining that there are limitless profits to be won simply by enlarging the accumulator. Firstly, one must ensure that an edge has been secured for every part of the accumulator bet. Where this is not the case, the increased overround will begin to quickly conspire against the punter, eating into the expected return. Secondly, and more significantly, however, at greater odds, each bet is more likely to lose, regardless of the greater available returns. To be able to benefit from these superior returns, a punter must stake the same for his double, treble, or accumulator as he would for a single. The same is true for higher-priced singles – a multiple bet is really just like a single wager at longer odds, although the overround will be larger. The downside to this strategy will be a considerable increase in bankruptcy risk because of the larger and more frequent losing runs.

Table 6.4 compares the chance of bankruptcy for singles, doubles and trebles for a series of 1,000 bets, where each selection is priced at 11/10, and where the true expectancy is 50%. As for the coin-flipping challenge, the edge per selection is 5%. For this experiment, however, the punter must only terminate his sequence of betting if he loses his starting pot of 100 points. If this is avoided, the sequence continues to 1,000 bets, regardless of how large his bankroll grows. Results are based on a typical 1,000-run Monte Carlo simulation, for a series of level stake sizes from 1 to 10 points. Odds for a double and treble are 4.41 and 9.261, with true expectancies of 25% and 12.5% respectively.

Table 6.4. Risk of bankruptcy for singles, double and trebles with a 5% edge per 11/10 selection

	Singles			Doubles			Trebles		
Level stake	*Actual bank*	*Expect-ed bank*	*% Bank-ruptcy*	*Actual bank*	*Expect-ed bank*	*% Bank-ruptcy*	*Actual bank*	*Expect-ed bank*	*% Bank-ruptcy*
1	149	150	0.0%	201	203	0.1%	254	258	1.6%
2	197	200	0.4%	296	305	5.1%	378	415	15.5%
3	242	250	3.4%	379	408	12.7%	465	573	28.4%
4	282	300	9.3%	441	510	20.9%	525	731	38.9%
5	317	350	15.2%	491	613	28.9%	571	888	46.5%
6	350	400	20.5%	528	715	35.8%	598	1046	53.2%
7	379	450	24.9%	553	818	42.4%	625	1203	58.0%
8	401	500	29.7%	575	920	47.3%	646	1361	62.2%
9	423	550	33.5%	606	1023	50.4%	674	1519	65.0%
10	445	600	36.6%	629	1125	53.5%	679	1676	68.3%

Modifying F = B + (YSN/100), we can calculate the size of the expected bankroll, that is, the size hypothetically achievable, given the boundary conditions, and assuming a limitless supply of betting capital.[28] In this case, the final expected bankroll after 1,000 bets is given by:

$$100 + \{(1000S)(1.05^n - 1)\}$$

since B, the starting bankroll, is equal to 100 points, N, the number of bets, is equal to 1,000 and Y, the yield, is proportional to the n^{th} power of the

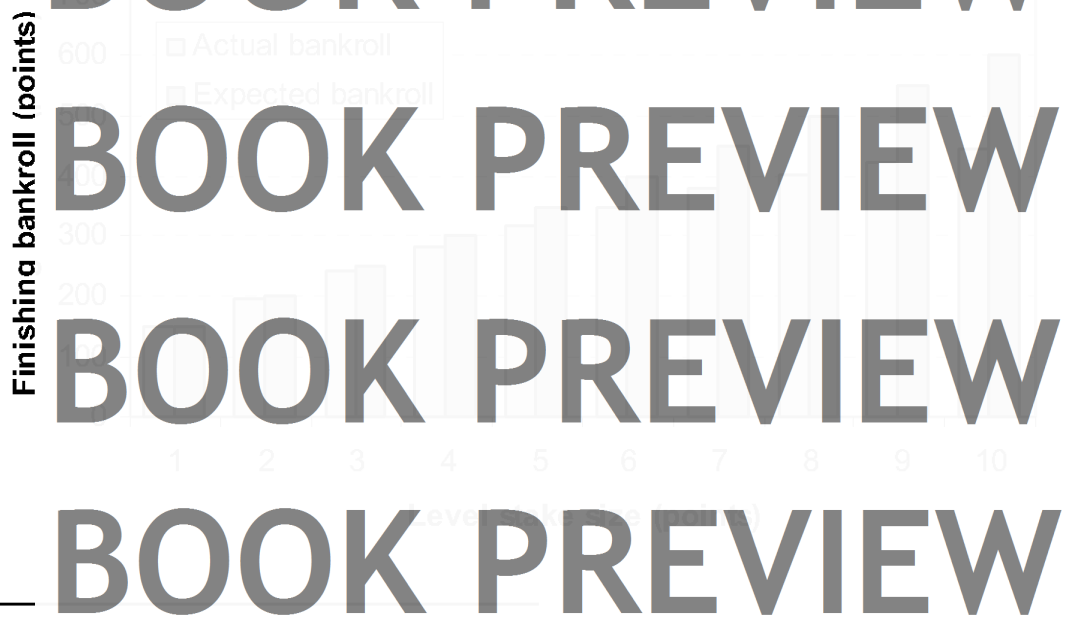
[28] In other words, the bankroll is hypothetically permitted to fall below zero.

DOWNLOAD FULL VERSION HERE: https://bettingbooks.org/8

betting edge,[29] where n is the number of selections used to make up the multiple bet. S, of course, is the stake size.

The ts is
logic bles,
since e n^th
powe ze of
the onte
Carl kroll
will l age,
since tless
capit se, a
start f the
actu truer
refle ving.
The r the
aver , the
diver s as
the l ce is
muc bles
the after
1,00

Figur

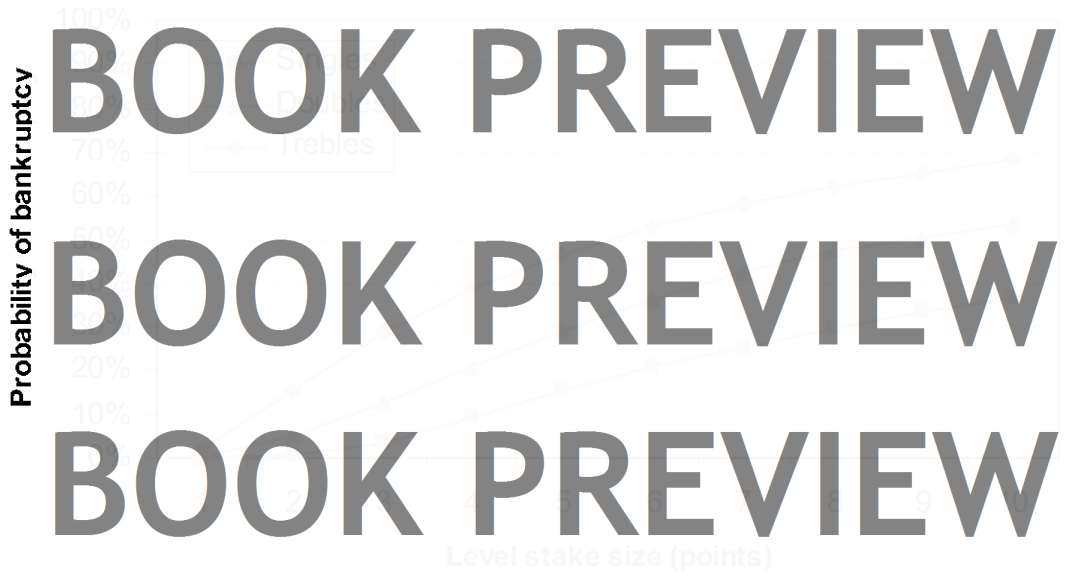


[29] Th expected yield for singles is 5%, whilst that for doubles and trebles is 10.25% and 15.76% respectively.

Figure 6.9. Increasing stake size on average finishing bankroll: trebles

Unsu and
actu)-bet
sequ rger
mult plies
near point
singl or 3-
poin gles.

Figur ngles,
doub



Clearly, one way to limit risk exposure is to reduce the size of the stakes on multiple bets, or for that matter, on higher priced singles. Unfortunately, this ways exist the nece most impo the posit will win vere misf can pote xists the mer acce rast, seek ent. Whil that proa fixed odds

[30] A successful punter is here defined as one who has gained an edge over the bookmaker, confirmed through analysis of his long-term betting record.

What Is Money Management?

There are really two parts to a successful betting strategy. The first is to find a method of predicting sporting events. Chapters 3 and 4 revealed how the principles of value analysis and quantitative forecasting might be used to gain an edge over the bookmaker. Without an edge, no betting system will be successful. Where a punter has achieved one, however, his second task is to plan a staking strategy in order to maximise his profits. The last chapter introduced the idea that merely increasing the stake size or the odds on a bet with a view to securing a greater return is not necessarily the safest way to achieving this goal. The downside to such a basic approach is an increase in bankruptcy risk. Instead, the punter must learn to identify, assess and mitigate the perils associated with his betting strategy through effective risk management. What this actually means in practice is a study of staking strategy and money management.

Whilst only a few per cent of punters actually profit from fixed odds sports betting over the long term, there are potentially many others who could do so, provided they paid better attention to their money management. Establishing a betting edge is a hard-enough undertaking in itself, but too many punters undo their good work by failing to give any serious consideration to this aspect of their betting strategy. Proper money management may mean different things to different people, but common elements include:

1) the application of a bankroll of known size, set aside for the purposes of betting, which if lost would not be detrimental to everyday living;
2) the identification of a suitable staking plan;
3) the maximisation of returns;
4) the reduction and control of bankruptcy risk to acceptable levels.

There exist myriad staking plans, some with very elaborate names, including Martingale, D'Alembert, Oscar's Grind, Steady Drip, Kelly, Rolling Bank and many more. All of them in some way attempt to increase the profits a punter can win above those achievable from simple level

DOWNLOAD FULL VERSION HERE: https://bettingbooks.org/8

staking. In the main they are successful, but for many, with an unacceptable increase in risk.

Broa erent
cate

Fixe hich
ever tting
odds hich
all o Many
punt ze of
their their
odds it he
wins will
amo ary.
This

Perc f the
stak t the
time onal
to th mple
perc ding
the the
book This
inter

Fina take
size w to
reco The
Mart sers.
Ther y all
shar nore
com risk
asse ious
chap may

also wish to refer to Stuart Holland's e-book, *Successful Staking Strategies for the Gambler*,[31] upon which much of the risk analysis in this chap

A co ome staki turn loss- and repr lerlie such cally teste the Mart the read edge and odds betti

Stak

The king strat ch to work gh to anal one perm erent rand ence them e its unde not nece very temp to a stati fixed odds mple prob us. Inste pter, lend

The apter are n of betti bets, cons nber

[31] http://homepage.ntlworld.com/fcp.online/sss.htm

of bets a typical sports bettor or advisory service might wager during the course of a year or sports season. For each staking plan simulation, infor

For s of betti

Betti ge to the was assu the book rage betti d for

[32] The taking plan a nge of possib culate the ex ourse, that is ll, as well a

[33] The erage value. most values des a statist ut the avera profit makin

[34] The gh the edge of a coin, than others by a singles level stakes yield. The punter, like the bookmaker, cannot be right all the time.

any bet was 1.36 (or 36%), whilst the minimum was 0.88 (or -12%), with 49.6% of the bets having an edge greater than 1.1. The complete betting edge [illegible] neral char[illegible]ed in Tabl[illegible]

Table [illegible] plan simul[illegible]

Aver[illegible]	[illegible]20
Maxi[illegible]	[illegible]44
Minir[illegible]	[illegible]935
% be[illegible]	[illegible]%
Stan[illegible]	[illegible]093

In a[illegible] plan simu[illegible]d by the [illegible] the book[illegible]

The [illegible] the sam[illegible]g in Ame[illegible] ome may [illegible] ts at 40/1 [illegible] here a pu[illegible] rket, he is [illegible] tting prefe[illegible] gain shov[illegible]

[35] A [illegible]), for exam[illegible]e was 1.1, the true win expectancy for the punter is 1.1 x 0.4 = 0.44 or 44%, with fair odds of 2.273.

Table 7.2. Characteristics of the bookmaker's expectancy scenarios used for the staking plan simulations

Aver				
Maxi				95
Minir				65
Stan				09
Aver				3
Maxi				7
Minir				2
% be				%

The examination of the bookmaker's overround in Chapter 3 hinted that the b ably the b st in footb erior edge gher price aker, how erior betti rket, the ngly, with ch a relat the staki cant corre win expe over the a tting edge can be n ange of pc t the betti than 0.6 the betti 7.3. Valu es a perfe).

[36] It s e win expec

[37] An 1%, a logical impossibility.

Table 7.3. Correlation between betting edge and bookmaker's expectancy

Bookmaker's expectancy	Betting edge						
	0.9	*0.95*	*1*	*1.05*	*1.1*	*1.15*	*1.2*
0.2	0.026	0.051	0.067	-0.125	-0.046	-0.127	0.077
0.3	-0.057	-0.064	-0.090	-0.029	0.041	0.003	0.137
0.4	0.011	-0.096	0.079	0.045	-0.042	0.070	-0.002
0.5	-0.028	-0.019	0.002	0.067	0.010	0.052	0.009
0.6	-0.008	0.012	-0.017	0.068	-0.027	-0.074	-0.019

Each scenario was run for 6 different staking strategies:

- Level staking
- Percentage staking
- Fixed profits staking
- Martingale staking
- Pyramid staking
- Kelly staking.[38]

For each staking plan, 5 different sizes of stake were compared, the specific size of each stake dependent on the nature and characteristics of the rules of the strategy.[39] For level staking, these were 1 point, 2 points, 3 points, 5 points and 10 points, whilst for percentage bank staking, they were 1%, 2%, 3%, 5% and 10% of the betting bankroll at the time the wager was made. For every simulation, the starting bank was assumed to be 100 points. Where bankruptcy occurred before 250 bets, the simulation was truncated and the final bankroll taken to be 0 points, which was included in the average finishing bankroll calculation. In total, 930 Monte Carlo simulations were processed, each one consisting of 10,000 model runs. This is equivalent to over 2 billion simulated fixed odds wagers!

---

[38] Kelly staking is dependent upon the punter finding value in the odds, that is, a betting edge greater than unity. Where no value exists, Kelly staking advises no bet. Naturally, a value punter would never choose to back a valueless selection, but Kelly staking, in contrast to other staking plans, explicitly recognises this through the choice of the stake size. Consequently, simulations are theoretically only possible where the average betting edge is greater than 1, although they can be run for those less than 1 where one assumes that the punter has overestimated his advantage, in order to test this influence.

[39] Kelly staking, furthermore, identifies what the hypothetically correct stake size should be for every bet, and therefore no stake size comparisons are made for this strategy.

Level Staking

Leve one
deci on of
the i t be
conf f the
stak For
novi they
cons t or
calc will
wag veen
diffe level
stak t the
sam ually
repr

Tabl Carlo
simu rder,
deta n in
finis the
prob

The n be
draw vide
supp hed.
Whe ded.
The (and
thos able
only very
scen More
or fe cally
influ otcy.
In ge ance
to a with
his c

Table 7.4.1. Average finishing bankroll (points) after 250 level stake singles

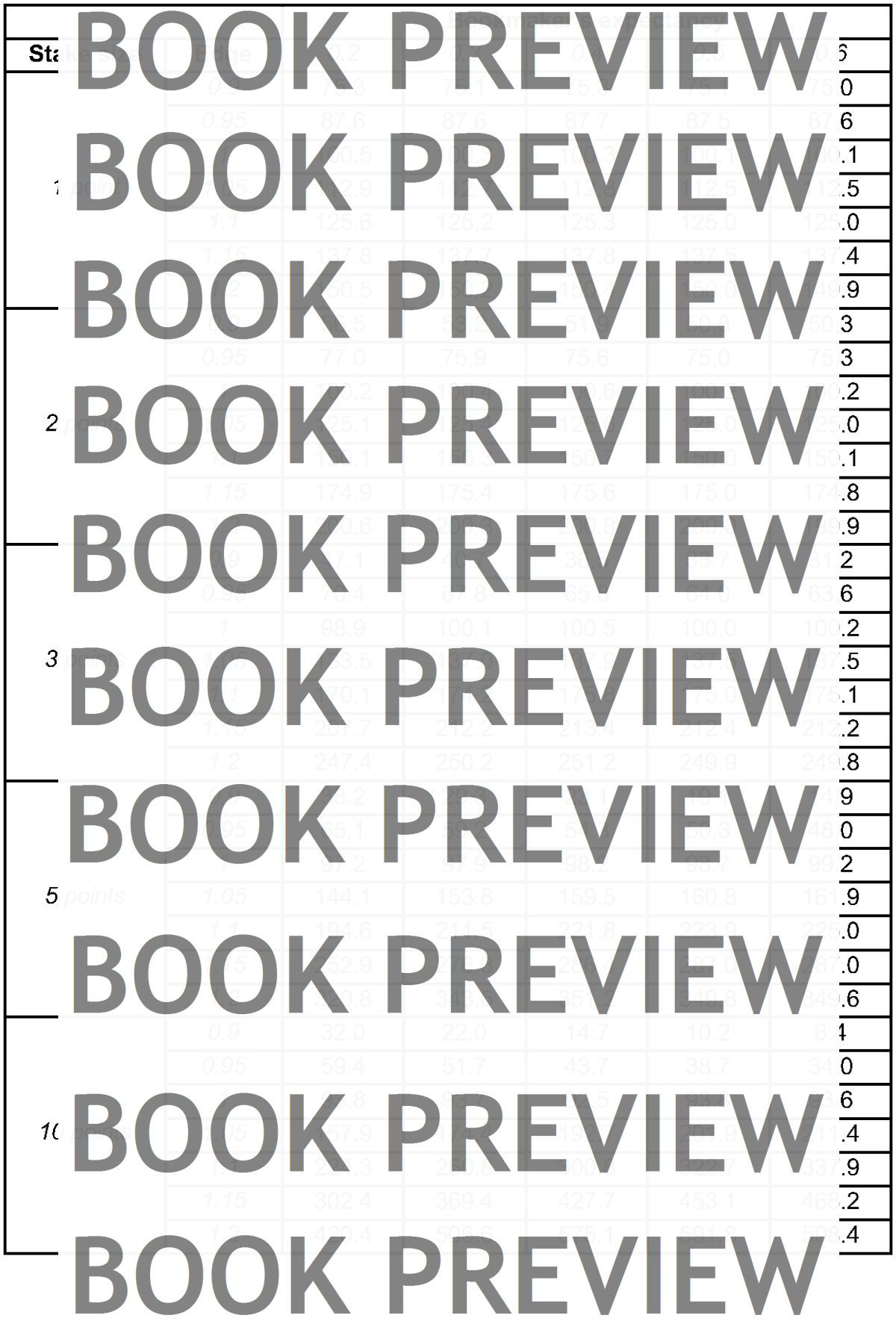


Table 7.4.2. Standard deviation in finishing bankroll (points) after 250 level stake singles

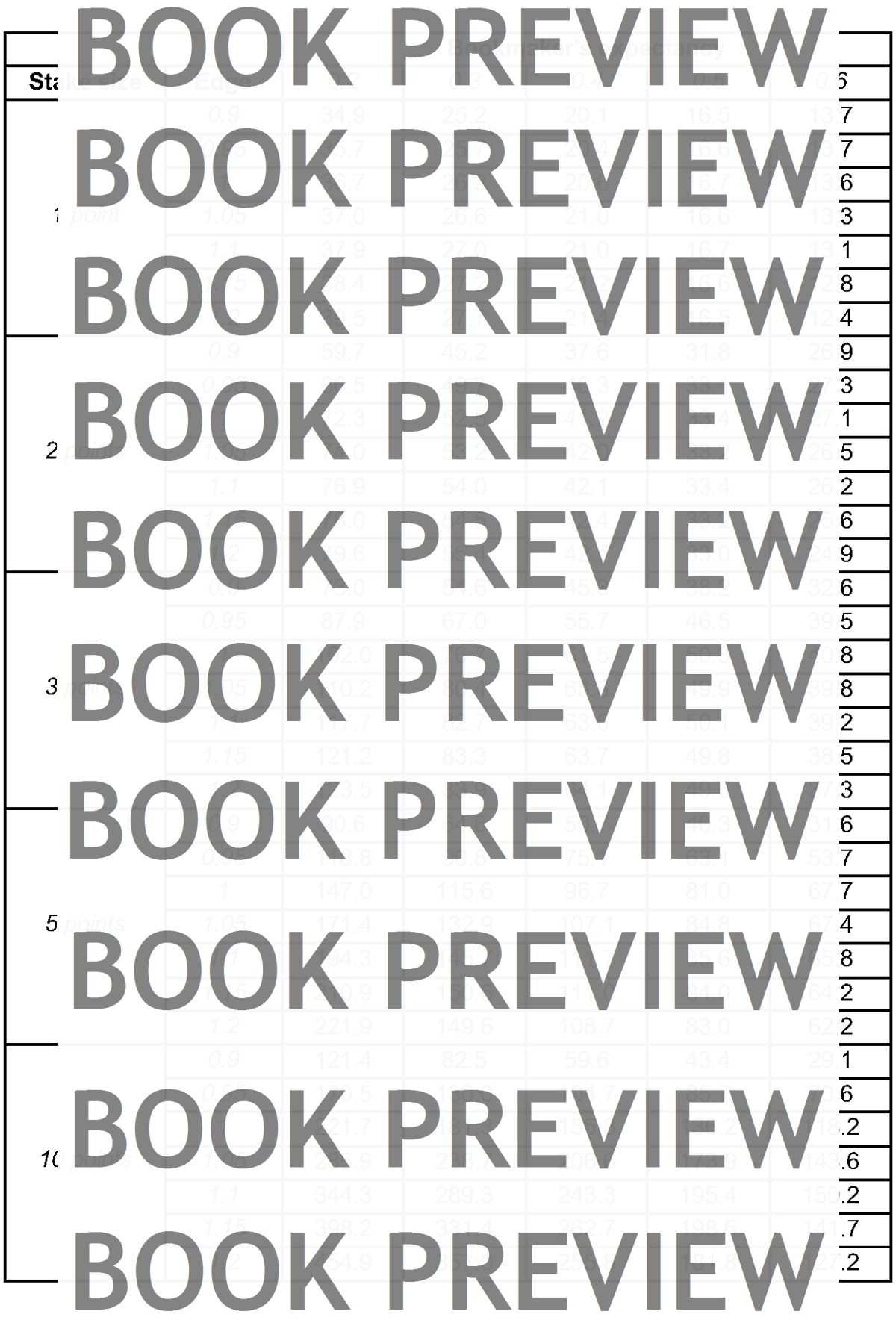


Table 7.4.3. Probability of bankruptcy after 250 level stake singles

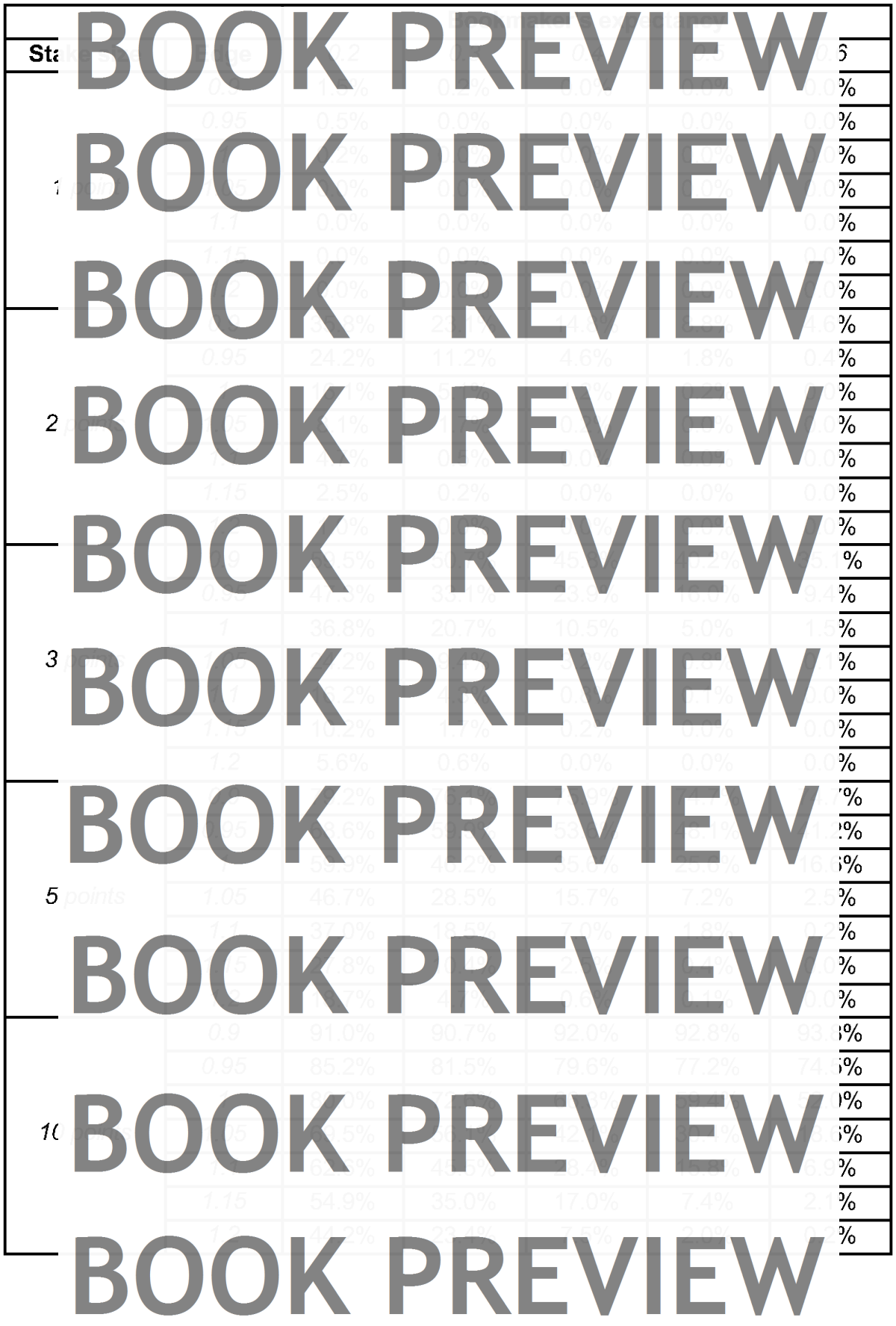
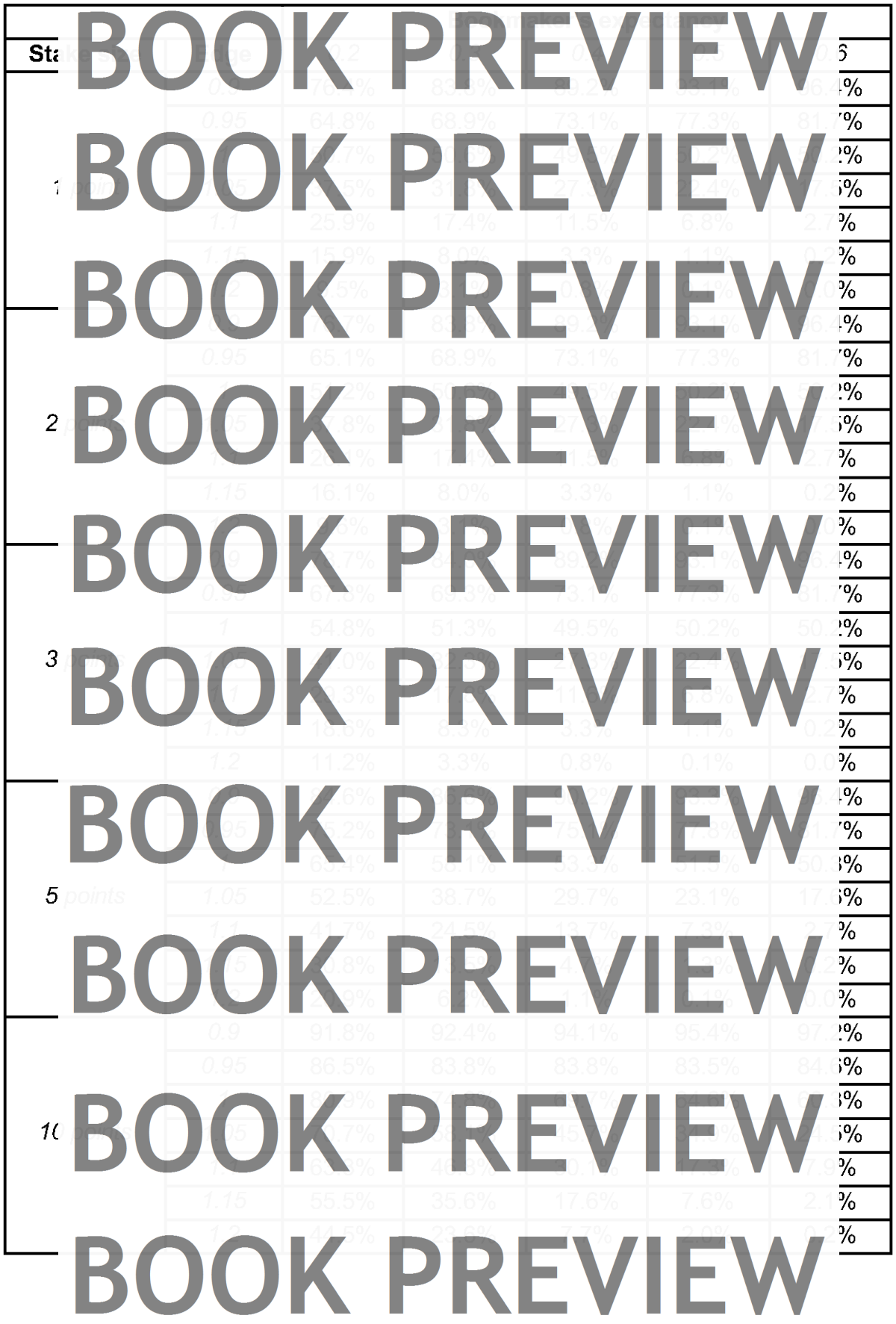


