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Odds Modelling and Testing Inefficiency of Sports Bookmakers Rmodel

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Abstract

In this paper I am applied a diagonal inflated biviriate 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 1996¹, 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 enahanced to be more complicated model. Moya 2012^5 taken 40000 customers' data from bwin to analayse and

¹Refer to reference paper 02

 $^{^{2}}$ Refer to reference paper 08

 $^{^3\}mathrm{Refer}$ to reference paper 05

 $^{{}^{4}}$ Refer to reference paper 01

 $^{^5\}mathrm{Refer}$ 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 1997⁷ has built a rebirth model on 90 minutes In-Play soccer gaming. Crowder, Dixon, Anthony & Robinson 2001⁸ 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 1998¹⁰ 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 & Ntzoufras 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

 $^{^{7}}$ Refer to reference paper 03

 $^{^{8}}$ Refer to reference paper 04

⁹Markov Chain Monte Carlo model

 $^{^{10}\}mathrm{Refer}$ to reference paper 06

$$(X_i, Y_i) \sim BP(\lambda_{1i}, \lambda_{2i}, \lambda_{3i})$$

where $BP(\lambda_1, \lambda_2, \lambda_3)$ is the bivariate Poisson distribution with parameters λ_i , i = 1, 2, 3 and probability function

$$P(X = x, Y = y) = e^{-(\lambda_1 + \lambda_2 + \lambda_3)} \frac{\lambda_1^x}{x!} \frac{\lambda_2^y}{y!} \sum_{k=0}^{\min(x,y)} \begin{pmatrix} x\\ k \end{pmatrix} \begin{pmatrix} y\\ k \end{pmatrix} k! \left(\frac{\lambda_3}{\lambda_1 \lambda_2}\right)^k.$$
(1)

- Marginals: X ~ Poisson(λ₁ + λ₃) and Y ~ Poisson(λ₂ + λ₃)
- Means and Variance: E(X) = V(X) = λ₁ + λ₃, E(Y) = V(X) = λ₂ + λ₃
- Covariance: Cov(X, Y) = λ₃ > 0
- Can be derived using latent variables W_i ~ Poisson(λ_i), for i = 1, 2, 3 with X = W₁ + W₃ and with Y = W₂ + W₃.

Figure 1: Bivariate Poisson regression models

From above formula, bivariate poisson basically measure the correlationship 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.

- Covariates can be linked directly on the means of the latent variables as in Karlis and Ntzoufras (2003) or directly on the marginal means.
- A Simple Model (Karlis and Ntzoufras, 2003)
 - Response variables (X, Y) are the home and away goals in each game.
 - Consider the structure of Lee (1997) for λ₁ and λ₂

$$log(\lambda_{1i}) = \mu + H + A_{HT_i} + D_{AT_i} \qquad (2$$

$$log(\lambda_{2i}) = \mu + A_{AT_i} + D_{HT_i} \qquad (3)$$

 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.

Constant covariance λ₃

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 & Ntzuofras 2005* introduced a more complicated model which able to inflated the probabilities of the occurrance on draw games.

Under this approach a diagonal inflated model is specified by

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



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 & Ntzuofras 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 flutuation of the ability and aggresiveness 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

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

where $B_{\rm H} = \{(l, m): l > m\}$, 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 $p_k^{\rm A}$ and $p_k^{\rm D}$, the probabilities of an away win and a draw respectively. Now define

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

where, for example, $\delta_k^{\rm H} = 1$ if match k is a home win and $\delta_k^{\rm H} = 0$ otherwise, and $p_k^{\rm H}$, $p_k^{\rm A}$ and $p_k^{\rm D}$ 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:

Rmodel: Odds Modelling and Testing Inefficiency of Sports Bookmakers

- 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 $1^{\sim}10\%$. 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

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- 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 $200611 \text{ EngAllOdds}^{12}$

Data source :

¹²The spreadsheet file locate inside the dataset of Odds Modelling and Testing Inefficiency of Sports-Bookmakers 2008-2010 by ($\mathbb{R}yo$ Eng Lian Hu to see the odds price of every single soccer match.

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)

- 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 efficieny.
- 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. Convertion to Odds Price

Odds Price based on Pure Probabilities

From above description we know the bookmakers has charges a certain spread margin / overounds / 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^R , b_k^D and b_k^A for a home win, draw and away win respectively, and similarly let \hat{p}_k^R , \hat{p}_k^D and \hat{p}_k^A be the corresponding maximum likelihood estimates for this match under model . 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 (\mathbb{R} 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.

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o) Handicap Patio d) Handicap Ratio d) Price Stakes	Rogal Fada	0.4998 0.0250 0.4991 0.0255	0.4768 0.5000 0 0.4779 0.5000 0	5232 0.4931 0.00 5231 0.4930 0.00 5195 0.4926 0.00	132 0.4385 0.438 134 0.4383 0.499 128 0.4384 0.499	0.5460 0.5450	Singlet 0.5160 0 Rogal 0.5153 0 Fada 0.5176 0 Dual (1) 0.5176 0	0257 0.4526 0.5155 0259 0.4926 0.5155 0267 0.4950 0.5181	0.5405	103%			
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a) Handicap Stakes b) Handicap P&L c) Handicap Ratio	Mansion 3Star Yongli	0.4995 0.0280 0.4994 0.0280 0.4993 0.0265	0.4769 0.5000 0. 0.4768 0.5000 0. 0.4768 0.5000 0.	5230 0.4931 0.00 5231 0.4932 0.00 5219 0.4931 0.00	133 0.4382 0.492 122 0.4396 0.492 128 0.4386 0.498	1 0.5462 1 0.5456 3 0.5460	Mansion 0.5121 0 3Star 0.5150 0 Yongli 0.5150 0	.0288 0.4878 0.5102 .0289 0.4902 0.5128 .0274 0.4926 0.5155	0.5348 0.5376 0.5376	103% 103% 103%			
d) Price Stakes e) Price P&L f.) Price Ratio	Sbobet IBCBet Hengsing	0.4999 0.0266 0.4995 0.0274 0.4992 0.0268	0.4770 0.5000 0. 0.4769 0.5000 0. 0.4768 0.5000 0.	5230 0.4931 0.0 5230 0.4930 0.0 5219 0.4928 0.0	128 0.4386 0.492 133 0.4381 0.495 130 0.4383 0.499	0.5460 0.5461 0.5460	Sbobet 0.5115 0 IBCBet 0.5114 0 Hengsing 0.5133 0	.0273 0.4878 0.5102 .0282 0.4878 0.5102 .0277 0.4902 0.5128	0.5348 0.5348 0.5376	102% 102% 103%			
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	Bet365 Easybet 10Bet	0.5016 0.0269 0.5006 0.0264 0.5002 0.0257	0.4805 0.5000 0. 0.4805 0.5000 0. 0.4812 0.5000 0.	256 0.5072 0.0 5195 0.5073 0.0 204 0.5070 0.0	331 0.4541 0.5071 42 0.4530 0.5071 35 0.4535 0.5084	0.5623 0.5622 0.5620	Bet365 0.5210 0 Easybet 0.5213 0 10Bet 0.5756 0	0288 0.5000 0.5195 0278 0.5000 0.5181 0265 0.4975 0.5147	0.5405 0.5405 0.5371				
	Mansion 3Star Yongli	0.5005 0.0280 0.5006 0.0280 0.5007 0.0265	0.4770 0.5000 0. 0.4769 0.5000 0. 0.4781 0.5000 0.	5231 0.5069 0.06 232 0.5068 0.06 232 0.5069 0.06	33 0.4538 0.5075 22 0.4544 0.5075 28 0.4540 0.5083	0.5618 0.5604 0.5614	Mansion 0.5132 0 3Star 0.5163 0 Yongli 0.5163 0	.0288 0.4902 0.5102 .0291 0.4926 0.5155 .0276 0.4926 0.5155	0.5376 0.5405 0.5405				
	Sbobet IBCBet Hengsing	0.5001 0.0266 0.5005 0.0274 0.5008 0.0268	0.4770 0.5000 0. 0.4770 0.5000 0. 0.4781 0.5000 0.	230 0.5069 0.00 5231 0.5070 0.00 232 0.5072 0.00	28 0.4540 0.5076 33 0.4539 0.5086 30 0.4540 0.5084	0.5614 0.5619 0.5617	Sbobet 0.5118 0 IBCBet 0.5124 0 Hengsing 0.5156 0	0273 0.4878 0.5102 0282 0.4878 0.5102 0279 0.4926 0.5128	0.5348 0.5348 0.5391				
	AS3388 AB International SR1888	0.5006 0.0274 0.5005 0.0279 0.5002 0.0264	0.4770 0.5000 0.5 0.4770 0.5000 0.5 0.4770 0.5000 0.5	230 0.5069 0.00 232 0.5071 0.0 230 0.5070 0.00	22 0.4547 0.5075 331 0.4543 0.5084 30 0.4540 0.5080	0.5605	AS3388 0.5123 0 AB International 0.5160 0 SE1988 0.5118 0	0283 0.4878 0.5102 0289 0.4926 0.5155 0271 0.4878 0.5102	0.5348 0.5405 0.5348				
	Vin268 Asianbookie VoordiiGao	0.5017 0.0296 0.5007 0.0267 0.5005 0.0264	0.4783 0.5026 0.1 0.4784 0.5000 0.1 0.4781 0.5000 0.1	256 0.5072 0.08 230 0.5071 0.08 232 0.5059 0.08	26 0.4541 0.5093 30 0.4539 0.5080 29 0.4539 0.508	0.5605	Vin368 0.5/56 0 Asianbookie 0.5/65 0 VoodiGao 0.5/84 0	0309 0.4902 0.5128 0278 0.4938 0.5128 0274 0.4938 0.5155	0.5405 0.5376 0.5405				
	Nikebet STSbet Vitatko	0.50% 0.0274 0.5004 0.0284 0.5002 0.0282	0.4788 0.5013 0.1 0.4770 0.5000 0.	244 0.5077 0.0 5231 0.5067 0.0	31 0.4543 0.5085 28 0.4541 0.5075 28 0.4541 0.5075	0.5623	Nkebet 0.5157 0 STSbet 0.5130 0	0285 0.4926 0.5155 0294 0.4902 0.5102 0272 0.4928 0.5102	0.5405 0.5376				
	PinnacleSports Sangibo	0.5003 0.0283 0.5007 0.0272 0.5004 0.0262	0.4783 0.5000 0.1 0.4805 0.5000 0.1	230 0.5083 0.0 232 0.5071 0.0 5195 0.5073 0.0	26 0.4541 0.507 30 0.4537 0.5084 38 0.4534 0.5077	0.5619	PinnacleSports 0.5138 0 Sangibo 0.5203 0	0275 0.4926 0.5128 0282 0.4902 0.5128 0276 0.5000 0.5181	0.5376 0.5376 0.5405				
	12Bet Bwin	0.5002 0.0263 0.5005 0.0274 NA NA	0.4770 0.5000 0. 0.4770 0.5000 0. NA NA	230 0.5059 0.06 5231 0.5070 0.00 NA NA I	2.0 0.4540 0.508 33 0.4539 0.508 4A NA NA	0.5612 0.5619 NIA	12Bet 0.5124 0 Bwin NA	0202 0.4878 0.5102 0202 0.4878 0.5102 NA NA NA	0.5348 NA				
	Villiam Hill HKJC	NA NA NA NA 0.5004 0.0272	NA NA NA NA 0.4768 0.5000 0.1	NA NA 1 NA NA 1 233 0.5068 0.08	un NA NA UA NA NA 23 0.4542 0.5080	NA NA 0.5539	NA Villiam Hill NA HKJC 0.5222 0	NA NA NA NA NA NA 0287 0.5000 0.5208	NA NA 0.5435				
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	Unbet Coral Average	NA NA NA NA 0.5005 0.0269	NA NA NA NA 0.4779 0.5000 0.5	NA N	ua na na ua na na 30 0.4539 0.5080	NIA NIA 0.5612	Unibet NA Coral NA Average 0.5%2 0	NA NA NA NA NA NA 0281 0.4931 0.5145	NA NA 0.5391				١
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Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Asian Handicap odds price without vigorish of total soccer matches in season 2008/09 and 2009/10.

