



Odds Modelling and Testing Inefficiency of Sports Bookmakers Rmodel

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Abstract

In this paper I am applied a diagonal inflated bivivariate poisson as well as a simple staking model whereby evaluate the efficiency of odds price of Asian Handicap and Goal Line offered by 40 sports bookmakers. Finally I get a breakdown profit & lose table. While I used Kelly model next to this research which generated a profit every year.

Keywords: keywords, Bivariate poisson, Multivariate discrete model, Betting strategy, Soccer, English Premier League, Expected return, Maximum likelihood, Statistical forecast, Bookmakers, R, Excel.

1. Introduction

The odds modelling in Europe and United States are very popular since decades. However statistical odds modelling and algorithmic staking has not yet popular in Far East Asia.

By refer to *Dixon & Coles 1996*¹, *Karlis & Ntzoufras 2005*² and also *Dixon & Pope 2004*³ I tried to collect soccer data from year 2006 to 2011. The purpose of the research is testing the inefficiency of soccer odds offered by 29 bookmakers as well as making profit from bookmakers.

The paper *Dixon & Coles 1996* inspired by the *Maher 1982*⁴ to identify the offence and defence index of every single team where *Karlis & Ntzoufras 2005* enhanced to be more complicated model. *Moya 2012*⁵ taken 40000 customers' data from bwin to analyse and

¹Refer to reference paper 02

²Refer to reference paper 08

³Refer to reference paper 05

⁴Refer to reference paper 01

⁵Refer to reference paper 10

profit and lose and applied diversified staking strategies to make profit from bookmakers. *Goddard 2004*⁶ model an ordered probit regression and placed stkes on English soccer leagues from 1998 to 2002 and finally yeild $1998/99 = 0.116$, $1999/00 = 0.008$, $2000/01 = -0.008$, $2001/02 = 0.160$.

Well, *Dixon & Robinson 1997*⁷ has built a rebirth model on 90 minutes In-Play soccer gaming. *Crowder, Dixon, Anthony & Robinson 2001*⁸ applied MCMC⁹ model for soccer result prediction and do a comparison with previous *Dixon & Coles 1996* model where concludes that previous model forecast more precisely.

Similar with *Dixon & Coles 1996*, *Karlis & Ntzuofras 1998*¹⁰ has encountered an issue which is a number of nil-nil tied games. while *Dixon & Coles 1996* applied an inflation on low scores games while *Karlis & Ntzuofras 2005* built an extra distribution parameter to settle it.

The latest research paper wrote by Dixon is that *Dixon & Pope 2004* which have reviewed the previous model and testing the efficiency on correct score of 3 major firms in UK. *Karlis & Ntzuofras 2007* make a summary of evolution on his research which is apply Skellam's distribution on bivariate poisson model to resolve the obstacle of draw games.

Section 2 discribe a statiscal model applicable to soccer odds modelling. Section 3 talk about the dataset while section 4 model focus on staking model. Section 5 present the result and last section conclude.

2. Modelling

2.1. Basic Model

As mentioned in *Karlis & Ntzuofras 2005*, bivariate Poisson models are appropriate for modeling paired count data exhibiting correlation. Paired count data arise in a wide context including:

- marketing (number of purchases of different products)
- epidemiology (incidents of different diseases in a series of districts)
- accident analysis (number of accidents in a site before and after infrastructure changes)
- medical research (the number of seizures before and after treatment)
- sports (the number of goals scored by each one of the two opponent teams in soccer)
- econometrics (number of voluntary and involuntary job changes)

Where I just to name a few among the use.

Bivariate Poisson regression models

⁶Refer to reference paper 09

⁷Refer to reference paper 03

⁸Refer to reference paper 04

⁹Markov Chain Monte Carlo model

¹⁰Refer to reference paper 06

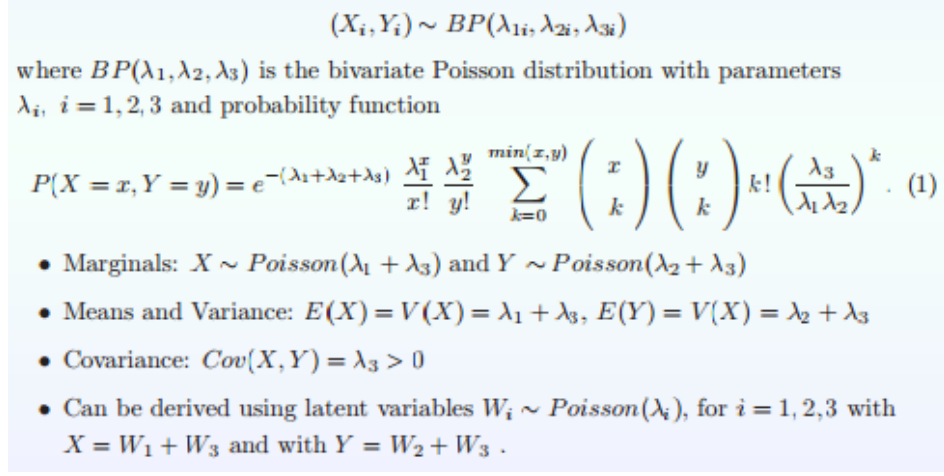


Figure 1: Bivariate Poisson regression models

From above formula, bivariate poisson basically measure the correlation between X and Y compare to double poisson models. However, as I mentioned which is *Dixon & Coles 1996* modified a little on the score 0-0, 1-0, 1-1 and vice versa.

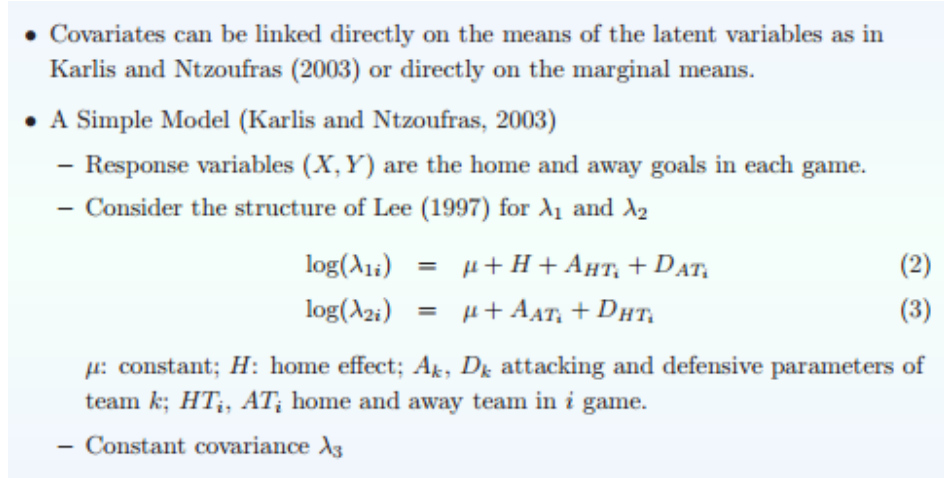


Figure 2: Double Poisson regression models

A Double poisson model can be easily applied by generalized linear model. The covariates is a constant parameter across all soccer matches or teams as we know from figure 2.

Diagonal Inflated Bivariate Poisson regression models

Due to the bivariate is not accurate enough and applicable to predict the real life soccer result. *Karlis & Ntzoufras 2005* introduced a more complicated model which able to inflated the probabilities of the occurrence on draw games.

Under this approach a diagonal inflated model is specified by

$$P_D(x, y) = \begin{cases} (1-p)BP(x, y \mid \lambda_1, \lambda_2, \lambda_3), & x \neq y \\ (1-p)BP(x, y \mid \lambda_1, \lambda_2, \lambda_3) + pD(x, \theta), & x = y, \end{cases} \quad (4)$$

where $D(x, \theta)$ is discrete distribution with parameter vector θ . Such models can be fitted using the EM algorithm.

Important: diagonal inflation improves in several aspects: better draw prediction, overdispersed marginals, introduce correlation

Figure 3: Diagonal Inflated Bivariate Poisson regression models

The author then introduced Skellam's distribution which measure the correlation between X and Y on draw games, he term it as Zero-Inflated Poisson Model.

Skellam's Distribution for Football Scores

- Response variable: $Z = X - Y$ the goal difference in each game.
- Same structure for parameters λ_1 and λ_2 as in Bivariate Poisson:

$$\log(\lambda_{1i}) = \mu + H + A_{HT_i} + D_{AT_i} \quad (6)$$

$$\log(\lambda_{2i}) = \mu + A_{AT_i} + D_{HT_i} \quad (7)$$

μ : constant; H : home effect; A_k, D_k attacking and defensive parameters of team k ; HT_i, AT_i home and away team in i game.

- Use the zero inflated variation of Skellam's distribution to model the excess of draws. Hence we define the zero inflated Poisson Difference (ZPD) distribution as

$$f_{ZPD}(0 \mid p, \lambda_1, \lambda_2) = p + (1-p)f_{PD}(0 \mid \lambda_1, \lambda_2) \quad \text{and}$$

$$f_{ZPD}(z \mid p, \lambda_1, \lambda_2) = (1-p)f_{PD}(z \mid \lambda_1, \lambda_2), \quad (8)$$

for $z \in \mathbb{Z} \setminus \{0\}$; where $p \in (0, 1)$ and $f_{PD}(z \mid \lambda_1, \lambda_2)$ is given by (5).

Figure 4: Skellam's Distribution for Football Scores

Well, when we talk about the parameter to measure the correlationship. How can we know what models might fit into it? *Karlis & Ntzoufras 2005* has compare few models which are :

- Discrete distribution (with an adjustable paramters)
- Poisson distribution
- Geometric distribution

They built 12 statistical models to compare and get the best fit model. For more details

kindly refer to the paper.

2.2. Model Enhancement

There has a popular quote in sportsbook betting industry which is term as FORM. There is a fluctuation of the ability and aggressiveness on sports competition as time goes by. Lets review the *Dixon & Coles 1996* model and fit the decay parameter into our basic model.

Choice of Weighting Function ϕ

There are various possible choices for the weighting function ϕ in equation . One possibility would be

$$\phi(t) = \begin{cases} 1 & t \leq t_0, \\ 0 & t > t_0, \end{cases}$$

in which case, at time t , all results within the last t_0 time units would be given equal weight in the inference. Instead, we work with the model

$$\phi(t) = \exp(-\xi t),$$

in which all previous results, downweighted exponentially according to a parameter $\xi > 0$, are included in the inference at time t . The static model arises as the special case $\xi = 0$, whereas taking increasingly large values of ξ gives relatively more weight to the most recent results.

Optimizing the choice of ξ is problematic, since equation defines a sequence of non-independent ‘likelihoods’, whereas we require ξ such that the overall predictive capability of the model is maximized. In fact, in subsequent sections, we restrict attention to the prediction of match outcomes rather than match scores. Therefore it is pragmatic to choose ξ to optimize the prediction of outcomes. First note that the probability of a home win in match k is estimated as

$$p_k^H = \sum_{l, m \in B_H} \Pr(X_k = l, Y_k = m)$$

where $B_H = \{(l, m): l > m\}$, and the score probabilities are determined from the maximization of model (4.5) at $t(k)$, the time of match k . Similar expressions hold for p_k^A and p_k^D , the probabilities of an away win and a draw respectively. Now define

$$S(\xi) = \sum_{k=1}^N (\delta_k^H \log p_k^H + \delta_k^A \log p_k^A + \delta_k^D \log p_k^D)$$

where, for example, $\delta_k^H = 1$ if match k is a home win and $\delta_k^H = 0$ otherwise, and p_k^H , p_k^A and p_k^D are the maximum likelihood estimates from model , with weighting parameter set at ξ . Considering only the outcomes, and not the scores, equation is the analogue of a predictive profile log-likelihood. A plot of $S(\xi)$ against ξ , with time units taken to be half-weeks, is given in Fig. 1. The function is maximized at $\xi = 0.0065$, and all subsequent results are given with respect to this choice of ξ , though in fact the results are robust across a range of ξ -values.

Figure 5: decay rates

After simulation, I get a decay rate which is almost 0.0065 and similar with *Dixon & Coles 1996*. However, due to I consider the soccer matches has come out result once the whistle is blew. Therefore I’ve tried to build another model which is similar with Weibull model to make the decay rate flexible compare to constantly annum. few models, which are:

- Count in the soccer result once a soccer match is finished to get a dynamic decay rates to refresh next prediction odds price.
- Follow *Dixon & Coles 1996* which taken a constant decay rates for a soccer session.
- Count in the soccer result once a week to get a weekly dynamic decay rates to predict next week soccer matches.