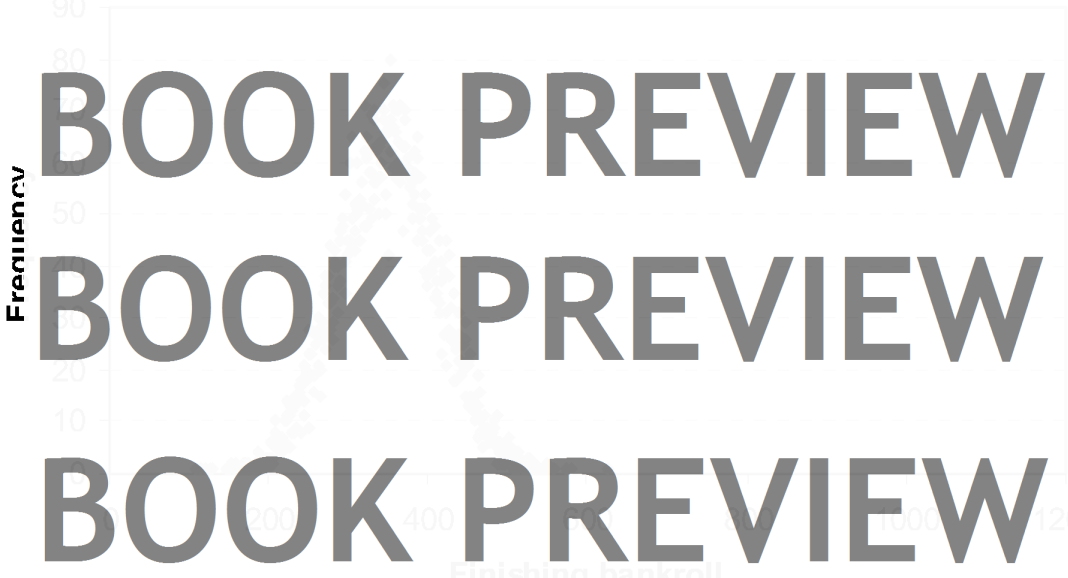
Table 7.4.4. Probability of not making a profit after 250 level stake singles



Conclusion 1

There is a lot of noise, or variability, in the size of the finishing bankroll. This ation (Tab tting scen hole rang se or varia n of finisl akes of 5 d an aver ,000 mod d by the l ll for this

Figur -point stake level staki



[40] For ,000), the n ormal distrib ormal distrib on on the binomial distribution in the last chapter, and in particular the shape of its curve in Figure 6.2.

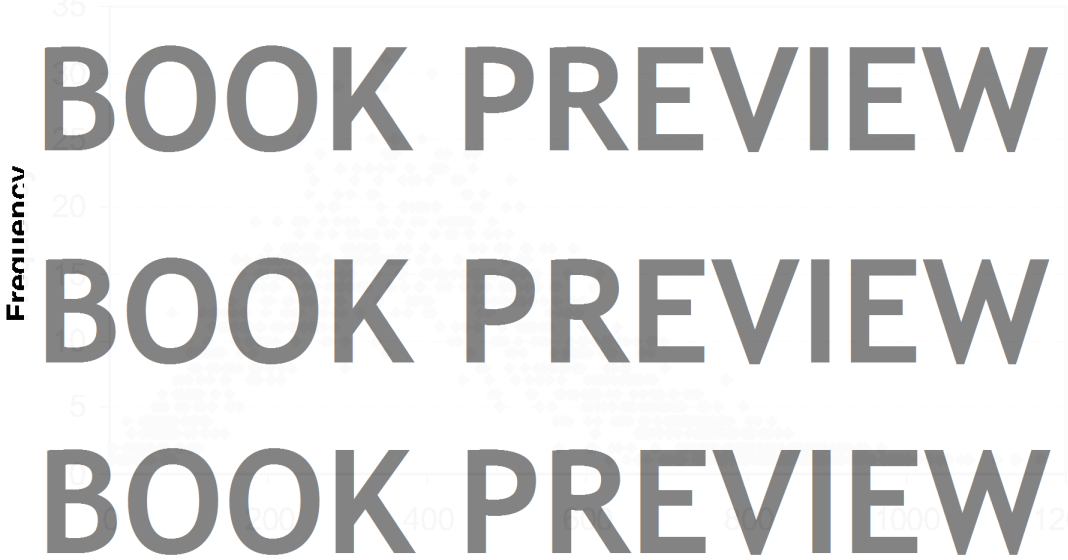
Explanation

No two finishing banks will ever be the same, simply because of the inhe No matt n an elem sult. Betti s of succ tical tech ofits.

Con

The size, incre less conf hing bank % of finis For wage take size s lie withi this scen odds betti , for ease ptcy occu

Figur -point stake level staki



Explanation

Variability in the finishing bankroll is naturally greater for higher odds beca, the way ses, so c ade. Simi take size, that varia otcy.

Con

For a l, on aver s will have n of the f

Expl

This edge and ce of bets nce.

Con

A pu kroll betti es a loga hing bank nitial bank bank for 1 .9 is only

Expl

The d be lost. sing shor , but only orter odds atic.

Con

Con win prop d for

stakes greater than 3 points, proportionally more for shorter prices, since bankruptcy rates decrease dramatically as the odds shorten (Table 7.4.3).

Figur *shing*
bank

Expl
The d be
won. able
beca es of
a dis size
of 5 s as
large ce of
8/11 turn,
mea

Con
The of a
punt dge
of 0. ce of
250 le.

Expl
This will
ultim

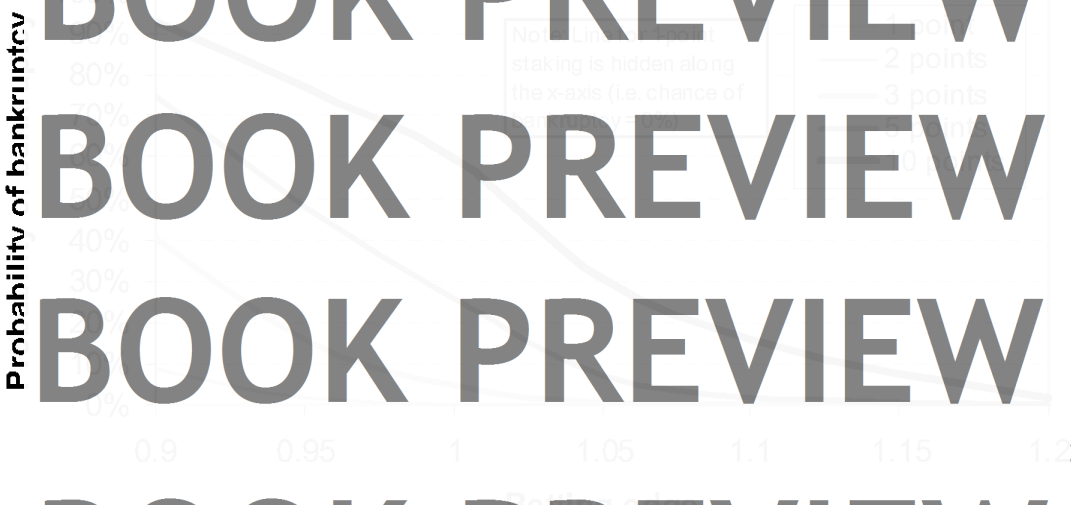
Conclusion 7

The probability of bankruptcy is dependent on the stake size. The larger the s ss of the y be rega usly cont akes the ed a dece

Expl

Clea the stak any edge .4.

Figur ity of bank



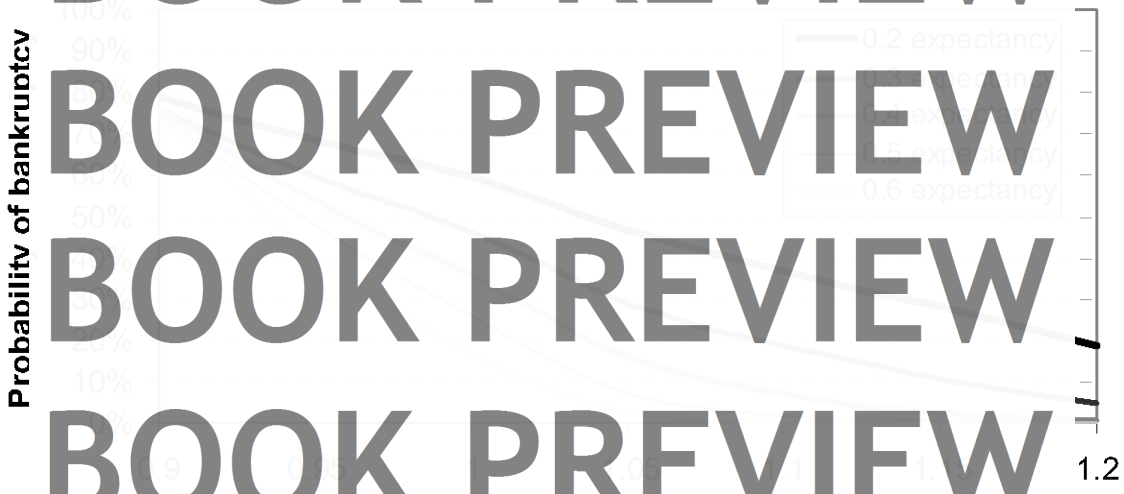
Conclusion 8

The , as illust , the punt ng is at a back sele

Explanation

Since losing runs are more probable for higher odds betting, the risks will be g

Figur *uptcy,* *with s*



Con

The bility of a e, he has son, altho k of bank

Expl

This er is unlik able for h t be mad

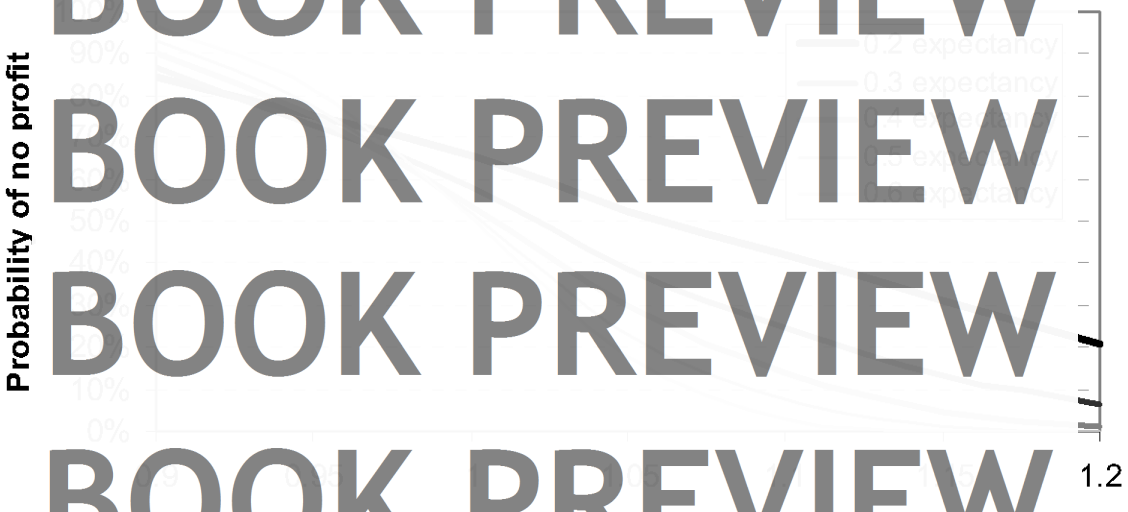
Con

For with leng find betti ct is show

Explanation

This is a reiteration of Conclusions 4 and 5. Profitable systems show smo ead, whe sely, the rofit prop

Figur ng to retur



Man nade by p and anal lany of th yield over *table Foot* y be infla can none fully cons the pote d of bank point even ce of 250 most doub ll to 16% s to take his

attitudes towards gambling. Nevertheless, the informed punter is always more likely to make the correct decision appropriate to his betting prefe

Furtl on
unde ty of
shor and
odds nnis
and rrect
scor gher
odds tting
reco ch a
betti ause
at su al to
elim es to
abou kes,
altho

It sh way
to bc eater
pote gher
than even
withi m a
succ trate
on s s-on
and / go
agai dge
of lo r an
alter

Perc

Ther olves
wage et is
mad f the
stak bank
staki kroll,
unlik

The advantage, in theory, of percentage bank staking is that it is not possible to lose your betting bank. In practice, a losing system will see the bank [BOOK PREVIEW] small as to [BOOK PREVIEW] More likely [BOOK PREVIEW] some this [BOOK PREVIEW] kers limit [BOOK PREVIEW]

A se [BOOK PREVIEW] e for level [BOOK PREVIEW] that when [BOOK PREVIEW] an it would [BOOK PREVIEW] R. J. Mille[41] [BOOK PREVIEW] ecise timing [BOOK PREVIEW] ed, it make [BOOK PREVIEW] day, you [BOOK PREVIEW] you will [BOOK PREVIEW] ight consi[BOOK PREVIEW]king strat[BOOK PREVIEW]ts at the s[BOOK PREVIEW] size to ea[BOOK PREVIEW]

Tabl[BOOK PREVIEW]arlo simu[BOOK PREVIEW]5.1), the [BOOK PREVIEW]y of bank[BOOK PREVIEW]5.4). Com[BOOK PREVIEW]sk of bank[BOOK PREVIEW]f its initia[BOOK PREVIEW] the purp[BOOK PREVIEW]ave shel[BOOK PREVIEW] may pres[BOOK PREVIEW], the mini[BOOK PREVIEW]pted – at [BOOK PREVIEW] that only [BOOK PREVIEW] take will [BOOK PREVIEW]

[BOOK PREVIEW]

[41] http://www.professionalgambler.com/

Table 7.5.1. Average finishing bankroll (points) after 250 percentage bank singles

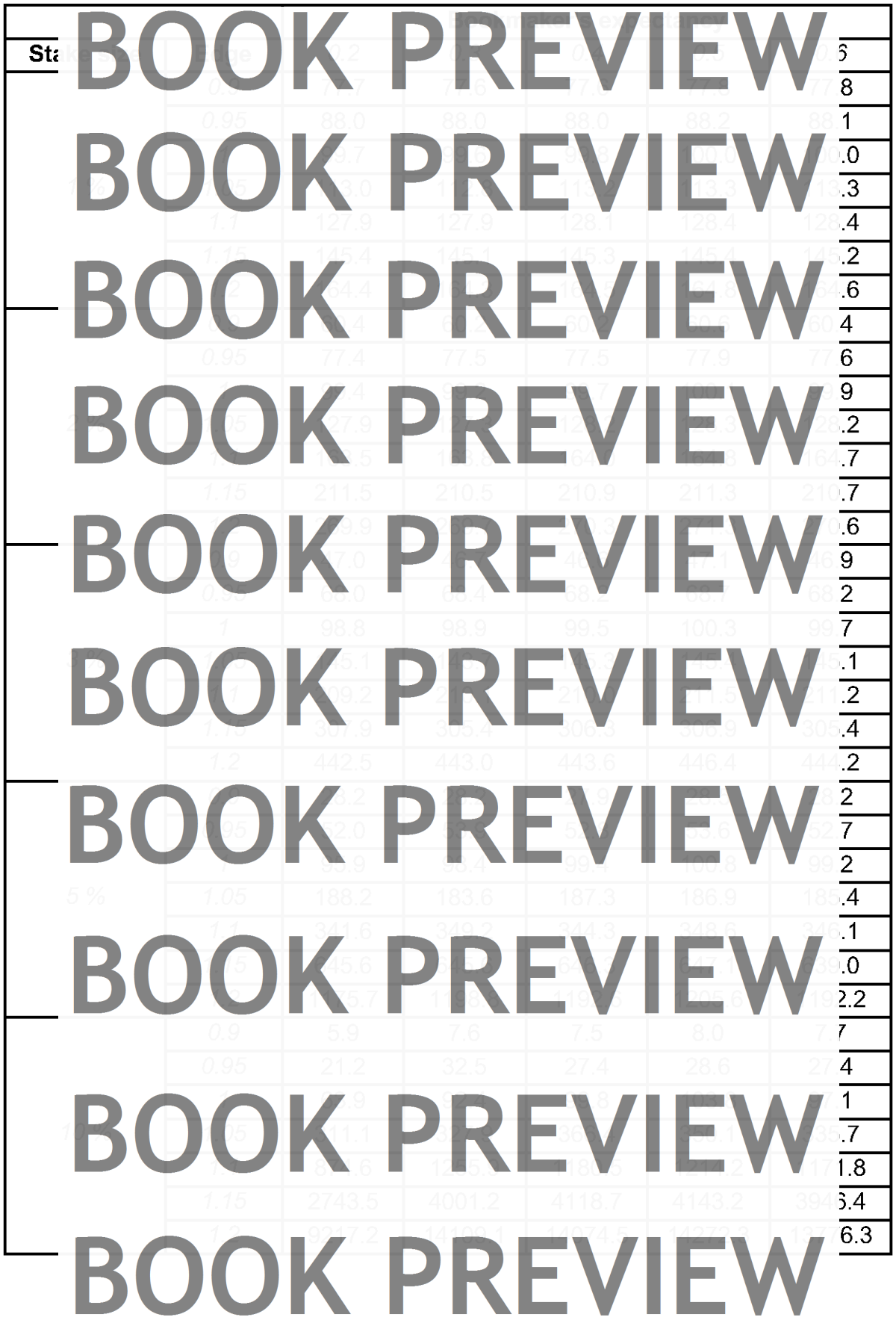


Table 7.5.2. Standard deviation in finishing bankroll (points) after 250 percentage bank singles