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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	Comparison (Data of Season 08/09) Pure Probabilities	Comparison (Data of Season 00/09) Probabilities from Odds Prices
A Bookmakers B Comparison	This section compare of the observations/outcome, EM model, and also the pure probabilities (without norminal vigorish) of 25 bookmakers with EM model. Omits the difference of handloup between bookmakers.	This service compare of the outcome Asian Handloop odds prices of 28 bookmakers. Assume that all bookmakers offer similar handloar for a soccer match, omits the difference of handloap between bookmakers.
a) Season 08/09 b) Season 09/10	The Mean, standard deviation, and quartiles (25%, median, and 75%) are given. It can be seen that there is vitrually no difference between bookmakers in terms of these summains. Also given are the corresponding qualities obtained from the statistical model.	The Mean, standard deviation, and quantiles (20%, median, and 70%) are given. It can be seen that there is vitually no difference between bookmakers in terms of these summaries. Also given are the corresponding guidties obtained
 Bets Breakdown a) Handicap Stakes b) Handicap PôL 	HomeProb • JAwa/Price • II / HomePrice • Awa/Price • 21	from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2°4% take has been accounted for. Home Vinscobability = (11/dome Price + 1)
 a) Handicap Ratio b) Price Stakes a) Price Ptd. 	Home Vin Bookmakers EM Model Mean Std Dev 25% Median 75% Mean Std Dev 25% Median 75%	Home Vin Company Mean Std Dev 25% Median 75% Norminal Vigorish
F) Price Batio 2018/09 Breakdown a) Mardiana Staker	Macao-Skot 0.4393 0.0254 0.4764 0.5026 0.5232 0.4673 0.0126 0.4345 0.4637 0.5331 Lathonias 0.5023 0.0283 0.4752 0.5502 0.5500 0.4507 0.0131 0.4383 0.4678 0.5423 Wroter Shander 0.4590 0.0270 0.4750 0.4500 0.4514 0.0154 0.4155 0.4155	Macao-Stot 0.5275 0.0269 0.5000 0.5218 0.5405 104% Ladirokes 0.5245 0.0257 0.5000 0.5233 0.5435 104%
b) Handicap Ptd. c) Handicap Ratio	Singlet 0.4997 0.0242 0.4769 0.5000 0.5206 0.4971 0.0630 0.4228 0.4942 0.5332 Poysi 0.4969 0.0246 0.4769 0.5000 0.5206 0.4970 0.0134 0.4328 0.4442 0.5332	Single 0,555 0,0250 0,4328 0,555 0,5376 1005 Royal 0,555 0,0254 0,4328 0,5555 0,5376 1005
e)Price States e)Price P&L f)Price Batio	Hata 0.4494 0.0010 0.0195 0.4872 0.0022 0.4574 0.0328 BetA15 0.4944 0.0404 0.4744 0.0407 0.0417	Pada 0.588 0.0246 0.0000 0.595 0.5405 1045 Becalis 0.577 0.0280 0.4330 0.5516 0.5405 1045 Eargbert 0.5205 0.0254 0.5000 0.5208 0.5405 1045
2009/10 Breakdown a) Handicap Stakes b) Handicap Ptd.	Hiller 0.5001 0.0258 0.4796 0.5000 0.4817 0.014 0.4129 0.4344 0.5406 Manzion 0.5002 0.0274 0.4796 0.5000 0.5231 0.4800 0.4337 0.4863 0.5405 JStar 0.4952 0.0274 0.4768 0.5000 0.5231 0.4867 0.0268 0.4740 0.4844 0.5191	105et 0.5154 0.0264 0.4950 0.5147 0.5246 103x Manslon 0.5137 0.0282 0.4902 0.5128 0.5376 103x 35iar 0.5155 0.0288 0.4902 0.5155 0.5376 103x
 a) Handicap Ratio b) Price Stakes c) Price PM 	Yong1 0.4982 0.0257 0.4768 0.5000 0.5212 0.4874 0.0127 0.4336 0.4942 0.5334 Skober 0.4988 0.0263 0.4770 0.5000 0.5230 0.4875 0.0828 0.4386 0.4381 0.5383 IRCHer 0.4988 0.026 0.4770 0.5000 0.55210 0.4877 0.0123 0.4328 0.4581 0.5383	Yongli 0.5145 0.0264 0.4326 0.5155 0.5376 1035; Sobelat 0.5113 0.0259 0.4373 0.5192 0.5346 1025; BCDee 0.5114 0.0277 0.4473 0.5192 0.5348 1025;
f) Price Batio	Henging 0.493 0.0256 0.4768 0.5000 0.5222 0.4875 0.0827 0.4336 0.4843 0.5395 AS3088 0.4930 0.0258 0.4770 0.5000 0.5210 0.4170 0.0126 0.4333 0.4443 0.5395	Hengaing 0.5547 0.0263 0.4428 0.5556 0.5576 1005 AS308 0.5590 0.0276 0.4479 0.5514 0.5514 1055
a) Season 08409 b) Season 0940	SBIIIN 0.4596 0.0272 0.4768 0.0010 0.0268 0.4872 0.0103 0.4228 0.4424 0.4334 VIn368 0.4969 0.0237 0.4768 0.5000 0.5241 0.4822 0.4369 0.4523 0.4424 0.4324 0.4424 0.4324 0.4424 0.4524	Mission Output
E Conclusion	Asianbockie 0.4989 0.0257 0.4794 0.5010 0.5392 0.4874 0.0125 0.4374 0.5101 Yongküso 0.4983 0.0257 0.4768 0.5010 0.5322 0.4874 0.0126 0.4445 0.5490 Kikubert 0.4982 0.0257 0.4768 0.5010 0.5212 0.4874 0.0828 0.4368 0.4442 0.5394	Asianbookie 0.5142 0.0222 0.4339 0.5239 1005 YoogliGao 0.5146 0.0265 0.4326 0.5155 0.5376 1035 Kikubee 0.5146 0.0265 0.4326 0.5155 0.5376 1035
	STEbet 0.4988 0.0266 0.4770 0.5000 0.5200 0.4877 0.0137 0.4327 0.4945 0.5401 Yinghv 0.4930 0.0256 0.4788 0.5000 0.5212 0.4875 0.0327 0.4304 0.5395 Pitrosub/Experts 0.4930 0.0256 0.4788 0.5000 0.5212 0.4875 0.0327 0.4304 0.5395	STSbet 0.5120 0.0298 0.4678 0.51/2 0.5346 102% Visitiv 0.5147 0.0253 0.4328 0.5195 0.5376 1035 Pinavle@conts 0.511 0.0270 0.440 0.5196 103546 1035
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	Down NA	Bivin NA NA NA NA NA NA 05:
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	AwayProb = (HomePrice + 1) / (HomePrice + AwayPrice + 2)	Away Win probability = 1/ (Away Prise + 1)
	Away Vin Bookmakers EM Model Mean Std Dev 25% Median 75% Macan-Stot 050/0 015/0 04974 0528 0409 95%	Avag Vin Company Mean Std Dev 25x Median 75x Mean-Std 0.522 0.0203 0.500 0.544
	Ladorokez 0.4977 0.028 0.41740 0.4946 0.5008 0.0503 0.0831 0.4577 0.5122 0.5617 Victor Chandler 0.5001 0.0270 0.4779 0.5000 0.5247 0.5116 0.4504 0.4539 0.5546 Exect of the state of the st	Ladbrokes 0.5787 0.0238 0.4950 0.5155 0.5435 Victor Chander 0.5200 0.0234 0.4339 0.5155 0.5435
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	Massion 0.4598 0.0274 0.4769 0.5000 0.5221 0.5120 0.0010 0.4565 0.517 0.5661 3Star 0.5508 0.0276 0.4769 0.5000 0.5222 0.5129 0.0266 0.4695 0.5766 0.5660 Yenetic 0.5508 0.0277 0.4769 0.5000 0.5222 0.5129 0.0266 0.4695 0.5766 0.5660	Nansion 0.5133 0.0283 0.4902 0.5102 0.5276 35tar 0.5171 0.0287 0.4926 0.5105 0.5405 Vanati 0.5161 0.0288 0.4926 0.5155 0.5101
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	AS3388 0.5007 0.0289 0.4770 0.5000 0.5230 0.5100 0.0288 0.4609 0.5557 0.5661 AB International 0.5008 0.0272 0.4794 0.5000 0.5232 0.5125 0.0612 0.4601 0.5153 0.5662	ASJ388 0.5512 0.0278 0.4578 0.5102 0.5548 AB International 0.5171 0.0283 0.4580 0.5155 0.5405
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	Asisebookie 0.501 0.0255 0.4008 0.5000 0.5036 0.5058 0.5058 0.5058 0.5058 0.5651 0.5058 0.5651 0.5551 0.565	Operation 0.094 0.0286 0.4325 0.0184 0.0376 VangiGao 0.5540 0.0286 0.4305 0.5141 0.5301 Vandeket 0.5511 0.0286 0.4305 0.5541 0.5301 STSber 0.5541 0.0286 0.4305 0.5546 0.5546
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Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Asian Handicap odds price without vigorish of total soccer matches in season 2008/09.



Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Asian Handicap odds price without vigorish of total soccer matches in season 2009/10.