I got a vector of decay rates around 0.0045 with the standard deviation not more than 1~10%, which is similar with the model at MatchOdds.org.

3. Data

3.1. Soccer Sports Dataset

- 1) test the efficiency of 29 bookmakers' Asian Handicap prices.
- 2) comparison between EM model, observations/outcome, and also pure probabilities of products offered by 29 bookmakers.
- 3) 29 bookmakers exclude below 11 companies:
 - i) bwin
 - ii) Interwetten
 - iii) William Hill
 - iv) SSP International
 - v) Betfair
 - vi) Intralot
 - vii) SNAI
 - viii) SingaporePools
 - ix) Stan James
 - x) Unibet
 - xi) Coral

3.2. Odds Price Dataset

In order to test the efficiency of my model. I took quite long time period¹¹ to gather data from below websites. You are feel free to browse over the dataset via [200611 EngAllOdds](https://200611eng.github.io/EngAllOdds/)¹²

Data source :

¹¹After I completed the odds modelling part. took time more than 10 hours per day and around half year time manually copy and paste the odds price (soccer matches data, all events in all English 9 leagues + cups as well as all Japanese leagues and tournaments for both prematch as well as the rebirth modelling, and also testing staking model's purpose)

¹²The spreadsheet file locate inside the **dataset** of **Odds Modelling and Testing Inefficiency of Sports-Bookmakers 2008-2010** by [@yo Eng Lian Hu](https://github.com/200611eng) to see the odds price of every single soccer match.

1. the soccer matches and also Asian Handicap odds prices of 29 bookmakers getting from 3 websites below:

- <http://www.500wan.com>
- <http://www.bet007.com>
- <http://www.nowgoal.com>

2. English soccer leagues from 2006/07 to 2010/11 collected as my sample data, which are include:

- 1) English Premier League
- 2) English League Championship
- 3) English Division 1
- 4) English Division 2
- 5) English FA Cup
- 6) English League Cup
- 7) English League Trophy
- 8) English FA Trophy / English Challenge Cup

3. Season 2006/07 and 2007/08 used for EM model, however odds price of only seasons 2008/09 and 2009/10 gathered and use for testing efficiency.

- there are 4389 soccer matches used as sample in our research.
- unfortunately, odds prices of around 10 to 20 soccer matches inside research works have no data source.
- open prices and closed prices collected but only open prices get into research works.

3.3. Conversion to Odds Price

Odds Price based on Pure Probabilities

From above description we know the bookmakers has charges a certain spread margin / overrounds / vigorish.

Odds Price based with Vigorish

Therefore we need to convert to a net probabilities without vigorish to compare with our time series diagonal inflation bivariate poisson regression model.

A typical set of bookmakers' odds for a particular match might be (8:13, 12:5, 4:1) for a home win, draw and away win respectively. Thus, in this example, a stake of 13 units on a home win would yield a profit of 8 units if that outcome occurred. Odds $o_1:o_2$ transform to a probability p by using the formula

$$p = o_2/(o_1 + o_2).$$

The above set of odds then corresponds to the set of probabilities (0.62, 0.29, 0.20), which has a sum of 1.11. This phenomenon is standard in betting markets: if the bookmakers are accurate in their probability specifications, they have an in-built 'take', corresponding to their expected profit, which in the above example is 11%. To win money from bookmakers, in the sense of having a positive expected return, requires a determination of probabilities which is sufficiently more accurate than those obtained from the odds in order to overcome the bookmakers' take. We first rescale multiplicatively the bookmakers' odds so that they sum to 1. Denote these probabilities for match k by b_k^H , b_k^D and b_k^A for a home win, draw and away win respectively, and similarly let \hat{p}_k^H , \hat{p}_k^D and \hat{p}_k^A be the corresponding maximum likelihood estimates for this match under model \mathcal{M} . Comparisons of the two sets of probability estimates for each of the result outcomes are given in Fig. 3 for each match in our database. Overall there is reasonable agreement between the probability assessments, but the variability in these plots indicates the potential for positive gain if our model probabilities are accurate.

Figure 6: odds price with vigorish

Remarks : you are feel free to browse over [dataset](#) of **Odds Modelling and Testing Inefficiency of Sports-Bookmakers 2008-2010** by *©yo Eng Lian Hu* to observe the EM odds, odds price offered by bookmakers without vigorish as well as with vigorish for every single soccer match. Total soccer matches in this research project has 4389 across 8 leagues + tournaments in England.

4. Betting Strategies

4.1. Comparison of Efficiency of the Models

By refer to *Dixon & Pope 2004*, before we start build our staking model, we try to summarize the statistical prices offered by 40 sports bookmakers on both Asian Handicap and Goal Line.

Research AH (PureProb)

Research AH [PureProb]ah [Read-Only] - Excel (Trial)

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Home

Competition (Data of Season 2008/9 and 2009/10)
Pure Probabilities

This section compares the live observations outcome, EM model, and also the **pure probabilities** (without normal vigoris) of 29 bookmakers with EM model. Only the difference of handicap between bookmakers.

The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these summaries. Also given are the corresponding quantiles obtained from the statistical model.

Competition (Data of Season 2008/9 and 2009/10)
Probabilities from Odds Prices

This section compares the outcome Asian Handicap **odds prices** of 29 bookmakers. Assume that all bookmakers offer similar handicap for a soccer match, omits the difference of handicap between bookmakers.

The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these summaries. Also given are the corresponding quantiles obtained from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2% take has been accounted for.

Home Vm probability = 1/(Home Price + 1)

A Bookmakers

B Competitions

C Bet's Breakdown

d) Handicap Status

b) Handicap P/L

c) Handicap Ratio

d) Price Status

d) Price Status

a) Price P/L

b) Price Ratio

c) Handicap Status

d) Handicap P/L

e) Handicap Ratio

f) Price Status

d) Summary

a) Season 2008

b) Season 2009

E Conclusion

Home Vin		Bookmakers					EM Model																	
Company	Mean	Std Dev	25%	Median	75%	Company	Mean	Std Dev	25%	Median	75%	Company	Mean	Std Dev	25%	Median	75%	Company	Mean	Std Dev	25%	Median	75%	Normal Vigorish
Macao-Six	0.4318	0.0238	0.4762	0.5000	0.5221	0.4313	0.0233	0.4400	0.4899	0.5453		Macao-Six	0.5228	0.0201	0.5000	0.5209	0.5445		0.5228	0.0201	0.5000	0.5209	0.5445	0.04%
Ladbrokes	0.5018	0.0288	0.4782	0.5028	0.5260	0.4945	0.0203	0.4425	0.4891	0.5488		Ladbrokes	0.5228	0.0201	0.5000	0.5209	0.5445		0.5228	0.0201	0.5000	0.5209	0.5445	0.04%
Victor Chandler	0.4995	0.0282	0.4782	0.5000	0.5221	0.4940	0.0203	0.4387	0.4807	0.5468		Victor Chandler	0.5096	0.0204	0.4950	0.5195	0.5435		0.5096	0.0204	0.4950	0.5195	0.5435	0.04%
Singbet	0.4988	0.0249	0.4788	0.5000	0.5221	0.4931	0.0202	0.4385	0.4898	0.5469		Singbet	0.5060	0.0207	0.4926	0.5195	0.5405		0.5060	0.0207	0.4926	0.5195	0.5405	0.03%
Papa	0.4989	0.0220	0.4788	0.5000	0.5221	0.4930	0.0204	0.4383	0.4896	0.5468		Papa	0.5069	0.0209	0.4926	0.5195	0.5405		0.5069	0.0209	0.4926	0.5195	0.5405	0.03%
Fafa	0.4991	0.0225	0.4779	0.5000	0.5195	0.4926	0.0208	0.4384	0.4896	0.5460		Fafa	0.5076	0.0207	0.4950	0.5191	0.5405		0.5076	0.0207	0.4950	0.5191	0.5405	0.04%
Bet365	0.4884	0.0228	0.4784	0.5000	0.5195	0.4929	0.0201	0.4377	0.4823	0.5465		Bet365	0.5076	0.0208	0.4930	0.5192	0.5405		0.5076	0.0208	0.4930	0.5192	0.5405	0.04%
Target	0.4934	0.0234	0.4805	0.5000	0.5195	0.4927	0.0242	0.4378	0.4824	0.5470		Target	0.5201	0.0275	0.5000	0.5191	0.5405		0.5201	0.0275	0.5000	0.5191	0.5405	0.04%
Marathon	0.4988	0.0257	0.4786	0.5000	0.5188	0.4930	0.0205	0.4380	0.4896	0.5465		Marathon	0.5051	0.0208	0.4901	0.5197	0.5371		0.5051	0.0208	0.4901	0.5197	0.5371	0.03%
SB	0.4995	0.0230	0.4788	0.5000	0.5219	0.4931	0.0202	0.4382	0.4821	0.5461		SB	0.5050	0.0209	0.4900	0.5203	0.5376		0.5050	0.0209	0.4900	0.5203	0.5376	0.03%
YSB	0.4983	0.0235	0.4788	0.5000	0.5219	0.4929	0.0202	0.4386	0.4821	0.5461		YSB	0.5050	0.0209	0.4900	0.5203	0.5376		0.5050	0.0209	0.4900	0.5203	0.5376	0.03%
Tongji	0.4989	0.0236	0.4779	0.5000	0.5219	0.4931	0.0208	0.4386	0.4824	0.5460		Tongji	0.5050	0.0209	0.4900	0.5203	0.5376		0.5050	0.0209	0.4900	0.5203	0.5376	0.03%
Shobet	0.4985	0.0232	0.4778	0.5000	0.5219	0.4930	0.0202	0.4385	0.4821	0.5461		Shobet	0.5050	0.0209	0.4900	0.5203	0.5376		0.5050	0.0209	0.4900	0.5203	0.5376	0.03%
ECBbet	0.4982	0.0232	0.4779	0.5000	0.5219	0.4930	0.0202	0.4385	0.4821	0.5461		ECBbet	0.5050	0.0209	0.4900	0.5203	0.5376		0.5050	0.0209	0.4900	0.5203	0.5376	0.03%
Henggang	0.4982	0.0238	0.4788	0.5000	0.5219	0.4929	0.0200	0.4383	0.4896	0.5467		Henggang	0.5039	0.0277	0.4902	0.5203	0.5376		0.5039	0.0277	0.4902	0.5203	0.5376	0.03%
AS1888	0.4984	0.0274	0.4778	0.5000	0.5219	0.4930	0.0202	0.4385	0.4821	0.5461		AS1888	0.5050	0.0209	0.4900	0.5203	0.5376		0.5050	0.0209	0.4900	0.5203	0.5376	0.03%
AB International	0.4989	0.0244	0.4778	0.5000	0.5219	0.4929	0.0200	0.4385	0.4896	0.5467		AB International	0.5050	0.0209	0.4902	0.5203	0.5376		0.5050	0.0209	0.4902	0.5203	0.5376	0.03%
SB188	0.4989	0.0244	0.4778	0.5000	0.5219	0.4929	0.0200	0.4385	0.4896	0.5467		SB188	0.5050	0.0209	0.4902	0.5203	0.5376		0.5050	0.0209	0.4902	0.5203	0.5376	0.03%
Vin888	0.4983	0.0236	0.4784	0.4874	0.5217	0.4928	0.0236	0.4395	0.4908	0.5468		Vin888	0.5050	0.0204	0.4878	0.5192	0.5348		0.5050	0.0204	0.4878	0.5192	0.5348	0.03%
Asiarabacke	0.4983	0.0237	0.4778	0.5000	0.5219	0.4929	0.0200	0.4385	0.4896	0.5467		Asiarabacke	0.5050	0.0209	0.4902	0.5203	0.5376		0.5050	0.0209	0.4902	0.5203	0.5376	0.03%
TongjiGut	0.4985	0.0234	0.4788	0.5000	0.5219	0.4931	0.0209	0.4387	0.4839	0.5461		TongjiGut	0.5052	0.0273	0.4926	0.5195	0.5376		0.5052	0.0273	0.4926	0.5195	0.5376	0.03%
Mibet	0.4984	0.0274	0.4785	0.4987	0.5212	0.4923	0.0201	0.4377	0.4801	0.5467		Mibet	0.5050	0.0202	0.4878	0.5203	0.5348		0.5050	0.0202	0.4878	0.5203	0.5348	0.03%
ST-Sbet	0.4986	0.0234	0.4788	0.5000	0.5219	0.4932	0.0200	0.4387	0.4825	0.5465		ST-Sbet	0.5052	0.0208	0.4902	0.5203	0.5376		0.5052	0.0208	0.4902	0.5203	0.5376	0.03%
Vigore	0.4987	0.0232	0.4778	0.5000	0.5219	0.4931	0.0208	0.4389	0.4822	0.5465		Vigore	0.5042	0.0279	0.4902	0.5203	0.5376		0.5042	0.0279	0.4902	0.5203	0.5376	0.03%
Pinawaleports	0.4983	0.0272	0.4788	0.5000	0.5217	0.4928	0.0230	0.4381	0.4896	0.5461		Pinawaleports	0.5052	0.0279	0.4878	0.5192	0.5348		0.5052	0.0279	0.4878	0.5192	0.5348	0.03%
Sargbo	0.4986	0.0262	0.4905	0.5000	0.5195	0.4927	0.0238	0.4380	0.4823	0.5468		Sargbo	0.5049	0.0274	0.5000	0.5191	0.5405		0.5049	0.0274	0.5000	0.5191	0.5405	0.04%
IBSBet	0.4988	0.0272	0.4778	0.5000	0.5219	0.4931	0.0238	0.4385	0.4896	0.5468		IBSBet	0.5050	0.0279	0.4878	0.5192	0.5348		0.5050	0.0279	0.4878	0.5192	0.5348	0.04%
ESBet	0.4995	0.0274	0.4788	0.5000	0.5219	0.4930	0.0233	0.4381	0.4896	0.5461		ESBet	0.5050	0.0232	0.4878	0.5192	0.5348		0.5050	0.0232	0.4878	0.5192	0.5348	0.04%
EWI	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	EWI	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Interetten	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Interetten	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
VillamHil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	VillamHil	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
HEUC	0.4988	0.0272	0.4787	0.5000	0.5212	0.4932	0.0233	0.4401	0.4929	0.5468		HEUC	0.5034	0.0290	0.5000	0.5209	0.5435		0.5034	0.0290	0.5000	0.5209	0.5435	0.04%
SSP International	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SSP International	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Barbar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Barbar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Imacot	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Imacot	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
SR4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SR4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Singaporepools	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Singaporepools	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Stran-James	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Stran-James	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Unibet	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Unibet	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Corat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Corat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0%
Average	0.4935	0.0263	0.4771	0.5000	0.5221	0.4931	0.0230	0.4388	0.4830	0.5461		Average	0.5051	0.0279	0.4930	0.5191	0.5365		0.5051	0.0279	0.4930	0.5191	0.5365	0.03%