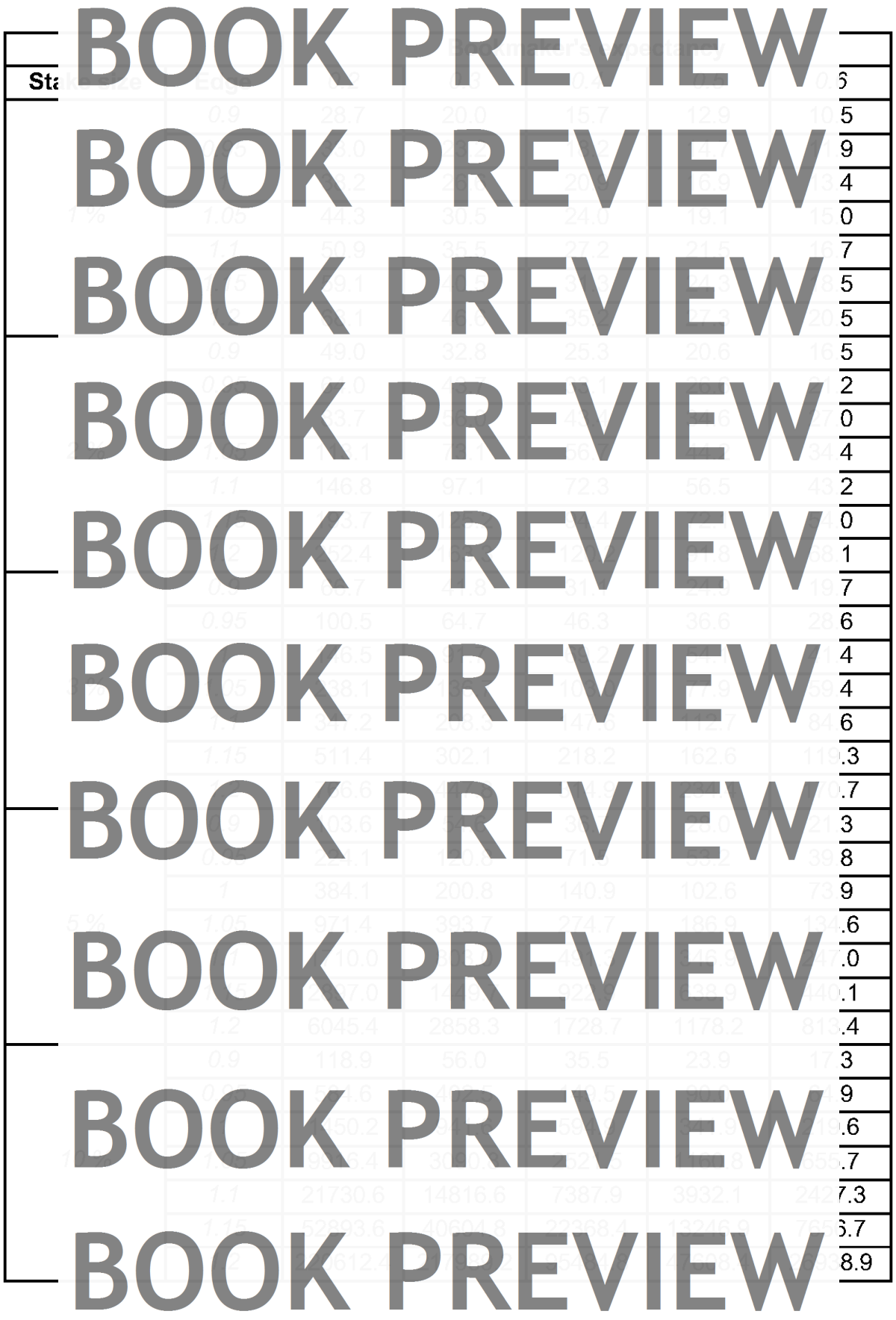


Table 7.5.3. Probability of bankruptcy after 250 percentage bank singles

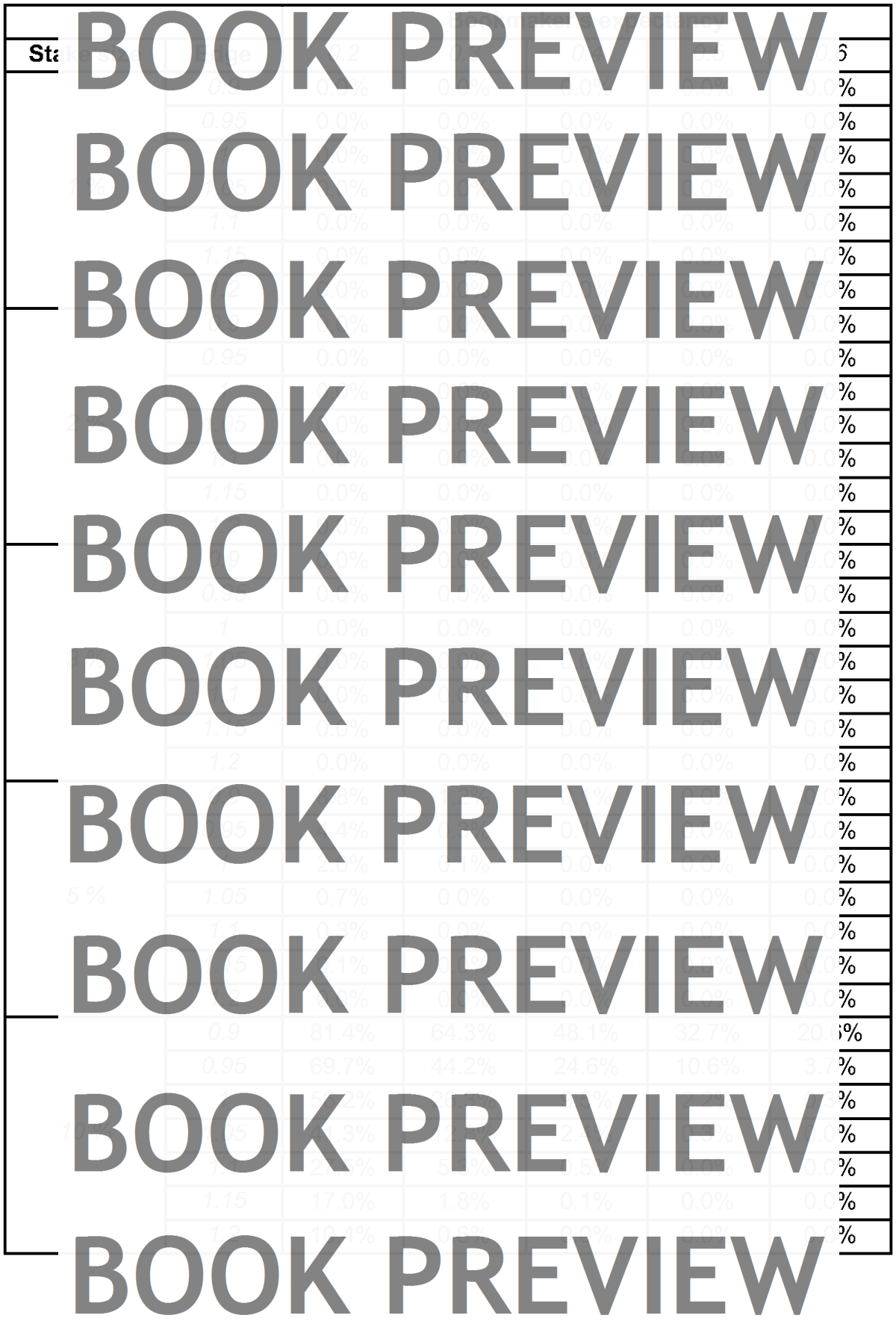
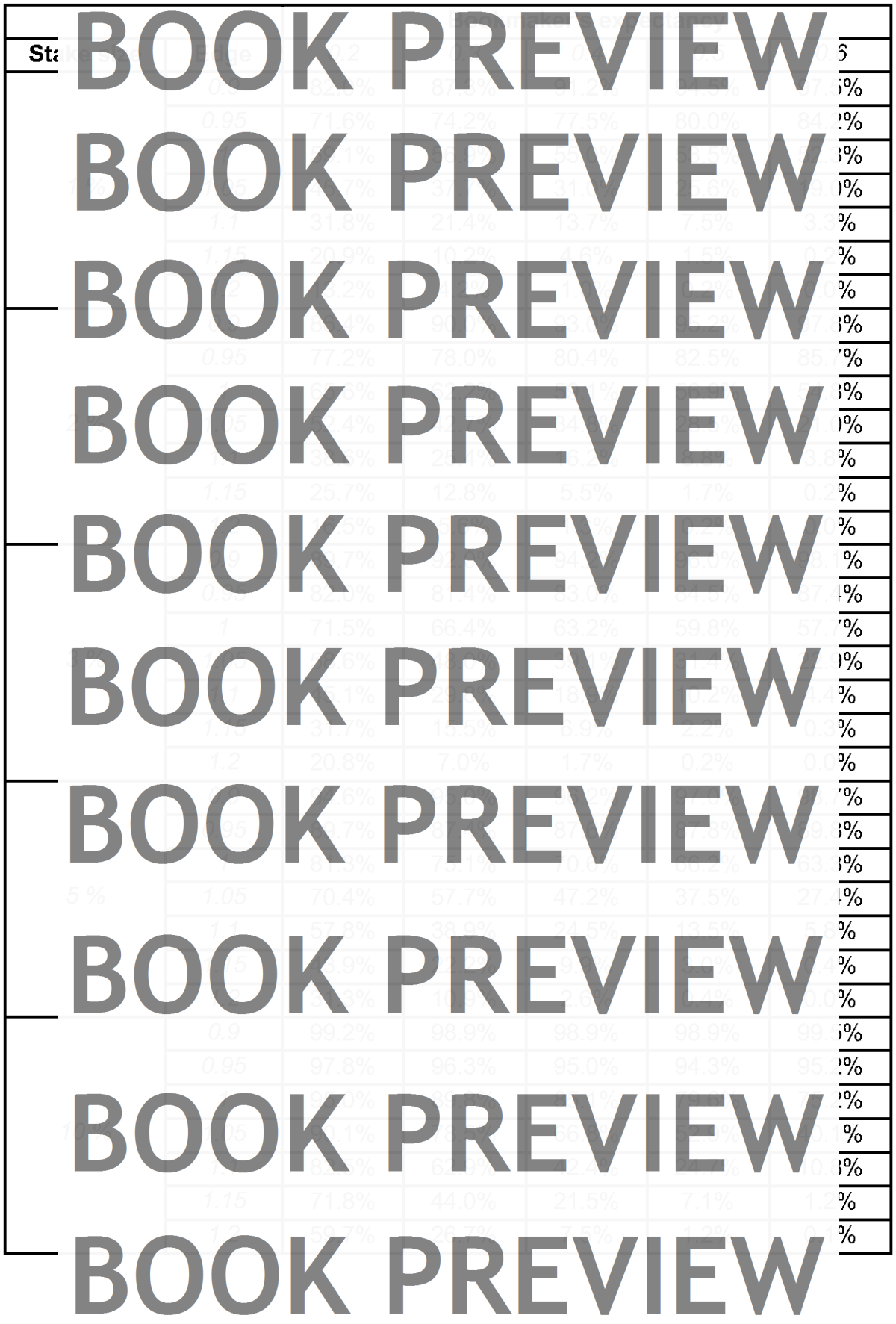
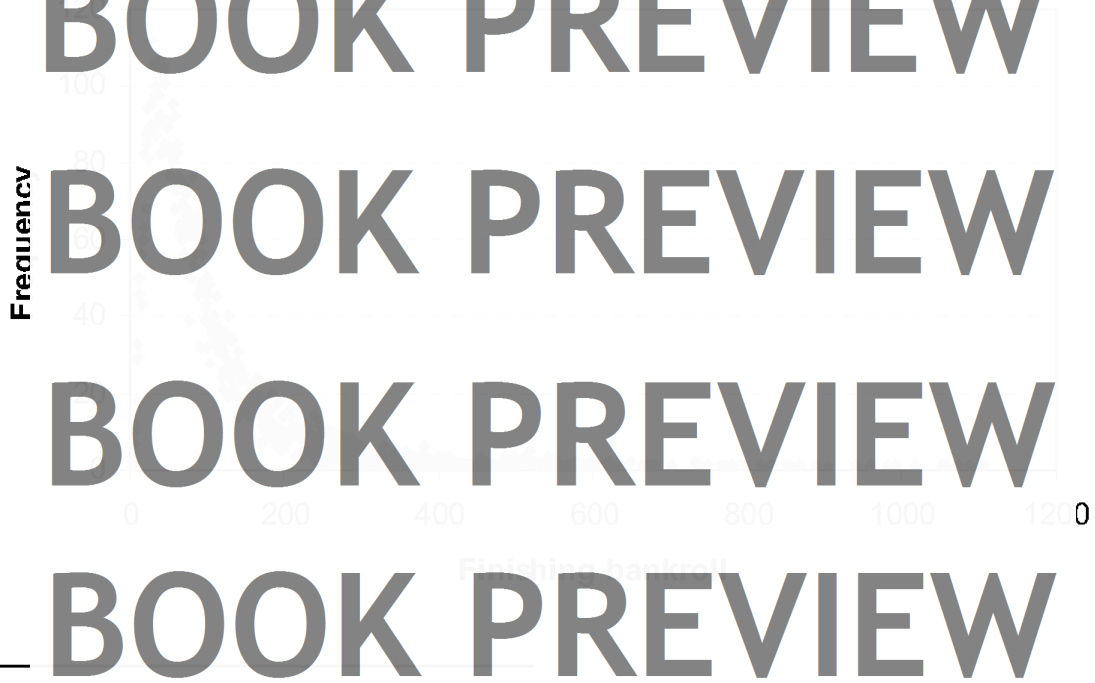


Table 7.5.4. Probability of not making a profit after 250 percentage bank singles



In general, profit potential and the risk of bankruptcy for percentage bank staking are once more dependent on edge, stake size and betting odds, altho… finish… stak… for a… stak… bank… bank… edge… the … expe… failu… hand… time… time… betti… gene… the l…

Figur… stake… perce…



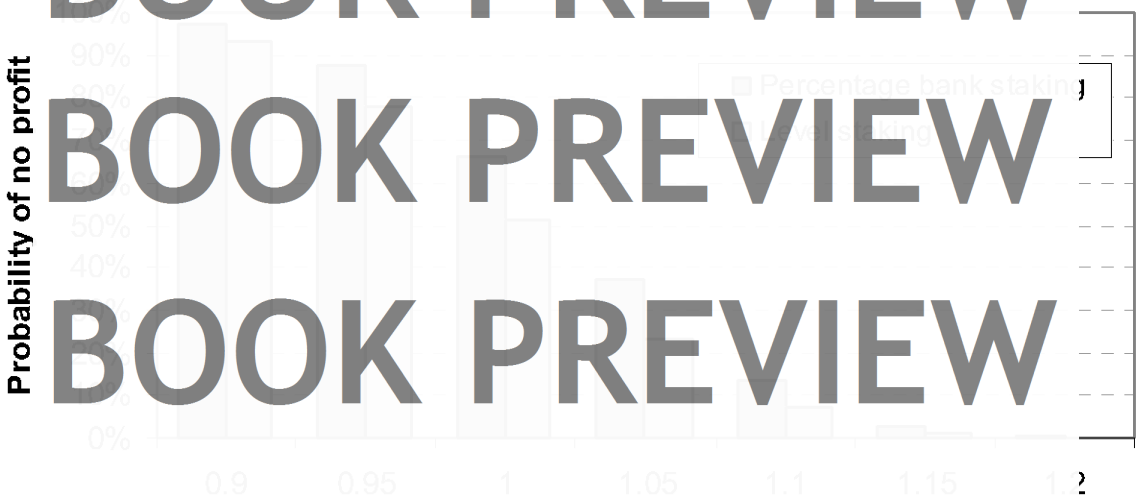
[42] The … edge clearly deviates significantly from the perfect bell-shaped curve of the normal distribution.

Figure 7.8. The influence of betting edge and stake size on average finishing bankroll, with average bookmaker's expectancy 0.5, for percentage bank staking

Is pe Not
entir 7.7.
For ty of
level tage
bank ated
in Fi hich
emp king
relat rofit
for e bling
and eater
for l tting
syste y for
both

Figure 7.9. The influence of odds and betting edge on the probability of failing to return a profit, for the 5% percentage bank staking plan

Figur *king,*
of th *f 0.5,*
with 5



[43] For level staking this is 5% of the initial bankroll, i.e. 5 points.

Why is it, then, that the chance of securing a profit after a specified period of betting is less for percentage bank staking than for level staking, even thou ause whe ns of perc ithin the bank staki level staki n the shor es, it take

This erely hypo gy of real- tting syste ning his r nter awa sons whe ettor with e to pay e for sma king punt ing? Ther gy is supe edly true, ward trad t his prefe

Fixe

Whe ofits staki 10 is stak e of 50/1 s on high ough the p for a

[44] Pr lity of winnir hapter 4).

stake of £10, the risks imposed on the betting bank by the higher-priced bets are substantially reduced. The reader may recall that for both level staki es a subs

Tabl arlo simu , the stan / of bank s for perc king are e the size able with ords, for a ered durir . For a pu cally impo size (as a tting reco tting scen

Table

S					
					6
					8
2	7.54	4.35	2.76	1.81	6
3	11.31	6.53	4.14	2.71	3
5	18.84	10.88	6.89	4.52	9
					8

Table 7.6.1. Average finishing bankroll (points) after 250 fixed profit singles

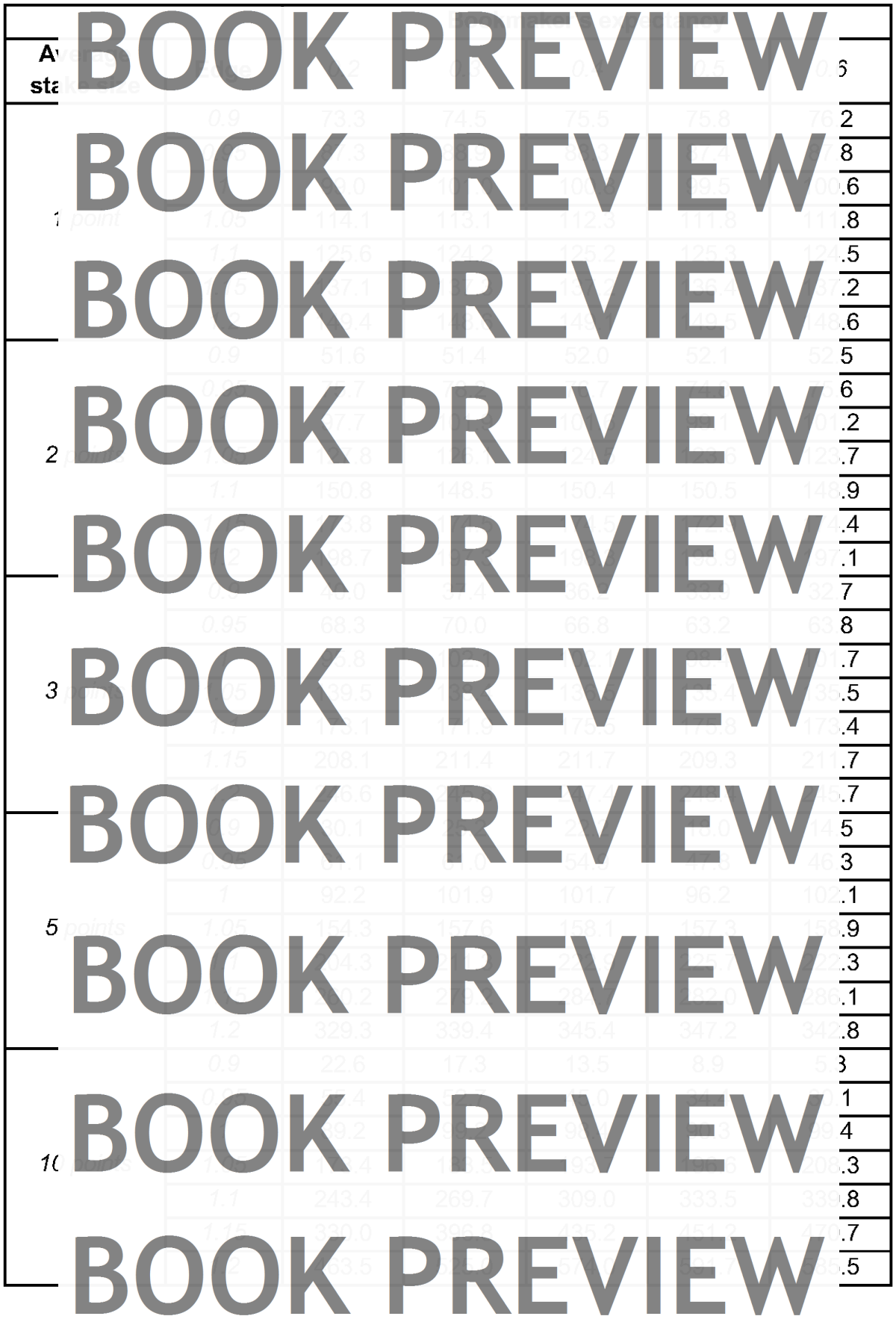


Table 7.6.2. Standard deviation in finishing bankroll (points) after 250 fixed profit singles

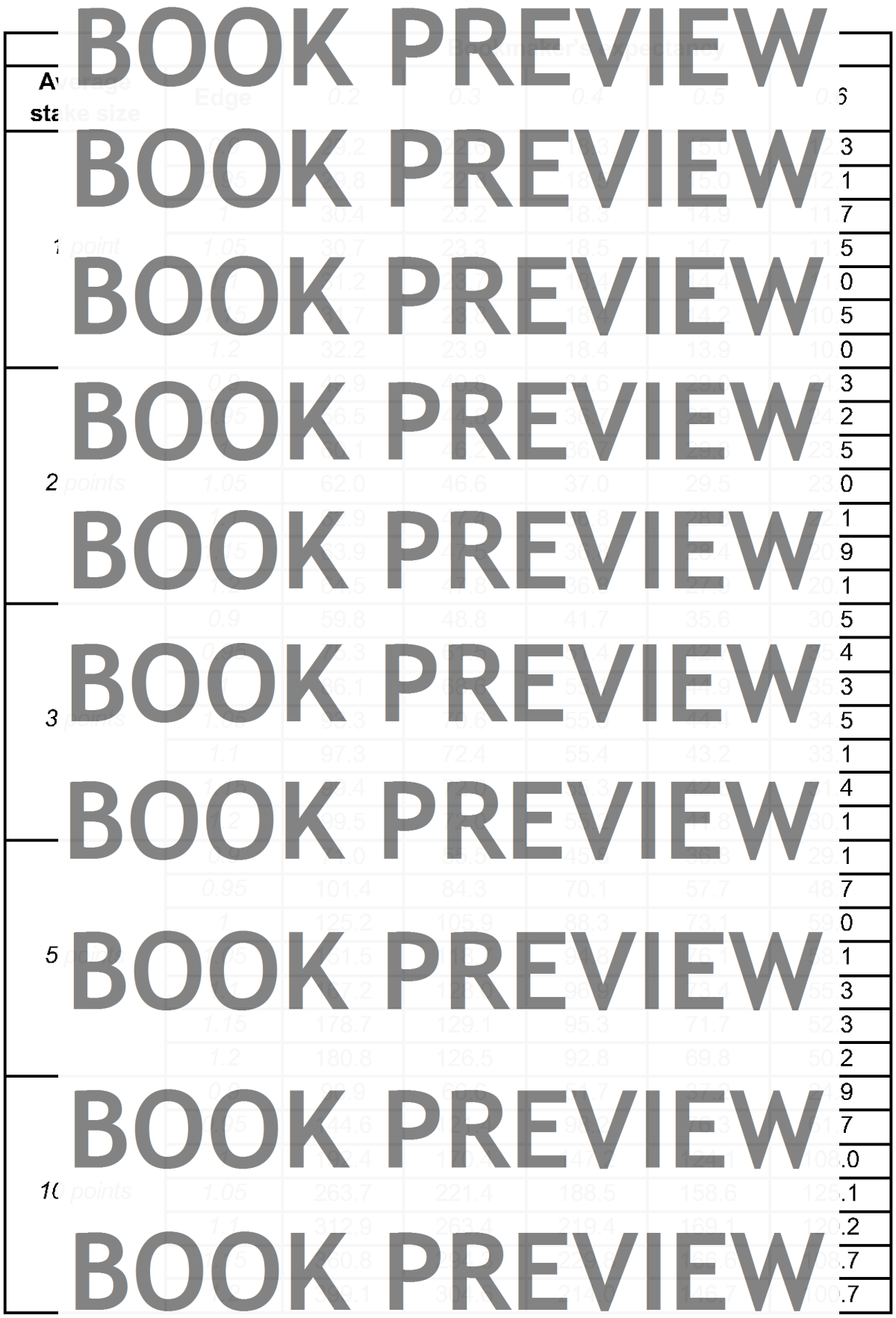


Table 7.6.3. Probability of bankruptcy after 250 fixed profit singles

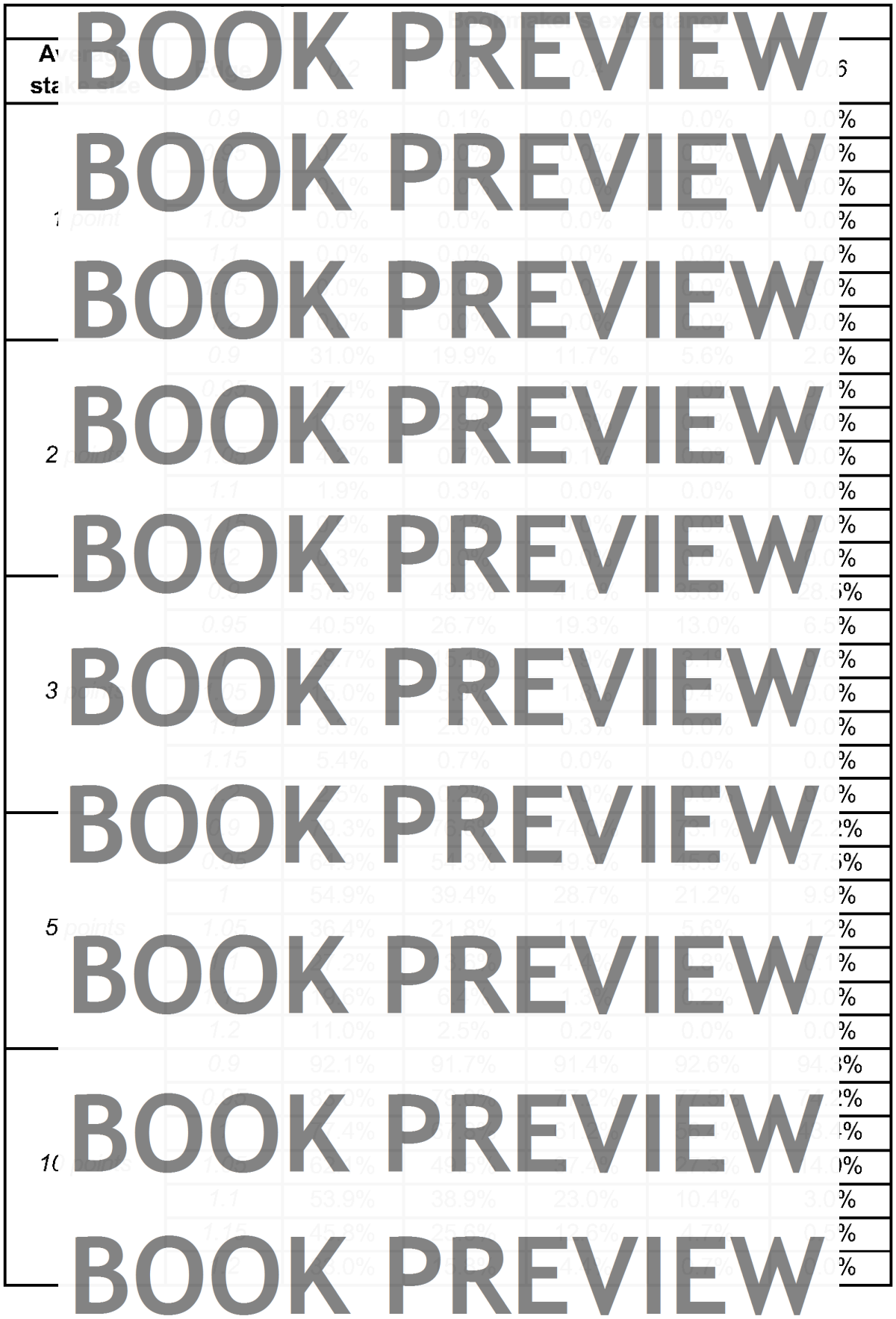
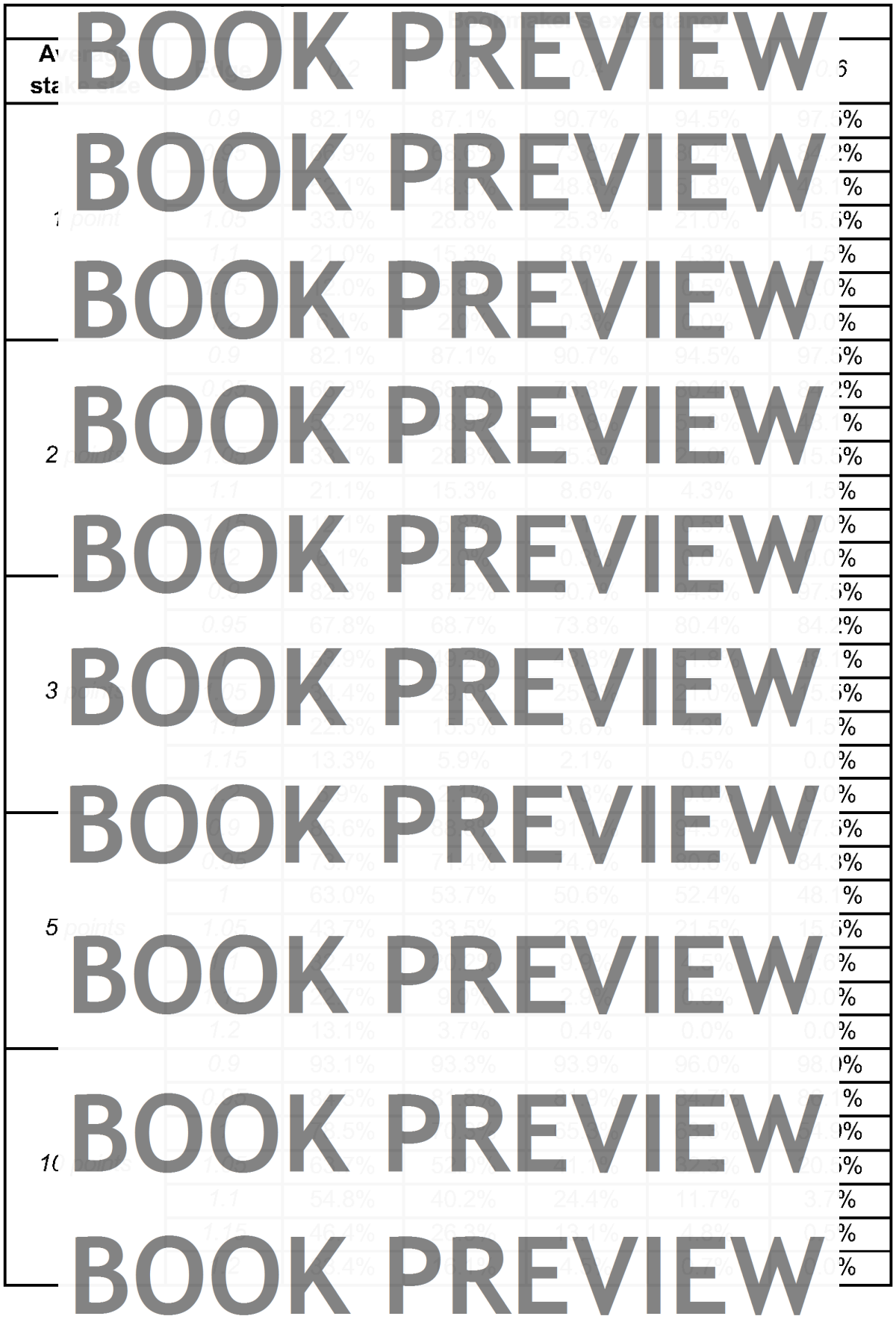
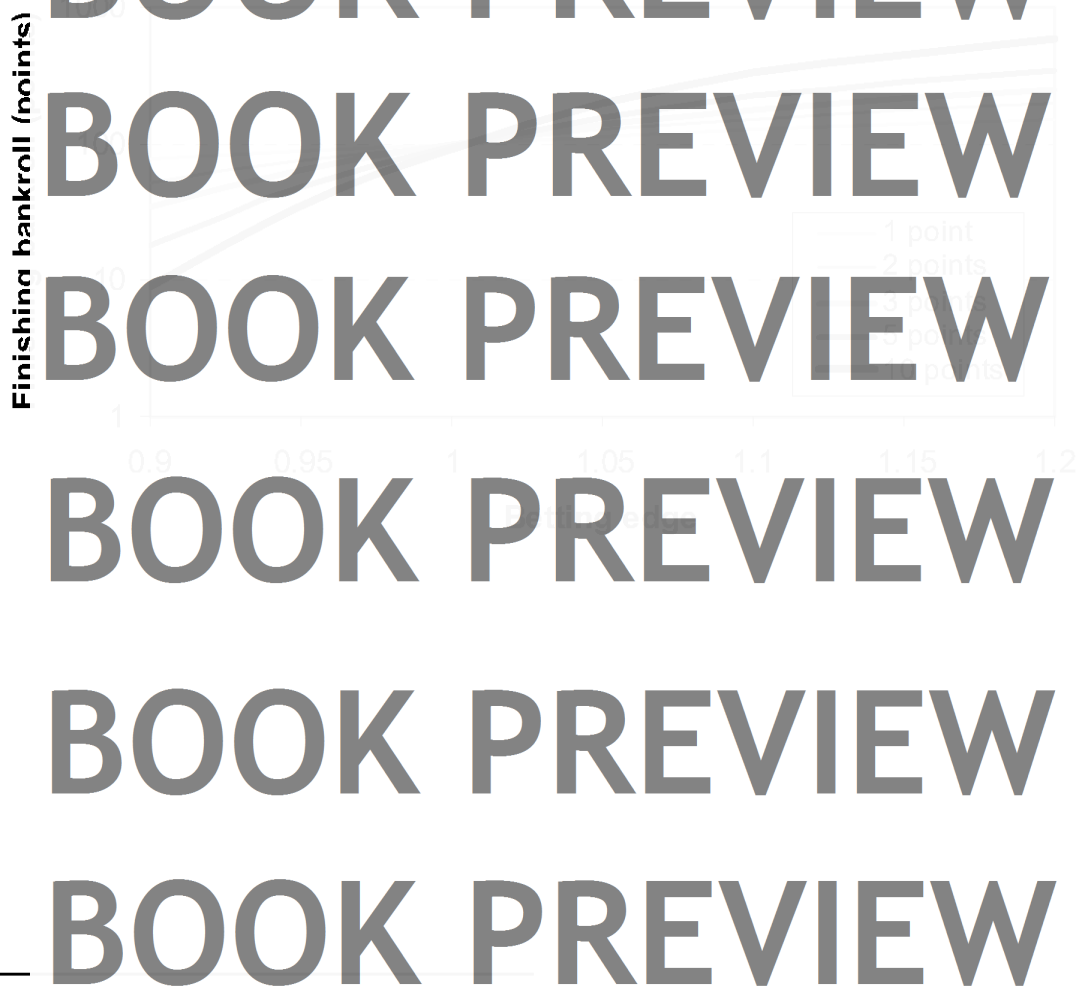