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Home Comparison (Data of Season 09/09 and 09/0) Pure Probabilities	Comparison (Data of Season 08/09 and 09/10) Probabilities from Odds Prices
A Bookmakers This section compare of the observational outcome, EM model, and also the pure probabilities (without norminal vigorish) 100 because the observational outcome of the observational outcome, EM model, and also the pure probabilities (without norminal vigorish) 100 because the observational outcome of the observational outcome, EM model, and also the pure probabilities (without norminal vigorish) 100 because the observational outcome of the observational outcome, EM model, and also the pure probabilities (without norminal vigorish)	This section compare of the outcome Asian Handicap odds prices of 29 bookmakers. Assume that all bookmakers
a) Season 08/03 The Mean, standard deviation, and quantiles (25%, median, and 75%) are given, it can be seen that there is virtually no difference	over similar national for a solver instore clines are directive or national between boundaters. The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is virtually no
C Bets Breakdown a) Handicup States	difference between bookmakers in terms of these summales. Also given are the corresponding quatities obtained from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2°4% take has been accounted for.
b) Handcap P6L HomePick = (AwayPrice +)/ (HomePrice + AwayPrice + 2) c) Handcap Pario d) Price States EM Model	Home Vin probability = 17 (Home Price = 1) Home Vin
e)Price Pol. Home Vin Mean Std Dev 25x Median 75x Mean Std Dev 25x Median 75x (France Vin Maxao-Stor 0.4594 0.0258 0.4767 0.5000 0.5212 0.4453 0.0823 0.4400 0.4593 0.5459 0.0000 0.5212 0.4565 0.5560 0.4569 0.0000 0.0000 0.455 0.5560 0.4569 0.0000 0.455 0.5560 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.0000 0.455 0.4569 0.4569 0.0000 0.455 0.4569 0.455 0.4569 0.0000 0.455 0.4569 0.456 0.4569 0.455 0.4569 0.456 0.4569 0.455 0.4569 0.456 0.4569 0.456 0.4569 0.456 0.4569 0.456	Company Mean Std Dev 25x Median 75x Norminal Vigorish Macac-Stor 0.5214 0.0273 0.5000 0.5208 0.5435 104x Lobardow 0.5224 0.0273 0.5000 0.5208 0.5435 104x
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o)Handicup Ratio d)Price States Pada 0.4998 0.0250 0.4768 0.5000 0.5231 0.4930 0.0834 0.4383 0.4956 0.5460 d)Price States Pada 0.4991 0.0255 0.4778 0.5000 0.5585 0.4926 0.0028 0.4304 0.4916 0.5460	Rogal 0.5159 0.0259 0.4926 0.5155 0.5405 103% Fada 0.5176 0.0267 0.4950 0.5101 0.5405 104%
e)PitoePbL Bet365 0.4984 0.0269 0.4744 0.5000 0.5195 0.4928 0.0831 0.4377 0.4923 0.5459 f)PitoePadio Eargbet 0.4394 0.0264 0.4805 0.5000 0.5195 0.4927 0.0942 0.4378 0.4924 0.5470	Bec365 0.5176 0.0285 0.4938 0.5162 0.5405 104% Eargbet 0.5201 0.0275 0.5000 0.5181 0.5405 104%
2009/0 Eveak.down IDExt 0.4998 0.0257 0.4796 0.5000 0.5988 0.4930 0.4380 0.4986 0.5465 a) Handicap States Mansion 0.4996 0.0280 0.4768 0.5000 0.5331 0.4332 0.4321 0.5465	10Bet 0.5153 0.0265 0.4950 0.5147 0.5371 103% Mansion 0.5121 0.0288 0.4878 0.5102 0.8346 103%
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e) Price States Shote-I 0.4999 0.0286 0.4770 0.5000 0.5270 0.4931 0.0228 0.4386 0.4924 0.5460 e) Price P&L ECEve: 0.4995 0.0274 0.4769 0.5000 0.5230 0.4300 0.0833 0.4381 0.494 0.5461	Socket 0.51% 0.0273 0.4878 0.5102 0.5346 1022 BCBet 0.51% 0.0282 0.4878 0.5102 0.5346 1022
F) Price Habo Hengang 0.4952 0.0256 0.4768 0.5000 0.4363 0.4365 <th< td=""><td>Hengang 0.5139 0.0277 0.4902 0.508 0.5376 1032 A53388 0.5111 0.0281 0.4978 0.5102 0.5348 1022</td></th<>	Hengang 0.5139 0.0277 0.4902 0.508 0.5376 1032 A53388 0.5111 0.0281 0.4978 0.5102 0.5348 1022
Summary Barton and Card Card Card Card Card Card Card Car	He international 0.5150 0.0216 0.4302 0.5160 0.5346 103% SE19988 0.5114 0.0271 0.4678 0.5102 0.5346 102%
Bjaeson (010) Windo Unite Uni	Virtu60 0.5120 0.0004 0.4970 0.5022 0.5340 103% Asianbookie 0.5140 0.0276 0.4926 0.5128 0.5348 103%
Nikober 0.4984 0.0274 0.4756 0.4987 0.5102 0.4923 0.0831 0.4377 0.4911 0.5457 0.4984 0.0274 0.4756 0.4987 0.5102 0.4923 0.0831 0.4377 0.4911 0.5457	Nikeber 0.5125 0.0283 0.4878 0.5128 0.5348 10312
Yingtee 0.4997 0.0263 0.4770 0.5000 0.5219 0.4931 0.0626 0.4369 0.4922 0.5459 Proved Street, 0.4909 0.0222 0.4700 0.5000 0.5219 0.4029 0.0000 0.4369 0.4922 0.5459	Yingte 0.5142 0.0270 0.4902 0.5128 0.5376 1037 BinardeScott 0.5122 0.0270 0.4902 0.5128 0.5376 1037
Sangho 0.4996 0.0252 0.4905 0.5000 0.5955 0.4927 0.0838 0.4920 0.4923 0.5466 1989e 0.4939 0.0253 0.4770 0.5000 0.5201 0.4931 0.0023 0.4380 0.5460	Sanyibo 0.5194 0.0274 0.5000 0.5181 0.5405 104% 1895/ee 0.5114 0.0270 0.4628 0.5102 0.5348 102%
125+1 0.4995 0.0274 0.4789 0.5000 0.5230 0.4930 0.0833 0.4981 0.5461 Binn NA	12B+4 0.5114 0.0282 0.4878 0.5102 0.5348 1102% Binin NA NA NA NA NA 005
Intervetten NA NA Villum Hill NA	Intervetten NA NA NA NA NA 055 Miliam Hill NA NA NA NA NA 055
HKJC 0.4996 0.0272 0.4767 0.5000 0.5212 0.492 0.0623 0.4401 0.4920 0.5458 SSP-International NA	HKJC 0.5214 0.0290 0.5000 0.5208 0.5495 104% SSP-International NA NA NA NA NA NA 0.0%
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Local ref	Loral NH NH NH NH 000 Average 0.5/51 0.0279 0.4920 0.5141 0.5380
AwayFrob = (HomeFrice + I) / (HomeFrice + AwayFrice + 2)	Away Win probability = 17 (Away Price + 1)
Avay Vin Bookmakers EM Model Mean Std Dev 25% Median 75% Macan-Stef 05006 0/258 0.5000 0.5723 0.5681 0.5002 Macan-Stef 0.5006 0/258 0.4768 0.5000 0.5723 0.5681 0.5022 0.5610	Awag Vin Company Mean Std Dev 25% Median 75% Muser-Stot 0.52/8 0.0273 0.5000 0.5208 0.5435
Ladorokies 0.4982 0.0288 0.4740 0.4974 0.5208 0.0035 0.0831 0.4534 0.5049 0.5575 Vistor Chandler 0.5005 0.0282 0.4779 0.5000 0.5247 0.5010 0.0033 0.4542 0.5073 0.5603	Laderokes 0.5191 0.0302 0.4950 0.5155 0.5435 Victor Chandler 0.5206 0.0239 0.4950 0.5195 0.5435
Singhert 0.5002 0.0249 0.4768 0.5000 0.5212 0.5059 0.0832 0.4541 0.5082 0.5615 Royal 0.5002 0.0250 0.4768 0.5000 0.5212 0.5070 0.0034 0.4540 0.5004 0.5617	Singbot 0.5%3 0.0258 0.4926 0.5%5 0.5405 Powel 0.5%3 0.0260 0.4926 0.5%5 0.5405
Fada 0.5003 0.0255 0.4805 0.5000 0.5221 0.5074 0.0828 0.4550 0.5084 0.5616 Bet365 0.5016 0.0269 0.4105 0.5000 0.5256 0.5072 0.0131 0.4541 0.5077 0.5123	Fada 0.5196 0.0268 0.4975 0.5181 0.5405 Beci65 0.5290 0.0289 0.5000 0.5195 0.5405
Earybet 0.5006 0.0264 0.4805 0.5000 0.5195 0.5073 0.0842 0.4530 0.5076 0.5622 100et 0.5002 0.0257 0.4812 0.5000 0.5204 0.5070 0.0035 0.4535 0.5084 0.5620	Eargbet 0.5213 0.0278 0.5000 0.5181 0.5405 10Bet 0.5156 0.0265 0.4975 0.5147 0.5371
Mansion 0.5005 0.0280 0.4770 0.5000 0.5231 0.5069 0.0833 0.4538 0.5079 0.5618 38ter 0.5006 0.0280 0.4768 0.5000 0.5212 0.5068 0.0822 0.4544 0.5079 0.5614	Mansion 0.5132 0.0288 0.4902 0.5102 0.5376 3Star 0.5163 0.0291 0.4926 0.5165 0.5405
Yongli 0.5007 0.0285 0.4781 0.5000 0.5212 0.5069 0.0828 0.4540 0.5082 0.5614 Sbaber 0.5001 0.0266 0.4770 0.5000 0.5210 0.5069 0.0828 0.4540 0.5076 0.5614	Yongli 0.5163 0.0278 0.4928 0.5155 0.5405 Sbobet 0.5118 0.0273 0.4678 0.5102 0.8346
ECEver 0.5005 0.0274 0.4770 0.5000 0.5231 0.5070 0.0833 0.4539 0.5088 0.5619 Henging 0.5008 0.0258 0.4781 0.5000 0.5232 0.5072 0.0830 0.4540 0.5084 0.5517	ECEvit 0.5124 0.0282 0.4678 0.5102 0.5348 Hengeing 0.5156 0.0273 0.4926 0.5128 0.5391
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SERIES 0.502 0.024 0.4770 0.5000 0.5210 0.5070 0.0030 0.4540 0.5080 0.565 Vinjes 0.5017 0.0236 0.4783 0.5026 0.5256 0.5072 0.0826 0.4541 0.5082 0.565	Sensise 0.519 0.0271 0.4978 0.5102 0.5348 Win368 0.5156 0.0309 0.4902 0.5128 0.5405
Anambodue 0.5007 0.0257 0.4794 0.5000 0.5220 0.5071 0.0500 0.4529 0.5000 0.5515 Yong/Gao 0.5005 0.0254 0.4781 0.5000 0.5212 0.7059 0.4529 0.4539 0.5081 0.5613	Assebooke 0.5155 0.0278 0.4338 0.528 0.5376 YongKiao 0.5164 0.0274 0.4926 0.5155 0.5405
STSDeri 0.5004 0.0224 0.4770 0.5003 0.523 0.5067 0.0828 0.4541 0.5075 0.5613	Nikeler 0.5157 0.0215 0.4326 0.5165 0.5405 STSber 0.5130 0.0294 0.4902 0.5102 0.5376
Yingte 0.50/00 0.62/00 0.52/00 0.50/20 0.64/1 0.50/20 0.56/10 Pinnack/signers 0.50/00 0.02/22 0.47/83 0.50/00 0.52/20 0.50/81 0.56/10 0.55/10 0.56/10 0.55/20 0.56/10 <t< td=""><td>Imgre 0.519 0.0273 0.4926 0.520 0.5376 PinacleSports 0.513 0.0282 0.4902 0.5128 0.5376</td></t<>	Imgre 0.519 0.0273 0.4926 0.520 0.5376 PinacleSports 0.513 0.0282 0.4902 0.5128 0.5376
Tangho 0.5004 0.0262 0.4105 0.5000 0.5115 0.5073 0.0058 0.4534 0.5077 0.5620 188Ew 0.5002 0.0263 0.4770 0.5500 0.5230 0.5689 0.0628 0.4540 0.5561 0.5612	0.510 0.0276 0.000 0.510 0.5405 183Eer 0.518 0.0271 0.4878 0.5502 0.5348
128et 0.5005 0.0274 0.4770 0.5000 0.5231 0.5070 0.0833 0.4839 0.5086 0.5619	Labor 0.5124 0.0212 0.4878 0.5102 0.5348
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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.