Away Prob = (Home Price + 1) / (Home Price + Away Price + 2)
Away Vm probability = 1/(Away Price + 1)

Away Vin		Bookmakers					EM Model																	
Company	Mean	Std Dev	25%	Median	75%	Company	Mean	Std Dev	25%	Median	75%	Company	Mean	Std Dev	25%	Median	75%	Company	Mean	Std Dev	25%	Median	75%	Normal Vigorish
Macao-Six	0.5068	0.0288	0.4788	0.5000	0.5213	0.5069	0.0233	0.4941	0.5002	0.5000		Macao-Six												

Research AH (PureProb).xlsx (Read-Only) - Excel (Trial) @yq, Lian Hu Eng Tell me what you want to do Share

Home		C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD AE AF																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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<p>A Bookmakers</p> <p>B Comparison</p> <p>C Betz Breakdown</p> <p>D Summary</p> <p>E Conclusion</p>		<p>This section compare of the observations from home, EM model, and also the pure probabilities (without normal vigoris) of 23 bookmakers with EM model. Also gives are the corresponding quantiles obtained from the statistical model.</p> <p>The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is usually no difference between bookmakers in terms of these summaries. Also gives are the corresponding quantiles obtained from the statistical model.</p>													<p>This section compare of the outcome Asian Handicap odds prices of 29 bookmakers. Assume that all bookmakers offer similar handicap for a soccer match, omit the difference of handicap between bookmakers.</p> <p>The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is usually no difference between bookmakers in terms of these summaries. Also gives are the corresponding quantiles obtained from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2-4% rate has been corrected for.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Home Prob = (AvgPrice + 1) / (HomePrice + AvgPrice + 2)		<table border="1"> <thead> <tr> <th colspan="6">Bookmakers</th> <th colspan="6">EM Model</th> </tr> <tr> <th>Home Win</th> <th>Mean</th> <th>Std Dev</th> <th>25%</th> <th>Median</th> <th>75%</th> <th>Home Win</th> <th>Mean</th> <th>Std Dev</th> <th>25%</th> <th>Median</th> <th>75%</th> </tr> </thead> <tbody> <tr><td>Macao Slot</td><td>0.4932</td><td>0.0204</td><td>0.4774</td><td>0.5000</td><td>0.5236</td><td>0.4932</td><td>0.0204</td><td>0.4774</td><td>0.5000</td><td>0.5236</td><td>0.4932</td></tr> <tr><td>Ladbrokes</td><td>0.5023</td><td>0.0203</td><td>0.4782</td><td>0.5000</td><td>0.5202</td><td>0.5023</td><td>0.0203</td><td>0.4782</td><td>0.5000</td><td>0.5202</td><td>0.5023</td></tr> <tr><td>Victor Chandler</td><td>0.4989</td><td>0.0270</td><td>0.4782</td><td>0.5000</td><td>0.5232</td><td>0.4989</td><td>0.0270</td><td>0.4782</td><td>0.5000</td><td>0.5232</td><td>0.4989</td></tr> <tr><td>Singbet</td><td>0.4987</td><td>0.0242</td><td>0.4769</td><td>0.5000</td><td>0.5206</td><td>0.4987</td><td>0.0242</td><td>0.4769</td><td>0.5000</td><td>0.5206</td><td>0.4987</td></tr> <tr><td>Pinnacle</td><td>0.4986</td><td>0.0246</td><td>0.4769</td><td>0.5000</td><td>0.5206</td><td>0.4986</td><td>0.0246</td><td>0.4769</td><td>0.5000</td><td>0.5206</td><td>0.4986</td></tr> <tr><td>Fafa</td><td>0.4993</td><td>0.0227</td><td>0.4805</td><td>0.5000</td><td>0.5195</td><td>0.4993</td><td>0.0227</td><td>0.4805</td><td>0.5000</td><td>0.5195</td><td>0.4993</td></tr> <tr><td>Baribet</td><td>0.4986</td><td>0.0206</td><td>0.4764</td><td>0.5000</td><td>0.5195</td><td>0.4986</td><td>0.0206</td><td>0.4764</td><td>0.5000</td><td>0.5195</td><td>0.4986</td></tr> <tr><td>Eastbet</td><td>0.5000</td><td>0.0244</td><td>0.4805</td><td>0.5000</td><td>0.5195</td><td>0.5000</td><td>0.0244</td><td>0.4805</td><td>0.5000</td><td>0.5195</td><td>0.5000</td></tr> 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Chandler	0.4989	0.0270	0.4782	0.5000	0.5232	0.4989	0.0270	0.4782	0.5000	0.5232	0.4989	Singbet	0.4987	0.0242	0.4769	0.5000	0.5206	0.4987	0.0242	0.4769	0.5000	0.5206	0.4987	Pinnacle	0.4986	0.0246	0.4769	0.5000	0.5206	0.4986	0.0246	0.4769	0.5000	0.5206	0.4986	Fafa	0.4993	0.0227	0.4805	0.5000	0.5195	0.4993	0.0227	0.4805	0.5000	0.5195	0.4993	Baribet	0.4986	0.0206	0.4764	0.5000	0.5195	0.4986	0.0206	0.4764	0.5000	0.5195	0.4986	Eastbet	0.5000	0.0244	0.4805	0.5000	0.5195	0.5000	0.0244	0.4805	0.5000	0.5195	0.5000	Marsson	0.5000	0.0206	0.4764	0.5000	0.5195	0.5000	0.0206	0.4764	0.5000	0.5195	0.5000	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	0.0206	0.4769	0.5000	0.5232	0.4986	Yongli	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	0.0274	0.4769	0.5000	0.5232	0.4992	BCBet	0.4986	0.0206	0.4769	0.5000	0.5232</
Bookmakers						EM Model																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Macao Slot	0.4932	0.0204	0.4774	0.5000	0.5236	0.4932	0.0204	0.4774	0.5000	0.5236	0.4932																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Ladbrokes	0.5023	0.0203	0.4782	0.5000	0.5202	0.5023	0.0203	0.4782	0.5000	0.5202	0.5023																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Victor Chandler	0.4989	0.0270	0.4782	0.5000	0.5232	0.4989	0.0270	0.4782	0.5000	0.5232	0.4989																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Singbet	0.4987	0.0242	0.4769	0.5000	0.5206	0.4987	0.0242	0.4769	0.5000	0.5206	0.4987																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Pinnacle	0.4986	0.0246	0.4769	0.5000	0.5206	0.4986	0.0246	0.4769	0.5000	0.5206	0.4986																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Fafa	0.4993	0.0227	0.4805	0.5000	0.5195	0.4993	0.0227	0.4805	0.5000	0.5195	0.4993																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Baribet	0.4986	0.0206	0.4764	0.5000	0.5195	0.4986	0.0206	0.4764	0.5000	0.5195	0.4986																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Eastbet	0.5000	0.0244	0.4805	0.5000	0.5195	0.5000	0.0244	0.4805	0.5000	0.5195	0.5000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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Research AH (PureProb).xlsx (Read-Only) - Excel (Trial)

Yan, Lin Hu Eng

HomeInsertPage LayoutFormulasData ReviewViewACROBATTell me what you want to do

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD AE AF

Home

A Bookmakers

Comparison

a) Season 98/99

b) Season 99/00

C Data Breakdowns

a) Handicap Status

b) Handicap P/L

c) Handicap P/L

d) Price Status

e) Price P/L

f) Price P/L

g) Handicap Breakdown

h) Handicap Status

i) Handicap P/L

j) Handicap P/L

k) Price Status

l) Price P/L

D Summary

a) Season 98/99

b) Season 99/00

E Conclusion

This section compares the observations from the observations, EM model, and also the pure probabilities (without nominal vigors) of 29 bookmakers with EM model. Omit the difference of handicap between bookmakers.

The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these summaries. Also given are the corresponding quantiles obtained from the statistical model.

Home Prob: (AvgPrice + 1) (HomePrice - AvgPrice - 2)

Home Win		Bookmakers					EM Model				
		Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%
Maroon-Sin		0.4995	0.0322	0.4763	0.5000	0.5232	0.4993	0.0321	0.4760	0.4998	0.5245
Leobrokers		0.5001	0.0302	0.4767	0.5000	0.5230	0.4995	0.0302	0.4762	0.4995	0.5246
Victor Chandler		0.4998	0.0304	0.4762	0.5000	0.5231	0.4990	0.0302	0.4767	0.4997	0.5249
Singlet		0.5000	0.0295	0.4768	0.5000	0.5232	0.4991	0.0302	0.4765	0.4998	0.5249
Poyal		0.5000	0.0305	0.4768	0.5000	0.5232	0.4999	0.0304	0.4762	0.4996	0.5249
Fala		0.4998	0.0272	0.4763	0.5000	0.5208	0.4995	0.0302	0.4764	0.4998	0.5249
Bet365		0.4993	0.0321	0.4760	0.5000	0.5195	0.4923	0.0301	0.4777	0.4993	0.5249
Earlight		0.4998	0.0293	0.4805	0.4987	0.5195	0.4927	0.0242	0.4778	0.4924	0.5270
IBet		0.4998	0.0327	0.4768	0.5000	0.5195	0.4929	0.0305	0.4768	0.4995	0.5249
Marsson		0.4998	0.0295	0.4745	0.5000	0.5230	0.4991	0.0302	0.4762	0.4921	0.5242
Star		0.4998	0.0325	0.4768	0.5000	0.5232	0.4992	0.0305	0.4768	0.4921	0.5246
Yongli		0.4998	0.0273	0.4768	0.5000	0.5232	0.4991	0.0302	0.4768	0.4998	0.5249
AB International		0.4999	0.0306	0.4770	0.5000	0.5230	0.4991	0.0302	0.4768	0.4924	0.5249
BCB		0.4998	0.0278	0.4745	0.5000	0.5230	0.4999	0.0301	0.4768	0.4994	0.5249
AS3388		0.4998	0.0305	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4994	0.5249
Singapore		0.4998	0.0278	0.4745	0.5000	0.5230	0.4999	0.0302	0.4768	0.4994	0.5249
SB1888		0.5000	0.0271	0.4770	0.5000	0.5230	0.4999	0.0302	0.4768	0.4994	0.5249
William-Hill		0.4997	0.0329	0.4770	0.4974	0.5231	0.4999	0.0302	0.4768	0.4998	0.5249
Asianbookie		0.4998	0.0300	0.4768	0.5000	0.5231	0.4999	0.0300	0.4765	0.4920	0.5249
YongliGao		0.4998	0.0270	0.4768	0.5000	0.5232	0.4991	0.0302	0.4767	0.4998	0.5249
Marsson		0.4977	0.0306	0.4744	0.4974	0.5238	0.4923	0.0302	0.4777	0.4991	0.5247
STBet		0.4993	0.0302	0.4767	0.5000	0.5230	0.4993	0.0302	0.4767	0.4925	0.5249
IBet		0.5000	0.0302	0.4762	0.5000	0.5232	0.4993	0.0302	0.4768	0.4992	0.5249
PinnacleSports		0.4993	0.0300	0.4768	0.5000	0.5230	0.4999	0.0300	0.4768	0.4995	0.5249
Singapore		0.4998	0.0306	0.4768	0.5000	0.5232	0.4997	0.0302	0.4768	0.4992	0.5249
IBet		0.5000	0.0270	0.4770	0.5000	0.5230	0.4991	0.0302	0.4768	0.4998	0.5249
IBet		0.4999	0.0321	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4998	0.5249
Bwin		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inventon		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
William-Hill		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W.C.		0.4999	0.0302	0.4768	0.5000	0.5232	0.4992	0.0302	0.4768	0.4920	0.5249
SSP International		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IBet		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IBet		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Singapore		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Singapore		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Star James		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unbet		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coral		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average		0.4999	0.0321	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4998	0.5249