Table 7.6.4. Probability of not making a profit after 250 fixed profit singles



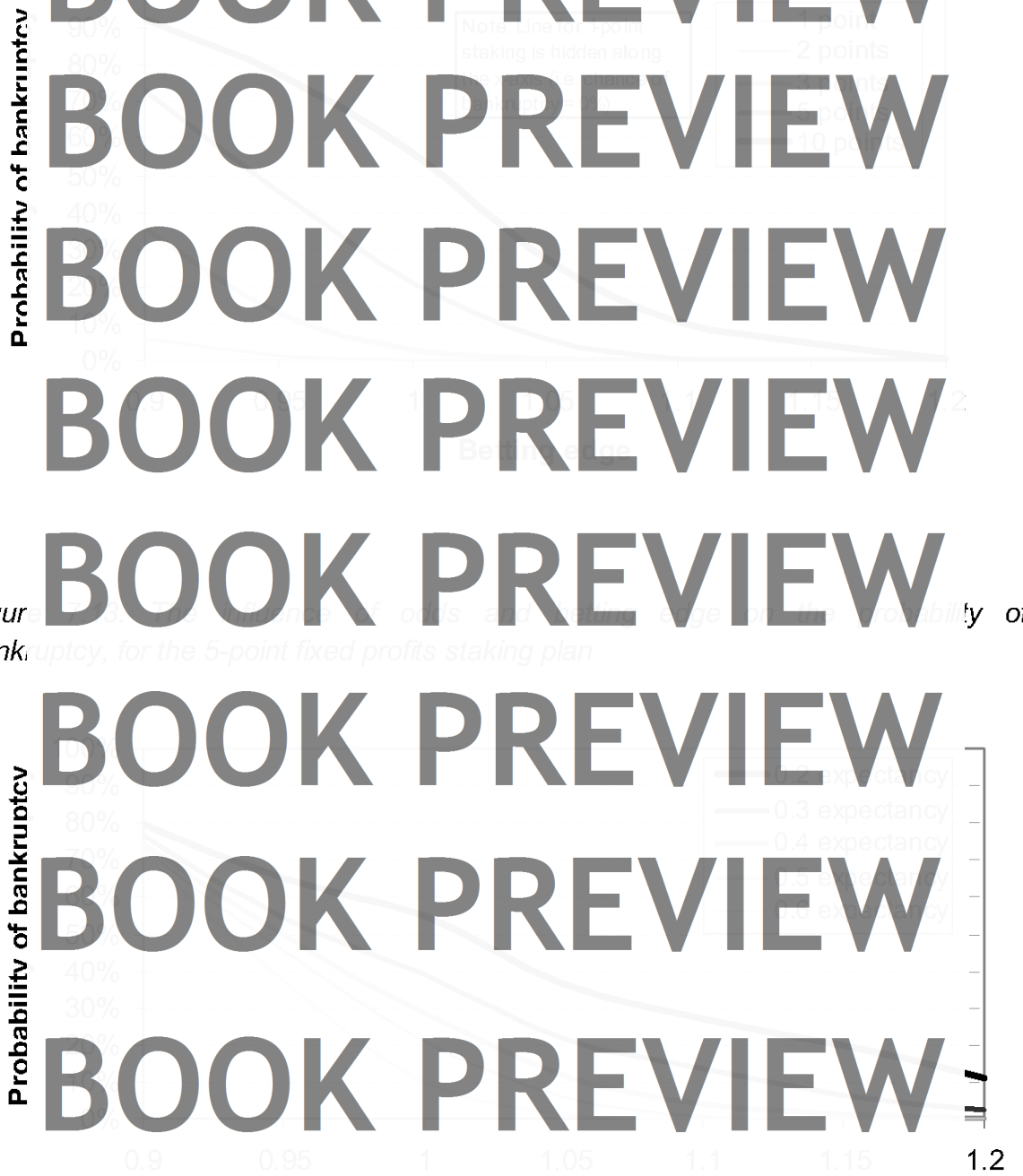
The relationships between stake size, odds and betting edge on the one hand and finishing bankroll on the other for fixed profits staking is broadly very [BOOK PREVIEW].14. Simi[BOOK PREVIEW]ls a stror[BOOK PREVIEW](see Figu[BOOK PREVIEW]bank staki[BOOK PREVIEW]s the sam[BOOK PREVIEW]are, howe[BOOK PREVIEW]ause of th[BOOK PREVIEW]This is illu[BOOK PREVIEW]gate these[BOOK PREVIEW]that statis[BOOK PREVIEW]

Figur[BOOK PREVIEW]shing bank[BOOK PREVIEW]oll, with average bookmaker's expectancy 0.5, for fixed profits staking



[45] For [BOOK PREVIEW]fixed profits staking, the points size refers to the size of the average stake, which varies according to the odds of each bet.

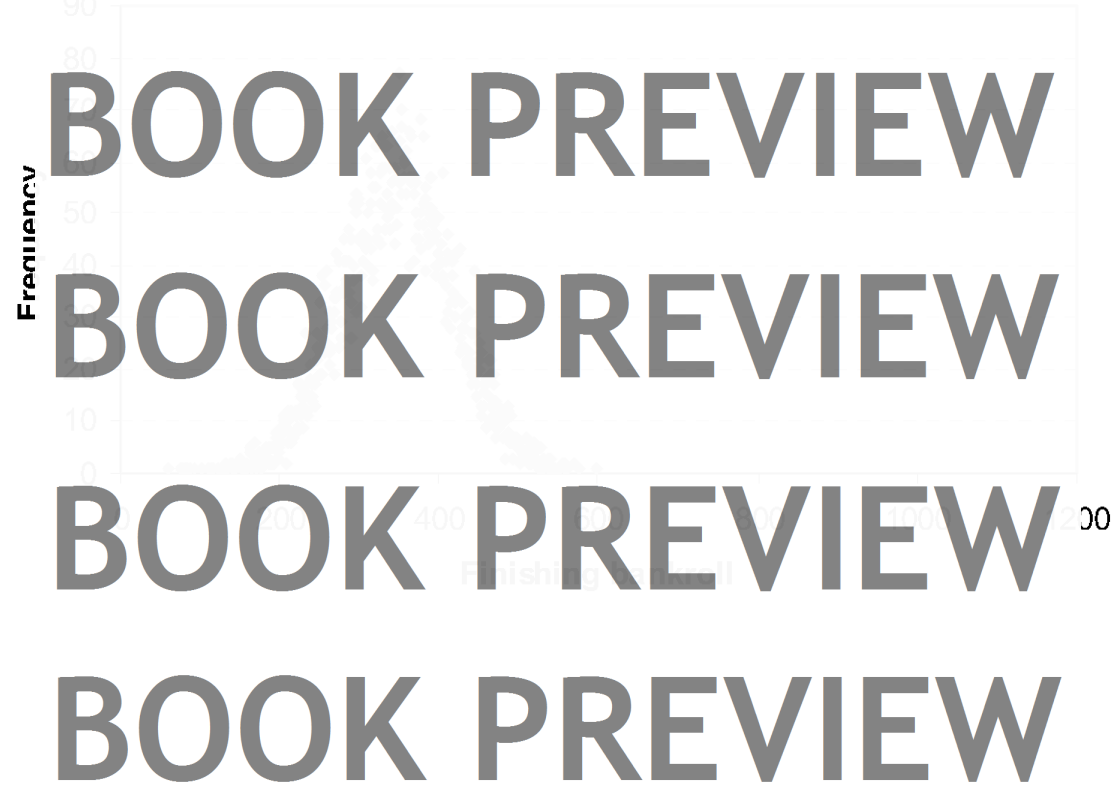
Figure 7.12. The influence of stake size and betting edge on the probability of bankruptcy, with average bookmaker's expectancy 0.5, for fixed profits staking.



Figur *bank* *uptcy, for the 5-point fixed profits staking plan*

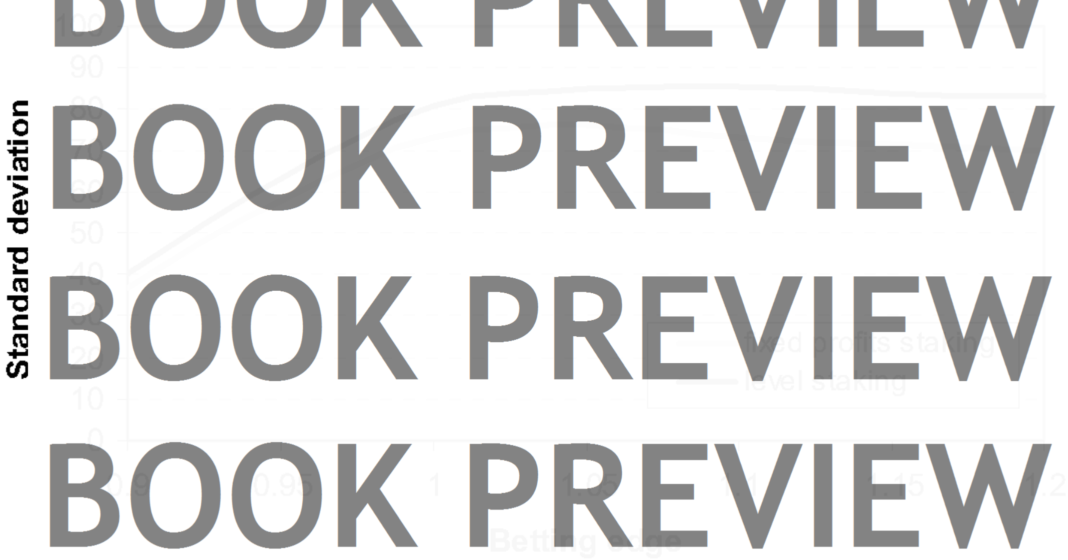
Figure 7.14. The influence of odds and betting edge on the probability of failing to return a profit, for the 5-point fixed profits staking plan

Figur *or 5-point* *2, for fixed*



[46] For fixed profits staking this is an average stake size of 5 points.

Figure 7.16. Variability (standard deviation) in finishing bankroll for fixed and level staking, for 5-point stakes and average bookmaker's expectancy 0.5



For some staking plans, the standard deviation in the finishing bankroll can be used to estimate the likelihood of finishing with a particular size of bankroll. Where the binomial, or normal, distribution provides a reasonable description of the range of possible finishing banks, it is possible to say that approximately 68% of finishing bankrolls will lie within 1 standard deviation above or below the average size, whilst about 95% will lie within 2 standard deviations.[47] This assumption should be quite reliable for winning level staking (Figure 7.1) and fixed profits staking (Figure 7.15) scenarios. It will be much less reliable for losing fixed staking plans where rates of bankruptcy are high, and for percentage and progressive staking plans, like percentage bank strategies (Figure 7.7), for which more complex statistics would be required to account for their finishing bankroll distributions.[48] The relevance of this assumption may be further illustrated by means of an example.

Bankruptcy for even money 5-point level staking with an edge of 10% is only 2%, and the variation in possible finishing bankrolls should be close to

---

[47] The possibility of bankruptcy in sports betting means results do not theoretically conform to any known probability distribution, which is why it was necessary to run the Monte Carlo simulations. Frequently, however, known probability distributions, like the normal distribution, offer good approximations, particularly where bankruptcy rates are very low.
[48] The lognormal distribution, for example, frequently offers a fairly good approximation for the distribution of finishing bankrolls from percentage bank staking, since the distribution of the **logarithms** of these finishing bankrolls is approximately normal.

that described by the normal distribution. With an average finishing bankroll of 224 and a standard deviation of 86, this informs us that about two-thirds of the time we can expect to finish with a bankroll of somewhere between 138 and 310. In fact, knowing the standard deviation of a normally distributed set of data can allow one to calculate the chances of obtaining any possible outcome. For this betting scenario, the size of the average bank is 1.44 standard deviations above the profit line of 100, and 2.60 standard deviations away from bankruptcy. Using a set of normal distribution (or Z) tables, or a simple computer program,[49] we can calculate that the probability of failing to make a profit is 7.5%, whilst the probability of bankruptcy is 0.5%. These values are similar to those identified by the Monte Carlo simulation, 7.3% and 1.8% respectively. The higher empirical value for the probability of bankruptcy is likely to be a consequence of the assumption that where the bankroll is lost before 250 wagers have been placed, the betting is terminated. There is no opportunity for recovery from a lost bankroll. A calculation from first principles using the normal distribution cannot take this important condition into account, which is why the Monte Carlo simulation was run.

The significant feature of Figure 7.16 is that the standard deviation in the finishing bankroll is consistently lower for fixed profits staking than it is for level staking. This is true for any range of betting odds. For even money fixed profits staking at an average of 5 points per bet and an edge of 10%, the average bank is 226, which is almost the same, unsurprisingly, as that for the equivalent level staking scenario. For the fixed profits scenario, however, the standard deviation in the finishing bank is 73, 13 less than for the equivalent level staking plan, with the average finishing bank now a larger 1.73 standard deviations above the profit line. Statistically, this converts to a probability of failing to make a profit of only 4.2%, in contrast to 7.5% for level staking. Again, this figure compares well with the experimental result from the Monte Carlo simulation of 4.5%.

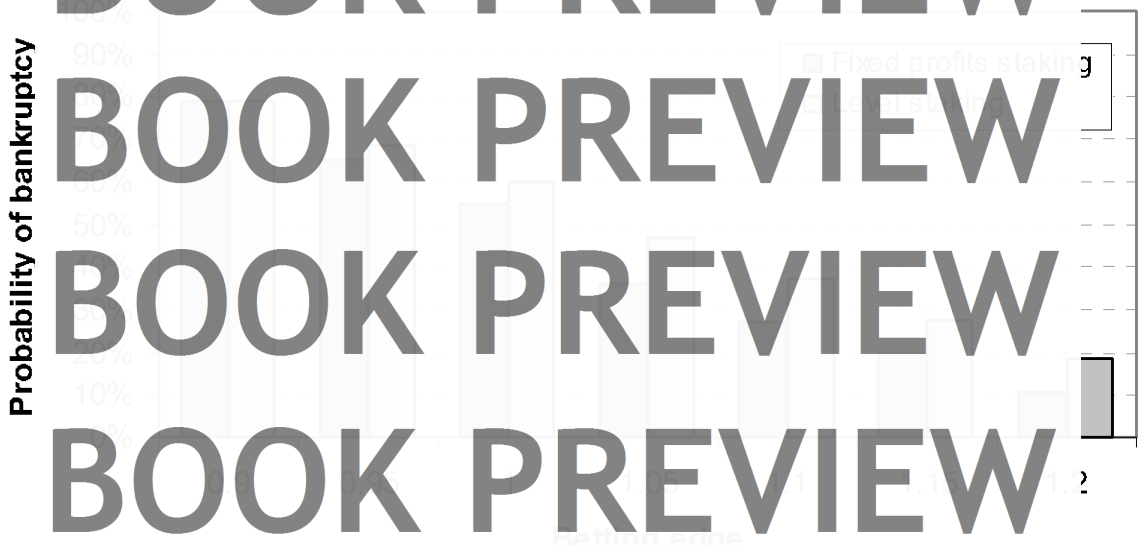
For all profitable betting systems, that is, those with an edge greater than 1, fixed profits staking offers roughly the same rewards as for level staking but at a reduced risk, both of losing the betting bank (Figure 7.17) and failing to make a profit (Figure 7.18). This supplementary safety margin is not large but it is significant, and could mean the difference between profit

---

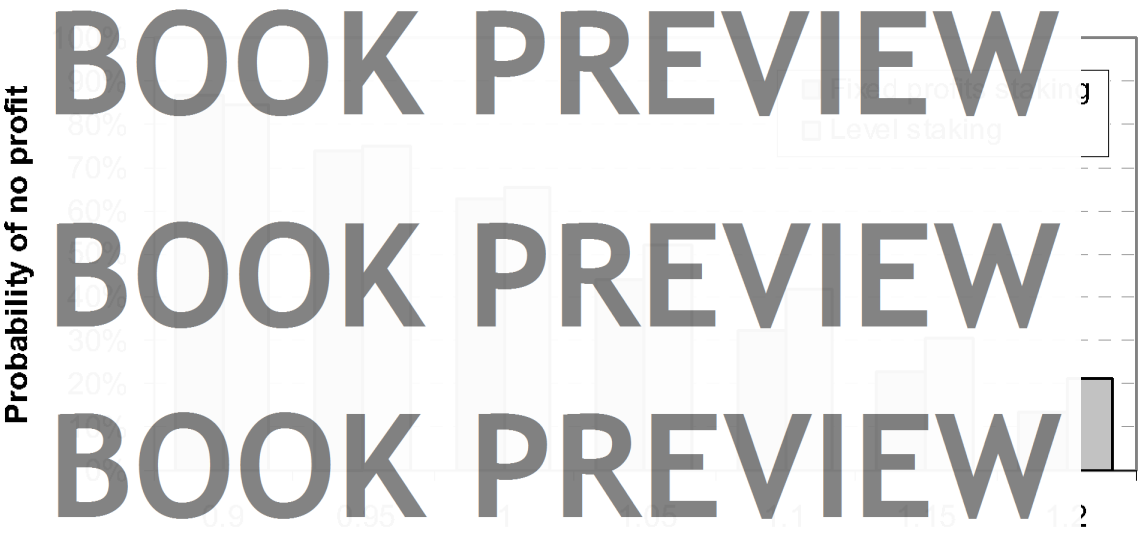
49 Hyperstat Online provide a useful normal distribution applet at http://davidmlane.com/hyperstat/z_table.html. $Z_{no\ profit}$ for the example here is -1.44 whilst $Z_{bankruptcy}$ is -2.60.

or loss, bankroll preservation or bankruptcy, particularly for higher odds and larger stakes gambling, where substantial risks exist even for profi d by the r s are high sses on lc ns in the s

Figur of the proba s



Figur of the proba ith 5-point



The Martingale

The and
in pa el is
red-b d on
eithe ence
of th idea
behi and
retur s are
reco t, as
the f

Whe otal

Mart here
he is nore
frequ ding
losse ader,
howe rous
strat soon
incre s in
succ just
to w pted
limit le, is
the f its is
quite pport
its m

[50] Wh er red or black will lose, and this where the casino gains the advantage.

Stuart Holland, in *Successful Staking Strategies*, provides an excellent and thorough proof of why Martingale is unable to make something out of noth… …the sequ… …of 8 poss… …7.7 shov…

Table … …wheel spins … for Martingale staking

Perm… tati…	…	…	…	…	…ofit …pec.
1	R, R, R	B, B, B	1, 2, 4	-1, -2, -4	-7	0.125	-0.875
2	R, R, R	B, B, R	1, 2, 3	-1, -2, +3	-3	0.125	-0.375
3	R, R, R	B, R, B	1, 2, 2	-1, +2, -2	-2	0.125	-0.25
4	R, R, R	B, R, R	1, 2, 1	-1, +2, +1	+2	0.125	+0.25
5	R, R, R	R, B, B	1, 1, 2	+1, -1, -2	-2	0.125	-0.25
6	R, R, R	R, B, R	1, 1, 1	+1, -1, +1	+1	0.125	+0.125
7	R, R, R	R, R, B	1, 1, 1	+1, +1, -1	+1	0.125	+0.125
8	R, R, R	R, R, R	1, 1, 1	+1, +1, +1	+3	0.125	+0.375
Tot…					36	1	0

R = R…

Over… …r the roule… …n. A simil… …- no over…

Table … 7.8. Permutations and profit expectancy for red-black roulette after 3 …wheel spins … for level staking

Perm… tati…	…	…	…	…	…ofit …pec.
1	R, R, R	B, B, B	1, 1, 1	-1, -1, -1	-3	0.125	-0.375
2	R, R, R	B, B, R	1, 1, 1	-1, -1, +1	-1	0.125	-0.125
3	R, R, R	B, R, B	1, 1, 1	-1, +1, -1	-1	0.125	-0.125
4	R, R, R	B, R, R	1, 1, 1	-1, +1, +1	+1	0.125	+0.125
5	R, R, R	R, B, B	1, 1, 1	+1, -1, -1	-1	0.125	-0.125
6	R, R, R	R, B, R	1, 1, 1	+1, -1, +1	+1	0.125	+0.125
7	R, R, R	R, R, B	1, 1, 1	+1, +1, -1	+1	0.125	+0.125
8	R, R, R	R, R, R	1, 1, 1	+1, +1, +1	+3	0.125	+0.375
Tot…					24	1	0

All Martingale has achieved is an increase in the number of times we can expect to make a profit, in this example from 4 with level staking to 5. Unfortunately, this is at the expense of one large loss, which is essentially the source of the inherent risk associated with Martingale staking. Before it is dismissed out of hand completely, however, it is nonetheless worthwhile exploring how it compares to the other staking plans that have been examined so far.

For the purposes of the Monte Carlo simulations, a more appropriate staking progression for each betting scenario was identified than a simple doubling-up after losses, where the nature of the progression is dependent on the size of the odds, as illustrated in Table 7.9 by the following example sequence of bets.

Table 7.9: A typical Martingale stakes progression, initial stakes of 1 point

Bet	Odds	Stake	Target	Result	Profit	Running total	Running losses
1	2.38	1	1.38	Lose	-1	-1	-1
2	1.96	2.479	1.38	Lose	-2.479	-3.479	-3.479
3	2.02	4.764	1.38	Lose	-4.764	-8.243	-8.243
4	1.63	15.275	1.38	Win	+9.623	+1.38	0
5	1.96	1	0.96	Lose	-1	+0.380	-1
6	2.70	1.153	0.96	Win	+1.960	+2.340	0
7	1.79	1	0.79	Win	+0.790	+3.130	0
8	1.92	1	0.92	Lose	-1	+2.130	-1
9	1.91	2.110	0.92	Lose	-2.110	+0.02	-3.11
10	3.23	1.807	0.92	Win	+4.030	+4.050	0

For the 1-point staking plan, the first stake and each stake after every winning bet is 1. The odds of this bet set the profit target for following bet(s) if this one should lose. The aim, then, is to win back all that is lost, plus the identified target as profit, for each and every bet. The size of each stake is determined by the amount that needs to be won and the odds of the current bet, and is given by:

$$S_n = \{[L_{n-1}] + T_n\} / \{O_n - 1\}$$

where S_n is the size of the n^{th} stake, $[L_{n-1}]$ is the magnitude of the running losses up to the $(n-1)^{th}$ bet, and T_n and O_n are the profit target and

(decimal) odds respectively for the n^{th} bet. For n = 1, the first bet, the running total of losses is obviously 0, and is 0 after every winning bet.

After odds for t ence abov rget for b ter a loss bet), whe - 1)th bet, ieve the t r the winn s set durir little conv eans of cc tting bank s as calcu

Tabl Carlo simu , the stan y of bank 0.4). Onc s.

Table 7.10.1. Average finishing bankroll (points) after 250 Martingale singles

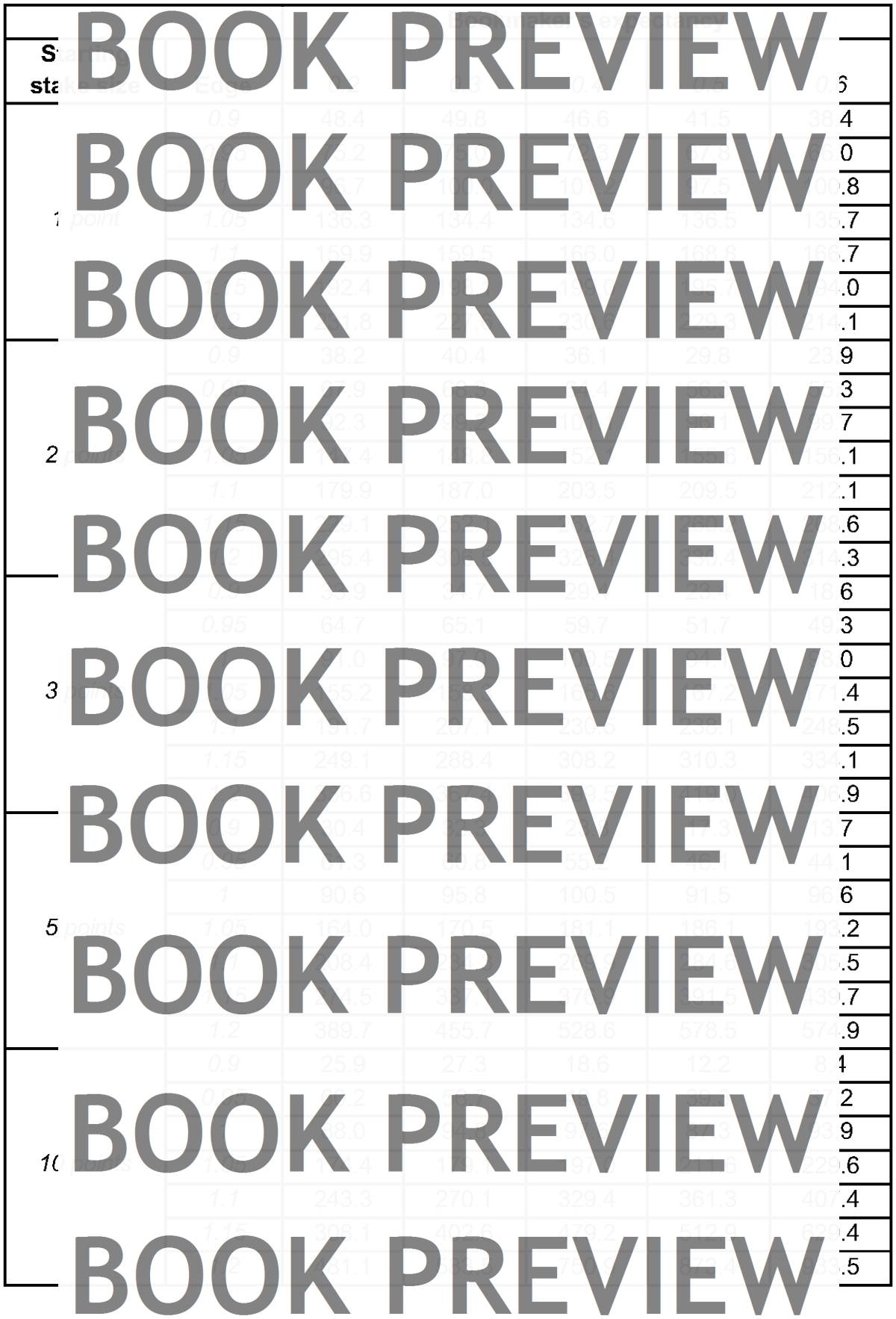


Table 7.10.2. Standard deviation in finishing bankroll (points) after 250 Martingale singles