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Home Insert Pag	ge Layout Formu	las Data	Review View	ACROBAT		م
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Home	Comparison Pure Probabilities	(Data of Season 08 1	(60)			Comparison (Data of Season (MKB) Probabilities from Odds Prices
A Bookmakers B Comparison	This section com of 29 bookmaker	pare of the observation s with EM model. Omit:	ns/outcome, EM model, s the difference of handic	and also the pure prot ap between bookmaker	babilities (vithout norminal vigorish) 3.	This section compare of the outcome Asian Handoop odds prices of 28 bookmakers. Assume that all bookmakers offer similar handioap for a soccer match, omits the difference of handicap between bookmakers.
b) Season 09/10 C Bets Breakdown	The Mean, stand between bookma	erd deviation, and quant kers in terms of these s	tiles (25%, median, and 75 summaries. Also given a	3%) are given. It can be so the corresponding quality	een that there is virtually no difference atities obtained from the statistical model.	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 qualities obtained from the statistical model. The probabilities from the model and the bookmakers are acts orimatin in value once the 2*%.
a) Handicap Stakes b) Handicap P&L c) Handicap Patio	HomeProb = (Av	ayPrice • 1) / (HomePri	ice • AwagPrice • 2)			take has been accounted for. Home Vin probability = 17 (Home Price + 1)
e) Price PaL F) Price PaL	Home Vin Macao-Slot	Mean Std Dev 0.4993 0.0254	25% Median 75 0.4764 0.5026 0.	5% Mean Std De 5232 0.4873 0.082	v 25% Median 75% 6 0.4345 0.4837 0.5391	Tome Vin Company Mean Std Dev 25% Median 75% Norminal Vigorish Musao-Sist 0.5215 0.0269 0.5000 0.5208 0.5405 004%
2008/09 Breakdown a) Handicap Stakes	Ladbrokes Victor Chandler	0.5023 0.0283 0.4999 0.0270	0.4792 0.5052 0.	5260 0.4907 0.083 5221 0.4884 0.081	11 0.4383 0.4878 0.5423 8 0.4354 0.4861 0.5396	Ladbrokes 0.5245 0.0297 0.5000 0.5263 0.5495 104% Victor Chandler 0.5197 0.0293 0.4838 0.5195 0.5435 104%
b) Handicap P&L c) Handicap Ratio	Singbet Royal	0.4997 0.0242 0.4996 0.0246	0.4769 0.5000 0.	5206 0.4871 0.083 5206 0.4870 0.083	0 0.4328 0.4842 0.5392 4 0.4325 0.4839 0.5393	Singbet 0.5155 0.0250 0.4326 0.5155 0.5376 003x Royal 0.5153 0.0254 0.4326 0.5155 0.5378 003x
d) Price Stakes e) Price PbL	Fada Bet365	0.4993 0.0237 0.4984 0.0266	0.4805 0.5000 0	5195 0.4872 0.082 5195 0.4873 0.083	8 0.4339 0.4842 0.5389 11 0.4326 0.4855 0.5393	Fada 0.5835 0.0246 0.5000 0.5195 0.5405 104% Bec365 0.5177 0.0289 0.4938 0.5195 0.5405 104%
2009/10 Breakdown	10Bet	0.5001 0.0256	0.4796 0.5000 0	5110 0.4877 0.083 5110 0.4877 0.083	6 0.4334 0.4851 0.5336 4 0.4329 0.4846 0.5406 0 0.4337 0.4962 0.5405	108-r 0.5554 0.0264 0.4950 0.5147 0.5348 103%
b) Handicap Pite	3Star Vonali	0.4992 0.0276	0.4768 0.5000 0	5231 0.4871 0.082 5232 0.4874 0.082	6 0.4340 0.4844 0.5391 7 0.4326 0.4942 0.5391	351at 0.5155 0.026 0.4902 0.5155 0.5376 0.3%
d) Price Stakes e) Price Phi	Shobet	0.4998 0.0263	0.4770 0.5000 0.	5230 0.4875 0.082 5230 0.4877 0.082	8 0.4336 0.4851 0.5393 3 0.4328 0.4850 0.5401	Sbobet 0.5113 0.0269 0.4678 0.5102 0.5348 102%
() Price Ratio	Hengsing AS3388	0.4993 0.0256	0.4768 0.5000 0	5212 0.4875 0.082 5230 0.4870 0.082	7 0.4336 0.4843 0.5395 6 0.4339 0.4843 0.5391	Hengsing 0.5147 0.0263 0.4926 0.5155 0.5376 0.33; A53368 0.5510 0.0253 0.4926 0.5152 0.5348 0.25;
Summary a) Season 08/09	AB International SB1888	0.4992 0.0272 0.4996 0.0257	0.4768 0.5000 0.	5206 0.4875 0.083 5204 0.4872 0.083	2 0.4338 0.4847 0.5399 0 0.4329 0.4842 0.5392	AB International 0.5195 0.0281 0.4926 0.5195 0.5376 103% SEB388 0.509 0.0283 0.4928 0.5102 0.5319 102%
b) Season 09/10	Win368 Asianbookie	0.4993 0.0297 0.4989 0.0255	0.4768 0.5000 0	5231 0.4981 0.082 5192 0.4874 0.082	3 0.4360 0.4851 0.5403 8 0.4337 0.4845 0.5410	Vin368 0.5130 0.0306 0.4878 0.5128 0.5376 003% Asianbookie 0.5142 0.0252 0.4938 0.5128 0.5333 003%
E Conclusion	YongliGao Nikebet	0.4993 0.0257 0.4992 0.0257	0.4768 0.5000 0	5212 0.4875 0.082 5212 0.4874 0.082	8 0.4336 0.4842 0.5384 7 0.4336 0.4842 0.5384	YongliGao 0.5146 0.0265 0.4926 0.5155 0.5376 103% Nikebet 0.5145 0.0264 0.4926 0.5155 0.5376 103%
	STSbet Vinghe	0.4998 0.0286 0.4993 0.0256	0.4770 0.5000 0.	5208 0.4877 0.083 5212 0.4875 0.082	7 0.4327 0.4845 0.5401 7 0.4336 0.4843 0.5395	STSbet 0.5120 0.0239 0.4678 0.5102 0.5348 102% Yinghe 0.5147 0.0263 0.4926 0.5195 0.5376 103%
	PinnacleSports Sangibo	0.4992 0.0263 0.5000 0.0244	0.4768 0.5000 0 0.4805 0.5013 0	5216 0.4873 0.082 5195 0.4873 0.083	9 0.4330 0.4843 0.5393 6 0.4334 0.4851 0.5398	PinnacleSports 0.5131 0.0270 0.4902 0.5128 0.5348 103% Sangibo 0.5205 0.0254 0.5000 0.5208 0.5405 104%
	1888et 128et	0.4996 0.0257 0.4999 0.0269	0.4770 0.5000 0.	5204 0.4872 0.083 5230 0.4877 0.083	0 0.4329 0.4842 0.5392 3 0.4328 0.4850 0.5401	1818et 0.5109 0.0263 0.4678 0.5102 0.5319 102% 128et 0.5114 0.0277 0.4678 0.5102 0.5348 102%
	Bvin Intervetten	NA NA NA NA	NA NA NA NA	NA NA NA	a na na na a na na na	Binin NA NA NA NA NA 01; Intervetten NA NA NA NA NA 01;
	William Hill HKJC	NA NA 0.4998 0.0282	NA NA 0.4764 0.5026 0.	NA NA N/ 5232 0.4876 0.082	A NA NA NA 7 0.4347 0.4839 0.5391	Villam Hill NA NA NA NA 05 HKJC 0.5216 0.0303 0.5000 0.5208 0.5405 104%
	SSP International Betfair	NA NA NA NA	NA NA NA NA	NA NA NA	a na na na a na na na	SSP International NA NA NA NA NA 015 Betfar NA NA NA NA NA 015
	SATAT	NA NA	NA NA	NA NA NA	a NA NA NA A NA NA NA	SNAL NA NA NA NA NA U2 SNAL NA NA NA NA NA 02
	Singaporepools Stan James	NA NA	NA NA	NA NA NA	4 NA NA NA A NA NA NA	Singaporepodes IVA IVA IVA IVA IVA IVA IVA Stan James IVA IVA IVA IVA IVA IVA IVA IVabat
	Coral Average	NA NA 0.4996 0.0263	NIA NIA 0.4774 0.5004 0	NA NA N/ 5215 0.4876 0.082	A NA NA NA 9 0.4337 0.4847 0.5397	Coral NA NA NA NA NA NA Average 0.5554 0.0272 0.4923 0.5553 0.5376
	AvaşProb = (Hor	nePrice • 1) / (HomePri	ice • AwagPrice • 2)			Away Vin probability = 1 / (Away Price • 1)
	Away Vin	Bo Mean Std Dev	okmakers 25% Median 79	5% Mean Std De	EM Model v 25% Median 75%	Avag Vin Company Mean Std Dev 25% Median 75%
	Macao-Slot Ladbrokes	0.5007 0.0254 0.4977 0.0283	0.4768 0.4974 0. 0.4740 0.4948 0.	5236 0.5127 0.082 5208 0.5093 0.083	6 0.4609 0.5163 0.5655 11 0.4577 0.5122 0.5617	Maxao-Slot 0.5229 0.0269 0.5000 0.5208 0.5464 Ladbrokes 0.5197 0.0238 0.4950 0.5155 0.5435
	Victor Chandler Singbet	0.5001 0.0270 0.5003 0.0242	0.4779 0.5000 0.	5247 0.5116 0.081 5231 0.5129 0.083	8 0.4604 0.5139 0.5646 0 0.4608 0.5158 0.5672	Victor Chandler 0.5200 0.0284 0.4838 0.5195 0.5425 Singbet 0.5162 0.0252 0.4944 0.5155 0.5376
	Royal Fada	0.5004 0.0246 0.5007 0.0237	0.4794 0.5000 0	5231 0.5130 0.083 5195 0.5128 0.082	4 0.4607 0.5161 0.5675 8 0.4611 0.5158 0.5661	Royal 0.5162 0.0255 0.4950 0.5155 0.5376 Fada 0.5204 0.0250 0.5000 0.5195 0.5405
	Bet365 Easybet	0.5016 0.0266 0.5000 0.0244	0.4805 0.5000 0. 0.4805 0.4987 0	5256 0.5127 0.083 5196 0.5127 0.083	11 0.4607 0.5145 0.5674 6 0.4602 0.5149 0.5666	Bec385 0.5211 0.0230 0.5000 0.5195 0.5405 Eargbet 0.5204 0.0256 0.5000 0.5101 0.5405
	10Bet Mansion	0.4999 0.0256 0.4998 0.0274	0.4920 0.5000 0.	5204 0.5123 0.083 5231 0.5120 0.083	4 0.4594 0.5154 0.5671 0 0.4595 0.5137 0.5683	10Bet 0.5152 0.0264 0.4975 0.5147 0.5371 Mansion 0.5133 0.0283 0.4902 0.5102 0.5376
	3Star Yongli	0.5008 0.0276 0.5008 0.0257	0.4769 0.5000 0.	5232 0.5129 0.082 5232 0.5126 0.082	6 0.4609 0.5156 0.5660 7 0.4606 0.5158 0.5664	251ai 0.5171 0.0287 0.4828 0.5155 0.5405 Yongi 0.5161 0.0288 0.4828 0.5155 0.5391
	BCBet	0.5002 0.0263 0.5001 0.0269	0.4770 0.5000 0.	5230 0.5125 0.082 5230 0.5123 0.083	8 0.4607 0.5149 0.5664 3 0.4599 0.5150 0.5672	Sbobet 0.516 0.0270 0.4878 0.5102 0.5348 ECBet 0.5116 0.0277 0.4878 0.5102 0.5348
	Hengung AS3388	0.5007 0.0256 0.5007 0.0269	0.4770 0.5000 0.	5232 0.5125 0.082 5230 0.5130 0.082	7 0.4605 0.5157 0.5664 6 0.4609 0.5157 0.5661	Hengang 0.5%2 0.02%7 0.4426 0.5%5 0.5%1 AS3388 0.5%2 0.0278 0.4678 0.5%2 0.5348
	SB1988	0.5008 0.0272 0.5004 0.0257	0.4796 0.5000 0.	5232 0.5125 0.083 5230 0.5128 0.083	2 0.4601 0.5153 0.5662 0 0.4608 0.5158 0.5671	ABImemanonal 0.51/1 0.0283 0.4950 0.5155 0.5405 SE3888 0.5118 0.0264 0.4902 0.5102 0.5348
	Asianbookie	0.501 0.0255	0.4808 0.5000 0.	5206 0.5126 0.082 5206 0.5126 0.082	3 0.4697 0.5149 0.5640 8 0.4590 0.5155 0.5663	Asianbookie 0.5/64 0.0266 0.4938 0.5128 0.5376
	Yongiluao Nikebet	0.5007 0.0257 0.5008 0.0257	0.4788 0.5000 0.	5232 0.5125 0.082 5232 0.5126 0.082	8 0.4606 0.5158 0.5684 7 0.4606 0.5158 0.5684	Vongituao 0.5360 0.0288 0.4428 0.5341 0.5391 Nikebet 0.5161 0.0288 0.4428 0.5155 0.5391
	Yinghe	0.5002 0.0286	0.4782 0.5000 0.	5230 0.5123 0.083 5232 0.5125 0.082	7 0.4605 0.5155 0.5673 7 0.4605 0.5157 0.5664	Vinghe 0.5162 0.0267 0.4902 0.5102 0.5389 Vinghe 0.5162 0.0267 0.4926 0.5155 0.5391
	Sangibo Sangibo	0.5008 0.0263	0.4805 0.4987 0	5195 0.5127 0.082 5195 0.5127 0.083	0 0.4602 0.5157 0.5670 6 0.4602 0.5149 0.5666 0 0.4602 0.5149 0.5666	Sanybo 0.5204 0.0256 0.5000 0.5105 0.5005 0.5204 0.0256 0.5000 0.5105
	12Bet	0.5004 0.0257 0.5001 0.0269	0.4770 0.5000 0.	5230 0.5128 0.083 5230 0.5123 0.083	0 0.4600 0.5158 0.5671 3 0.4599 0.5150 0.5672	128+e 0.516 0.0277 0.4678 0.5102 0.5348
	Binterwetten	NA NA NA NA	NA NA NA NA	NA NA NA	n na NA NA A NA NA NA	Intervettori NA NA NA NA Intervettori NA NA NA NA NA
	HKJC	0.5002 0.0282	0.4768 0.4974 0.	5236 0.5124 0.082	7 0.4609 0.5161 0.5653	HAGE 10237 0.500 0.5235 COD Languigned 0.5221 0.0237 0.5000 0.5205 COD Languigned 0.5225 0.5000 0.5205
	Betfair Introlog	NA NA	NA NA	NA NA NA	A NA NA NA	Bertain NA NA NA NA NA
	SNLAI	NA NA	NA NA	NA NA NA		SNAL NA NA NA NA NA SNAL NA NA NA NA
	Stan James	NA NA NA NA		NA NA NA	A NA NA NA A NA NA NA	Stan James NAA NAA NAA NAA NAA NAA Umbee NAA NAA NAA NAA NAA
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	Average	3,5004 0.0263		oneo1 0.0124 0.082	o orroop 0.0000 0.0000g	www.ge 003 0.0279 0.936 0.0146 0.0367