Home Prob: (AvgPrice + 1) (HomePrice - AvgPrice - 2)

Home Win		Bookmakers					EM Model				
		Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%
Maroon-Sin		0.4995	0.0322	0.4763	0.5000	0.5232	0.4993	0.0321	0.4760	0.4998	0.5245
Leobrokers		0.5001	0.0302	0.4767	0.5000	0.5230	0.4995	0.0302	0.4762	0.4995	0.5246
Victor Chandler		0.4998	0.0304	0.4762	0.5000	0.5231	0.4990	0.0302	0.4767	0.4997	0.5249
Singlet		0.5000	0.0295	0.4768	0.5000	0.5232	0.4991	0.0302	0.4765	0.4998	0.5249
Poyal		0.5000	0.0305	0.4768	0.5000	0.5232	0.4999	0.0304	0.4762	0.4996	0.5249
Fala		0.4998	0.0272	0.4763	0.5000	0.5208	0.4995	0.0302	0.4764	0.4998	0.5249
Bet365		0.4993	0.0321	0.4760	0.5000	0.5195	0.4923	0.0301	0.4777	0.4993	0.5249
Earlight		0.4998	0.0293	0.4805	0.4987	0.5195	0.4927	0.0242	0.4778	0.4924	0.5270
IBet		0.4998	0.0327	0.4768	0.5000	0.5195	0.4929	0.0305	0.4768	0.4995	0.5249
Marsson		0.4998	0.0295	0.4745	0.5000	0.5230	0.4991	0.0302	0.4762	0.4921	0.5242
Star		0.4998	0.0325	0.4768	0.5000	0.5232	0.4992	0.0305	0.4768	0.4921	0.5246
Yongli		0.4998	0.0273	0.4768	0.5000	0.5232	0.4991	0.0302	0.4768	0.4998	0.5249
AB International		0.4999	0.0306	0.4770	0.5000	0.5230	0.4991	0.0302	0.4768	0.4924	0.5249
BCB		0.4998	0.0278	0.4745	0.5000	0.5230	0.4999	0.0301	0.4768	0.4994	0.5249
AS3388		0.4998	0.0305	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4994	0.5249
Singapore		0.4998	0.0278	0.4745	0.5000	0.5230	0.4999	0.0302	0.4768	0.4994	0.5249
SB1888		0.5000	0.0271	0.4770	0.5000	0.5230	0.4999	0.0302	0.4768	0.4994	0.5249
William-Hill		0.4997	0.0329	0.4770	0.4974	0.5231	0.4999	0.0302	0.4768	0.4998	0.5249
Asianbookie		0.4998	0.0300	0.4768	0.5000	0.5231	0.4999	0.0300	0.4765	0.4920	0.5249
YongliGao		0.4998	0.0270	0.4768	0.5000	0.5232	0.4991	0.0302	0.4767	0.4998	0.5249
Marsson		0.4977	0.0306	0.4744	0.4974	0.5238	0.4923	0.0302	0.4777	0.4991	0.5247
STBet		0.4993	0.0302	0.4767	0.5000	0.5230	0.4993	0.0302	0.4767	0.4925	0.5249
IBet		0.5000	0.0302	0.4762	0.5000	0.5232	0.4993	0.0302	0.4768	0.4992	0.5249
PinnacleSports		0.4993	0.0300	0.4768	0.5000	0.5230	0.4999	0.0300	0.4768	0.4995	0.5249
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IBet		0.5000	0.0270	0.4770	0.5000	0.5230	0.4991	0.0302	0.4768	0.4998	0.5249
IBet		0.4999	0.0321	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4998	0.5249
Bwin		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inventon		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
William-Hill		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
W.C.		0.4999	0.0302	0.4768	0.5000	0.5232	0.4992	0.0302	0.4768	0.4920	0.5249
SSP International		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IBet		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IBet		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Singapore		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Singapore		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Star James		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Unbet		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Coral		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average		0.4999	0.0321	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4998	0.5249

Home Prob: (AvgPrice + 1) (HomePrice - AvgPrice - 2)

Home Win		Bookmakers					EM Model				
		Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%
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Victor Chandler		0.4998	0.0304	0.4762	0.5000	0.5231	0.4990	0.0302	0.4767	0.4997	0.5249
Singlet		0.5000	0.0295	0.4768	0.5000	0.5232	0.4991	0.0302	0.4765	0.4998	0.5249
Poyal		0.5000	0.0305	0.4768	0.5000	0.5232	0.4999	0.0304	0.4762	0.4996	0.5249
Fala		0.4998	0.0272	0.4763	0.5000	0.5208	0.4995	0.0302	0.4764	0.4998	0.5249
Bet365		0.4993	0.0321	0.4760	0.5000	0.5195	0.4923	0.0301	0.4777	0.4993	0.5249
Earlight		0.4998	0.0293	0.4805	0.4987	0.5195	0.4927	0.0242	0.4778	0.4924	0.5270
IBet		0.4998	0.0327	0.4768	0.5000	0.5195	0.4929	0.0305	0.4768	0.4995	0.5249
Marsson		0.4998	0.0295	0.4745	0.5000	0.5230	0.4991	0.0302	0.4762	0.4921	0.5242
Star		0.4998	0.0325	0.4768	0.5000	0.5232	0.4992	0.0305	0.4768	0.4921	0.5246
Yongli		0.4998	0.0273	0.4768	0.5000	0.5232	0.4991	0.0302	0.4768	0.4998	0.5249
AB International		0.4999	0.0306	0.4770	0.5000	0.5230	0.4991	0.0302	0.4768	0.4924	0.5249
BCB		0.4998	0.0278	0.4745	0.5000	0.5230	0.4999	0.0301	0.4768	0.4994	0.5249
AS3388		0.4998	0.0305	0.4768	0.5000	0.5232	0.4999	0.0302	0.4768	0.4994	0.5249
Singapore		0.4998	0.0278	0.4745	0.5000	0.5230	0.4999	0.0302	0.4768	0.4994	0.5249
SB1888		0.5000	0.0271	0.4770	0.5000	0.5230	0.4999	0.0302	0.4768	0.4994	0.5249
William-Hill		0.4997	0.0329	0.4770	0.4974	0.5231	0.4999	0.0302	0.4768	0.4998	0.5249
Asianbookie		0.4998	0.0300	0.4768	0.5000	0.5231	0.4999	0.0300	0.4765	0.4920	0.5249
YongliGao		0.4998	0.0270	0.4768	0.5000	0.5232	0.4991	0.0302	0.4767	0.4998	0.5249
Marsson		0.4977	0.0306	0.4744	0.4974	0.5238					

[illegible]

Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Asian Handicap odds price with vigorish of total soccer matches in season 2008/09 and 2009/10.