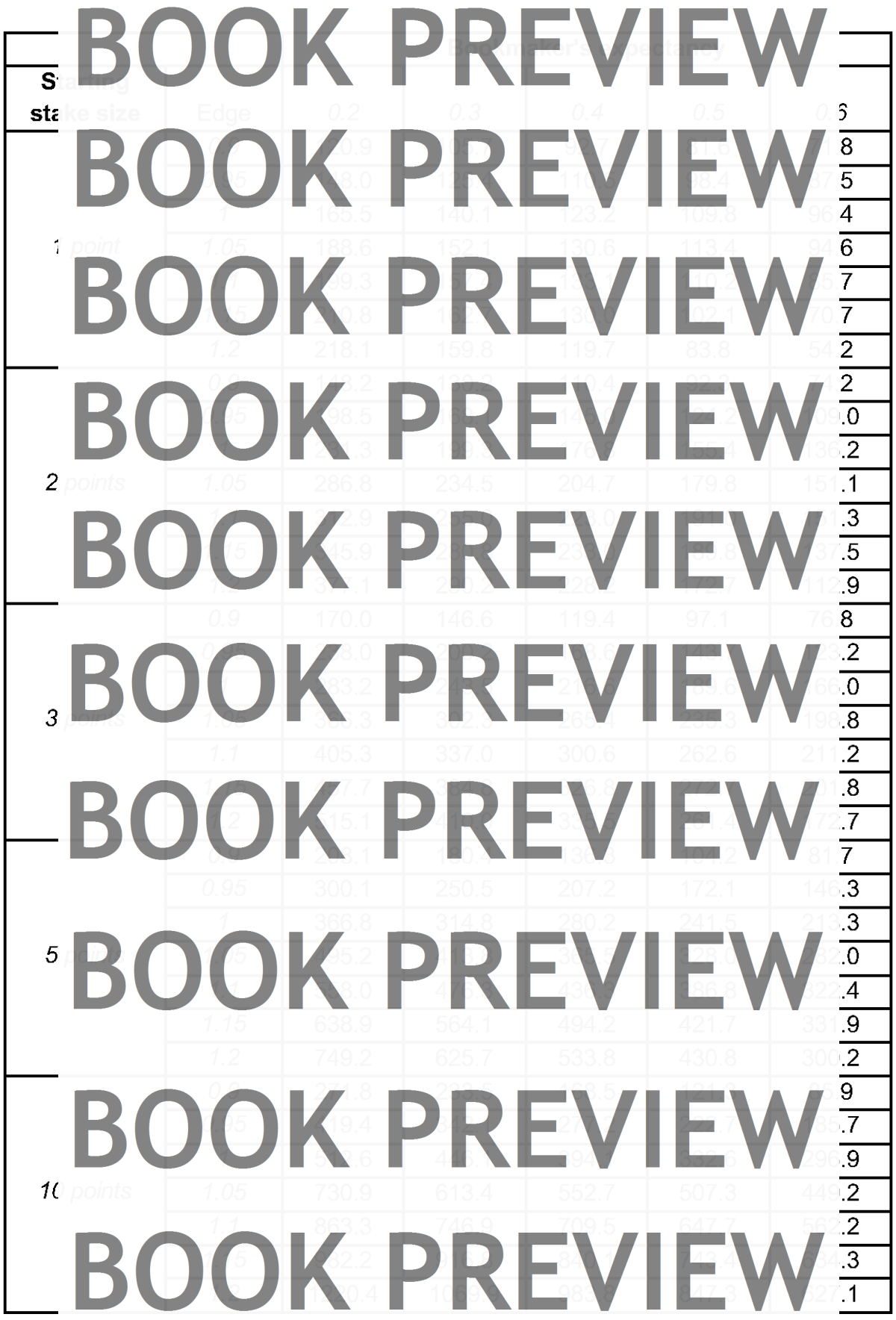


Table 7.10.3. Probability of bankruptcy after 250 Martingale singles

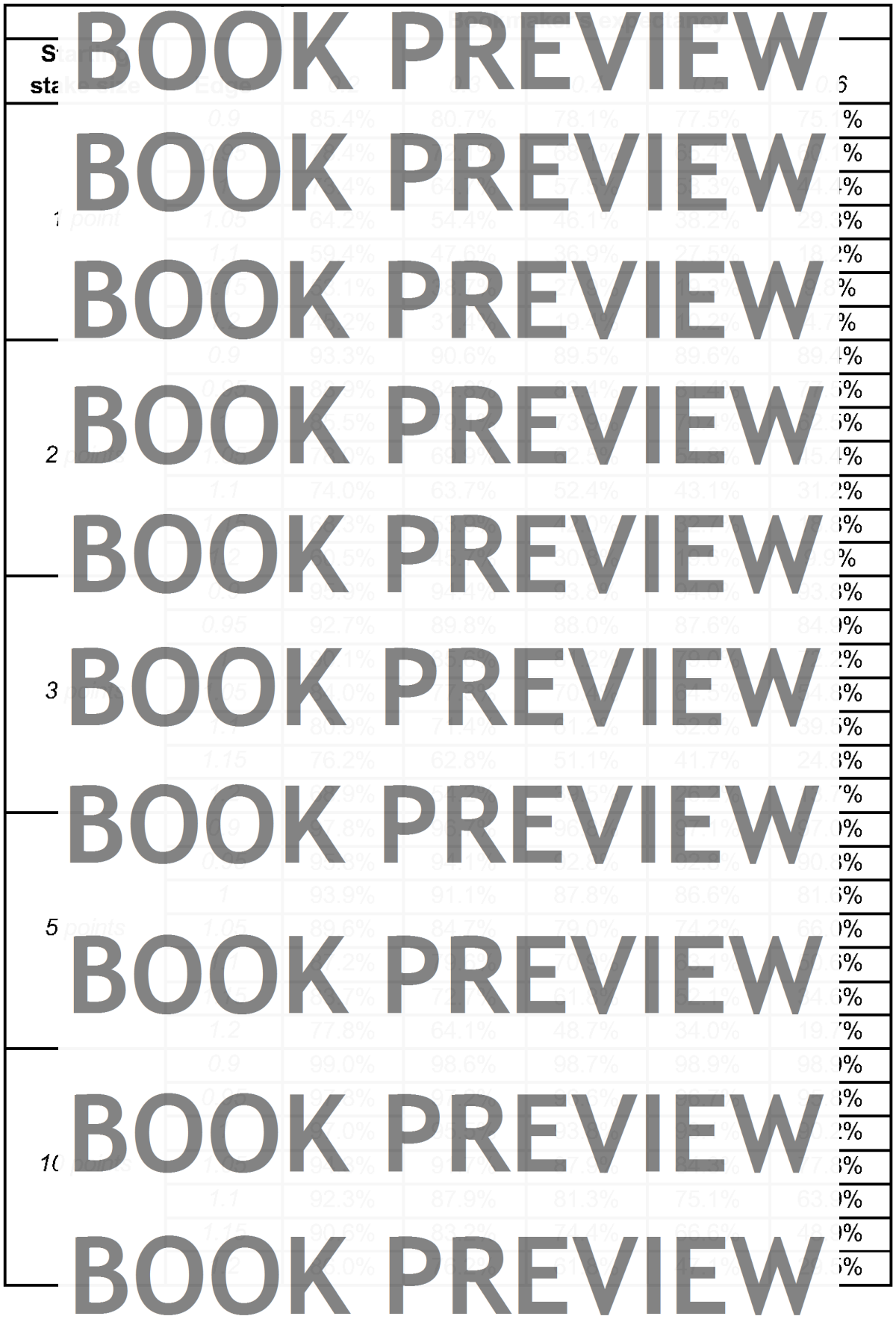
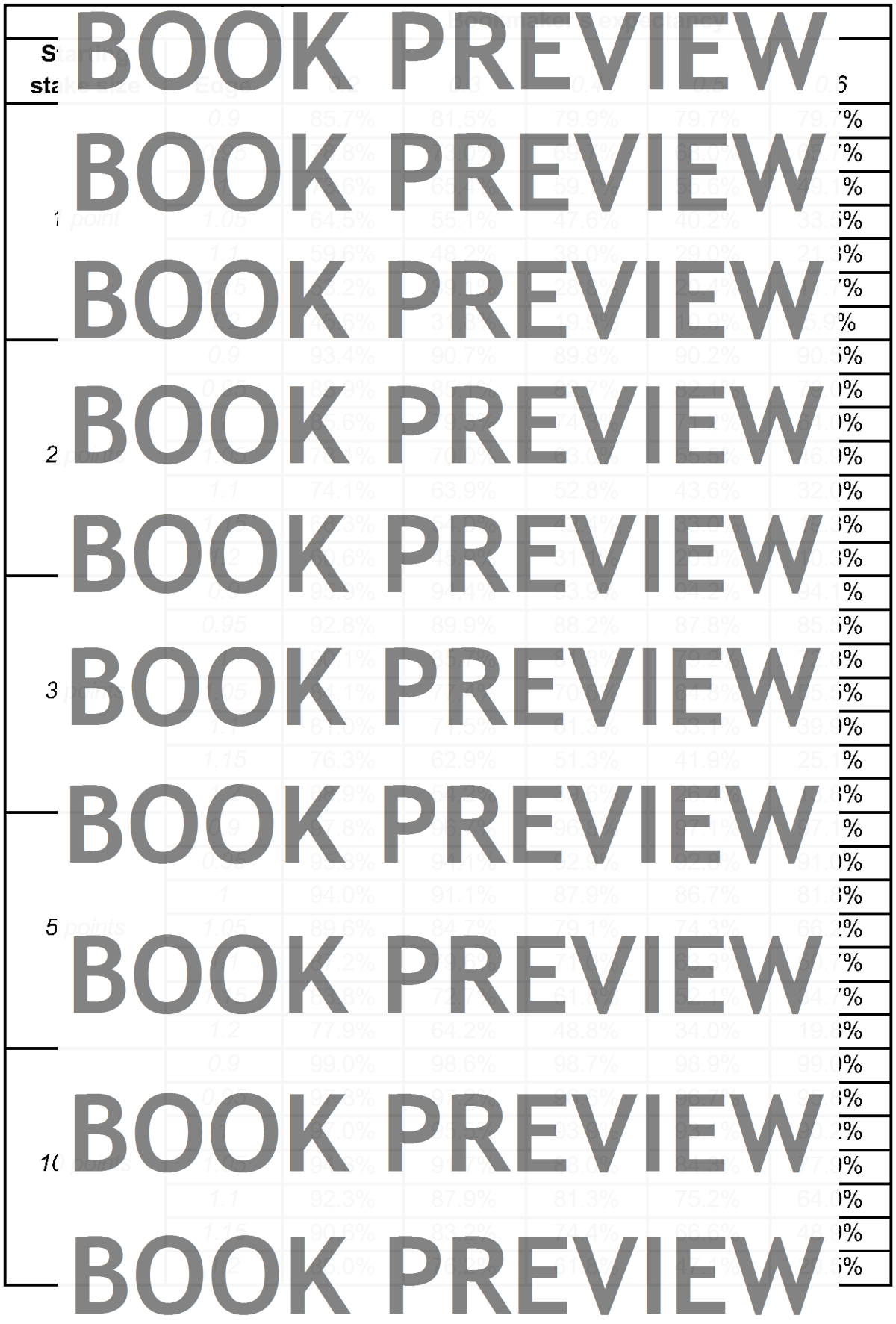


Table 7.10.4. Probability of not making a profit after 250 Martingale singles

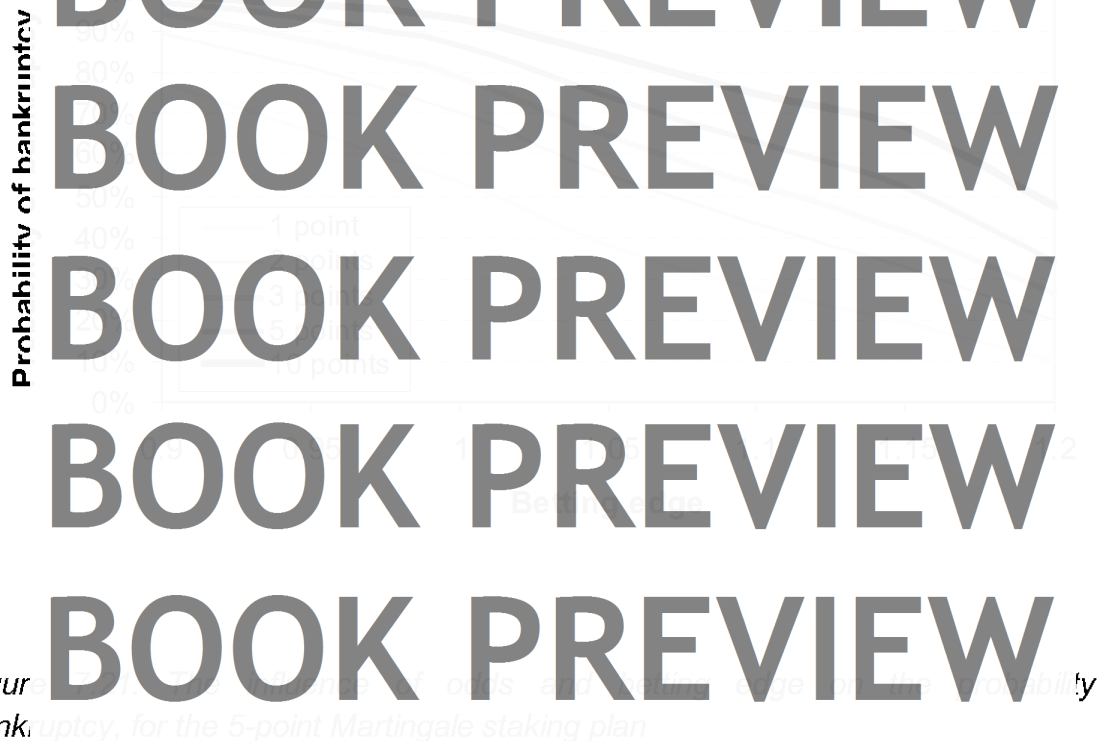


What a disaster! As for other staking plans, where the punter has found an edge, a profit can potentially be made, greater for larger stakes and shor and cons r all but t , the odds ugh, the r .21). Figu e in com s of retur ides adec at is whei

Figur shing bank

[51] For Martingale staking, the points size refers to the size of the first stake in every betting sequence, and the stake size after every winning bet.

Figure 7.20. The influence of stake size and betting edge on the probability of bankruptcy, with average bookmaker's expectancy 0.5, for Martingale staking



Figur *ty of bank* *uptcy, for the 5-point Martingale staking plan*

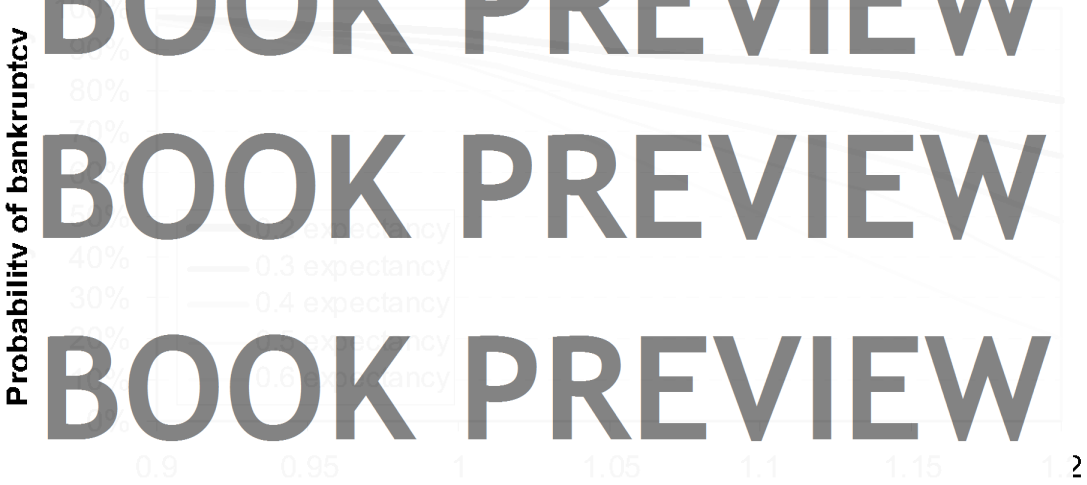
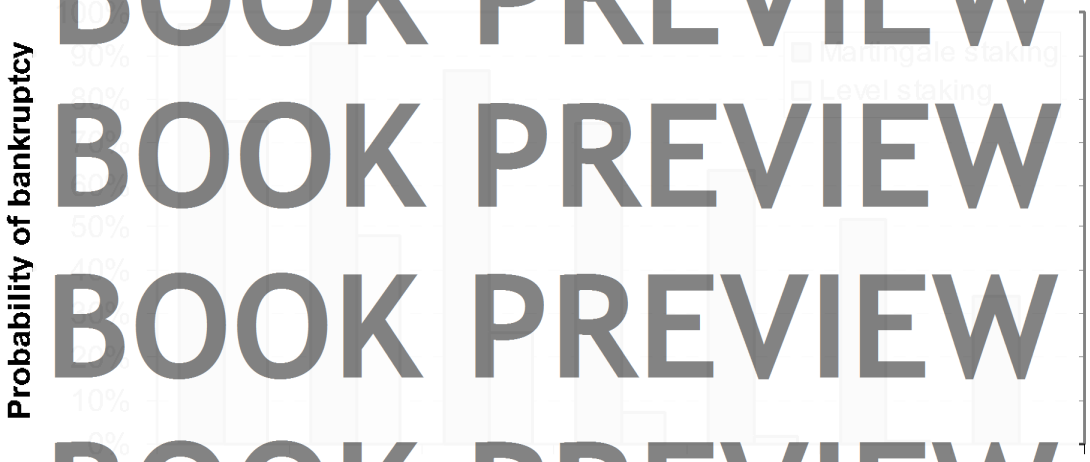


Figure 7.22. The comparison, between Martingale staking and level staking, of the probability of bankruptcy, for a bookmaker's expectancy of 0.5, with 5-point stakes



The are
expe ut of
cont t are
not s ding
in ba ank,
but v aybe
1,00 e to
indu king
limit the
punt 0.01
poin n the
prac egy,
howe egy.
In sh stem
into ning
edge ering
losse

The Pyramid Plan

The Martingale staking plan is perhaps the most extreme example of a progressive staking strategy. The Pyramid Plan, sometimes called the D'Alembert System,[52] is somewhat more conservative in the way that it increases the stake size after a loss. For the traditional Pyramid staking plan for 1/1 betting, stakes are increased by 1 point after a loss, and decreased by 1 point after a win, to a minimum of the starting stake. In this way, every loser has a corresponding winner with a 1-point higher stake, with the aim of recovering the loss.

Although clearly less aggressive than the Martingale progression, the idea that losses can be converted into profits over the long term again looks somewhat unconvincing. Further confirmation, if it were needed, of this fallacy is presented for Pyramid staking in Table 7.11.

Table 7.11. Permutations and profit expectancy for red-black roulette after 3 wheel spins, for Pyramid staking

Permu-tation	Bet	Outcome	Pyramid stakes	Profit	Total	Chance	Profit expec.
1	R, R, R	B, B, B	1, 2, 3	-1, -2, -3	-6	0.125	-0.75
2	R, R, R	B, B, R	1, 2, 3	-1, -2, +3	0	0.125	0
3	R, R, R	B, R, B	1, 2, 1	-1, +2, -1	0	0.125	0
4	R, R, R	B, R, R	1, 2, 1	-1, +2, +1	+2	0.125	+0.25
5	R, R, R	R, B, B	1, 1, 2	+1, -1, -2	-2	0.125	-0.25
6	R, R, R	R, B, R	1, 1, 2	+1, -1, +2	+2	0.125	+0.25
7	R, R, R	R, R, B	1, 1, 1	+1, +1, -1	+1	0.125	+0.125
8	R, R, R	R, R, R	1, 1, 1	+1, +1, +1	+3	0.125	+0.375
Total			*34*		*0*	*1*	*0*

No surprise there. As for Martingale and level staking, the profit expectancy for a system with 0% edge is of course zero.[53] Losses most definitely **cannot** be turned into profits. Nevertheless, let's look at the Monte Carlo simulations.

[52] The D'Alembert System is named after the 18th-century French mathematician, Jean Le Rond D'Alembert, who supposedly applied his "Theory of Equilibrium" to casino gambling.
[53] The total profit expectancy for any system with an edge less than 1 is negative, and positive for an edge greater than 1. A proof of this generalisation is offered by Stuart Holland in *Successful Staking Strategies*, and is true for all staking plans, progressions included.

For the 1-point plan, stakes are increased by 1 after every loss, and reduced, to a minimum of 1 point, by an amount equivalent to the decimal odds of the winner minus 1. This scenario is exemplified by Table 7.12. Similarly, for a 5-point plan, stakes are increased by 5 after a loss, and decreased by 5 multiplied by the decimal odds minus 1 after a winner.

Table 7.12. A typical Pyramid stakes progression, initial stakes of 1 point

Bet	Odds	Stake	Result	Profit	Running total
1	2.38	1	Lose	-1	-1
2	1.96	2	Lose	-2	-3
3	2.02	3	Lose	-3	-6
4	1.63	4	Win	+2.52	-3.48
5	1.95	3.37	Lose	-3.37	-6.85
6	2.70	4.37	Win	+7.43	0.58
7	1.79	2.67	Win	+2.11	2.69
8	1.92	1.88	Lose	-1.88	0.81
9	1.91	2.88	Lose	-2.88	-2.07
10	3.23	3.88	Win	+8.65	6.58

Table 7.13.1 to Table 7.13.4 summarises the outputs of the Monte Carlo simulations for Pyramid staking: average finishing bankroll (7.13.1), the standard deviation in finishing bankroll (7.13.2), the probability of bankruptcy (7.13.3) and the probability of not making a profit (7.13.4).

Table 7.13.1. Average finishing bankroll (points) after 250 Pyramid singles

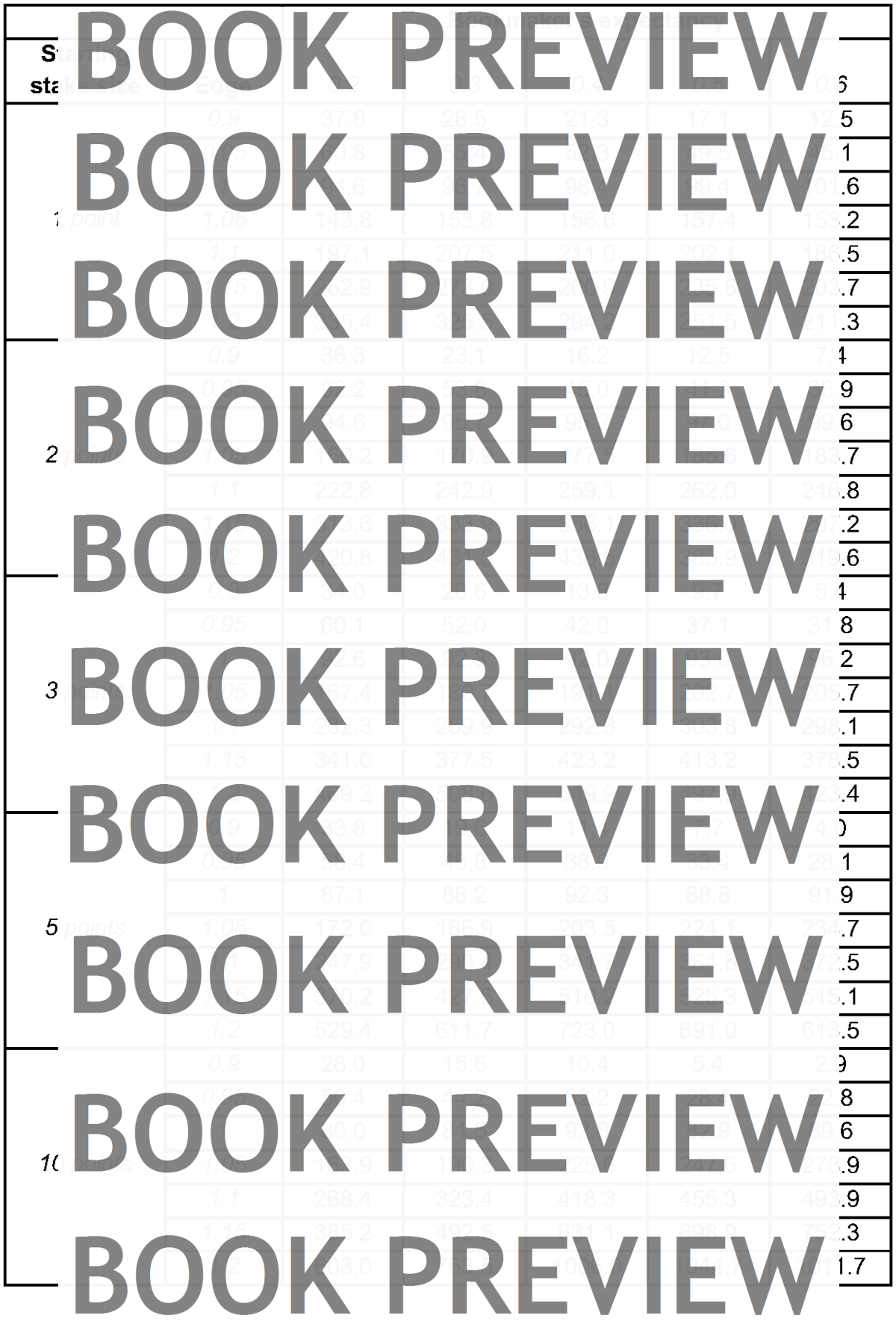


Table 7.13.2. Standard deviation in finishing bankroll (points) after 250 Pyramid singles