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.



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 2009/10.

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<text><text><text><text><text><text><text></text></text></text></text></text></text></text>	Home	Comparison (Data of Season 0803 and 09/0) Pure Probabilities	Comparison (Data of Season 08/09 and 09/10) Probabilities from Odds Prices
<text><text><text><text></text></text></text></text>	A Bookmakers B Comparison	This section compare of the observationsfoutcome, EM model, and also the pure probabilities (vithout nominal vigorish) of 23 bookmakers with EM model Omits the difference of handleap between book makers.	This section compare of the outcome Asian Handicap odds prices of 29 bookmakers. Assume that all bookmakers offer similar handicap for a specer match, omits the difference of handicap between bookmakers.
	a) Season 08/09 b) Season 09/10	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 guardise obtained from the statistical model.	The Mean, standard deviation, and quantiles (25%, median, and 75%) are given. It can be seen that there is vitually no difference bitween book makers in terms of these summaries. Also given are the corresponding qualities obtained
	C Bets Breakdown a) Handicap Stakes b) Handicap PbL	DwiFrob : [UndirFride - 1] / [DivirFride - UndirFride - 2]	From the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2°4% take has been accounted for. Dow Vin probability: 17 (Dow Price + 1)
i and b	o) Handioap Ratio d) Price Stakes e) Price Ptd.	Over Vin Bookmakers EM Model Mean Std Dev 25% Median 75% Mean Std Dev 25% Median 75%	Over Vin Company Mean Std Dev 25% Median 75% Norminal Vigorish
	F) Price Ratio 2008/09 Breakdown a) Handicap Stakes	Macao-Stor 0.4594 0.0277 0.4730 0.4685 0.5102 0.4752 0.1085 0.3770 0.4531 0.5272 Ladorokes 0.4917 0.0233 0.4740 0.4816 0.5030 0.4552 0.1014 0.3078 0.4658 0.5276 Vistor-Chandler 0.4491 0.0271 0.4755 0.555 0.5546 0.1014 0.3014 0.4551 0.5281	Macao-Slot 0.5244 0.0204 0.5000 0.5283 0.5405 077c Laderokes 0.5119 0.0238 0.4550 0.5102 0.5283 0445c Victor Chandler 0.5235 0.0420 0.5000 0.5181 0.5464 065c
• • • • • • • • • • • • • • • • • • •	b) Handicap PoL c) Handicap Ratio d) Price Stakes	Singbot 0.4932 0.0194 0.4932 0.5078 0.4558 0.018 0.3847 0.4568 0.5251 Hogal 0.4532 0.0185 0.4522 0.5078 0.4558 0.018 0.3846 0.4566 0.5251 Fada 0.4511 0.018 0.4522 0.5078 0.4556 0.018 0.3446 0.4566 0.5251	Singbot 0.51% 0.0188 0.4975 0.5102 0.5263 04% Royal 0.5175 0.0189 0.4975 0.5102 0.2823 04% Facts 0.5067 0.0230 0.4966 0.5102 0.5263 104%
Image: 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	e) Price P6L F) Price Ratio	Ber365 0.4830 0.0221 0.4741 0.4870 0.5065 0.4859 0.3021 0.3845 0.4565 0.5254 Earpher 0.4909 0.0234 0.4730 0.4865 0.5155 0.4576 0.1022 0.3863 0.4565 0.5276	Bec365 0.5072 0.0225 0.4678 0.5051 0.5283 104% Earghert 0.5314 0.0249 0.5128 0.5263 0.5556 106%
Single All Single All <th>a) Handicap Stakes b) Handicap P&L</th> <th>Marcian 0.4903 0.0231 0.4742 0.4572 0.5077 0.4561 0.1022 0.3849 0.4555 0.5582 351ar 0.4907 0.0228 0.4730 0.4670 0.5078 0.4568 0.015 0.3866 0.4578 0.5582</th> <th>Mansion 0.5544 0.4224 0.4578 0.5500 0.5238 1035 35tar 0.5107 0.0238 0.4526 0.5706 0.5263 1045</th>	a) Handicap Stakes b) Handicap P&L	Marcian 0.4903 0.0231 0.4742 0.4572 0.5077 0.4561 0.1022 0.3849 0.4555 0.5582 351ar 0.4907 0.0228 0.4730 0.4670 0.5078 0.4568 0.015 0.3866 0.4578 0.5582	Mansion 0.5544 0.4224 0.4578 0.5500 0.5238 1035 35tar 0.5107 0.0238 0.4526 0.5706 0.5263 1045
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Yange Yange <th< th=""><th>E Conclusion</th><th>Vongifičiao 0.4535 0.0205 0.4768 0.4622 0.5078 0.4652 0.017 0.3852 0.4570 0.5261 Nikebet 0.4690 0.0229 0.4718 0.4672 0.5552 0.1026 0.3135 0.4570 0.5251 STSbet 0.4916 0.0224 0.4744 0.4695 0.5078 0.4566 0.0015 0.3855 0.4578 0.5268</th><th>YooguGaba 0.5121 0.0210 0.4550 0.5102 0.5263 0045 Nakebet 0.5009 0.0225 0.4654 0.5000 0.5200 0025; STSbat 0.5045 0.0322 0.4678 0.5051 0.5238 005;</th></th<>	E Conclusion	Vongifičiao 0.4535 0.0205 0.4768 0.4622 0.5078 0.4652 0.017 0.3852 0.4570 0.5261 Nikebet 0.4690 0.0229 0.4718 0.4672 0.5552 0.1026 0.3135 0.4570 0.5251 STSbet 0.4916 0.0224 0.4744 0.4695 0.5078 0.4566 0.0015 0.3855 0.4578 0.5268	YooguGaba 0.5121 0.0210 0.4550 0.5102 0.5263 0045 Nakebet 0.5009 0.0225 0.4654 0.5000 0.5200 0025; STSbat 0.5045 0.0322 0.4678 0.5051 0.5238 005;
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Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Goal Line odds price without vigorish of total soccer matches in season 2008/09 and 2009/10.