Home		Comparison		Comparison																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Home		Pure Probabilities		Probabilities from Odds Prices																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
<p>A Bookmakers</p> <p>B Comparison</p> <p>a) Season 2008/09</p> <p>c) Best Breakdown</p> <p>d) Handicap Stakes</p> <p>e) Handicap P/L</p> <p>f) Price P/L</p> <p>g) Handicap P/L</p> <p>h) Handicap P/L</p> <p>i) Price P/L</p> <p>j) Price P/L</p> <p>k) Handicap P/L</p> <p>l) Price P/L</p> <p>m) Handicap P/L</p> <p>n) Handicap P/L</p> <p>o) Handicap P/L</p> <p>p) Handicap P/L</p> <p>q) Handicap P/L</p> <p>r) Handicap P/L</p> <p>s) Handicap P/L</p> <p>t) Handicap P/L</p> <p>u) Handicap P/L</p> <p>v) Handicap P/L</p> <p>w) Handicap P/L</p> <p>x) Handicap P/L</p> <p>y) Handicap P/L</p> <p>z) Handicap P/L</p> <p>aa) Handicap P/L</p> <p>ab) Handicap P/L</p> <p>ac) Handicap P/L</p> <p>ad) Handicap P/L</p> <p>ae) Handicap P/L</p>		<p>This section compares the observations to the home, EM model, and also the pure probabilities (without normal vigorisht)</p> <p>of 29 bookmakers with EM model. Only the difference of handicap between bookmakers.</p> <p>The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these summaries. Also given are the corresponding quantiles obtained from the statistical model.</p> <p>HomeProb = (AvgPrice + 1) / (HomePrice + AvgPrice + 2)</p>		<p>This section compares the outcome Asian Handicap odds prices of 29 bookmakers. Assume that all bookmakers offer similar handicaps for a soccer match, only the difference of handicap between bookmakers.</p> <p>The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these summaries. Also given are the corresponding quantiles obtained from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2nd K; take has been accounted for.</p> <p>Home Vln probability = 1 / (HomePrice + 1)</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
<p>D Summary</p> <p>a) Season 2008/09</p> <p>b) Season 2008/09</p> <p>E Conclusion</p>		<p>HomeProb = (AvgPrice + 1) / (HomePrice + AvgPrice + 2)</p> <table> <tr> <th>Home Win</th><th>Mean</th><th>Std Dev</th><th>25%</th><th>Median</th><th>75%</th><th>Mean</th><th>Std Dev</th><th>25%</th><th>Median</th><th>75%</th></tr> <tr> <td>Macao-Slot</td><td>0.4932</td><td>0.0254</td><td>0.4764</td><td>0.5026</td><td>0.5232</td><td>0.4972</td><td>0.0256</td><td>0.4765</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Ladbrokes</td><td>0.5023</td><td>0.0253</td><td>0.4764</td><td>0.5026</td><td>0.5232</td><td>0.4987</td><td>0.0251</td><td>0.4765</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Victor Chandler</td><td>0.4939</td><td>0.0270</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4984</td><td>0.0268</td><td>0.4764</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Engel</td><td>0.4907</td><td>0.0242</td><td>0.4763</td><td>0.5000</td><td>0.5230</td><td>0.4971</td><td>0.0250</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Royal</td><td>0.4936</td><td>0.0246</td><td>0.4763</td><td>0.5000</td><td>0.5230</td><td>0.4970</td><td>0.0254</td><td>0.4765</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Fala</td><td>0.4932</td><td>0.0237</td><td>0.4805</td><td>0.5000</td><td>0.5199</td><td>0.4972</td><td>0.0252</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Bar365</td><td>0.4984</td><td>0.0266</td><td>0.4764</td><td>0.5000</td><td>0.5199</td><td>0.4972</td><td>0.0251</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Expert</td><td>0.5000</td><td>0.0244</td><td>0.4805</td><td>0.5000</td><td>0.5199</td><td>0.4972</td><td>0.0256</td><td>0.4764</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>10Bet</td><td>0.5001</td><td>0.0256</td><td>0.4796</td><td>0.5000</td><td>0.5199</td><td>0.4977</td><td>0.0254</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Marion</td><td>0.5002</td><td>0.0274</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4980</td><td>0.0260</td><td>0.4737</td><td>0.4982</td><td>0.5405</td></tr> <tr> <td>10Bet</td><td>0.4932</td><td>0.0276</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4971</td><td>0.0256</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Yongli</td><td>0.4932</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4974</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>10Bet</td><td>0.4939</td><td>0.0259</td><td>0.4763</td><td>0.5000</td><td>0.5230</td><td>0.4975</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>BCBet</td><td>0.4939</td><td>0.0259</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.4977</td><td>0.0253</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Henging</td><td>0.4932</td><td>0.0256</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4975</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>AC365</td><td>0.4932</td><td>0.0259</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.4970</td><td>0.0256</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>ABInternational</td><td>0.4932</td><td>0.0272</td><td>0.4763</td><td>0.5000</td><td>0.5230</td><td>0.4975</td><td>0.0252</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>EB365</td><td>0.4932</td><td>0.0257</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.4972</td><td>0.0250</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Vin365</td><td>0.4932</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4981</td><td>0.0252</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>AsianBookie</td><td>0.4939</td><td>0.0255</td><td>0.4764</td><td>0.5000</td><td>0.5232</td><td>0.4974</td><td>0.0252</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>YongliGao</td><td>0.4932</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4975</td><td>0.0252</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>10Bet</td><td>0.4932</td><td>0.0256</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4974</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>STSBet</td><td>0.4939</td><td>0.0256</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.4977</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>10Bet</td><td>0.4932</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.4975</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>PinnacleSports</td><td>0.4932</td><td>0.0253</td><td>0.4763</td><td>0.5000</td><td>0.5230</td><td>0.4972</td><td>0.0252</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Sargbo</td><td>0.5000</td><td>0.0244</td><td>0.4805</td><td>0.5000</td><td>0.5199</td><td>0.4972</td><td>0.0256</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>10Bet</td><td>0.4939</td><td>0.0257</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.4972</td><td>0.0250</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>10Bet</td><td>0.4939</td><td>0.0259</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.4977</td><td>0.0253</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>Bwin</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Interwetten</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Vilken-Hel</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>HKC</td><td>0.4939</td><td>0.0252</td><td>0.4763</td><td>0.5026</td><td>0.5232</td><td>0.4976</td><td>0.0257</td><td>0.4763</td><td>0.5027</td><td>0.5230</td></tr> <tr> <td>SSP International</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Beljar</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>10Bet</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>SHAI</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Singaporepools</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Star James</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Unibet</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Coral</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Average</td><td>0.4939</td><td>0.0263</td><td>0.4774</td><td>0.5004</td><td>0.5239</td><td>0.4976</td><td>0.0253</td><td>0.4737</td><td>0.4947</td><td>0.5237</td></tr> </table>		Home Win	Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%	Macao-Slot	0.4932	0.0254	0.4764	0.5026	0.5232	0.4972	0.0256	0.4765	0.5027	0.5230	Ladbrokes	0.5023	0.0253	0.4764	0.5026	0.5232	0.4987	0.0251	0.4765	0.5027	0.5230	Victor Chandler	0.4939	0.0270	0.4763	0.5000	0.5232	0.4984	0.0268	0.4764	0.5027	0.5230	Engel	0.4907	0.0242	0.4763	0.5000	0.5230	0.4971	0.0250	0.4763	0.5027	0.5230	Royal	0.4936	0.0246	0.4763	0.5000	0.5230	0.4970	0.0254	0.4765	0.5027	0.5230	Fala	0.4932	0.0237	0.4805	0.5000	0.5199	0.4972	0.0252	0.4763	0.5027	0.5230	Bar365	0.4984	0.0266	0.4764	0.5000	0.5199	0.4972	0.0251	0.4763	0.5027	0.5230	Expert	0.5000	0.0244	0.4805	0.5000	0.5199	0.4972	0.0256	0.4764	0.5027	0.5230	10Bet	0.5001	0.0256	0.4796	0.5000	0.5199	0.4977	0.0254	0.4763	0.5027	0.5230	Marion	0.5002	0.0274	0.4763	0.5000	0.5232	0.4980	0.0260	0.4737	0.4982	0.5405	10Bet	0.4932	0.0276	0.4763	0.5000	0.5232	0.4971	0.0256	0.4763	0.5027	0.5230	Yongli	0.4932	0.0257	0.4763	0.5000	0.5232	0.4974	0.0257	0.4763	0.5027	0.5230	10Bet	0.4939	0.0259	0.4763	0.5000	0.5230	0.4975	0.0257	0.4763	0.5027	0.5230	BCBet	0.4939	0.0259	0.4770	0.5000	0.5230	0.4977	0.0253	0.4763	0.5027	0.5230	Henging	0.4932	0.0256	0.4763	0.5000	0.5232	0.4975	0.0257	0.4763	0.5027	0.5230	AC365	0.4932	0.0259	0.4770	0.5000	0.5230	0.4970	0.0256	0.4763	0.5027	0.5230	ABInternational	0.4932	0.0272	0.4763	0.5000	0.5230	0.4975	0.0252	0.4763	0.5027	0.5230	EB365	0.4932	0.0257	0.4770	0.5000	0.5230	0.4972	0.0250	0.4763	0.5027	0.5230	Vin365	0.4932	0.0257	0.4763	0.5000	0.5232	0.4981	0.0252	0.4763	0.5027	0.5230	AsianBookie	0.4939	0.0255	0.4764	0.5000	0.5232	0.4974	0.0252	0.4763	0.5027	0.5230	YongliGao	0.4932	0.0257	0.4763	0.5000	0.5232	0.4975	0.0252	0.4763	0.5027	0.5230	10Bet	0.4932	0.0256	0.4763	0.5000	0.5232	0.4974	0.0257	0.4763	0.5027	0.5230	STSBet	0.4939	0.0256	0.4770	0.5000	0.5230	0.4977	0.0257	0.4763	0.5027	0.5230	10Bet	0.4932	0.0257	0.4763	0.5000	0.5232	0.4975	0.0257	0.4763	0.5027	0.5230	PinnacleSports	0.4932	0.0253	0.4763	0.5000	0.5230	0.4972	0.0252	0.4763	0.5027	0.5230	Sargbo	0.5000	0.0244	0.4805	0.5000	0.5199	0.4972	0.0256	0.4763	0.5027	0.5230	10Bet	0.4939	0.0257	0.4770	0.5000	0.5230	0.4972	0.0250	0.4763	0.5027	0.5230	10Bet	0.4939	0.0259	0.4770	0.5000	0.5230	0.4977	0.0253	0.4763	0.5027	0.5230	Bwin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Interwetten	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Vilken-Hel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	HKC	0.4939	0.0252	0.4763	0.5026	0.5232	0.4976	0.0257	0.4763	0.5027	0.5230	SSP International	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Beljar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10Bet	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SHAI	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Singaporepools	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Star James	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Unibet	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Coral	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Average	0.4939	0.0263	0.4774	0.5004	0.5239	0.4976	0.0253	0.4737	0.4947	0.5237
Home Win	Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Macao-Slot	0.4932	0.0254	0.4764	0.5026	0.5232	0.4972	0.0256	0.4765	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Ladbrokes	0.5023	0.0253	0.4764	0.5026	0.5232	0.4987	0.0251	0.4765	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Victor Chandler	0.4939	0.0270	0.4763	0.5000	0.5232	0.4984	0.0268	0.4764	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Engel	0.4907	0.0242	0.4763	0.5000	0.5230	0.4971	0.0250	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Royal	0.4936	0.0246	0.4763	0.5000	0.5230	0.4970	0.0254	0.4765	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Fala	0.4932	0.0237	0.4805	0.5000	0.5199	0.4972	0.0252	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Bar365	0.4984	0.0266	0.4764	0.5000	0.5199	0.4972	0.0251	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Expert	0.5000	0.0244	0.4805	0.5000	0.5199	0.4972	0.0256	0.4764	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5001	0.0256	0.4796	0.5000	0.5199	0.4977	0.0254	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Marion	0.5002	0.0274	0.4763	0.5000	0.5232	0.4980	0.0260	0.4737	0.4982	0.5405																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4932	0.0276	0.4763	0.5000	0.5232	0.4971	0.0256	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Yongli	0.4932	0.0257	0.4763	0.5000	0.5232	0.4974	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4939	0.0259	0.4763	0.5000	0.5230	0.4975	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
BCBet	0.4939	0.0259	0.4770	0.5000	0.5230	0.4977	0.0253	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Henging	0.4932	0.0256	0.4763	0.5000	0.5232	0.4975	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AC365	0.4932	0.0259	0.4770	0.5000	0.5230	0.4970	0.0256	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
ABInternational	0.4932	0.0272	0.4763	0.5000	0.5230	0.4975	0.0252	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
EB365	0.4932	0.0257	0.4770	0.5000	0.5230	0.4972	0.0250	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Vin365	0.4932	0.0257	0.4763	0.5000	0.5232	0.4981	0.0252	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AsianBookie	0.4939	0.0255	0.4764	0.5000	0.5232	0.4974	0.0252	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
YongliGao	0.4932	0.0257	0.4763	0.5000	0.5232	0.4975	0.0252	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4932	0.0256	0.4763	0.5000	0.5232	0.4974	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
STSBet	0.4939	0.0256	0.4770	0.5000	0.5230	0.4977	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4932	0.0257	0.4763	0.5000	0.5232	0.4975	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
PinnacleSports	0.4932	0.0253	0.4763	0.5000	0.5230	0.4972	0.0252	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Sargbo	0.5000	0.0244	0.4805	0.5000	0.5199	0.4972	0.0256	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4939	0.0257	0.4770	0.5000	0.5230	0.4972	0.0250	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4939	0.0259	0.4770	0.5000	0.5230	0.4977	0.0253	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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HKC	0.4939	0.0252	0.4763	0.5026	0.5232	0.4976	0.0257	0.4763	0.5027	0.5230																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Average	0.4939	0.0263	0.4774	0.5004	0.5239	0.4976	0.0253	0.4737	0.4947	0.5237																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<p>AvgVlnProb = (HomePrice + 1) / (HomePrice + AvgPrice + 2)</p> <table> <tr> <th>Home Win</th><th>Mean</th><th>Std Dev</th><th>25%</th><th>Median</th><th>75%</th><th>Mean</th><th>Std Dev</th><th>25%</th><th>Median</th><th>75%</th></tr> <tr> <td>Macao-Slot</td><td>0.5007</td><td>0.0254</td><td>0.4763</td><td>0.4974</td><td>0.5238</td><td>0.5027</td><td>0.0256</td><td>0.4609</td><td>0.5063</td><td>0.5405</td></tr> <tr> <td>Ladbrokes</td><td>0.4977</td><td>0.0237</td><td>0.4764</td><td>0.4940</td><td>0.5230</td><td>0.5000</td><td>0.0251</td><td>0.4657</td><td>0.5022</td><td>0.5407</td></tr> <tr> <td>Victor