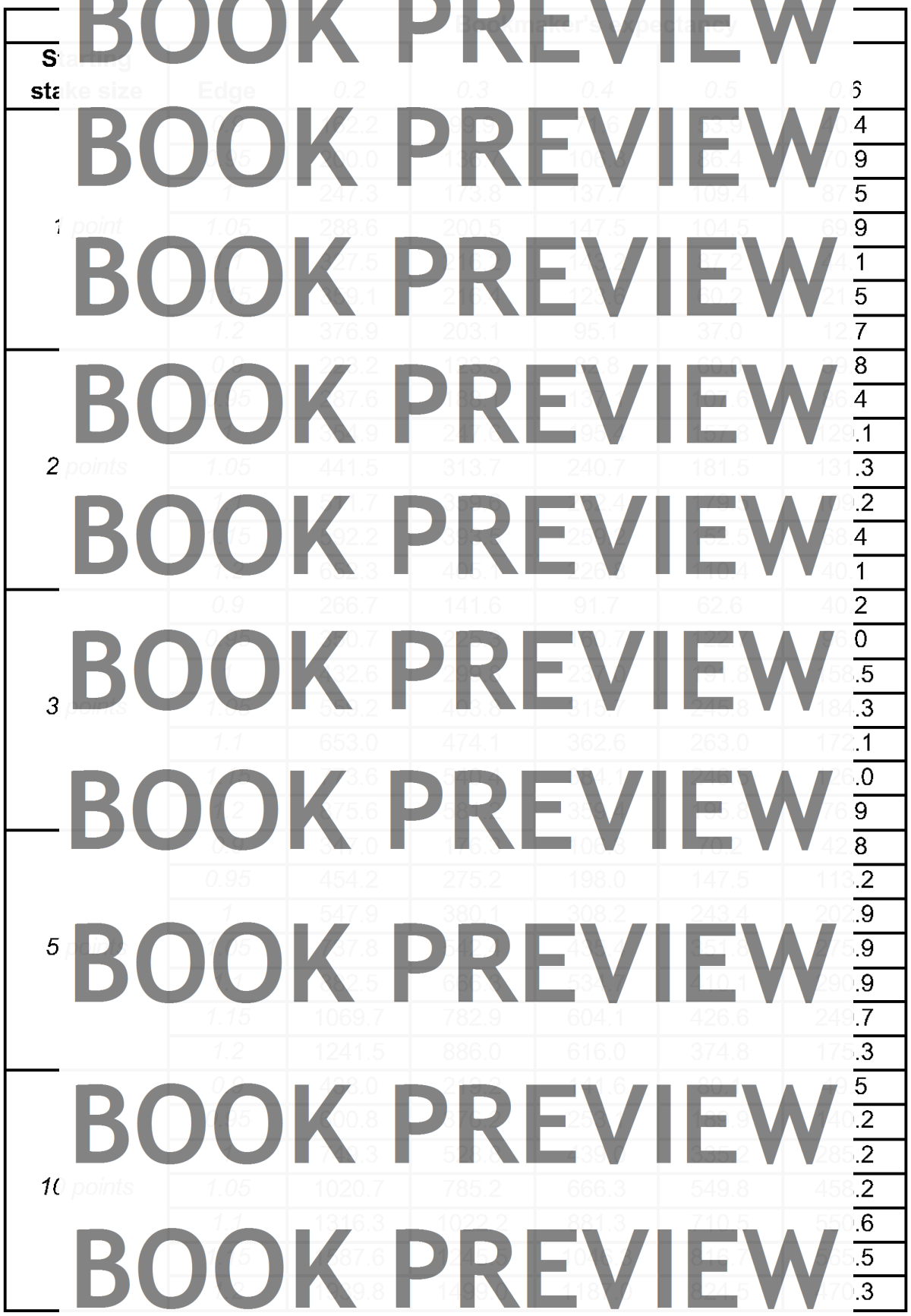


Table 7.13.3. Probability of bankruptcy after 250 Pyramid singles

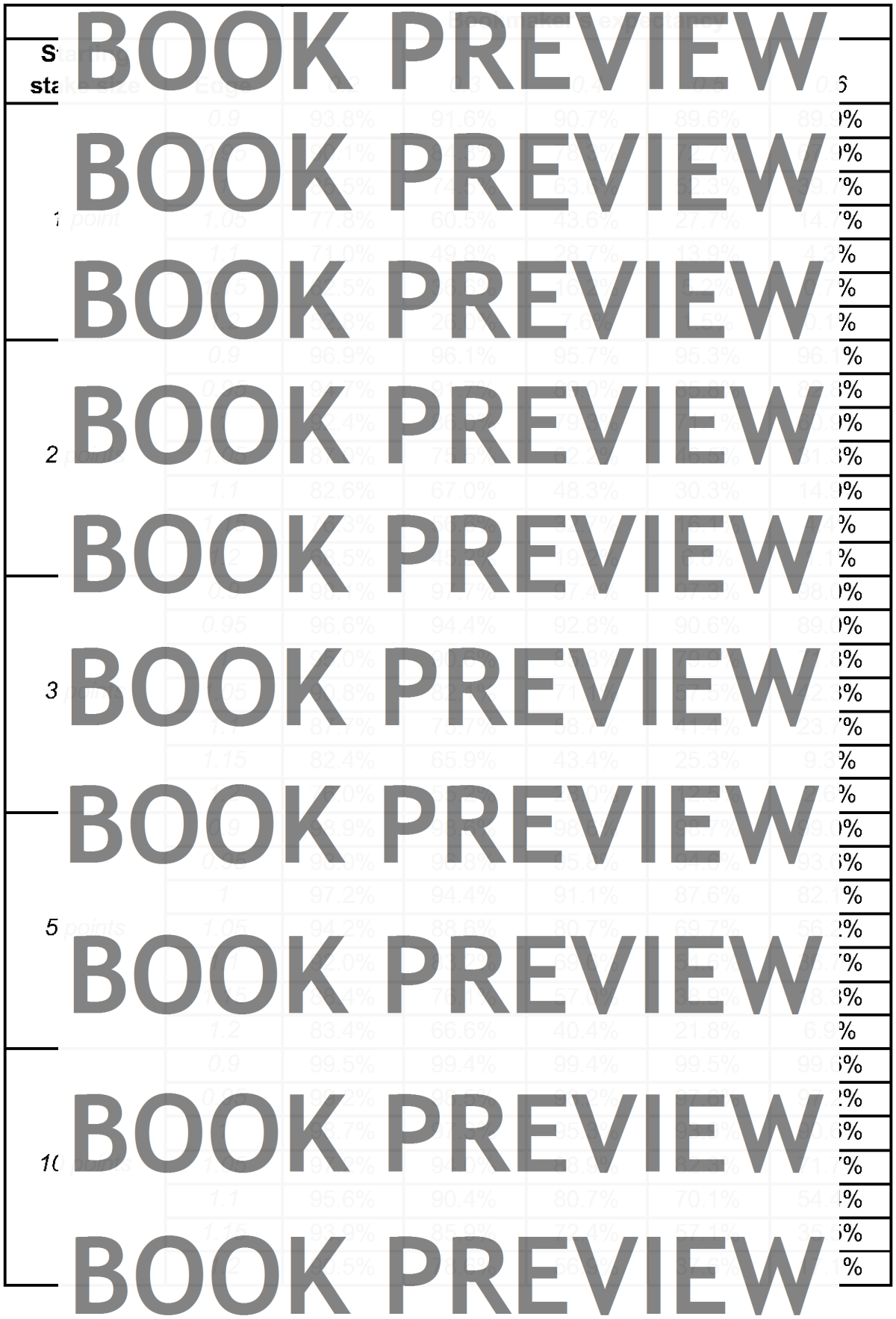
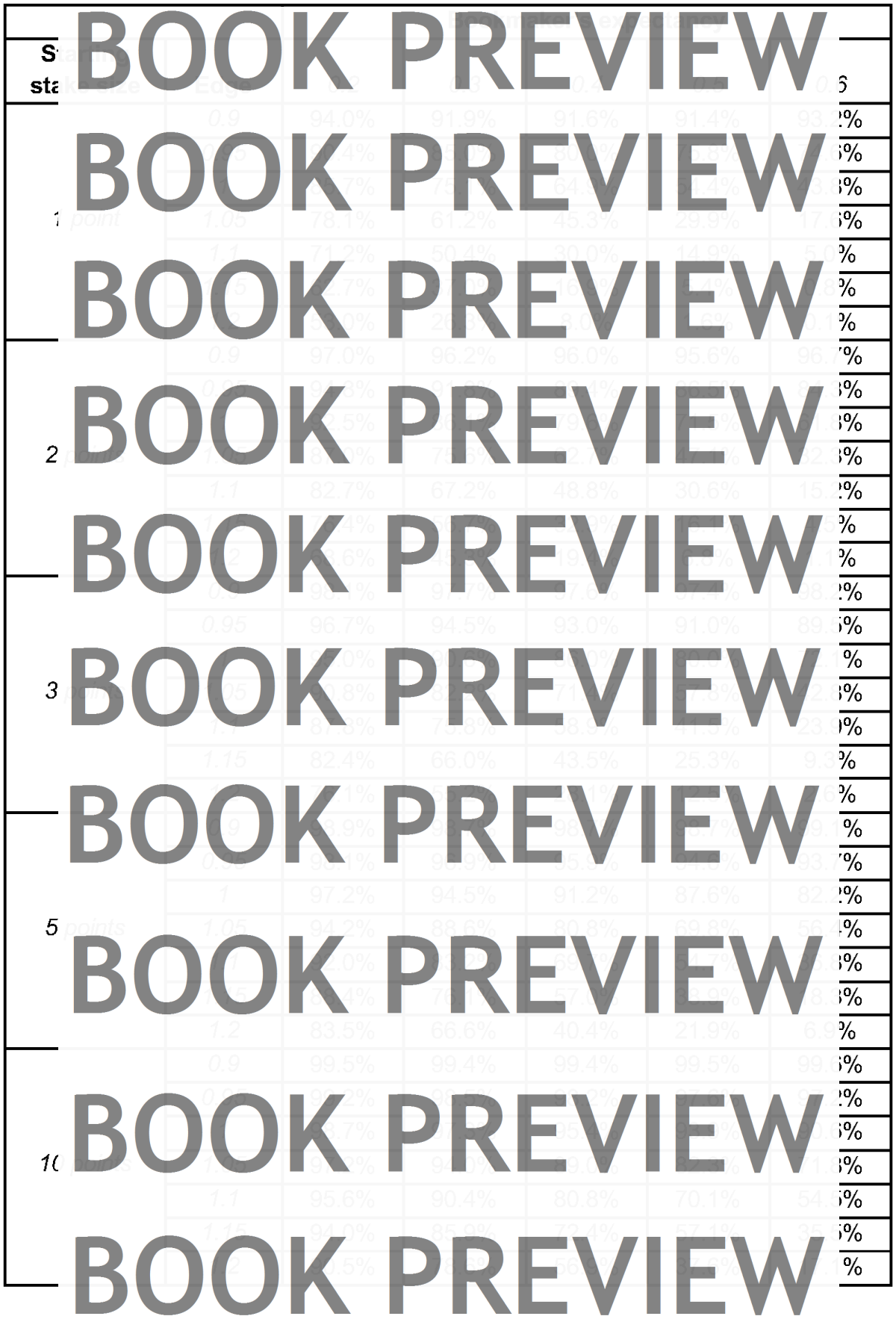
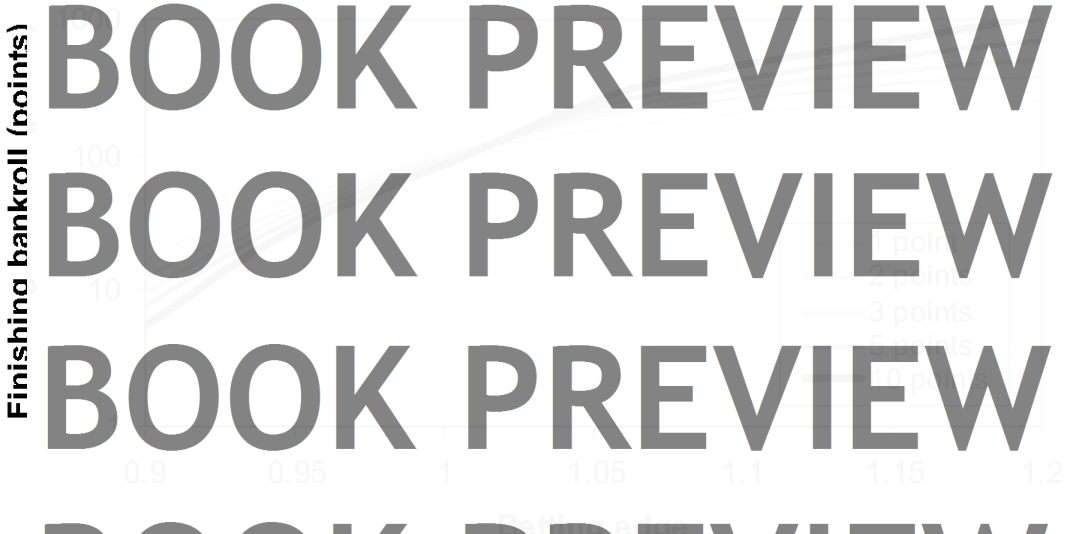


Table 7.13.4. Probability of not making a profit after 250 Pyramid singles

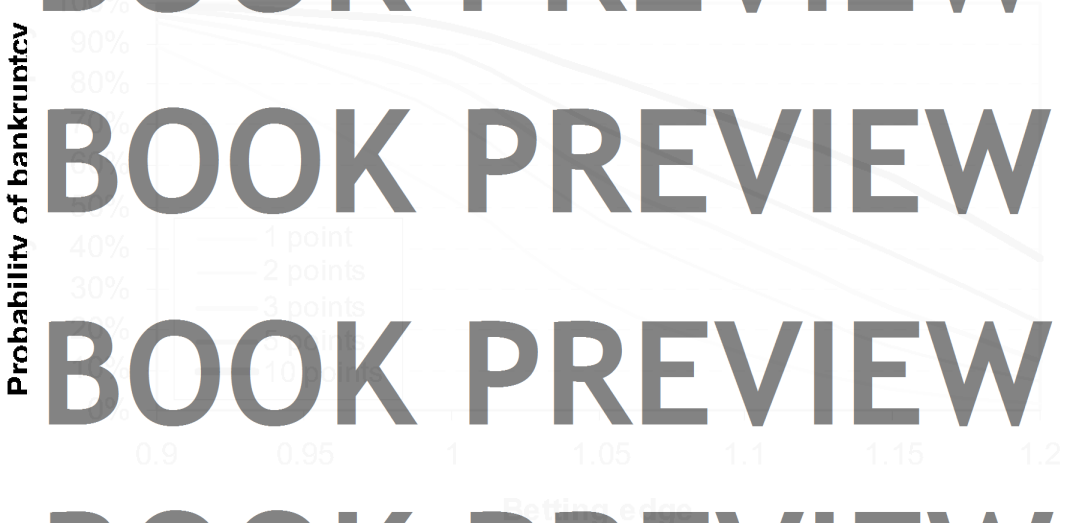


So much for being more conservative. Despite the less aggressive loss recovery strategy, the Pyramid staking plan performs little better than the Mart ith a dism cy of bank 25).

Figur shing bank



Figur ty of bank



[54] For Pyramid staking the points size refers to the size of the first stake, and the size by which the stake is increased after every loss.

Figure 7.25. The influence of odds and betting edge on the probability of bankruptcy, for the 5-point Pyramid staking plan

2

Figu king
for a

*Figur and
level f 0.5,
for th*

Kelly Staking

So f BOOK PREVIEW nost
cons ed a
real king,
altho will
pres hood
of b nter
with h an
optir , will
allov The
ansv and
perc plan
know BOOK PREVIEW

Deve , the
math t are
know e of
retur cally
justi that
max over.
The nical
Jour .pdf,
whils pler
expl how
to ca ship:

$$K = (E-1)/(O-1)$$[55]

BOOK PREVIEW

wher the
bank nd O
denc

BOOK PREVIEW

BOOK PREVIEW

BOOK PREVIEW

[55] Ac race",
althou otball
match
[56] An an as
0.1. Ir , with
those less than 1 representing an advantage for the bookmaker over the punter.

With the Kelly Criterion, one is always betting percentages of the bankroll, so as the bankroll grows, so does the size of the stakes. Likewise, when the b ze of bank fixed profi now, of c ds is no e the book itute for a rage edge ome exan

Table

Edg	ual ake
1.1	0
1.0	0
1.1	.33
1.02	56
1.07	33

With hich a ba hich the b

whic

whe take of 2(ancy facto % for such es it woul ould

grow by 2%. The size of the bankroll after n bets may then be determined by the following expression:

whe For
mos back
varia rican
spor or a
little g the
edge ettor
can bets
since

After le, a
punt 0 to
grow

It is dge,
the s have
an e take
size.[58] There are also inherent dangers with Kelly staking, where the
punt ds is
neve nate
what nore
than kroll
may rn, a
fract one-

[57] Be on of possil figure 7.7), t lls, its value most comm ere E is the tively, will b would requir

[58] In t there are m rmula does orses in a single race, one of which may not represent value.

half or one-third of the suggested Kelly stakes. Such strategies will obviously have the benefit of reducing the probability of bankruptcy, altho The choi f the punt

To te has beer ame for t tting edge n be calcu , the Kelly ge of 1.05 have actu each fair o be so a the betti 1.05 aver been assi edge is le take will this man Kelly staki

Tabl arlo simu the stan y of bank

Table

E	Bookmaker's expectancy				
dge	0.2	0.3	0.4	0.5	0.6
	NA	NA	NA	NA	NA
	NA	NA	NA	NA	NA
7	NA	NA	NA	NA	NA
1.05	119.8	134.3	153.0	187.4	266
					5
					0
1.2	1341.1	7383.4	78588	3501464	068

Table 7.15.2. Standard deviation in finishing bankroll (points) after 250 Kelly stake singles

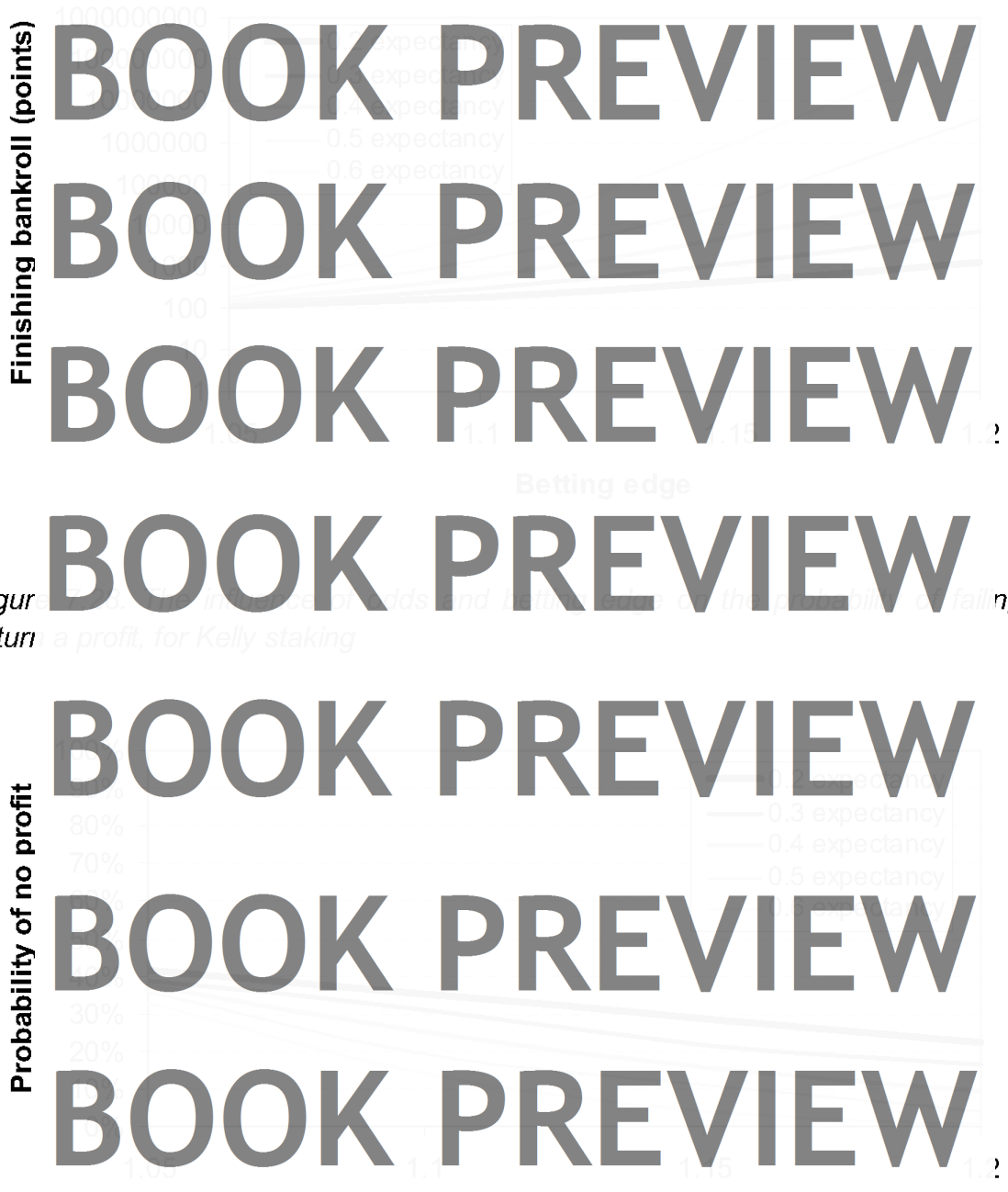
Table

Table

Ther ney, prov e, in its a o be truly bility in th y of

finishing bankrolls lower than the average value, a feature common to all percentage staking plans (see footnote 57 earlier). Figure 7.27 reveals that profi d on acc size of th dds sma e for ever e for shor

Figur k, for Kelly



Figur ng to return a profit, for Kelly staking

Using $B_n = B\ (F_1\ F_2\ F_3\ \ldots\ldots\ F_{250})$, it is possible to calculate the expected[59] size of the finishing bankroll for each scenario, assuming that the betting edge for each of the 250 bets is the same. Table 7.16 shows these expected finishing bankrolls for each betting scenario according to this equation, whilst in Table 7.17 a comparison is made with the actual average finishing bankrolls. The difference between the two, for each scenario, is expressed by means of a ratio (actual/expected), and provides a measure of how well the real scenarios perform, given the punter's margin of error in the assessment of the edge for each specific bet.[60]

Table 7.16. Expected finishing bankroll (points) after 250 Kelly stake singles

	Bookmaker's expectancy				
Edge	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*
0.9	NA	NA	NA	NA	NA
0.95	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA
1.05	118	133	157	199	294
1.1	194	314	608	1559	7204
1.15	442	1305	5681	45866	1329786
1.2	1395	9410	124483	4765145	1583562064

Table 7.17. Ratio of actual average finishing bankroll to expected finishing bankroll after 250 Kelly stake singles

	Bookmaker's expectancy				
Edge	*0.2*	*0.3*	*0.4*	*0.5*	*0.6*
0.9	NA	NA	NA	NA	NA
0.95	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA
1.05	1.01	1.01	0.97	0.94	0.91
1.1	1.00	0.94	0.93	0.95	0.91
1.15	0.96	0.92	0.86	0.72	0.66
1.2	0.96	0.78	0.63	0.73	0.16

[59] Considered here to be the average, and not the median, finishing bankroll (see footnote 57).

[60] The standard deviation in the edge for each betting scenario was about 0.1, meaning about two-thirds of the betting edges were within 0.1 either above or below the average edge for that scenario. For an average edge of 1.05, for example, the scenario assumed that 32% of bets actually failed to hold value. As argued, this feature is intended to replicate a punter's likely betting experience, and is preferable to awarding an edge of 5% for every bet, something a punter would find impossible to achieve, given the inherent uncertainties in sports prediction. Readers may wish to refer back to Table 7.1 and also the appendix.

For the majority of betting scenarios, it is surprising how close the actual average finishing bankroll is to the expected finishing bank. The disc ably beca the asse ct on profi good judg rt of that

Kelly il of staki ride out t king, the p l risk of ba f the punt has foun dge has ught to b uld. Whe ke a wag nuch to ar

Tabl Carlo simu has inac s is assu akes will b dge is 1.

Table or an edge

E					
7.2	191.4	301.9	580.9	1482.8	6291.5

Table 7.18.2. Standard deviation in finishing bankroll (points) after 250 Kelly stake singles, for an edge estimate of 1.05

Table *edge estim*

Table *or an edge*

Figu *on to all st* *eturn*

a profit over the long term. For Kelly staking, where the punter has overestimated his advantage over the bookmaker, odds-on betting will be pote are large ainst total dge, the p here is nc

Scer e, as one king (Figu rofit takir ther char g is pote f the Kelly true valu this conc e or rathe rofit, albei s for real arter resp dge is 1(er is twice here the r

Figur k, for Kelly

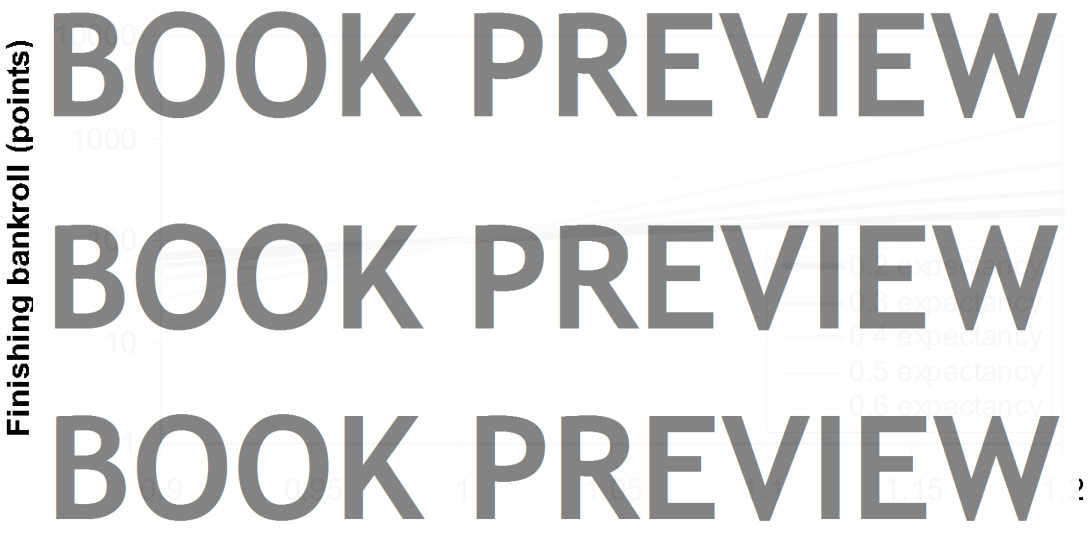


Figure 7.30. The influence of odds and betting edge on the probability of failing to return a profit, for Kelly staking with an edge estimate of 1.05

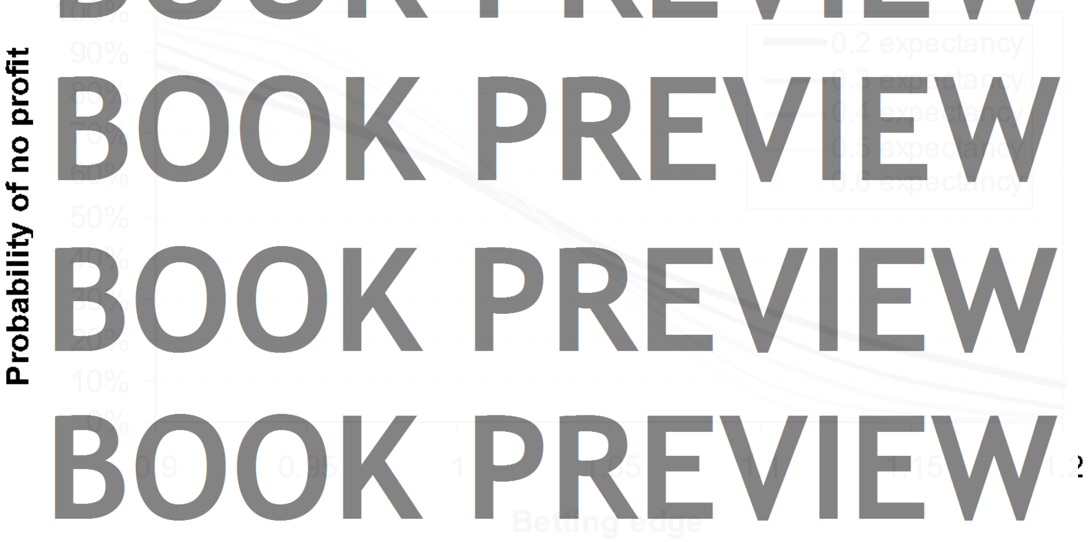
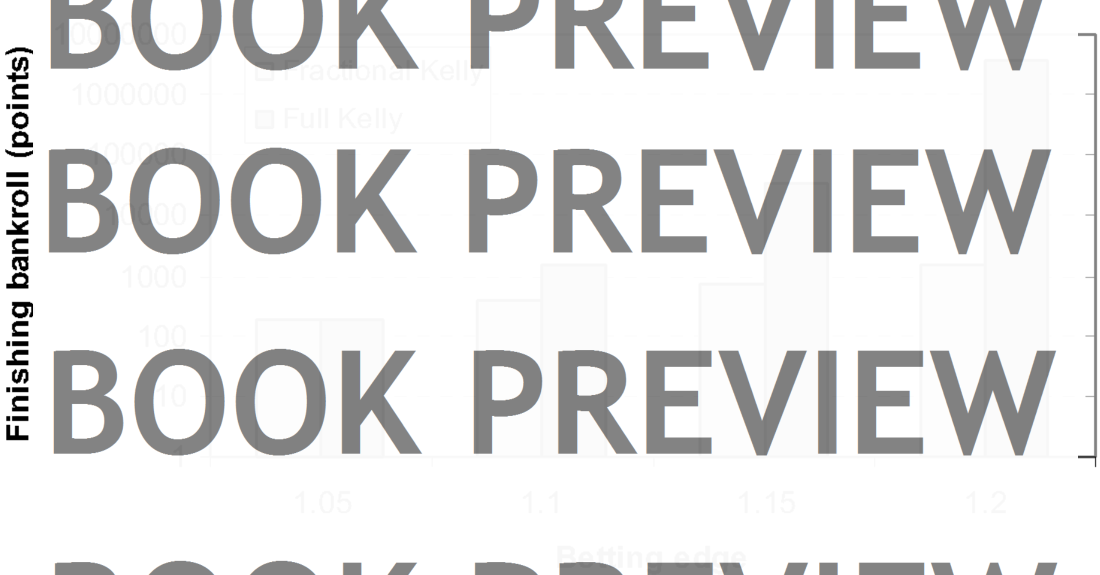


Figure 7.31. A comparison of full and fractional[61] Kelly staking for average finishing bankroll, for a bookmaker's expectancy of 0.5



[61] Betting edge estimated as 1.05.

Figure 7.32. A comparison of full and fractional Kelly staking for the probability of failing to return a profit, for a bookmaker's expectancy of 0.5

Sum

In th ty to
retur and
bank can
be d

1. kroll
2. nore
3. the
4. sses
5. able ame

[62] This is explored further in the final chapter.