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A Bookmakers B Comparison	This section compare of 29 bookmakers with	of the observations/outcome, EM model. Omits the differen	EM model, and also the pure prol ce of handicap between bookmaker	abilities (without norminal vigorish)	This section compare of the outcome Asian Handicap odds (rrises of 28 bookmakers. Assume that all bookmakers of handicap between bookmakers.
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F Price Batio 2018/09 Breakdown a) Handican Stakes	Macao-Slot Ladbrokes Victor Chandler	0.4873 0.0320 0.4605 0.4914 0.0225 0.4740 0.4922 0.0249 0.4741	0.4965 0.5130 0.4352 0.107 0.4996 0.5104 0.4466 0.091 0.4870 0.5065 0.4497 0.097	3 0.3621 0.4382 0.5137 1 0.3794 0.4480 0.5156 7 0.3830 0.4499 0.5157	Macao-Slot 0.5220 0.0350 0.4975 0.5128 Ladbrokes 0.5127 0.0230 0.4950 0.5112 Victor Chandler 0.5130 0.0273 0.4926 0.5128	0.5405 107% 0.5305 104% 0.5283 104%
b) Handicap P&L c) Handicap Ratio d) Price States	Singbet Rogal Farta	0.4936 0.0188 0.4793 0.4836 0.0189 0.4793 0.4918 0.0217 0.4744	0.4922 0.5078 0.4468 0.098 0.4922 0.5078 0.4468 0.098 0.4922 0.5078 0.4468 0.098	1 0.3763 0.4470 0.5145 1 0.3763 0.4470 0.5145 3 0.3764 0.4467 0.5156	Singbet 0.518 0.0191 0.4975 0.5102 Rogal 0.5117 0.0180 0.4975 0.5102 Earla 0.522 0.0332 0.4975 0.5102	0.5263 104% 0.5263 104% 0.5268 102%
e) Price P&L f) Price Ratio 2019/00 Price Ratio	Bet365 Easybet	0.4896 0.0219 0.4741 0.4905 0.0221 0.4730 0.4911 0.0221 0.4730	0.4870 0.5065 0.4472 0.098 0.4965 0.5135 0.4461 0.097 0.4984 0.5135 0.4461 0.097	0.3773 0.4470 0.5145 0.3790 0.4483 0.5152 0.2755 0.4483 0.5152	Bet385 0.5078 0.0221 0.4926 0.5051 Eargibet 0.5098 0.0234 0.5128 0.5263	0.5263 104% 0.5556 108% 0.5576 108%
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d) Price Stakes e) Price PbL	Sbobet IBCBet	0.4951 0.0136 0.4753 0.4884 0.0209 0.4718 0.4996 0.0238 0.4744	0.4972 0.5051 0.4469 0.039 0.4972 0.5051 0.4469 0.039 0.4972 0.5077 0.4460 0.039	0.3760 0.4460 0.5155 5 0.3763 0.4466 0.5150 5 0.3780 0.4481 0.5166	Congli 0.5141 0.0204 0.4375 0.5128 Sbobet 0.5021 0.0209 0.4854 0.5000 IBCBet 0.5055 0.0244 0.4878 0.5000	0.5281 10352 0.5281 10352 0.5208 10352
D Summary	AS3388 AB International	0.4951 0.0137 0.4754 0.4990 0.0217 0.4744 0.4822 0.0216 0.4767	0.4946 0.507 0.4478 0.056 0.4897 0.5077 0.4478 0.097 0.4922 0.5078 0.4473 0.097	0.3780 0.4430 0.5155 0.3789 0.4479 0.5155 0.3784 0.4468 0.5151	AS3388 0.5047 0.0218 0.4975 0.5125 AE3388 0.5047 0.0218 0.4976 0.5025 AB International 0.5111 0.0220 0.4950 0.5102	0.5208 103% 0.5208 103% 0.5263 104%
b) Season 09/10	Vin368 Asianbookie	0.4921 0.0204 0.4744 0.4924 0.0255 0.4730 0.4917 0.0211 0.4744	0.4637 0.5077 0.4465 0.056 0.4697 0.5103 0.4491 0.096 0.4696 0.5078 0.4691 0.123	0.3754 0.4496 0.5156 0.3838 0.4496 0.5156 7 0.3933 0.4828 0.5700	Science 0.5056 0.0216 0.4878 0.5025 Win368 0.5083 0.0250 0.4878 0.5051 Asianbookie 0.5064 0.0252 0.4878 0.5051	0.5265 1035 0.5263 1035 0.5263 1035
E Conclusion	Vorgitsiao Nikebet STSbet	0.4951 0.0198 0.4753 0.4996 0.0222 0.4744 0.4935 0.0211 0.4769	0.4948 0.5104 0.4479 0.097 0.4897 0.5077 0.4472 0.099 0.4922 0.5090 0.4476 0.098	9 0.3780 0.4480 0.5156 3 0.3756 0.4473 0.5155 3 0.3780 0.4483 0.5152	Vongiliaio 0.5141 0.0204 0.4975 0.5128 Nikebet 0.5005 0.0400 0.4878 0.5025 STSbet 0.5028 0.0400 0.4902 0.5076	0.5291 1045 0.5208 1025 0.5263 1025
	PinnacleSports Sanjibo	0.4912 0.0207 0.4744 0.4911 0.0220 0.4744 0.4904 0.0221 0.4730	0.4696 0.5077 0.4464 0.099 0.4896 0.5077 0.4469 0.098 0.4865 0.5096 0.4476 0.098	0 0.3784 0.4482 0.5160 0.3768 0.4470 0.5149 5 0.3772 0.4483 0.5148	Vinghe 0.5027 0.0329 0.4902 0.5051 PinnacleSports 0.4995 0.0396 0.4878 0.5025 Sanjibo 0.5241 0.0415 0.5128 0.5263	0.5208 102% 0.5208 102% 0.5405 107%
	108Bet 12Bet Bvin	0.4920 0.0205 0.4744 0.4996 0.0238 0.4744 NA NA NA NA	0.4897 0.5077 0.4462 0.098 0.4872 0.5077 0.4480 0.098 NA NA NA NA NA	S 0.3755 0.4470 0.5141 S 0.3780 0.4481 0.5166 NA NA NA NA	12Bet 0.4971 0.0425 0.4978 0.5000 12Bet 0.5055 0.0244 0.4978 0.5000 Bwin NA NA NA NA NA	0.5208 10% 0.5208 10% NA 0%
	Milliam Hill HKJC	NA NA NA NA NA NA 0.4900 0.0294 0.4730	NA NA NA NA NA NA NA NA NA NU 0.4865 0.5117 0.4418 0.105	NA NA NA NA NA NA 0.3655 0.4414 0.5147	Milliam Hill NA NA NA NA William Hill NA NA NA NA HKJC 05163 0.0440 0.4975 0.5129	NA 0% NA 0% 0.5405 105%
	SSP International Betfair Intralot	NA NA NA NA NA NA NA NA NA	NA NA NA NA NA NA NA NA NA NA NA NA	NA NA NA NA NA NA NA NA NA	SSP International NA NA NA NA Betiair NA NA NA NA NA Intralot NA NA NA NA	NA 0% NA 0% NA 0%
	SNAI Singaporepools Stan James	NA NA NA NA NA NA NA NA NA	NA NA NA NA NA NA NA NA NA NA NA NA	NA NA NA NA NA NA NA NA NA	SNAI NA NA NA NA Singaporepools NA NA NA NA Stan James NA NA NA NA	NA 000 NA 000 NA 000
	Uniber Coral Average	NA NA NA NA NA NA 0.4996 0.0222 0.4747	NA NA NA NA NA NA NA NA 0.4895 0.5084 0.4485 0.039	NA NA NA NA NA NA 0.3775 0.4483 0.5171	Unibet NA NA NA NA Coral NA NA NA NA Average 0.5032 0.0274 0.4331 0.5076	NA 0% NA 0%
	UnderProb = (OverPric	se • 1) / (OverPrice • UnderPrice	e • 2)		Under Vin probability = 17 (Under Price + 1)	
	Under Vin N	Bookmakers Mean Std Dev 25% M	edian 75% Mean Std De	EM Model v 25% Median 75%	Under Vin Company Mean Std Dev 25% Median	75×
	Ladbrokes Victor Chandler	0.5027 0.0225 0.4896 0.5078 0.0249 0.4935	0.5105 0.5135 0.5618 0.107 0.5104 0.5260 0.5514 0.038 0.5130 0.5259 0.5503 0.097	0.4843 0.5520 0.6206	Ladbrokes 0.5306 0.0243 0.5102 0.5318 Victor Chandler 0.5232 0.0262 0.5128 0.5319	0.5495 0.5464
	Fingal Finda	0.5064 0.0188 0.4922 0.5064 0.0189 0.4922 0.5092 0.0217 0.4923	0.5078 0.5207 0.5522 0.098 0.5078 0.5207 0.5532 0.098 0.5128 0.5256 0.5531 0.098	1 0.4855 0.5530 0.6237 1 0.4855 0.5530 0.6237 3 0.4844 0.5533 0.6236	Singlet 0.5250 0.0200 0.5022 0.5263 Rogal 0.5251 0.0202 0.502 0.5263 Fada 0.5213 0.0361 0.5076 0.5263	0.5405 0.5405 0.5405
	Easybet 10Eet	0.5036 0.0221 0.4835 0.5089 0.0221 0.4865 0.5089 0.0201 0.4961	0.5130 0.5259 0.5528 0.598 0.5135 0.5270 0.5519 0.097 0.5116 0.5219 0.5529 0.098	5 0.4855 0.5530 0.6227 3 0.4848 0.5517 0.6210 5 0.4850 0.5529 0.6234	Earghet 0.5295 0.0298 0.5280 0.5295 0.5575 0.0248 0.5263 0.5556 10Bet 0.5244 0.0209 0.5102 0.5263	0.5464 0.5714 0.5376
	Mansion 3Star Yongli	0.5101 0.0216 0.4949 0.5091 0.0220 0.4922 0.5049 0.0198 0.4896	0.5128 0.5256 0.5531 0.098 0.5104 0.5259 0.5522 0.097 0.5052 0.5207 0.5521 0.098	5 0.4848 0.5534 0.6237 7 0.4845 0.5522 0.6211 0 0.4844 0.5520 0.6220	Mansion 0.5243 0.0228 0.5076 0.5263 3Star 0.5287 0.0236 0.5102 0.5291 Yongi 0.5243 0.0210 0.5102 0.5263	0.5405 0.5464 0.5405
	Sbobet IBCBet Hengsing	0.5116 0.0209 0.4949 0.5084 0.0238 0.4923 0.5049 0.0197 0.4896	0.5128 0.5282 0.5531 0.098 0.5128 0.5256 0.5520 0.098 0.5052 0.5206 0.5521 0.098	5 0.4850 0.5534 0.6237 5 0.4834 0.5519 0.6220 0 0.4844 0.5520 0.6220	Sbobet 0.5260 0.0223 0.5063 0.5263 IBDBet 0.5229 0.0249 0.5051 0.5263 Hengsing 0.5243 0.0210 0.5076 0.5263	0.5435 0.5405 0.5405
	AS3388 AB International SB1888	0.5090 0.0217 0.4923 0.5078 0.0216 0.4922 0.5079 0.0204 0.4923	0.5103 0.5256 0.5522 0.097 0.5078 0.5233 0.5527 0.097 0.5103 0.5256 0.5532 0.098	7 0.4845 0.5522 0.6211 7 0.4849 0.5532 0.6216 1 0.4854 0.5530 0.6236	AS3388 0.5232 0.0229 0.5051 0.5238 AB International 0.5273 0.0230 0.5102 0.5263 SEH888 0.5219 0.0216 0.5051 0.5238	0.5405 0.5435 0.5405
	Vin368 Asianbookie YongliGao	0.5076 0.0255 0.4897 0.5083 0.0211 0.4922 0.5049 0.0198 0.4896	0.5103 0.5270 0.5509 0.096 0.5104 0.5256 0.5109 0.123 0.5052 0.5207 0.5521 0.097	8 0.4844 0.5504 0.6182 7 0.4300 0.5172 0.6007 9 0.4844 0.5520 0.6220	Win368 0.5240 0.0271 0.5051 0.5263 Asianbookie 0.5237 0.0274 0.5051 0.5263 YongiGao 0.5243 0.0210 0.5102 0.5263	0.5435 0.5405 0.5405
	Nikebet STSbet Yinghe	0.5084 0.0222 0.4923 0.5085 0.0211 0.4910 0.5088 0.0207 0.4923	0.5103 0.5256 0.5528 0.099 0.5078 0.5231 0.5524 0.098 0.5104 0.5256 0.5556 0.099	3 0.4845 0.5527 0.6244 3 0.4848 0.5517 0.6220 0 0.4840 0.5518 0.6216	Nikebet 0.5177 0.0423 0.5051 0.5263 STSbet 0.5163 0.0423 0.5051 0.5236 Vinghe 0.5207 0.0344 0.5051 0.5283	0.5405 0.5405 0.5405
	PinnacleSports Sanyibo 1988et	0.5089 0.0220 0.4923 0.5086 0.0221 0.4904 0.5080 0.0205 0.4923	0.5104 0.5256 0.5531 0.098 0.5135 0.5270 0.5524 0.098 0.5103 0.5256 0.5538 0.099	0.4851 0.5530 0.6232 0.4852 0.5517 0.6228 0.4859 0.5530 0.6245	Pinnack/Sports 0.5177 0.0421 0.5051 0.5263 Sangbo 0.5448 0.0435 0.5263 0.5556 05Eat 0.5133 0.0440 0.5560 0.5566	0.5405 0.5714 0.5405
	12Bet Bvin Intervetten	0.5084 0.0238 0.4923 NA NA NA NA	0.5128 0.5256 0.5520 0.098 NA NA NA NA NA	5 0.4834 0.5519 0.6220 NA NA NA NA NA NA	12Bet 0.5229 0.0249 0.5051 0.5263 Bvin NA NA NA NA NA Intervetten NA NA NA NA	0.5405 NA NA
	Viliam Hill HKJC SSP International	NA NA NA 0.5100 0.0294 0.4883	NA NA NA NA NA 0.5135 0.5270 0.5582 0.105	NA NA NA 0.4853 0.5586 0.6345 NA NA NA	William Hill NA NA NA NA HKJC 0.5379 0.0496 0.5128 0.5405 SSP Istamational NA NA NA NA	NA 0.5714
	Betfair Intralot Shai	NA NA NA NA NA NA	NA NA NA NA NA	NA NA NA NA NA NA	Betfair NA NA NA NA Intralot NA NA NA NA NA Studi	NA NA
	Singaporepools Stan James	NA NA NA NA NA NA	NA NA NA NA NA	NA NA NA NA NA NA	Singaporepools NA NA NA NA NA Stan James NA NA NA NA NA	NA NA
	Coral Average	NA NA NA 0.5084 0.0222 0.4916	NA NA NA NA 0.5105 0.5253 0.5515 0.039	NA NA NA 0.4829 0.5817 0.6225	Doral NA NA	<u>NA</u> 0.5459

Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Goal Line odds price without vigorish of total soccer matches in season 2008/09.