Chandler</td><td>0.5000</td><td>0.0270</td><td>0.4779</td><td>0.5000</td><td>0.5247</td><td>0.4996</td><td>0.0268</td><td>0.4604</td><td>0.5039</td><td>0.5446</td></tr> <tr> <td>Engel</td><td>0.5003</td><td>0.0242</td><td>0.4794</td><td>0.5000</td><td>0.5231</td><td>0.5029</td><td>0.0250</td><td>0.4608</td><td>0.5059</td><td>0.5472</td></tr> <tr> <td>Royal</td><td>0.5004</td><td>0.0246</td><td>0.4794</td><td>0.5000</td><td>0.5231</td><td>0.5010</td><td>0.0254</td><td>0.4607</td><td>0.5061</td><td>0.5475</td></tr> <tr> <td>Fala</td><td>0.5007</td><td>0.0237</td><td>0.4805</td><td>0.5000</td><td>0.5199</td><td>0.5029</td><td>0.0252</td><td>0.4601</td><td>0.5056</td><td>0.5461</td></tr> <tr> <td>Bar365</td><td>0.5016</td><td>0.0266</td><td>0.4805</td><td>0.5000</td><td>0.5230</td><td>0.5027</td><td>0.0251</td><td>0.4607</td><td>0.5045</td><td>0.5474</td></tr> <tr> <td>Expert</td><td>0.5000</td><td>0.0244</td><td>0.4805</td><td>0.4967</td><td>0.5199</td><td>0.5027</td><td>0.0256</td><td>0.4602</td><td>0.5049</td><td>0.5466</td></tr> <tr> <td>10Bet</td><td>0.4999</td><td>0.0256</td><td>0.4820</td><td>0.5000</td><td>0.5234</td><td>0.5023</td><td>0.0254</td><td>0.4594</td><td>0.5054</td><td>0.5471</td></tr> <tr> <td>Marion</td><td>0.5002</td><td>0.0274</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5020</td><td>0.0260</td><td>0.4595</td><td>0.5037</td><td>0.5463</td></tr> <tr> <td>10Bet</td><td>0.5008</td><td>0.0276</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5029</td><td>0.0260</td><td>0.4609</td><td>0.5056</td><td>0.5469</td></tr> <tr> <td>Yongli</td><td>0.5008</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5026</td><td>0.0257</td><td>0.4595</td><td>0.5054</td><td>0.5464</td></tr> <tr> <td>10Bet</td><td>0.5002</td><td>0.0257</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.5025</td><td>0.0250</td><td>0.4607</td><td>0.5048</td><td>0.5464</td></tr> <tr> <td>BCBet</td><td>0.5001</td><td>0.0259</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.5023</td><td>0.0253</td><td>0.4599</td><td>0.5056</td><td>0.5472</td></tr> <tr> <td>Henging</td><td>0.5007</td><td>0.0256</td><td>0.4770</td><td>0.5000</td><td>0.5232</td><td>0.5025</td><td>0.0257</td><td>0.4599</td><td>0.5057</td><td>0.5464</td></tr> <tr> <td>AC365</td><td>0.5007</td><td>0.0259</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.5020</td><td>0.0252</td><td>0.4601</td><td>0.5057</td><td>0.5461</td></tr> <tr> <td>ABInternational</td><td>0.5008</td><td>0.0272</td><td>0.4794</td><td>0.5000</td><td>0.5232</td><td>0.5025</td><td>0.0252</td><td>0.4601</td><td>0.5052</td><td>0.5462</td></tr> <tr> <td>EB365</td><td>0.5004</td><td>0.0257</td><td>0.4796</td><td>0.5000</td><td>0.5230</td><td>0.5029</td><td>0.0250</td><td>0.4608</td><td>0.5056</td><td>0.5471</td></tr> <tr> <td>Vin365</td><td>0.5007</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5019</td><td>0.0252</td><td>0.4597</td><td>0.5049</td><td>0.5460</td></tr> <tr> <td>AsianBookie</td><td>0.5001</td><td>0.0255</td><td>0.4800</td><td>0.5000</td><td>0.5230</td><td>0.5025</td><td>0.0250</td><td>0.4595</td><td>0.5056</td><td>0.5462</td></tr> <tr> <td>YongliGao</td><td>0.5007</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5025</td><td>0.0252</td><td>0.4608</td><td>0.5056</td><td>0.5464</td></tr> <tr> <td>10Bet</td><td>0.5009</td><td>0.0257</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5025</td><td>0.0257</td><td>0.4609</td><td>0.5056</td><td>0.5464</td></tr> <tr> <td>STSBet</td><td>0.5002</td><td>0.0256</td><td>0.4782</td><td>0.5000</td><td>0.5230</td><td>0.5023</td><td>0.0257</td><td>0.4595</td><td>0.5056</td><td>0.5464</td></tr> <tr> <td>10Bet</td><td>0.5007</td><td>0.0256</td><td>0.4763</td><td>0.5000</td><td>0.5232</td><td>0.5025</td><td>0.0257</td><td>0.4609</td><td>0.5056</td><td>0.5464</td></tr> <tr> <td>PinnacleSports</td><td>0.5000</td><td>0.0253</td><td>0.4794</td><td>0.5000</td><td>0.5232</td><td>0.5027</td><td>0.0252</td><td>0.4609</td><td>0.5056</td><td>0.5472</td></tr> <tr> <td>Sargbo</td><td>0.5000</td><td>0.0244</td><td>0.4805</td><td>0.4967</td><td>0.5199</td><td>0.5027</td><td>0.0256</td><td>0.4602</td><td>0.5049</td><td>0.5466</td></tr> <tr> <td>10Bet</td><td>0.5004</td><td>0.0257</td><td>0.4796</td><td>0.5000</td><td>0.5230</td><td>0.5020</td><td>0.0250</td><td>0.4601</td><td>0.5052</td><td>0.5471</td></tr> <tr> <td>10Bet</td><td>0.5001</td><td>0.0259</td><td>0.4770</td><td>0.5000</td><td>0.5230</td><td>0.5023</td><td>0.0253</td><td>0.4599</td><td>0.5056</td><td>0.5472</td></tr> <tr> <td>Bwin</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Interwetten</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Vilken-Hel</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>HKC</td><td>0.5002</td><td>0.0252</td><td>0.4763</td><td>0.4974</td><td>0.5238</td><td>0.5024</td><td>0.0257</td><td>0.4609</td><td>0.5061</td><td>0.5463</td></tr> <tr> <td>SSP International</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Beljar</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>10Bet</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>SHAI</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Singaporepools</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Star James</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Unibet</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Coral</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr> <tr> <td>Average</td><td>0.5004</td><td>0.0263</td><td>0.4795</td><td>0.4996</td><td>0.5248</td><td>0.5024</td><td>0.0253</td><td>0.4603</td><td>0.5051</td><td>0.5463</td></tr> </table>		Home Win	Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%	Macao-Slot	0.5007	0.0254	0.4763	0.4974	0.5238	0.5027	0.0256	0.4609	0.5063	0.5405	Ladbrokes	0.4977	0.0237	0.4764	0.4940	0.5230	0.5000	0.0251	0.4657	0.5022	0.5407	Victor Chandler	0.5000	0.0270	0.4779	0.5000	0.5247	0.4996	0.0268	0.4604	0.5039	0.5446	Engel	0.5003	0.0242	0.4794	0.5000	0.5231	0.5029	0.0250	0.4608	0.5059	0.5472	Royal	0.5004	0.0246	0.4794	0.5000	0.5231	0.5010	0.0254	0.4607	0.5061	0.5475	Fala	0.5007	0.0237	0.4805	0.5000	0.5199	0.5029	0.0252	0.4601	0.5056	0.5461	Bar365	0.5016	0.0266	0.4805	0.5000	0.5230	0.5027	0.0251	0.4607	0.5045	0.5474	Expert	0.5000	0.0244	0.4805	0.4967	0.5199	0.5027	0.0256	0.4602	0.5049	0.5466	10Bet	0.4999	0.0256	0.4820	0.5000	0.5234	0.5023	0.0254	0.4594	0.5054	0.5471	Marion	0.5002	0.0274	0.4763	0.5000	0.5232	0.5020	0.0260	0.4595	0.5037	0.5463	10Bet	0.5008	0.0276	0.4763	0.5000	0.5232	0.5029	0.0260	0.4609	0.5056	0.5469	Yongli	0.5008	0.0257	0.4763	0.5000	0.5232	0.5026	0.0257	0.4595	0.5054	0.5464	10Bet	0.5002	0.0257	0.4770	0.5000	0.5230	0.5025	0.0250	0.4607	0.5048	0.5464	BCBet	0.5001	0.0259	0.4770	0.5000	0.5230	0.5023	0.0253	0.4599	0.5056	0.5472	Henging	0.5007	0.0256	0.4770	0.5000	0.5232	0.5025	0.0257	0.4599	0.5057	0.5464	AC365	0.5007	0.0259	0.4770	0.5000	0.5230	0.5020	0.0252	0.4601	0.5057	0.5461	ABInternational	0.5008	0.0272	0.4794	0.5000	0.5232	0.5025	0.0252	0.4601	0.5052	0.5462	EB365	0.5004	0.0257	0.4796	0.5000	0.5230	0.5029	0.0250	0.4608	0.5056	0.5471	Vin365	0.5007	0.0257	0.4763	0.5000	0.5232	0.5019	0.0252	0.4597	0.5049	0.5460	AsianBookie	0.5001	0.0255	0.4800	0.5000	0.5230	0.5025	0.0250	0.4595	0.5056	0.5462	YongliGao	0.5007	0.0257	0.4763	0.5000	0.5232	0.5025	0.0252	0.4608	0.5056	0.5464	10Bet	0.5009	0.0257	0.4763	0.5000	0.5232	0.5025	0.0257	0.4609	0.5056	0.5464	STSBet	0.5002	0.0256	0.4782	0.5000	0.5230	0.5023	0.0257	0.4595	0.5056	0.5464	10Bet	0.5007	0.0256	0.4763	0.5000	0.5232	0.5025	0.0257	0.4609	0.5056	0.5464	PinnacleSports	0.5000	0.0253	0.4794	0.5000	0.5232	0.5027	0.0252	0.4609	0.5056	0.5472	Sargbo	0.5000	0.0244	0.4805	0.4967	0.5199	0.5027	0.0256	0.4602	0.5049	0.5466	10Bet	0.5004	0.0257	0.4796	0.5000	0.5230	0.5020	0.0250	0.4601	0.5052	0.5471	10Bet	0.5001	0.0259	0.4770	0.5000	0.5230	0.5023	0.0253	0.4599	0.5056	0.5472	Bwin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Interwetten	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Vilken-Hel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	HKC	0.5002	0.0252	0.4763	0.4974	0.5238	0.5024	0.0257	0.4609	0.5061	0.5463	SSP International	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Beljar	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10Bet	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SHAI	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Singaporepools	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Star James	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Unibet	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Coral	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Average	0.5004	0.0263	0.4795	0.4996	0.5248	0.5024	0.0253	0.4603	0.5051	0.5463		
Home Win	Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Ladbrokes	0.4977	0.0237	0.4764	0.4940	0.5230	0.5000	0.0251	0.4657	0.5022	0.5407																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Victor Chandler	0.5000	0.0270	0.4779	0.5000	0.5247	0.4996	0.0268	0.4604	0.5039	0.5446																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Royal	0.5004	0.0246	0.4794	0.5000	0.5231	0.5010	0.0254	0.4607	0.5061	0.5475																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Fala	0.5007	0.0237	0.4805	0.5000	0.5199	0.5029	0.0252	0.4601	0.5056	0.5461																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Bar365	0.5016	0.0266	0.4805	0.5000	0.5230	0.5027	0.0251	0.4607	0.5045	0.5474																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Expert	0.5000	0.0244	0.4805	0.4967	0.5199	0.5027	0.0256	0.4602	0.5049	0.5466																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.4999	0.0256	0.4820	0.5000	0.5234	0.5023	0.0254	0.4594	0.5054	0.5471																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Marion	0.5002	0.0274	0.4763	0.5000	0.5232	0.5020	0.0260	0.4595	0.5037	0.5463																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5008	0.0276	0.4763	0.5000	0.5232	0.5029	0.0260	0.4609	0.5056	0.5469																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Yongli	0.5008	0.0257	0.4763	0.5000	0.5232	0.5026	0.0257	0.4595	0.5054	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5002	0.0257	0.4770	0.5000	0.5230	0.5025	0.0250	0.4607	0.5048	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
BCBet	0.5001	0.0259	0.4770	0.5000	0.5230	0.5023	0.0253	0.4599	0.5056	0.5472																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Henging	0.5007	0.0256	0.4770	0.5000	0.5232	0.5025	0.0257	0.4599	0.5057	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AC365	0.5007	0.0259	0.4770	0.5000	0.5230	0.5020	0.0252	0.4601	0.5057	0.5461																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
ABInternational	0.5008	0.0272	0.4794	0.5000	0.5232	0.5025	0.0252	0.4601	0.5052	0.5462																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
EB365	0.5004	0.0257	0.4796	0.5000	0.5230	0.5029	0.0250	0.4608	0.5056	0.5471																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Vin365	0.5007	0.0257	0.4763	0.5000	0.5232	0.5019	0.0252	0.4597	0.5049	0.5460																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AsianBookie	0.5001	0.0255	0.4800	0.5000	0.5230	0.5025	0.0250	0.4595	0.5056	0.5462																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
YongliGao	0.5007	0.0257	0.4763	0.5000	0.5232	0.5025	0.0252	0.4608	0.5056	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5009	0.0257	0.4763	0.5000	0.5232	0.5025	0.0257	0.4609	0.5056	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
STSBet	0.5002	0.0256	0.4782	0.5000	0.5230	0.5023	0.0257	0.4595	0.5056	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5007	0.0256	0.4763	0.5000	0.5232	0.5025	0.0257	0.4609	0.5056	0.5464																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
PinnacleSports	0.5000	0.0253	0.4794	0.5000	0.5232	0.5027	0.0252	0.4609	0.5056	0.5472																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Sargbo	0.5000	0.0244	0.4805	0.4967	0.5199	0.5027	0.0256	0.4602	0.5049	0.5466																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5004	0.0257	0.4796	0.5000	0.5230	0.5020	0.0250	0.4601	0.5052	0.5471																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5001	0.0259	0.4770	0.5000	0.5230	0.5023	0.0253	0.4599	0.5056	0.5472																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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HKC	0.5002	0.0252	0.4763	0.4974	0.5238	0.5024	0.0257	0.4609	0.5061	0.5463																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Average	0.5004	0.0263	0.4795	0.4996	0.5248	0.5024	0.0253	0.4603	0.5051	0.5463																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
<p>AvgVlnProb = 1 / (AvgPrice + 1)</p> <table> <tr> <th>Home Win</th><th>Mean</th><th>Std Dev</th><th>25%</th><th>Median</th><th>75%</th><th>Mean</th><th>Std Dev</th><th>25%</th><th>Median</th><th>75%</th></tr> <tr> <td>Macao-Slot</td><td>0.5029</td><td>0.0269</td><td>0.5000</td><td>0.5200</td><td>0.5444</td><td>0.5029</td><td>0.0269</td><td>0.5000</td><td>0.5200</td><td>0.5444</td></tr> <tr> <td>Ladbrokes</td><td>0.5017</td><td>0.0266</td><td>0.4999</td><td>0.5199</td><td>0.5425</td><td>0.5017</td><td>0.0266</td><td>0.4999</td><td>0.5199</td><td>0.5425</td></tr> <tr> <td>Victor Chandler</td><td>0.5030</td><td>0.0264</td><td>0.4999</td><td>0.5199</td><td>0.5425</td><td>0.5017</td><td>0.0263</td><td>0.4999</td><td>0.5199</td><td>0.5425</td></tr> <tr> <td>Engel</td><td>0.5012</td><td>0.0252</td><td>0.4994</td><td>0.5199</td><td>0.5376</td><td>0.5012</td><td>0.0252</td><td>0.4994</td><td>0.5199</td><td>0.5376</td></tr> <tr> <td>Royal</td><td>0.5012</td><td>0.0255</td><td>0.4999</td><td>0.5199</td><td>0.5376</td><td>0.5012</td><td>0.0255</td><td>0.4999</td><td>0.5199</td><td>0.5376</td></tr> <tr> <td>Fala</td><td>0.5024</td><td>0.0250</td><td>0.5000</td><td>0.5199</td><td>0.5405</td><td>0.5024</td><td>0.0250</td><td>0.5000</td><td>0.5199</td><td>0.5405</td></tr> <tr> <td>Bar365</td><td>0.5021</td><td>0.0250</td><td>0.5000</td><td>0.5199</td><td>0.5405</td><td>0.5021</td><td>0.0250</td><td>0.5000</td><td>0.5199</td><td>0.5405</td></tr> <tr> <td>Expert</td><td>0.5024</td><td>0.0256</td><td>0.5000</td><td>0.5200</td><td>0.5391</td><td>0.5024</td><td>0.0256</td><td>0.5000</td><td>0.5200</td><td>0.5391</td></tr> <tr> <td>10Bet</td><td>0.5012</td><td>0.0254</td><td>0.4999</td><td>0.5199</td><td>0.5376</td><td>0.5012</td><td>0.0254</td><td>0.4999</td><td>0.5199</td><td>0.5376</td></tr> <tr> <td>Marion</td><td>0.5013</td><td>0.0263</td><td>0.4992</td><td>0.5199</td><td>0.5376</td><td>0.5013</td><td>0.0263</td><td>0.4992</td><td>0.5199</td><td>0.5376</td></tr> <tr> <td>10Bet</td><td>0.5017</td><td>0.0267</td><td>0.4995</td><td>0.5199</td><td>0.5405</td><td>0.5017</td><td>0.0267</td><td>0.4995</td><td>0.5199</td><td>0.5405</td></tr> <tr> <td>Yongli</td><td>0.5011</td><td>0.0258</td><td>0.4995</td><td>0.5199</td><td>0.5391</td><td>0.5011</td><td>0.0258</td><td>0.4995</td><td>0.5199</td><td>0.5391</td></tr> <tr> <td>10Bet</td><td>0.5016</td><td>0.0259</td><td>0.4979</td><td>0.5199</td><td>0.5348</td><td>0.5016</td><td>0.0259</td><td>0.4979</td><td>0.5199</td><td>0.5348</td></tr> <tr> <td>BCBet</td><td>0.5016</td><td>0.0277</td><td>0.4979</td><td>0.5199</td><td>0.5348</td><td>0.5016</td><td>0.0277</td><td>0.4979</td><td>0.5199</td><td>0.5348</td></tr> <tr> </tr></table>	Home Win	Mean	Std Dev	25%	Median	75%	Mean	Std Dev	25%	Median	75%	Macao-Slot	0.5029	0.0269	0.5000	0.5200	0.5444	0.5029	0.0269	0.5000	0.5200	0.5444	Ladbrokes	0.5017	0.0266	0.4999	0.5199	0.5425	0.5017	0.0266	0.4999	0.5199	0.5425	Victor Chandler	0.5030	0.0264	0.4999	0.5199	0.5425	0.5017	0.0263	0.4999	0.5199	0.5425	Engel	0.5012	0.0252	0.4994	0.5199	0.5376	0.5012	0.0252	0.4994	0.5199	0.5376	Royal	0.5012	0.0255	0.4999	0.5199	0.5376	0.5012	0.0255	0.4999	0.5199	0.5376	Fala	0.5024	0.0250	0.5000	0.5199	0.5405	0.5024	0.0250	0.5000	0.5199	0.5405	Bar365	0.5021	0.0250	0.5000	0.5199	0.5405	0.5021	0.0250	0.5000	0.5199	0.5405	Expert	0.5024	0.0256	0.5000	0.5200	0.5391	0.5024	0.0256	0.5000	0.5200	0.5391	10Bet	0.5012	0.0254	0.4999	0.5199	0.5376	0.5012	0.0254	0.4999	0.5199	0.5376	Marion	0.5013	0.0263	0.4992	0.5199	0.5376	0.5013	0.0263	0.4992	0.5199	0.5376	10Bet	0.5017	0.0267	0.4995	0.5199	0.5405	0.5017	0.0267	0.4995	0.5199	0.5405	Yongli	0.5011	0.0258	0.4995	0.5199	0.5391	0.5011	0.0258	0.4995	0.5199	0.5391	10Bet	0.5016	0.0259	0.4979	0.5199	0.5348	0.5016	0.0259	0.4979	0.5199	0.5348	BCBet	0.5016	0.0277	0.4979	0.5199	0.5348	0.5016	0.0277	0.4979	0.5199	0.5348																																																																																																																																																																																																																																																																																																												
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Victor Chandler	0.5030	0.0264	0.4999	0.5199	0.5425	0.5017	0.0263	0.4999	0.5199	0.5425																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Royal	0.5012	0.0255	0.4999	0.5199	0.5376	0.5012	0.0255	0.4999	0.5199	0.5376																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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10Bet	0.5012	0.0254	0.4999	0.5199	0.5376	0.5012	0.0254	0.4999	0.5199	0.5376																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Marion	0.5013	0.0263	0.4992	0.5199	0.5376	0.5013	0.0263	0.4992	0.5199	0.5376																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5017	0.0267	0.4995	0.5199	0.5405	0.5017	0.0267	0.4995	0.5199	0.5405																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Yongli	0.5011	0.0258	0.4995	0.5199	0.5391	0.5011	0.0258	0.4995	0.5199	0.5391																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
10Bet	0.5016	0.0259	0.4979	0.5199	0.5348	0.5016	0.0259	0.4979	0.5199	0.5348																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Research AH (OddsProb) xls (Read-Only) - Excel (Trial)