6. It is preferable to wager smaller stakes where the odds are longer (e.g. fixed profits staking).
7. Progressive staking, particularly loss recovery, is not advocated as a serious betting strategy. The risk of bankruptcy is simply too large to be considered acceptable for all but the most risk-seeking gamblers.
8. Kelly staking maximises the growth of a bankroll whilst minimising the chances of failure, although, being a percentage staking plan, the expectancy of profit is smaller than for fixed staking over a specified time span. A punter should, however, be able to estimate his advantage fairly accurately, at least on average, in order to benefit from this strategy.

What these conclusions mean for a bettor's preferences and attitudes to gambling will be examined in the final chapter.

Dev

It is
long
think
reas
impo
perti

The
spor
unfa
to ov
more
run y
likeli
strat

Beat
and
strat
betto
stake
runs
Man
strat
rand
spor
plan
show
advi

The
atter
succ
staki
reliability of this approach is essentially of little worth, particularly if the

bettor has failed to establish an edge. If a punter is to show any long-term viability with his betting, rejecting any such lack of discipline is imperative.

If the it is
the very
least and
even the
date the
book value
bettor the
book tting
syste ation
alone how
safe ore,
allow g to
diffe ising
risk. ways
analy the
benc ith a
punt tem;
a ne

Sinc the
book es to
som nter
to c ably
whe aker.
Foot orts
betti ker's
dispe able
long eld a
punt h as
poss imal
over With
over it is
no s treet
book ll be
able odds
for e king

strategy will be higher,[63] since losing runs will be more commonplace. Any punter choosing to focus on correct score football betting would be wise to keep ties, as w cess, whet nnis, darts and over the over o an even

It is riced doub n be enha f the influ l. Of cour ptcy with will, of c d its man

Bac

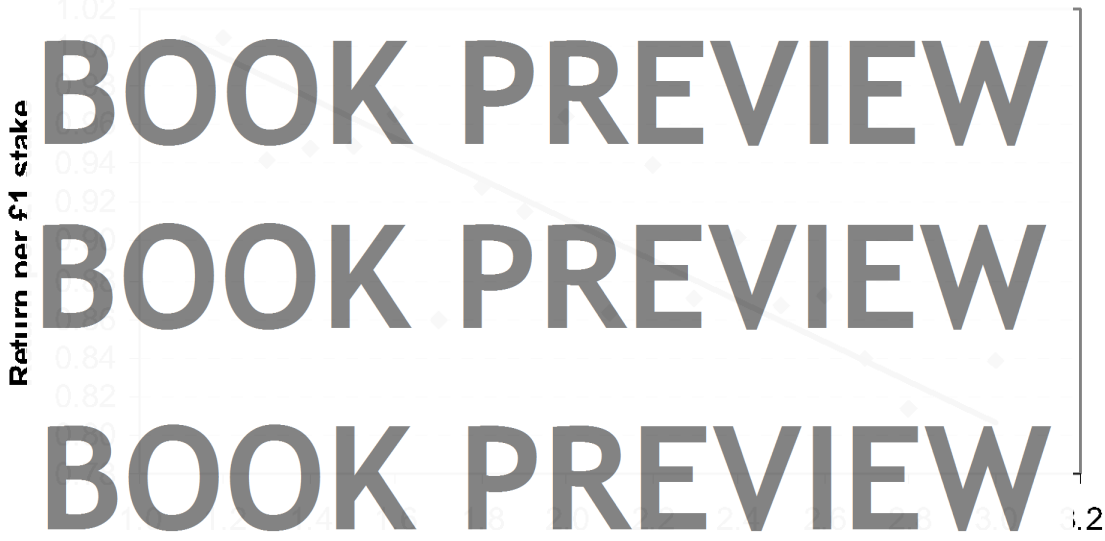
A fr on a favo have clain that betti nt in the l r the surp this argu in a cont dded liabil plete oppo

In C rofit marg mes, but i orter price very well r. A

[63] The reader may wish to refer back to some of the staking plan analyses presented in the previous chapter.

typical bookmaker's overround for a football match bet is about 112% to 116%, depending on the league. A detailed analysis of nearly 12,000 gam 1/02 seas , on aver g all hom 2 for ever ould have ould have all is frequ from back e per £1 s 5.6p per £ n in Figu

Figur up to 2/1 (during 2000



The e to cust rnet book ests, and s as the s ced, relat ent,

however, the assumption must be that both favourite and underdog were priced with no bias to begin with, that is, with the same measure of book ates that form prop all unde ches pres able befo into acco

For With hord very weel y be more /1 is sure at is more rite– long is a fund

A nu cade or sc bias in h this pher 3/1 expo on a hors sure hims is achi , the more gger the b ation play ker's expo ion. Cons dds book ct to spor

[64] Fo on of Bookr Paper No. 9 y are some (11), 1505 narket efficie

Consider an imaginary bookmaker offering odds for Michael Schumacher versus the rest of the field to win the Formula 1 motor racing world char hael Schu any othe cher win/l aker will s for whic

- overpriced favourite.

Tabl ario, toge cing the u n for over esult expe in in the p ancy for th

Table

			ced
			te
Schu			
Schu			
Sum			
Over			
Book			
expe			
Book			
expe			
Odd			
Odd			

Now nent in th true expe 0%. Alter nent

will affect the bookmaker's exposure to risk is illustrated in Tables 8.2a and 8.2b.

Table 8.2a. A bookmaker's expected profit margin (shaded) for variation in pricing bias and fair expectancy for a Schumacher win

			Bookmaker		
			Overpriced underdog	*No pricing bias*	*Overpriced favourite*
		Expectancies	*0.850*	*0.825*	*0.800*
	Expectancies	*Odds*	*1.18*	*1.21*	*1.25*
Fair	*0.70*	*1.43*	21.4%	17.9%	14.3%
	0.75	*1.33*	13.3%	10.0%	6.7%
	0.80	*1.25*	6.3%	3.1%	0%

Table 8.2b. A bookmaker's expected profit margin (shaded) for variation in pricing bias and fair expectancy for a Schumacher no-win

			Bookmaker		
			Overpriced underdog	*No pricing bias*	*Overpriced favourite*
		Expectancies	*0.250*	*0.275*	*0.300*
	Expectancies	*Odds*	*4*	*3.64*	*3.33*
Fair	*0.30*	*3.33*	-16.7%	-8.3%	0%
	0.25	*4*	0%	10.0%	20%
	0.20	*5*	25%	37.5%	50%

For an overpriced favourite, even where the bookmaker has underestimated its true expectancy, he has still managed to avoid a potential loss of revenue for wagers placed on the favourite. Where the true expectancy is overestimated, expected profits taken on this selection are increased to 14.3%. This is at the expense of a reduction in profit taken from underdog wagers, but crucially, once again a potential loss is avoided. By contrast, where the bookmaker has overpriced the underdog or even left the value of the odds unbiased, any margin of error in his assessment of the fair odds could expose him to considerable risk on the underdog price. Of course, where the underdog is overpriced but underestimated, profits will be increased on money taken from wagers on the favourite. Nevertheless, bookmakers are notoriously risk-averse creatures, and prefer to avoid any possibility of loss on any available

sporting outcome. For the scenarios presented above, the only way to achieve this level of risk management is to overprice the favourite.[65]

For grea will punt may even prop risk- subs outc over 130% Aust mark least adva

The expla and strai com supp 5/2, subs The was

A fu that be e expl

[65] Ob his cu of a p fundamental rationale behind a favourite–longshot bias will remain essentially unchanged.

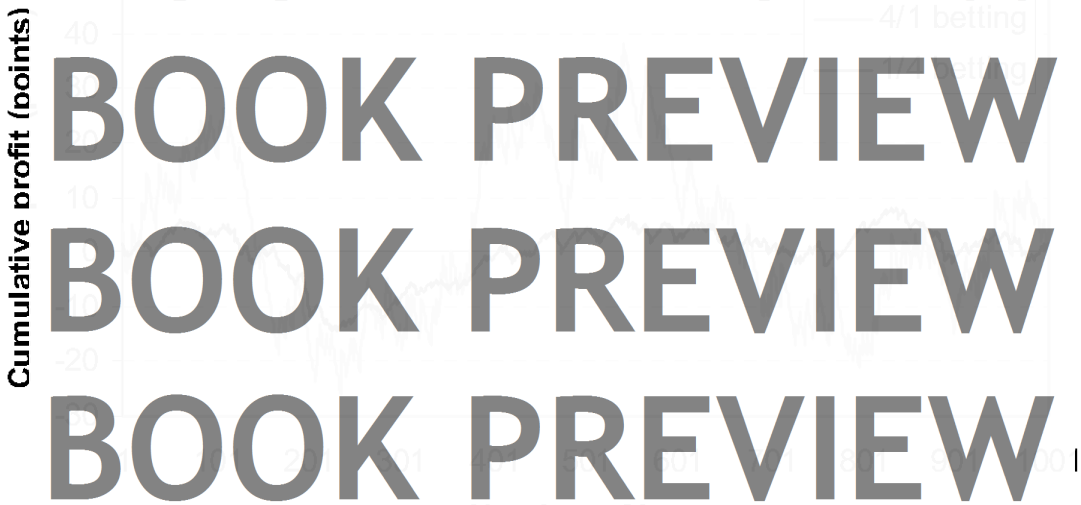
longer the odds, the “noisier” or less predictable the returns, as illustrated in Table 8.3.

Table 8.3 Profits and losses for various unit level stakes, break-even betting scenarios

Bet	Odds						
	5.00	*4.00*	*3.00*	*2.00*	*1.50*	*1.33*	*1.25*
1	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	0.25
2	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
3	-1.00	-1.00	-1.00	1.00	0.50	0.33	0.25
4	-1.00	-1.00	-1.00	-1.00	-1.00	0.33	0.25
5	4.00	3.00	2.00	1.00	0.50	0.33	0.25
6	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
7	-1.00	-1.00	-1.00	-1.00	-1.00	0.33	0.25
8	-1.00	-1.00	2.00	1.00	0.50	0.33	0.25
9	4.00	3.00	2.00	1.00	0.50	0.33	0.25
10	4.00	3.00	2.00	1.00	0.50	0.33	0.25
11	-1.00	-1.00	2.00	1.00	0.50	0.33	0.25
12	-1.00	-1.00	-1.00	1.00	0.50	0.33	0.25
13	-1.00	-1.00	2.00	1.00	0.50	0.33	0.25
14	-1.00	-1.00	-1.00	-1.00	0.50	0.33	0.25
15	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	0.25
16	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	0.25
17	4.00	3.00	2.00	1.00	0.50	0.33	0.25
18	-1.00	-1.00	-1.00	-1.00	0.50	0.33	0.25
19	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
20	4.00	3.00	2.00	1.00	0.50	0.33	0.25

The sequences for 4/1 odds-against and 1/4 odds-on betting have been extended in Figure 8.2 to 1,000 wagers, for which the cumulative profit after each bet is shown by means of a time series. Larger fluctuations in the shape of the profits time series are a consequence of the larger returns for a win at longer odds and the lengthier losing runs that separate them. A noisier profits time series places the bankroll at a greater risk of a more significant downturn, with an increased probability of bankruptcy.

Figure 8.2. A comparison of odds-on (1/4) and odds-against (4/1) profits time series for unit level staking, break-even betting.[66]



Vari dard
devi tting
odds

Stan

whe total
num unit
level s to:

whe inter
is ju sion
redu

[66] For a stake of 1 unit, the profit from a winning 4/1 bet is 4, whilst for a 1/4 bet it is 0.25. The profits time series generated for Figure 8.2 represent just one possible scenario.

For common stake size s, the standard deviation will be given by:

$$s\sqrt{e(o-e)}$$

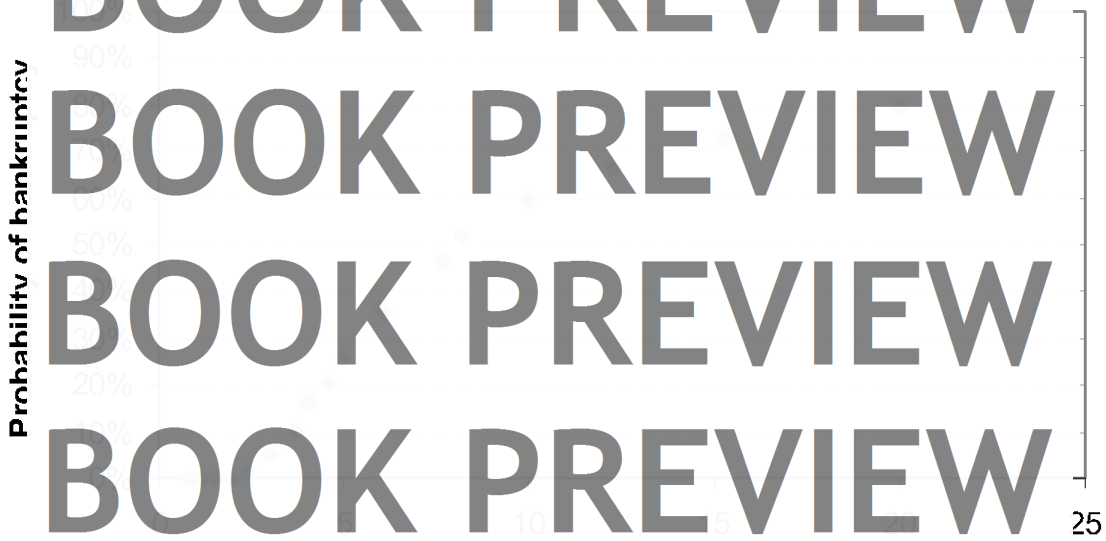
For a greater stake size, the standard deviation, and therefore variability in returns, will be larger, and consequently, so too will be the risk of bankruptcy for the same betting system and betting edge.

Table 8.4. Standard deviation in returns for break-even, unit level stake betting

Odds	√(odds-1)	Standard deviation in bet profit
5	√4	2
4	√3	1.732051
3	√2	1.414214
2	√1	1
1.5	√0.5	0.707107
1.3333	√0.3333	0.57735
1.25	√0.25	0.5

Of course we didn't need to calculate the standard deviation to find out what we can learn visually from Figure 8.2. Nevertheless, knowing its value for a particular betting scenario is useful, since it will be intimately related to the risk of bankruptcy. This relationship between the noisiness in the profits time series and the risk of bankruptcy is shown in Figure 8.3. The probabilities of bankruptcy have been taken from the results of the Monte Carlo simulations for level staking in the previous chapter (for stakes sizes 1, 2, 3, 5, and 10 units), where the reader will recall that each scenario involved a maximum sequence of 250 bets.

Figure 8.3. The relationship between standard deviation in bet profit and the probability of bankruptcy after 250 bets, for break-even betting



Cruc tting
than dge.
Cons nt of
view

One able
staki fixed
profi ade:
the l
the r ower
than king
plan
the a ty of
profi need
to fo

The

Esse tical
forec

1. Select a suitable method of prediction.
2. Define a relationship between ratings figures and forecasting rates.

The most signi d do not p ly to be al only cons and conc : the spre clear enou and repli ctive facto neral relat arily redu 3.4b, for e nger relat , the secc 78%, com

Figur

Figure 8.4b. A less reliable prediction model

Fron etter
to re ased
on m rting
infor t the
outc dom
facto ount
of ur ot to
acco reby
mini

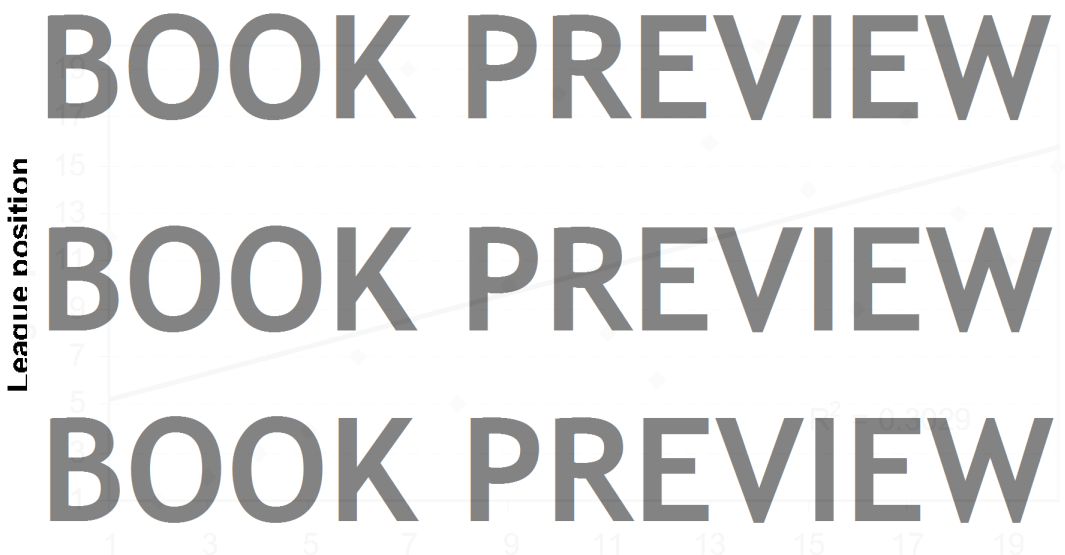
A fu the
diffe ation
exist 2/03
seas king
nam f the
varia the
man their
posit ngly
the r rage
valu 1.75
(betv 11.7
(app y, of
cour of a
man club.

Could one reasonably expect Alan Curbishly's Charlton Athletic to defeat Steve Bruce's Birmingham City on this basis?

Table

Club	rank me)
Man	
Arse	
New	
Chel	
Live	
Blac	
Ever	
Sout	
Man	
Tott	
Midd	
Char	
Birm	
Fulh	
Leed	
Astc	
Bolt	
Wes	
WBA	
Sun	

Figur *ership club's finishing position in the 2002/03 season*



Whilst somewhat far-fetched, this example nonetheless highlights the dangers of attributing a statistically significant association between 2 sets of v usal mec e for punt l.

An a tball leag mes finis eir 2 prev mes play such a fin ar to mak hes. Furtl 65 gam e of havi this anal tion. The bility and

Man has beer nter anot d to have eed. The n to add on 3 matc r the assc gain and real. This

The n to repr e of draw 28% for tl the nine erion finis ll be no p

[67] Str tically significant, requiring as little as a 5% probability or less that it had arisen by chance.

Table 8.5. Percentage of drawn games for matches involving at least one team with two draws in the two preceding games

Season	Percentage of draws	Number of matches
1993/94	24.14%	58
1994/95	22.22%	63
1995/96	31.00%	100
1996/97	25.32%	79
1997/98	34.02%	97
1998/99	25.64%	78
1999/00	24.29%	70
2000/01	30.49%	82
2001/02	18.46%	65
Overall	*26.88%*	*692*

The most likely explanation for the relationship arising in 2001/02 is that it represents a spurious correlation. A spurious correlation involves an association in which measures of 2 or more variables are statistically related, but are not in fact causally linked, usually because the statistical relation is caused by a third variable. A common illustration of this is the positive correlation between firemen and fire damage – more firemen, more fire damage. Naturally one might expect more firemen to attend a larger fire, but this is far removed from saying that the firemen are causing the fire damage. For the draws analysis above, there is probably some other factor lurking in the 65 games in 2001/02 which caused the low number of draws. What this might have been can only be speculated upon and would need a further inspection of the data to determine a possible explanation. The reason that this relationship arose in the first instance is linked to what Professor Vaughan Williams in his book *Betting To Win* calls data-mining: the idea that if one mines a set of data long and hard enough for a relationship, meaningful or not, one will eventually be found.

More critically, the idea that the probability of a draw occurring is decreased when such an outcome has occurred twice in the 2 preceding games is a serious misconception known as the Gambler's Fallacy. The Gambler's Fallacy is the mistaken notion that the odds for something with a fixed probability increase or decrease depending upon recent occurrences. The Gambler's Fallacy frequently crops up in roulette circles, where naïve gamblers believe that if they sit out a sequence of consecutive blacks, they are more likely to win betting on red. Suppose there has been a sequence of 10 consecutive blacks. What is the chance

of the next being red? More likely than black? Well, of course not, it's still the same chance as it was for all the preceding wheel spins, and is equal to th a red spin ne is inde

Of c rictly inde be abou the relat kers. Neve For exan ast 5 year . If a pers used up h the Gam that the n all prob wing parti

It sh are falla ons, then , for exan run, but t this sma ving that ry or moti s bet may

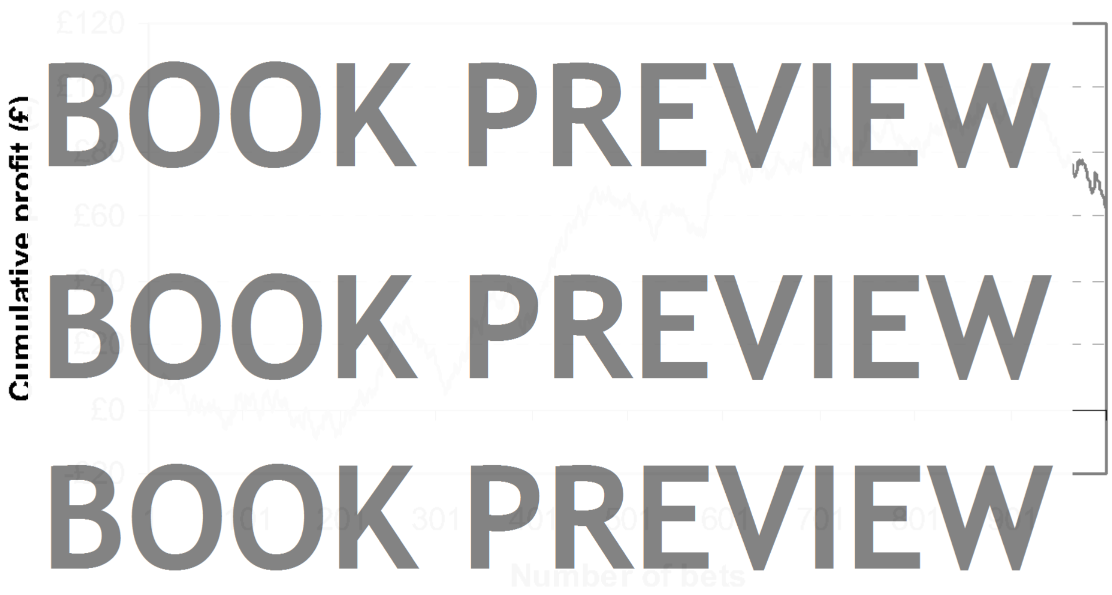
Whe cant relat and retes at a conc ctive judg both mea and illust wing simp tball leag won 3 or way

game, a reasonable assumption given that a) the away team is showing decent away form and b) the away side frequently accepts a point from their travels as a decent return. The back-tested betting returns for this forecast model are shown in Table 8.6, and charted to level stakes in Figure 8.6. Without information about the actual betting prices for much of this sequence, it has been assumed that every wager was available at odds of 9/4 (3.25), since that is a typical draw price on offer with many bookmakers for English league games.

Table 8.6. Level staking betting returns for an English football league draw forecast model

Season	Percentage of draws	Number of matches	Level stakes (£1) profit	Yield (%)
1993/94	31.8%	110	£3.75	3.41%
1994/95	28.3%	92	-£7.50	-8.15%
1995/96	37.9%	95	£22.00	23.16%
1996/97	34.8%	112	£14.75	13.17%
1997/98	41.1%	95	£31.75	33.42%
1998/99	34.5%	110	£13.50	12.27%
1999/00	30.6%	121	-£0.75	-0.62%
2000/01	34.6%	133	£16.50	12.41%
2001/02	23.5%	132	-£31.25	-23.67%
Overall	32.7%	1000	£62.75	6.28%

Figure 8.6. Level staking profits time series for an English football league draw forecast model



Initially, the results look very encouraging. Seven of the 10 seasons analysed revealed a level stakes profit, and a return on investment of over 6% is fairly reasonable. With 1,000 matches selected from 13,000 games played, a return of 327 draws compared to an expected 270 would be considered highly significant by standard statistical testing. Profits growth over the 9 years is fairly steady, although experiencing a notable decline in the last season. Nevertheless, a number of points need to be addressed before genuine confidence could be placed in this prediction model.

- Does the downturn in 2001/02 represent a short-term fluctuation in an otherwise profitable betting system, or a more fundamental failure?
- Can these results be reproduced for other leagues or is this a feature specific to English football?
- Do other similar forecasting models demonstrate a commensurate level of success?

The first concern might very well be addressed by looking at how the model has performed in 2002/03. During this season, 141 games matched the model criterion, with 42 of them, or 30%, finishing with a draw. At odds of 9/4, the level stakes profit is -4.5 and the yield -3.19%. Not terribly impressive, but until the last 2 weeks of the season, the record was showing a profit.[68] What about other football leagues? Results for the Spanish La Liga first division and German Bundesliga first division for seasons 1993/94 to 2002/03 are shown in Table 8.7 and charted in Figures 8.7 and 8.8. These two divisions have been chosen because they have a similar percentage of games finishing with a draw to the English league, with odds from the bookmakers similarly, if a little less, generous. For this analysis, each selected game was assigned draw odds of 11/5.

Table 8.7. Level staking betting returns for the draw forecast model for the Spanish La Liga first division and German Bundesliga first division, 1993/94 to 2002/03

League	% of draws	Number of matches	Long-term % of draws	Level stakes (£1) profit	Yield (%)
Spanish La Liga 1	33.6%	143	27.5%	£10.6	7.41%
German Bundesliga 1	23.8%	160	26.9%	-£35.2	-22.00%

[68] Of course, this analysis has used draw prices of 3.25. In fact, taking the best available prices for the selected games actually yielded a small profit.

Figure 8.7. Level staking profits time series for a draw forecast model: Spanish La Liga 1

Figur *rman Bund*

Whil ch of this t inter emp with such mes matc e, in com glish divis 4%, com most

statisticians would accept as statistically significant. Furthermore, the profits chart for the English league analysis also reveals many similar peric grow signi e far less n the long data sam

Whil is of cour able only rally grea pean leag , not only t the mod win their ester Unite nant Pren total num

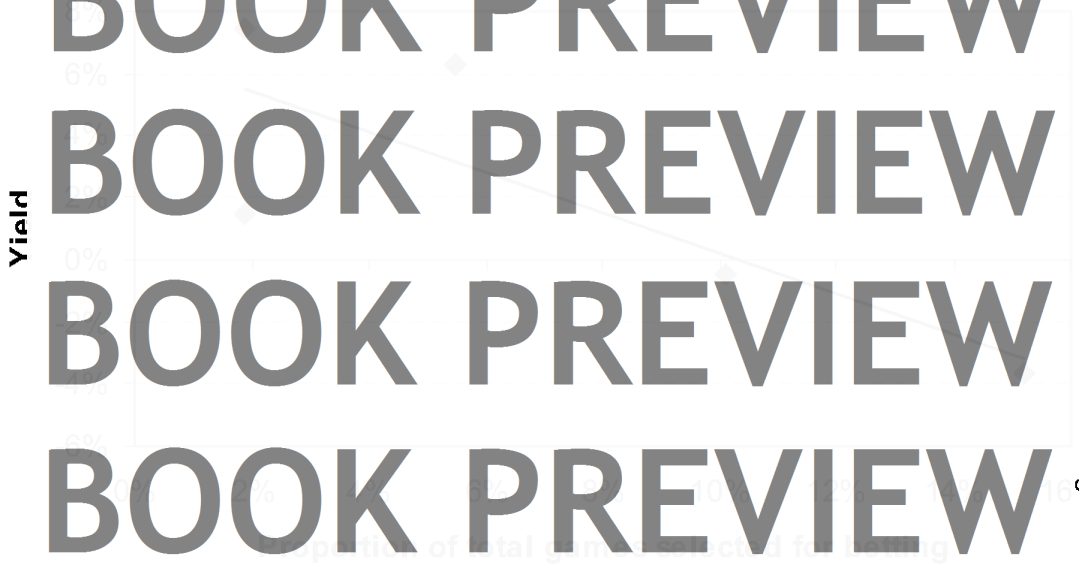
In te larly for E t the choi The plair ed a profi this relat ithin whic etter expl not inhe stem rema the fore the poss this furth ories in th night also The resu glish foot med throu

Table 8.8. Betting returns for an English Football League draw forecast model for four different criteria, seasons 1993/94 to 2001/02

Fore				(%)
Last or m				%
Last or m				%
Last or m				%
Last away				%
Last or m				%

All f the book able, forec is is grea t an unex ting, the ts a relat cast mod y, as illust st a punt f all gam ould have way wins t the profi as a prop eturn will l less signi ster, then ance of its draw pred at is, the ility, appe what migh le to safe ason basi

Figure 8.9. Relationship between profitability and the proportion of games selected by the forecast model



In cc draw
that er a
pote d be
awai s of
data and
limit

Thin

A pri nore
abou little
atter king
strat f the
punt t we
canr can
adhe ften
than xist.
Neve ging
losin dds
spor ffect,
learr risk,

and the following paragraphs which examine this subject in further detail are reproduced by kind permission of Mike Shor from Gametheory.net.