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Home	Comparison Pure Probabilities	(Data of Season 0990)				1	Comparison Probabilities from C	(Data of Season 09/10) Idds Prices			
A Bookmakers	This section com	are of the observations/outo	ome, EM model, and a	so the pure prob	abilities (vithout norminal vigorish)		This section compa	re of the outcome Asian Handicap ode	is prices of 29 bookmaker	s. Assume that all bookmak	ers
a) Season 08/09 b) Season 09/00	The Mean, standa	rd deviation, and quantiles (25	erence or nandicap be x, median, and 75%) ar	e given. It can be se	en that there is virtually no difference		The Mean, standard	p for a socier match, omits the directed in the dint the directed in the direc	ice of handicap between boo	kmakers. seen that there is virtually no	
C Bets Breakdown a) Handicap Stakes	between bookmai	ers in terms of these summar	es. Also given are the	corresponding qual	ities obtained from the statistical mod	iel.	difference between b from the statistical r take has been accor	pookmakers in terms of these summari model. The probabilities from the model unted for.	es. Also given are the corres and the bookmakers are als	ponding quatries obtained o similar in value once the 2	~4%
b) Handicap PitL c) Handicap Ratio d) Price Stakes	OverProb = (Unde	Price + 1) / (OverPrice + Under Bookmal	Price • 2)	E	M Model		Over Vin probability Over Vin	= 17 (Over Price = 1)		_	
e) Price P&L f) Price Ratio 2009/09 Breakdown	Macao-Slot Ladbrokes	Mean Std Dev 25% 0.4933 0.0223 0.473 0.4919 0.0241 0.47	Median 75% 0 0.4870 0.5135 5 0.4896 0.5103	Mean Std Dev 0.4659 0.1042 0.4673 0.1036	25% Median 75% 0.3933 0.4691 0.5400 0.3967 0.4702 0.5394		Company Macao-Slot Ladbrokes	Mean Std Dev 25% Median 0.5267 0.0251 0.5102 0.5263 0.5111 0.0244 0.4902 0.5102	75% Norminal Vi 0.5405 107% 0.5263 104%	gorish	
a) Handicap Stakes b) Handicap PbL c) Handicap PbL	Victor Chandler Singbet Road	0.4962 0.0457 0.463 0.4928 0.0200 0.476 0.4928 0.0200 0.476	8 0.5000 0.5362 8 0.4922 0.5078 9 0.4972 0.5078	0.4607 0.1168 0.4644 0.1045 0.4644 0.1045	0.3795 0.4607 0.5412 0.3923 0.4681 0.5380 0.2923 0.4681 0.5380		Victor Chandler Singbet Pound	0.5336 0.0503 0.5000 0.5405 0.5114 0.0205 0.4926 0.5102 0.5114 0.0205 0.4926 0.5102	0.5714 108% 0.5263 104% 0.5252 104%		
d) Price Stakes e) Price Ptd.	Fada Bet365	0.4914 0.0218 0.473 0.4885 0.0224 0.468	7 0.4868 0.5103 0 0.4870 0.5065	0.4652 0.1046 0.4642 0.1047	0.3933 0.4688 0.5390 0.3919 0.4678 0.5380		Fada Bet365	0.5148 0.0234 0.5000 0.5128 0.5066 0.0229 0.4878 0.5051	0.5263 105% 0.5263 104%		
a) Handicap Stakes	10Bet Mansion	0.4908 0.0202 0.475 0.4908 0.0202 0.475 0.4907 0.0244 0.47	6 0.4886 0.5035 6 0.4884 0.5039 8 0.4872 0.5077	0.4648 0.1049 0.4648 0.1049	0.3925 0.4679 0.5381 0.3922 0.4681 0.5381		Easyber 10Bet Mansion	0.5319 0.0263 0.5128 0.5263 0.5061 0.0208 0.4902 0.5025 0.5045 0.0249 0.4854 0.5000	0.5181 103% 0.5208 103%		
 b) Handicap P&L c) Handicap Ratio d) Pairs Stakes 	3Star Yongli Shohat	0.4906 0.0236 0.47 0.4911 0.0226 0.473 0.4877 0.0218 0.455	5 0.4870 0.5104 0 0.4884 0.5078 2 0.4872 0.5026	0.4653 0.1043 0.4648 0.1050 0.4644 0.1048	0.3931 0.4689 0.5389 0.3925 0.4681 0.5383 0.3923 0.4680 0.5381		3Star Yongli Shohet	0.5116 0.0252 0.4902 0.5076 0.5103 0.0248 0.4902 0.5076 0.5015 0.0217 0.4831 0.5000	0.5291 104% 0.5263 104% 0.5955 103%		
e) Price P&L F) Price Ratio	IBCBet Hengsing	0.4904 0.0236 0.47 0.4915 0.0233 0.47	8 0.4872 0.5077 0 0.4884 0.5078	0.4647 0.1047 0.4646 0.1049	0.3923 0.4683 0.5380 0.3921 0.4679 0.5383		IBCBet Hengsing	0.5043 0.0240 0.4854 0.5000 0.5090 0.0251 0.4902 0.5051	0.5208 103% 0.5263 104%		
D Summary a) Season 08/09	AB International SB1898	0.4904 0.0222 0.47 0.4906 0.0213 0.474	8 0.4872 0.5077 4 0.4872 0.5077	0.4653 0.1043 0.4644 0.1045	0.3938 0.4690 0.5385 0.3923 0.4683 0.5380		AB International SB1888	0.5073 0.0231 0.4878 0.5051 0.5043 0.0215 0.4878 0.5000	0.5236 103%		
 b) Season 09/10 E Conclusion 	Vin368 Asianbookle YongliGao	0.4879 0.0232 0.46 0.4903 0.0219 0.47 0.4920 0.0210 0.47	H 0.4852 0.5052 8 0.4872 0.5077 H 0.4897 0.5078	0.4638 0.1044 0.4735 0.1121 0.4641 0.1045	0.3923 0.4668 0.5372 0.3972 0.4736 0.5499 0.3925 0.4679 0.5380	:	Vin368 Asianbookie YongiGao	0.5055 0.0242 0.4878 0.5000 0.5060 0.0225 0.4878 0.5025 0.503 0.0216 0.4926 0.5076	0.5208 104% 0.5236 103% 0.5263 104%		
	Nikebet STSbet	0.4865 0.0233 0.465 0.4899 0.0235 0.47	2 0.4846 0.5026 8 0.4872 0.5077 4 0.4990 0.5077	0.4628 0.1052 0.4652 0.1037	0.3893 0.4674 0.5364 0.3943 0.4683 0.5389 0.3943 0.4683 0.5389	1	Nikebet STSbet	0.5012 0.0232 0.4831 0.4975 0.5059 0.0244 0.4878 0.5060 0.5059	0.5181 103% 0.5236 103%		
	PinnacleSports Sanybo	0.4899 0.0227 0.47 0.4902 0.0255 0.473	8 0.4855 0.5077 0 0.4855 0.5077	0.4653 0.1042 0.4659 0.1046	0.3938 0.4687 0.5381 0.3948 0.4682 0.5406	1	PinnacleSports Sanjibo	0.5050 0.0235 0.4854 0.5025 0.5965 0.0233 0.4975 0.5128	0.5236 103% 0.5319 105%		
	100Bet 12Bet Birlin	0.4907 0.0213 0.474 0.4904 0.0236 0.47 NA NA N	4 0.4872 0.5077 8 0.4872 0.5077 A NA NA	0.4645 0.1044 0.4647 0.1047 NA NA	0.3926 0.4681 0.5380 0.3923 0.4683 0.5380 NA NA NA		1088et 128et Bvin	0.5044 0.0214 0.4878 0.5000 0.5043 0.0240 0.4854 0.5000 NA NA NA NA NA	0.5208 103% 0.5208 103% NA 0%		
	Intervietten Villiam Hill HKJIC	NA NA N NA NA N 04831 0.0212 0.47	A NA NA A NA NA N 04922 05078	NA NA NA NA 0.4551 0.1045	NA NA NA NA NA NA 0.3331 0.4685 0.5389		Intervetten Villiam Hill HKJC	NA NA NA NA NA NA NA NA NA NA	NA 0% NA 0%		
	SSP International Betfair	NA NA N NA NA N	A NA NA A NA NA	NA NA NA NA	NA NA NA NA NA NA		SSP International Betfair	NA NA NA NA NA NA NA NA	NA 0% NA 0%		
	SNAI Singaporepools	NA NA N NA NA N	A NA NA A NA NA	NA NA NA NA	NA NA NA NA NA NA		SNAI Singaporepools	NA NA NA NA NA NA NA NA	NA 0% NA 0%		
	Stan James Unibet Coral	NA NA N NA NA N NA NA N	a na ma a na ma a na ma	NA NA NA NA NA NA	NA NA NA NA NA NA NA NA NA		Stan James Unibet Coral	NA NA NA NA NA NA NA NA NA NA NA NA	NA 0% NA 0% NA 0%		
	Average	0.4909 0.0233 0.472	3 0.4883 0.5068	0.4651 0.1052	0.3926 0.4683 0.5390	E	Average	0.5102 0.0244 0.4911 0.5073	0.5272		
	UnderProb = (Ove	Price • 1) / (OverPrice • Under Bookmal	Price • 2)		M Model	1	Under Win probabilit	y + 17 (Under Price + 1)			
	Macao-Slot Ladbrokes	Mean Std Dev 25% 0.5067 0.0223 0.486 0.5081 0.0241 0.485	Median 75% 5 0.5130 0.5270 7 0.5104 0.5285	0.5341 0.1042 0.5327 0.1036	0.4600 0.5309 0.6067 0.4606 0.5298 0.6033		Company Macao-Slot Ladbrokes	Mean Std Dev 25% Median 0.5410 0.0264 0.5263 0.5405 0.5280 0.0260 0.5051 0.5319	0.5556 0.5495		
	Victor Chandler Singbet Rosal	0.5038 0.0457 0.463 0.5072 0.0200 0.492 0.5072 0.0200 0.492	8 0.5000 0.5362 2 0.5078 0.5232 2 0.5078 0.5232	0.5393 0.1168 0.5356 0.1045 0.5356 0.1045	0.4588 0.5393 0.6205 0.4620 0.5319 0.6077 0.4620 0.5319 0.6077		Victor Chandler Singbet Ronal	0.5415 0.0488 0.5000 0.5464 0.5262 0.0212 0.5102 0.5263 0.5263 0.5263	0.5780 0.5405 0.5405		
	Fada Bet365	0.5086 0.0218 0.485 0.5115 0.0224 0.485	7 0.5132 0.5263 5 0.5130 0.5320	0.5348 0.1046 0.5358 0.1047	0.4610 0.5312 0.6067 0.4620 0.5322 0.6081		Fada Bet365	0.5328 0.0244 0.5128 0.5348 0.5305 0.0238 0.5128 0.5319	0.5556 0.5464		
	10Bet Mansion	0.5030 0.0246 0.436 0.5032 0.0202 0.49 0.5030 0.0244 0.492	5 0.5135 0.5270 3 0.5196 0.5244 3 0.5128 0.5282	0.5353 0.1049 0.5352 0.1049	0.4619 0.5321 0.6075 0.4619 0.5319 0.6078		NBet Mansion	0.5251 0.0211 0.502 0.5263 0.5253 0.5253 0.5253 0.5251 0.0211 0.5051 0.5263 0.5253 0.5254 0.5051 0.5263	0.5405 0.5435		
	3Star Yongli Shobet	0.5094 0.0236 0.485 0.5089 0.0226 0.495 0.5123 0.0218 0.495	6 0.5130 0.5285 2 0.5116 0.5270 4 0.5128 0.5308	0.5347 0.1043 0.5352 0.1050 0.5356 0.1048	0.4611 0.5311 0.6069 0.4617 0.5319 0.6075 0.4619 0.5320 0.6077		3Star Yongli Shohet	0.5313 0.0265 0.5102 0.5319 0.5287 0.0248 0.5102 0.5291 0.5267 0.0232 0.5102 0.5263	0.5525 0.5464 0.5464		
	IBCBet Hengsing	0.5096 0.0236 0.495 0.5085 0.0233 0.495	3 0.5128 0.5282 2 0.5116 0.5270 7 0.5139 0.5270	0.5353 0.1047 0.5354 0.1049 0.5340 0.1043	0.4620 0.5317 0.6077 0.4617 0.5321 0.6079 0.4502 0.5329 0.5055		IBCBet Hengsing	0.5242 0.0248 0.5051 0.5263 0.5267 0.0250 0.5076 0.5263 0.5252 0.5076 0.5253	0.5435 0.5464		
	AB International SB1888	0.5096 0.0222 0.492 0.5094 0.0213 0.492	3 0.5128 0.5282 3 0.5128 0.5282 3 0.5128 0.5256	0.5347 0.1043 0.5356 0.1045	0.4615 0.5310 0.6062 0.4620 0.5317 0.6077		AB International SB1888	0.5272 0.0235 0.5402 0.5263 0.5237 0.0225 0.5051 0.5263	0.5464 0.5405		
	Vin368 Asianbookie YonoliGao	0.5121 0.0232 0.494 0.5097 0.0219 0.495 0.5080 0.0210 0.495	8 0.5148 0.5309 3 0.5128 0.5282 2 0.5103 0.5259	0.5362 0.1044 0.5265 0.1121 0.5359 0.1045	0.4628 0.5332 0.6077 0.4501 0.5264 0.6028 0.4620 0.5321 0.6075	:	Vin368 Asianbookie YonolGao	0.5307 0.0260 0.5102 0.5319 0.5261 0.0232 0.5076 0.5263 0.5269 0.0221 0.5102 0.5263	0.5495 0.5464 0.5464		
	Alikebet STSbet	0.5135 0.0233 0.493 0.5101 0.0235 0.493	4 0.5154 0.5308 3 0.5128 0.5282	0.5372 0.1052 0.5348 0.1037	0.4636 0.5326 0.6107 0.4611 0.5317 0.6057		Nikebet STSbet	0.5291 0.0253 0.5102 0.5319 0.5269 0.0255 0.5076 0.5263	0.5464 0.5464		
	PinnacleSports Sanyibo	0.5101 0.0227 0.492 0.5098 0.0255 0.492	3 0.5128 0.5288 3 0.5128 0.5282 3 0.5135 0.5270	0.5347 0.1042 0.5341 0.1046	0.4619 0.5313 0.6062 0.4594 0.5308 0.6052	1	PinnacleSports Sanybo	0.5258 0.0238 0.5076 0.5263 0.5374 0.0310 0.5155 0.5405	0.5435 0.5556		
	199Bet 12Bet Bwin	0.5093 0.0213 0.492 0.5096 0.0236 0.492 NA NA N	3 0.5128 0.5256 3 0.5128 0.5282 A NA NA	0.5355 0.1044 0.5353 0.1047 NA NA	0.4620 0.5319 0.6074 0.4620 0.5317 0.6077 NA NA NA		138Bet 12Bet Bvin	0.5236 0.0225 0.5051 0.5263 0.5242 0.0248 0.5051 0.5263 NA NA NA NA NA	0.5405 0.5435 NA		
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	Average	0.5091 0.0233 0.49	2 0.5117 0.5277	0.5349 0.1052	0.4610 0.5317 0.6074	Ē	Average	0.5292 0.0253 0.5097 0.5305	0.5484		1