yq, Lian Hu Eng

HomeInsertPage LayoutFormulasDataReviewViewACROBATTell me what you want to do

BCEFGHIJKL MNOPQ RSTUVWXYZAAABACADAEAF

HomeComparison (Data of Season 09/10)Comparison (Data of Season 09/10) Probabilities from Odds Prices

A Bookmakers

This section compare of the observations outcome, EM model, and also the pure probabilities (without normal vigorish)

of 29 bookmakers with EM model. Only the difference of handicap between bookmakers.

The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these summaries. Also given are the corresponding quantiles obtained from the statistical model.

HomeProb = (AvgPrice - 1) / (HomePrice - AvgPrice + 2)

Home Win

Mean Std Dev 25% Median 75%

EM Model

Mean Std Dev 25% Median 75%

Normalized Vigorish

Mean Std Dev 25% Median 75%

Mean Std Dev 25% Median 75%

Mean Std Dev 25% Median 75%

Mean Std Dev 25% Median 75%

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Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Goal Line odds price with vigorish of total soccer matches in season 2008/09 and 2009/10.

HomeInsertPage LayoutFormulasDataReviewViewACROBAT

Tell me what you want to do

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Research OU (OddsProb).xlsx [Read-Only]

*yoy, Lian Hu Eng

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ			

Competition Two Probability Pairs										Competition (One or Several Probabilities)									
This section compares the two probabilities (OddsProb, and OddsProb), and also the game probabilities (all outcomes with probability) of 23 bookmakers with OddsProb (OddsProb) and OddsProb (OddsProb).										This section compares the two outcomes (OddsProb, OddsProb), and OddsProb (OddsProb). Assume that all bookmakers offer the same odds for a given match, and the difference is only in the bookmaker's margin.									
The Mean, standard deviation, and quartiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these parameters. But the games are the corresponding games obtained from the statistical model.										The Mean, standard deviation, and quartiles (25%, median, and 75%) are given. It can be seen that there is virtually no difference between bookmakers in terms of these parameters. But the games are the corresponding games obtained from the statistical model.									
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Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Goal Line odds price with vigorish of total soccer matches in season 2009/10.

4.2. Staking Model

As I mentioned in section [Model Enhancement](#) on the decay rates. In order to test the efficiency and the return of investment, I've taken both models in *algorithmic simulations*¹³. For the staking model, I just simply using the most simple staking model which from *Dixon & Coles 1996*.

Only \$1 One dollar placed on every level of edge from 1.00 until 4.00. Kindly refer to below sample table.

Below table is another sample breakdown table which showing the handicap breakdown and odds price breakdown in:-

- stake amount

¹³I tried to fit the constant decay rates, weekly dynamical decay rates and dynamical decay rates just right after finish a soccer match. It is my previous research saved in Rmodel.RData files prior to start this spreadsheet. Therefore this spreadsheet only taken the completed and converted odds price for staking and testing efficiency purpose.

[illegible]

Figure 7: A sample of edge value and staking breakdown table

- staking ratio
- profit & lose
- profit and lose ratio

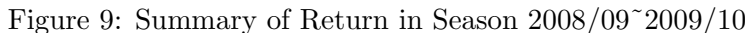
[illegible]

Figure 8: A sample of staking breakdown table

4.3. Preview of Returns.

Below tables breakdown the stakes and return on every single edge point that overcame the overrounds.

Research AH (PureProb)

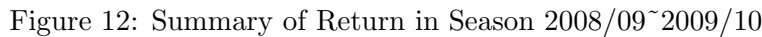


\ Above figure shows a staking breakdown on every single edge on Asian Handicap odds price without vigorish of total soccer matches in season 2009/10.

\ Above figure shows a staking breakdown on every single edge on Asian Handicap odds price with vigorish of total soccer matches in season 2009/10.

\ Above figure shows a staking breakdown on every single edge on Goal Line odds price without vigorish of total soccer matches in season 2009/10.