F kind
c ne's
v nore
s ainty
e ng to
p the
n risk.
I ands
h uch
v treet
c nost
v then
$ why,
c

F

T rd is
r ty of
v ome
(the
(My
e e on
a tility
fi ne in
e , on
a this
g d by
t

Notice that for the first person, the gamble between $0 and $100 is worth about $75. This means that the person would be willing to pay n ainly, t ever, j y or e

T $25. E s not v ler a p 50% c orth. T ither $ too g cost c th of $

T et is $ pay u rned c and $ the n d of t his c

Any s. In orde ager whe eater than ainty equi d by the hich repr n the betti

Exac e is perh king plan ettor can l, as

one might expect, the greater the stake size as a proportion of the bankroll, the greater the likelihood of either failure to profit or bankruptcy. A certa erse or ris

Figu the bank with an a 5 of the s the resu plan repre ints) spec sk of bank r, is the s ry of the r

Figur oney bets

Clea le or Pyra cept a dr rofit expe bout such ntial profi kroll throu king might be regarded as somewhat risk-neutral by comparison, with the risk

of bankruptcy only increasing significantly when the stake size climbs to 10% of the initial bankroll.

By c than
level ty of
not ng a
prop nitial
losse of 5
poin fixed
profi re a
profi able
throu ssive
staki t the
incre

Figur bets with a

Whil been
high size,
since uited
to di se to
acce cally
impo fixed
odds ed in
Figu e the

more risk-averse bettors that they might need to rethink the use of such misleading strategies.

The y on
his may
prefe and
sizea er to
limit egy,
whei The
feel- cant.
Perc ffers
pote very
from ands
the ll be
bette nces.

Usin

Ther se of
spor rsus
long tting
advi they
woul ften
sugg orts
betti used
your ectly
acce orts
advi

Nine erm.
For r erall
loss less,
for c the
punt easy
unde ters.
Freq plete
a ta very
profi nt of
rese deed

should, maintain interest through effective money management. Tipping agencies do advise stake sizes, and sometimes even a staking plan, but rarel tting risks

Fron vice shou ettor does y by back ever, earn tips will r mply a lux l. If, inste nthly payr

Purc ther. Wha vices can has rese ixed succ ised staki gh to be c from the ther, with hing thos vhilst staki g of bank level staki

On a sters seen ty at large g to purc the betti one exist the resu aims of pr has

[69] Va n UK betting markets, *Journal of Forecasting*, **19**, 505-513.

[70] The reader will acknowledge that this represents a very risk-averse staking strategy.

actually been achieved. A "300% profit in one season" means nothing without information about the money management strategy. Instead, find out

y is, and able for a reasonable growth of the bankroll without excessive risk.

In a with rega s be poss as a large often lead e on the l e. A profe date acco than 100. vill it alwa you have For heav will freq num allov t for doub nder £50. ems for th sing reco able curre n the less unter may nline book their acco nore signi s? A typic h or £250 have beer % of your night want

Ultin tting selec nted. Som work, gain ney.

Others simply may have no time to spend analysing and forecasting sporting events, but in order to maintain an interest will happily purchase som... own sele... pay to ris...

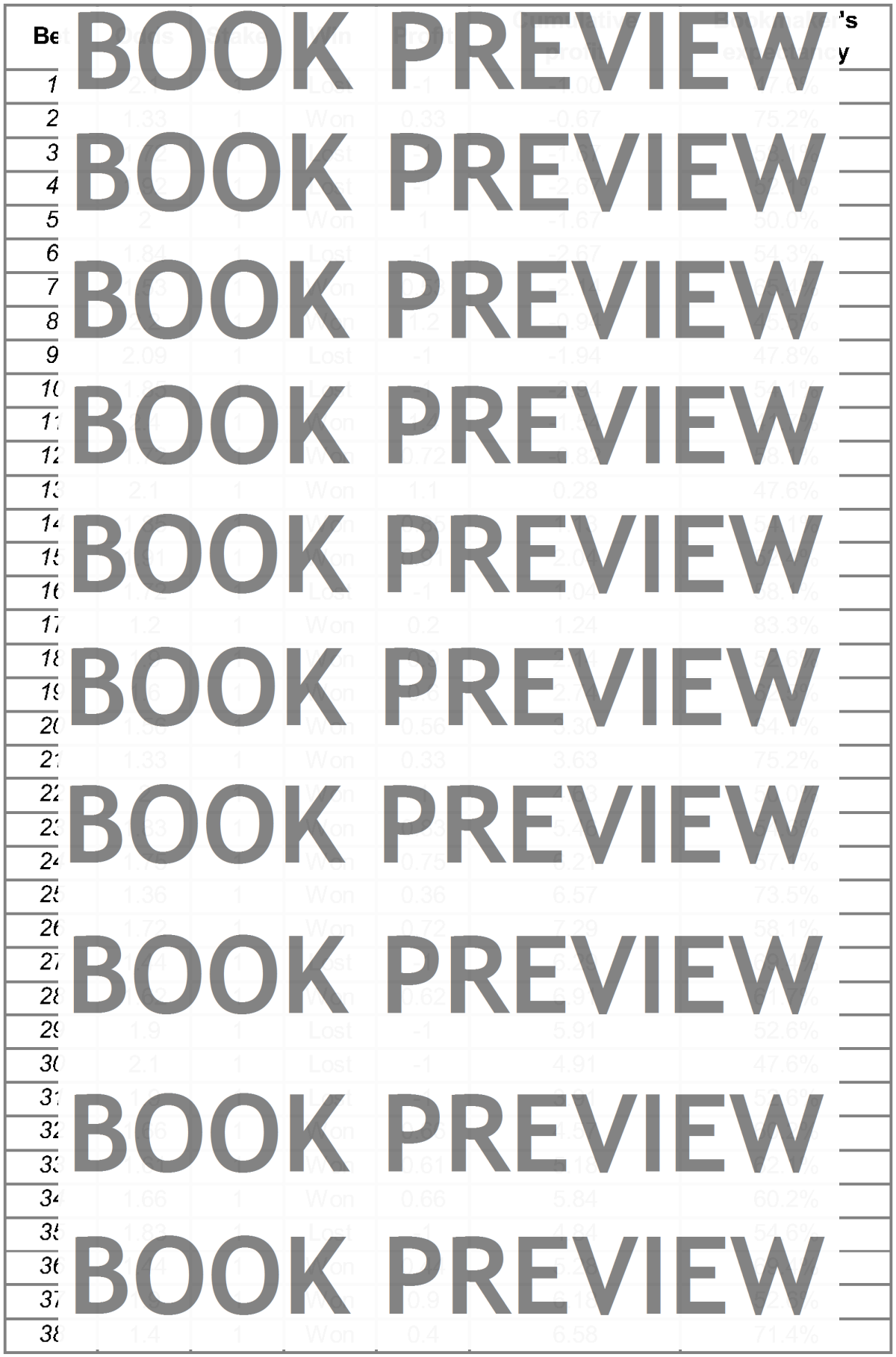
Ana...

Duri... tical signi... d an unus... how likely... ty of there... rring by c... ians use... The more... that it ha... n is stati... d it. The... g an assc... rther inves...

Of p... f his betti... , but how... ived succ... here are ... first is to... The secc... third appr...

Tabl... ngle wag... , the cum... 45% yield... own, calcu...

Table 8.9. A profitable level stakes betting record



Bet	Odds	Stake	Win	Profit	Cumulative profit	Bookmaker's expectancy
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						
73						
74						
75						
76						
77						
78						

Bet	Odds	Stake	Win	Profit	Cumulative profit	Bookmaker's expectancy
79						
80						
81						
82						
83						
84						
85						
86						
87						
88						
89						
90						
91						
92						
93						
94						
95						
96						
97						
98						
99						
100						

With ners than were 66 w that the l the book bout the p has beer g to the b gers, he w r, of cour ates that level of pr pen to de the betti well attra cted solel r an

average price of 1.76, this may be 108% or even lower as illustrated earlier in the chapter by Figure 8.1.

Secc erent
book et of
1.76 1.66
from ed in
Chaj and
on r f the
real bets,
then many
occa d be
cons nate
for t bets:
55.4 cific
book true
win that
for r e the
punt and
unju fair
price

Wha cord
are dds,
with n, he
coul r 45
lose e he
belie real
valu

To te that
pred what
stati test
is us from
what (χ^2)
is of

X

In plain English, if it can be expressed plainly, χ^2 is the sum of the square of the deviations of observed frequencies from the expected frequency divid rved
frequ s 34.
By c 4.53
resp

Winn
Loser
Total

The the
obse d be
expe odal
win/l cally
signi bility
table

Table

Prob	%
resu	
Chi-	379

For rate
of w n by
char ty to
be le rd to
be st skill.

Read and
expe n the
χ^2 st

[71] Re .8 are for a one-tailed Chi distribution with one degree of freedom.

where a1, b1, a2, and b2 represent the column-row cell locators for the observed frequency of winners, observed frequency of losers, expected frequ For this bility value tting reco

Whe error will b sers, whic rofit marg bove that ue of 1.05 f the bets able price alent simp alue is 0.5 n the betti the value and losse are shor into acco er to belie an it actu an is due, bias, were

Simi true book ce of the r ffect on t the book loss frequ nore signi n the obse alent to a dds. The bility value case the f the punt ker's

profit margin of less than about 1.035 would mean that the record could not traditionally be considered to be statistically significant.

Figur *ue of book*

2

Of c cing bias rices will r ker's profi ue of the c l-by-reco and dete

As c rger the v er of bets f the reco ably plac onth reco nter seek vice, this d of, say, d of 25 b 8.11 dem s the number of bets in it increases, all other things being equal.

Table 8.11. The influence of the size of a betting record on its statistical significance

Bet					ity
20					%
40					%
80					%
160					%
320					
640					
128					
256					

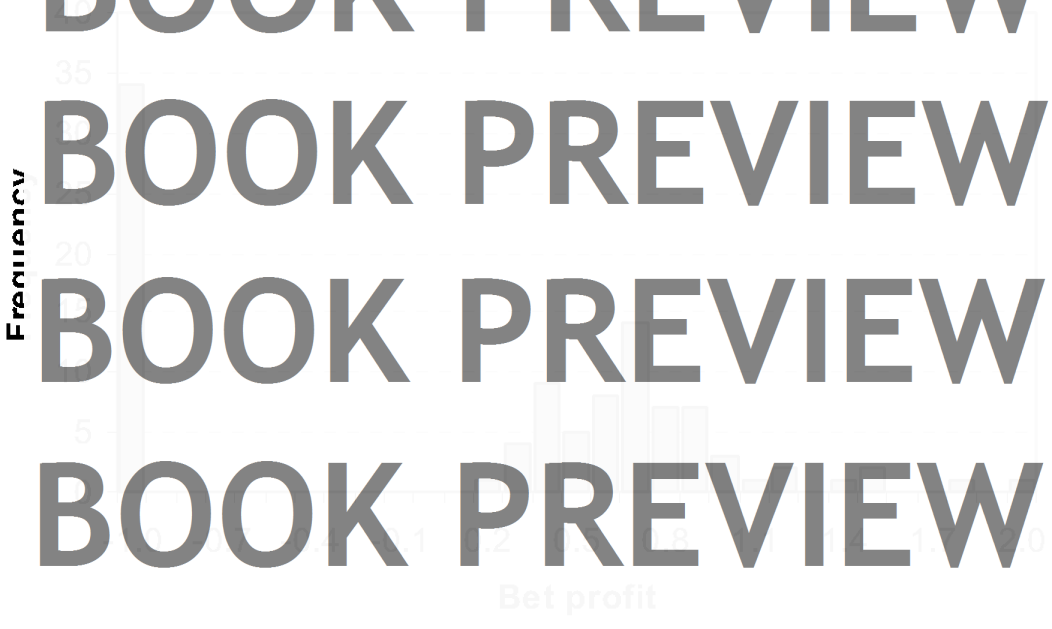
The ses. As s any othe king strat and loss d by mea rved win/l the prob rofit per b it to be. l long term as a succ nt to dete the signi will cont nue into the future.

The o the norm very muc mple of si and stan ean and :

$$t = \frac{\sqrt{n}(\bar{x} - \mu)}{s}$$

The t-statistic, like the Chi-Square statistic, provides a measure of how extreme a statistical estimate is, and in this example may be used to dete he t-
stati text,
the the
aver this
assu s bet
(excl e) or
posit ates
the s

Figur



Fortu the
norm rmal
distr then
the s f the
resp

Follc ume
that aced
by th ently
the ng a

spreadsheet to calculate the mean and standard deviation[72] of the 100 bet profits returns a t-statistic for this profit record of 2.23.

Whe rees
of fr bility
table tion,
allov h t =
2.23 has
arise

Table

Degr free	dom	25.0%	10.0%	5.0%	2.5%	1.0%	0.5%	%
		0.69981	1.37218	1.81246	2.22814	2.76377	3.16926	366
		0.67695	1.29008	1.66023	1.98397	2.36421	2.62589	377
		0.67547	1.28495	1.65097	1.96950	2.34136	2.59564	313

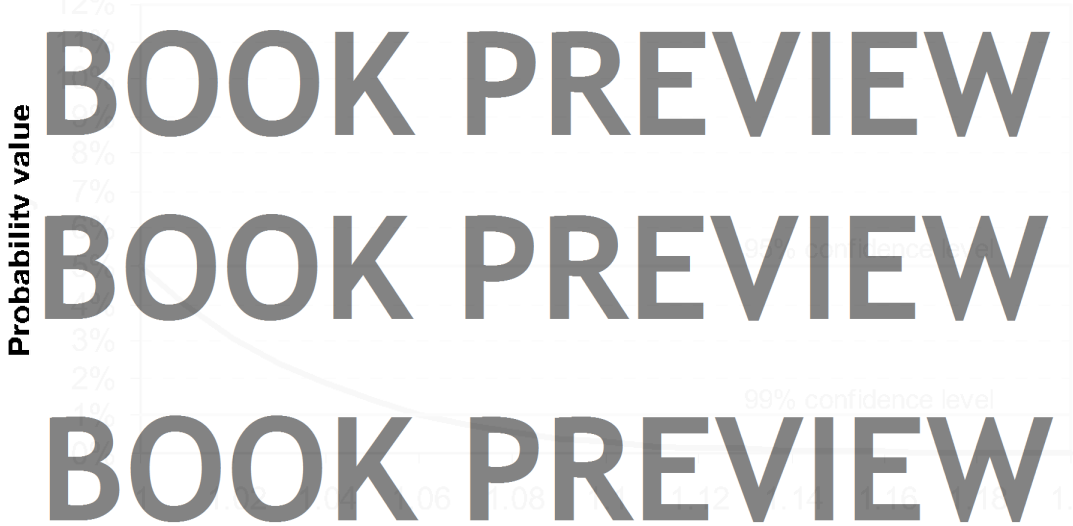
In M ulate
the p s the
valu ıer 1
(for since
we a able
reco ailed
distr 9%,

[72] The
[73] As each
proba values
are fc applet
calculator available online at http://duke.usask.ca/~rbaker/Tables.html.

not wholly dissimilar to the probability value obtained via the Chi-Square testing (3.41%).

Figu tical
signi this
time argin
usec since
there rofit
and ker's
profi rofit
reco ding
conc uted
to th as a
resu idity
of th

Figur e of
book

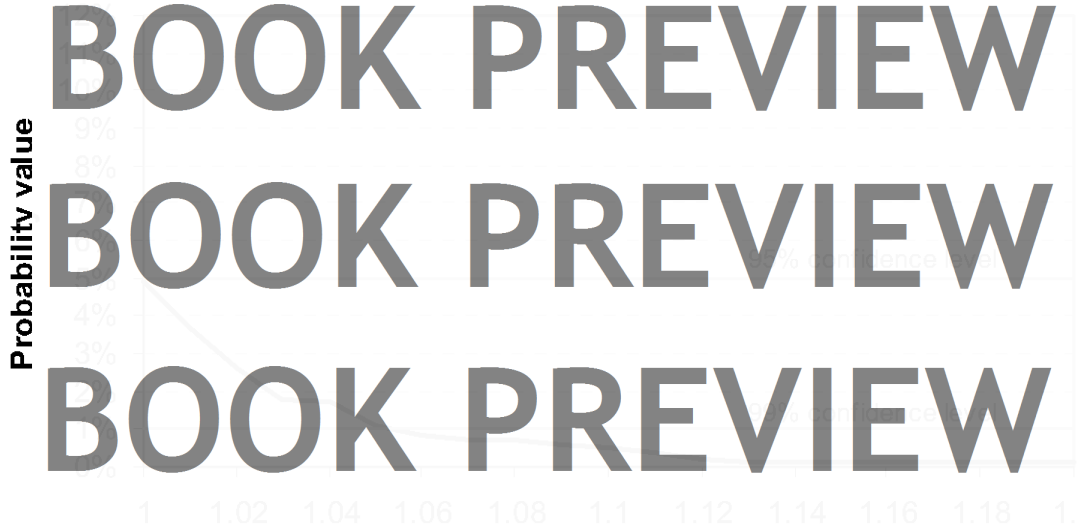


2

Perh ance
of a d to
anal tion,
whic g to
spec n on
each ct to
achieve or perform better than his actual profit record simply by chance.

For the betting record in question, a simulation was run, with 1,000 repetitions, for each of the specified values for the bookmaker's profit marg ame aver ned, altho cific valu g to the s ther book .16. The tistic does of a betti ality assu

Figur n the value



On t ance of th akes yield ably the r than simp king the b n the basi inue into cess rema cord is statistically significant after 100 bets does **NOT** prove that it will be after

1,000. Certainly, where the bettor is utilising a numerical forecasting approach, that is, a rating system, the statistical significance of a limited reco that migh cess. Cons treat noth here is les n by char bets, perh ance testi r the likeli and time

Befo ding the r tiple bets, used in ea how a bo into a be n for each ns it woul the book that he b cord base n an equi gger over ll be relat e of accu

Sum

Fixe ence sugg r the long ssful verif ided one to a sens tting offer nore

excitement than merely collecting an annual low interest return from their savings.

The ettor to th s he inve and num and mos l an exan tical appr ess. With and. Cons l be rega nent strat with som such princ sing mon

1. Se

With void betti ch to safe guard against this is to set aside a bankroll for the purposes of bet ting, the s ize of which should not encroach on the need to pay the bills. If th is is lost, orts betti y.

2. R esearch your sport and be selective

Ther es to be f d to stac this disa key spor ular mar the book makers will often know less about the events than a regular follower of su ying them you feel not betti at all is break even.

3. Keep accurate records

For and their rred. Keep gths and ly of all, t sory serv ying. With s will actu

4. Va

Winn : win all th iced you the red. ison of bo ques and the winn

5. Te

Punt ome prefe and mak ries, mora bout form next cont rical fore . Be wary the mea ised pred ooks long n or anot will ultim

6. Identify favourable betting markets

Ther st to
hanc , but
it is his
over es is
a mi ican
spor osed
disa kers
can n to
man

7. Be

For the
avail the
outc ernet
fixed but
disa outs
from sse.
For , but
the r trike
rates quite
reas kroll
early you
can

8. Ba

Cont s the
pres yond
ques s its
exist ould
soor s to
exce short
price nose
who antly
sma nore
ofter on't,
howe ause

you believe it contains real value, and that the bookmaker has made a mistake.

9. C

Real
offer
Perh
of th
the
unne
can
Desp
avail
tech
bet b
cont

10. I

Are
shap
are h
win
Furth
ratch
NOT
prefe
polic
perc
more
bettc
loss

11. A

Mon
you
becc
simp

easily in the future. Even where you have established significance in a betting history, beware of unexplained factors that may be accounting for your

12. L

Perh earn
is hc how
to m this
busi and
the v ling.
Succ eatly
enha in it,
you fixed
odds

Bibliography

Book

Ben
Harv d.
Hun
McG *w to*
Mak
Stee g.
Vau *uide*
To F

Sele

Cair shot
bias *al of*
Polit
Vau cast
succ *ting*,
19,
Vau ome
favo *plied*
Eco

Sele

Fing *n of*
Book aper
Serie
http:
Forr *cy in*
the bling
and
http: f
Holl *bler*,
First
http:

Hunter, Bill, *The 12Xpert*
http://members.aol.com/the12Xpert/
Kell
http:
Sho
http:
Tin *tting*
Marl artial
fulfil en's
Univ
http:

Sele

Beth

Betti

Betti

Foot

Foot

Gam

Glob

Onli

Prof

Punt

Spor

Spor

Appendix

The ...arlo staki... bets for e..., the corre...tting edge...each subs...dges acro...tting edge...take size ...n of Kelly ...

Bet	
1	1.325
2	1.215
3	1.27
4	1.285
5	1.17
6	1.22
7	1.265
8	1.135
9	1.34
10	1.345
11	1.275
12	1.155
13	1.06
14	1.15
15	1.195
16	1.21
17	0.99
18	1.23
19	1.205
20	1.14
21	1.175
22	1.33
23	1.215
24	1.2
25	1.165
26	1.01
27	1.135
28	1.105
29	1.39
30	1.215
31	1.25
32	1.04
33	1.2
34	1.3

	Bookmaker's result expectancies and their odds										Betting edges						
Bet	0.2		0.3		0.4		0.5		0.6		0.9	0.95	1	1.05	1.1	1.15	1.2
35	0.375	2.667	0.645	1.55	0.465	2.151	0.38	2.632	0.755	1.325	0.66	1.14	0.985	1.02	0.965	1.055	1.25
36																	1.195
37																	1.175
38																	1.135
39																	1.44
40																	1.15
41																	1.125
42																	1.1
43																	1.195
44																	1.115
45																	1.4
46																	1.205
47																	1.135
48																	1.14
49																	1.255
50																	1.055
51																	1.115
52																	1.22
53																	1.33
54																	1.27
55																	1.185
56																	1.25
57																	1.285
58																	1.175
59																	1.265
60																	1.35
61																	1.055
62																	1.255
63																	1.245
64																	1.155
65																	1.165
66																	1.2
67																	1.16
68																	1.115
69																	1.245
70																	1.35
71																	1.285
72																	1.075
73																	1.24
74																	1.39
75																	1.215
76																	1.16
77																	1.16
78																	1.195
79																	1.2
80																	1.11
81																	1.155
82																	1.01
83																	1.255
84																	1.325
85																	1.275
86																	1.19
87																	0.935
88																	1.26
89																	1.205
90																	1.245
91	0.26	3.846	0.385	2.597	0.46	2.174	0.235	4.255	0.79	1.266	0.87	0.97	1.025	1.07	1.265	1.01	1.145

	Bookmaker's result expectancies and their odds										Betting edges						
Bet	0.2		0.3		0.4		0.5		0.6		0.9	0.95	1	1.05	1.1	1.15	1.2
92	0.17	5.882	0.3	3.333	0.345	2.899	0.495	2.02	0.7	1.429	0.88	0.855	1.015	1.05	1.03	1.08	1.3
93																	1.065
94																	1.215
95																	1.255
96																	1.315
97																	1.2
98																	1.365
99																	1.185
100																	1.215
101																	1.25
102																	1.2
103																	1.24
104																	1.23
105																	1.23
106																	1.18
107																	1.185
108																	1.215
109																	1.2
110																	1.265
111																	1.345
112																	1
113																	1.195
114																	1.3
115																	1.135
116																	1.3
117																	1.21
118																	1.23
119																	1.08
120																	1.075
121																	1.16
122																	1.4
123																	1.24
124																	1.25
125																	1.13
126																	1.12
127																	1.2
128																	1.06
129																	1.255
130																	1.225
131																	1.22
132																	1.185
133																	1.13
134																	1.035
135																	1.25
136																	1.21
137																	1.415
138																	1.305
139																	1.31
140																	1.31
141																	1.355
142																	1.21
143																	1.205
144																	1.185
145																	1.295
146																	1.195
147																	1.18
148	0.175	5.714	0.29	3.448	0.22	4.545	0.43	2.326	0.45	2.222	0.825	0.835	1.02	1.29	0.975	1.145	1.14

	Bookmaker's result expectancies and their odds										Betting edges						
Bet	*0.2*		*0.3*		*0.4*		*0.5*		*0.6*		*0.9*	*0.95*	*1*	*1.05*	*1.1*	*1.15*	*1.2*
149	0.065	15.38	0.285	3.509	0.33	3.03	0.515	1.942	0.57	1.754	0.71	0.865	1.02	0.89	1.075	0.96	1.315
150																	1.17
151																	1.205
152																	1.015
153																	1.07
154																	1.26
155																	1.205
156																	1.21
157																	1.235
158																	1.135
159																	1.15
160																	1.24
161																	1.19
162																	1.26
163																	1.15
164																	1.37
165																	1.215
166																	1.245
167																	1.2
168																	1.3
169																	1.29
170																	1.045
171																	1.2
172																	1.35
173																	1.06
174																	1.18
175																	1.08
176																	1.29
177																	1.19
178																	1.3
179																	1.31
180																	1.095
181																	1.19
182																	1.175
183																	1.21
184																	1.06
185																	1.1
186																	0.995
187																	1.19
188																	1.2
189																	1.32
190																	1.185
191																	1.225
192																	1.25
193																	1.165
194																	1.23
195																	1.135
196																	1.285
197																	1.225
198																	1.205
199																	1.16
200																	1.22
201																	1.235
202																	1.155
203																	1.29
204																	1.09
205	0.17	5.882	0.215	4.651	0.29	3.448	0.225	4.444	0.785	1.274	0.955	0.86	1.05	0.995	1.235	1.15	1.045

	Bookmaker's result expectancies and their odds										Betting edges						
Bet	0.2		0.3		0.4		0.5		0.6		0.9	0.95	1	1.05	1.1	1.15	1.2
206	0.24	4.167	0.355	2.817	0.3	3.333	0.45	2.222	0.535	1.869	0.935	0.94	1.035	1.05	0.925	1.15	1.11
207																	1.195
208																	1.34
209																	1.125
210																	1.025
211																	1.055
212																	1.12
213																	1.05
214																	1.305
215																	1.2
216																	1.22
217																	1.17
218																	1.235
219																	1.4
220																	0.99
221																	1.25
222																	1.18
223																	1.055
224																	1.16
225																	1.33
226																	1.025
227																	1.16
228																	1.085
229																	1.03
230																	1.185
231																	1.3
232																	1.2
233																	1.315
234																	1.18
235																	1.155
236																	1.21
237																	1.275
238																	1.215
239																	1.235
240																	1.09
241																	1.35
242																	1.08
243																	1.145
244																	1.285
245																	1.265
246																	1.21
247																	1.175
248																	1.19
249																	0.95
250																	1.35
Avg																	1.2