Research OU (OddsProb)



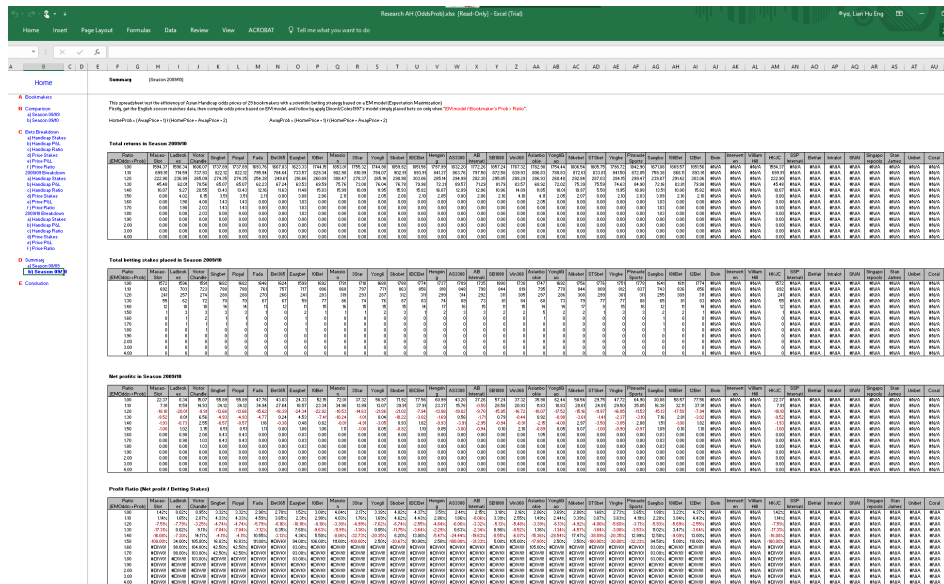


Figure 14: Summary of Return in Season 2009/10

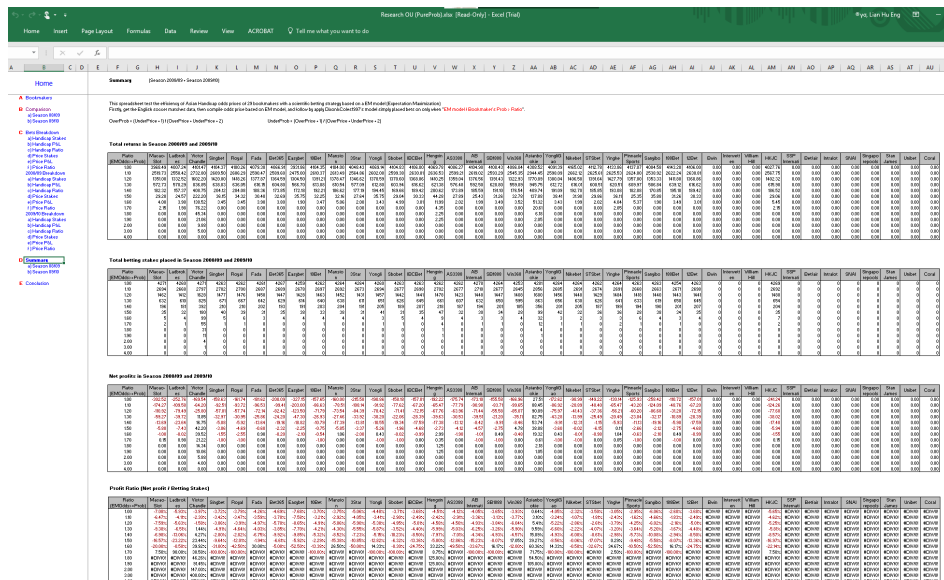


Figure 15: Summary of Return in Season 2008/09~2009/10

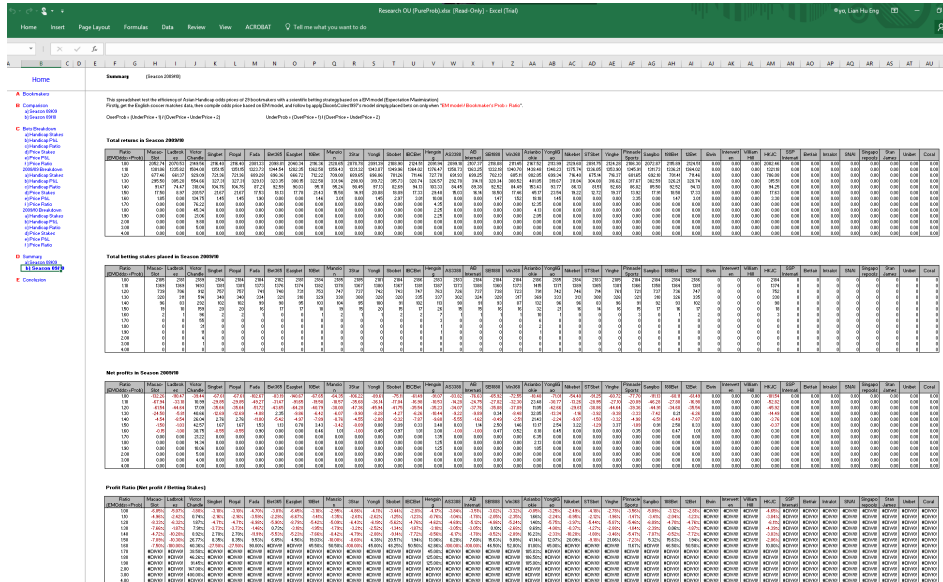


Figure 17: Summary of Return in Season 2009/10

The screenshot shows a Microsoft Excel spreadsheet titled "Research OUI (GoalLine) also (Head-Only) - East (Test)". The spreadsheet is organized into several sections:

- Summary:** This section provides an overview of the data, including the seasons (2008/09 and 2009/10) and the bookmakers (29 in total).
- Total returns in Season 2008/09 and 2009/10:** This section displays a large table of data for each bookmaker across the two seasons. The columns include various metrics such as Profit, Loss, Total, and Odds.
- Total betting stakes placed in Season 2008/09 and 2009/10:** This section displays another large table of data, showing the total betting stakes placed by each bookmaker in each season.
- Net profits in Season 2008/09 and 2009/10:** This section displays a table showing the net profits for each bookmaker in each season.
- Profit Ratio (Net profit / Betting Stakes):** This section displays a table showing the profit ratio for each bookmaker in each season.

The spreadsheet is a complex data table with many columns and rows, providing a comprehensive overview of the betting performance of 29 bookmakers over two seasons.

Figure 18: Summary of Return in Season 2008/09~2009/10

\ Above figure shows a staking breakdown on every single edge on Goal Line odds price with vigorish of total soccer matches in season 2008/09 and 2009/10.

\ Above figure shows a staking breakdown on every single edge on Goal Line odds price with vigorish of total soccer matches in season 2008/09.

\ Above figure shows a staking breakdown on every single edge on Goal Line odds price with vigorish of total soccer matches in season 2009/10.

5. Conclusion

5.1. Conclusion

This spreadsheet test the efficiency of Asian Handicap odds prices of 29 bookmakers with a scientific betting strategy based on a EM model (Expectation Maximization)

Firstly, get the English soccer matches data, then compile odds price based on EM model, based on that model simply placed bets on only when “EM model / Bookmaker’s Prob > Ratio”.

From the result of this research on 2 Seasons English Soccer Leagues, we conclude the below points:

- proof that nowadays we are hard to make profit from 29 bookmakers based on simple betting strategy (EMProb / BKProb).
- there are no Asian Handicap betting models in academics research industry, some more sophisticated betting model needed.



- furthermore, some matches have no odds prices may caused the betting made a lose result.
- the most importance point is that bookmakers take a very high advantages which is higher than norminal virogish (refer to application of Malay odds, and also Ryo handicap.xlsx spreadsheet to know the calculation of real vigorish).

5.2. Future Works

I applied **Kelly model**¹⁴ next to this research which generated profit (positive return of investment) more than 30% every year.

While now I am using dataset from European famous sportsbook consultancy firm to test thier staking model and efficiency. Wher I need to modify existing Kelly model to be half, quarter etc to control the risk similar with *Moya 2012*.

There has a weakness in this paper which is gathered dataset are history odds price while I am learning to build a real time trading system now. However a profit return from my few years research and put my all time and affort in this sportbook research is worthable, happier and stimulated to be more aggresive to continue my journey to setup own hedge fund company **Scibrokes**.

6. Appendices

6.1. Documenting File Creation

It's useful to record some information about how your file was created.

- File creation date: 2016-05-06
- R version 3.2.3 (2015-12-10)
- R version (short form): 3.2.3
- **rticles package** version: 0.2
- File version: 1.0.0
- File latest updated date: 2016-05-05
- Author Profile: **@yo, Eng Lian Hu**
- GitHub: **Source Code**
- Additional session information

[1] "2016-05-05 21:12:19 EDT" setting value
 version R version 3.2.3 (2015-12-10) system x86_64, linux-gnu
 ui X11
 language (EN)
 collate en_US.UTF-8
 tz America/New_York

¹⁴Refer to **Testing Inefficiency of Sports-Bookmakers by Kelly Model**

date 2016-05-05

sysname release "Linux" "3.10.0-229.20.1.el7.x86_64" version nodename "#1 SMP Tue Nov 3 19:10:07 UTC 2015" "scibrokes" machine login "x86_64" "unknown" user effective_user "ryoeng" "ryoeng"

6.2. Speech and Blooper

Firstly I do appreciate those who shade me a light on my research. Meanwhile I do happy and learn from the research. I do appreciated to take some spared time to write this thesis where the research has start from 2008 and finish in 2012. Infact I've finished my research on 2010 before I wrote a proposal to acquire the [Ladbrokes](#)¹⁵ trading and hedge fund project in Scicom (MSC) Bhd and extended dataset soccer matches until 2012. Unfortunately the project has closed but I keep up learning journey to run my own company [Scibrokes](#)¹⁶ some other days. I'll started work as customer service executive but in somewhere else next week, I am currently studying distance course data science at [Coursera.org](#). You are feel free to browse over my CV at [@yo Eng Lian Hu](#).

I started my research journey when I decided to resign from Caspo Inc. to be an customer service operator in Scicom (MSC) Bhd. I've search, collected and read through thousands of research papers to get the applicable model in our real life investment. Fortunately I found and know a person [Boffins -vs- Bookies \(The Man Who Broke the World Leading Bookmakers\)](#) and start my learning from an outsider which don't know any statistical tools for modelling until successfully completed the research in year 2012. Kindly refer to [My personal WordPress blog](#) for more experience and bloopers.

Now I would like to share some bloopers during process this thesis.

- **Remarks :** Due to the mathematical LaTeX formula and greek letters unable use in [rticles package](#). Here I forced to use some image for substitution.
- Due to the Microsoft Excel file inside my previous project [dataset](#) for **Odds Modelling and Testing Inefficiency of Sports-Bookmakers 2008-2010** by [@yo Eng Lian Hu](#) is very huge in xlsx format and set with a struture frame. Therefore I just omit to apply [openxlsx](#) to read the data for further process.
- I tried to convert the xlsx files to pdf format and attached as appendices but system keep endless processing there but no outcome. Secondly, huge dataset make it trouble to read into [@Studio](#) and summarise and plotting some d3 graphs.
- The embed figures always not align in order, some figures will always align to other topic after knit.

6.3. Reference

1. [Modelling association football scores 1982](#) by *M.J Maher*

¹⁵Ladbrokes is a world leader in the betting and gaming industry with over 2,700 betting outlets in the UK, Ireland, Belgium and Spain and over 800,000 active online customers. British public listed company which in the Fortune 500 and over hundred years business group.

¹⁶A registered company but not yet in operation. A prospective statistical hedge fund company.

2. **Modelling Association Football Scores and Inefficiencies in the Football Betting Market.** 1996 by Mark Dixon and Stuart Coles
3. **A Birth Process Model for Association Football Matches.** 1997 by Mark Dixon and Michael Robinson
4. **Dynamic Modelling and Prediction of English Football League Matches for Betting.** 2002 by Martin Crowder, Mark Dixon, Anthony Ledford and Mike Robinson
5. **The value of statistical forecasts in the UK association football betting market.** 2004 by Mark Dixon and Peter Pope
6. **Statistical Modelling for Soccer Games: The Greek League.** 1998 by Dimitris Karlis and Ioannis Ntzoufras
7. **Bayesian modelling of football outcomes (using Skellam's Distribution).** 2007 by Dimitris Karlis and Ioannis Ntzoufras
8. **Bivariate Poisson and Diagonal Inflated Bivariate Poisson Regression Models in R.** 2005 by Dimitris Karlis and Ioannis Ntzoufras
9. **John Goddard and Ioannis Asimakopoulos** 2004 by John Goddard and Ioannis Asimakopoulos
10. **Statistical Methodology for Profitable Sports Gambling** 2012 by Fabián Enrique Moya

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URL: <https://github.com/scibrokes/owner>