Above figure shows a comparison the mean, standard deviation, quantile 25%, median, quantile 75% of Goal Line odds price without vigorish of total soccer matches in season 2009/10.



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.

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A B C D	EFGHIJKLMNOPQRS	T U V W X Y Z AA AB AC AD AE AF AG AH AJ AJ
Home	Comparison (Data of Season 6000) Pure Probabilities	Comparizon (Data of Search 0869) Probabilities from Odds Prices
A Bookmakers B Comparison	This section compare of the observations/outcome, EM model, and also the pure probabilities (vithout norminal vigorish) of 28 bookmakers with EM model. Drifts the difference of handwap between bookmakers.	This section compare of the outcome Asian Handicap odds prices of 29 bookmakers. Assume that all bookmakers offer similar handsup/or a soccer match, omits the difference of handicap between bookmakers.
a) Season 00/19 b) Season 03/10	The Mean, standard deviation, and quantiles (25s; median, and 75s;) are given. It can be seen that there is viewally no difference between bookmakers in terms of these summaries. Also given are the corresponding quatries obtained from the statistical model.	The Mean, standard deviation, and quantiles (25x; median, and 75x) are given. It can be seen that there is virtually no difference between bookmakers interms of these summatics. Also given are the corresponding qualities obtained
C Bets Breakdown a) Handicap Stakes b) Handicap PoL	OverProb - (UnderPrice - 1) / (DwerPrice - UnderPrice - 2)	from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2°4% take has been accounted (or. Over V/n probability = 11 [Over Price = 1]
 c) Handicap Ratio d) Price Stakes e) Price P6L 	Over Vin Bookmakers EM Model Mean Std Dev 25% Median 75% Mean Std Dev 25% Median 75%	Over Vin Company Mean Std Dev 25x Median 75x Norminal Vigorish
 Frice Ratio 2008/09 Breakdown a) Handicap Stakes 	Macas-sile 0.4472 0.0220 0.4476 0.4532 0.0730 0.3021 0.3107 Latitorius 0.4544 0.0225 0.4740 0.4695 0.5110 0.4322 0.073 0.3241 0.4586 0.5581 0.5586 Viscor Chandler 0.4522 0.2494 0.4741 0.4670 0.5057 0.3010 0.4492 0.5567	Macaco-Biot 0.522 0.000 0.4975 0.5128 0.5468 N7% Ladookes 0.552 0.0273 0.6298 0.5565 104% ViccorChandler 0.550 0.0273 0.4286 0.5126 0.5263 104%
 b) Handicap P6L c) Handicap Ratio d) Price Stakes 	Singhet 0.4316 0.0109 0.4730 0.4522 0.5771 0.4468 0.0391 0.2763 0.4470 0.5145 Proyal 0.4336 0.0199 0.4733 0.4522 0.5778 0.4468 0.0591 0.3763 0.4470 0.5145 Fada 0.4910 0.1277 0.4744 0.4572 0.5777 0.4468 0.0593 0.3764 0.4457 0.5145	Singhet 0.5110 0.0111 0.4775 0.5112 0.5253 104% Pogul 0.5117 0.0133 0.4975 0.5112 0.5253 104% Fada 0.5102 0.0032 0.4778 0.5025 0.5250 102%
e) Price Pôl. F) Price Ratio 2009/0 Breakdown	Bec385 0.4495 0.0210 0.4741 0.4670 0.5055 0.4472 0.0005 0.3773 0.4470 0.5145 Exampler 0.4495 0.0221 0.4730 0.4695 0.5155 0.4461 0.0578 0.3796 0.4483 0.5152 (Meter 0.491 0.0201 0.4731 0.4694 0.5038 0.4471 0.0565 0.3796 0.4471 0.5150	Becadist 0.9177 0.0221 0.4066 0.9574 104% Eargher 0.9509 0.0224 0.5120 0.5243 0.9586 100% Meber 0.5560 0.0505 0.426 0.9519 100%
a) Handicap Stakes b) Handicap PõL c) Handicap Ratio	Munison 0.4039 0.0256 0.4744 0.4692 0.0505 0.2763 0.4486 0.5075 35kar 0.4596 0.0220 0.4741 0.4696 0.5071 0.3789 0.4478 0.5855 Yongji 0.4595 0.0750 0.4784 0.5914 0.4475 0.0807 0.3789 0.4478 0.5855	Manadom 0.5036 0.0277 0.478 0.5980 0.5191 100c 35tar 0.5569 0.0224 0.428 0.5978 0.5283 104c Yongi 0.514 0.624 0.478 0.518 0.5281 104c
d) Price Stakes e) Price P&L f) Price Batio	Stocket 0.4014 0.0210 0.4792 0.5101 0.4463 0.0005 0.2773 0.4466 0.5105 ECENet 0.4596 0.0220 0.4774 0.4672 0.5017 0.4460 0.5065 0.3730 0.4461 0.5165 Henging 0.4595 0.0774 0.4494 0.5114 0.4470 0.5065 0.3730 0.4460 0.5165	Booket 0.5021 0.0209 0.4954 0.5981 NCO: BCENH 0.5585 0.0244 0.4978 0.5910 0.5210 NCO: Hengsing 0.5141 0.0216 NCO: 0.5211 NCO:
D Summary a) Season 03409	ASJ288 0.4900 0.0207 0.4744 0.4697 0.5077 0.4478 0.0077 0.2709 0.4478 0.555 ABInternational 0.4922 0.0226 0.4767 0.4522 0.5071 0.4473 0.0557 0.3784 0.4478 0.556 SB388 0.4621 0.0204 0.4744 0.4897 0.5777 0.4488 0.0591 0.3784 0.4470 0.5546	AS3388 0.5447 0.029 0.4678 0.5250 0.5200 NO: AB international 0.511 0.0220 0.4990 0.5102 0.5203 NA: D59808 0.510 0.050 0.478 0.0255 0.5208 NO:
b) Season 03/10 E Conclusion	Vela368 0.4524 0.0255 0.4730 0.4697 0.5102 0.4491 0.0651 0.3388 0.4456 0.5155 Antanbookie 0.4597 0.0211 0.4744 0.4698 0.5010 0.4197 0.1237 0.3993 0.4428 0.5710 YongiGao 0.4551 0.0169 0.4739 0.4498 0.5114 0.4473 0.0579 0.3730 0.4400 0.5155	Visible 0.5563 0.6269 0.4678 0.5563 NO: Amarbookie 0.5564 0.6252 0.4078 0.5565 0.5263 NO: YongiGuo 0.5541 0.6204 0.4078 0.5561 0.5263 NO:
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	PrinateSports 0.4911 0.0220 0.4744 0.4895 0.5077 0.4469 0.0894 0.3768 0.4470 0.5149 Samples 0.4914 0.0221 0.4750 0.4005 0.5316 0.4476 0.0506 0.3772 0.4473 0.5141 198584 0.4520 0.0256 0.4744 0.4957 0.5077 0.4476 0.0595 0.4775 0.4579	PrinceleSports 0.4165 0.0366 0.4678 0.5025 0.5216 NC:s Sangho 0.5241 0.415 0.5218 0.5215 0.5216 NC:s Billet 0.4571 0.415 0.478 0.4578 0.05010 0.5216 1015
	IDEer 0.4956 0.0238 0.4974 0.4972 0.5077 0.4460 0.0895 0.3780 0.4461 0.5566 Dimm NA NA <td< th=""><th>12Ber 0.5555 0.0244 0.4678 0.5500 0.5216 NCCs Bolm NA NA NA NA NA NA 05 Bolm NA NA NA NA NA 05</th></td<>	12Ber 0.5555 0.0244 0.4678 0.5500 0.5216 NCCs Bolm NA NA NA NA NA NA 05 Bolm NA NA NA NA NA 05
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	Average 0.5004 0.0222 0.4986 0.5055 0.5255 0.5555 0.0996 0.4828 0.5557 0.6225	Average 0.5066 0.0288 0.5087 0.5237 0.5459

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.

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Home	Comparison (Data of Searon (0110) Pure Probabilities	Comparison (Data of Season (0/10) Probabilities from Odds Prices
A Bookmakers	This section compare of the observations/outcome, EM model, and also the pure probabilities (without norminal vigorish) of 30 hoof mixer with EM model. Only the difference of hoof is a battern broken where	This section compare of the outcome Asian Handicap odds prices of 29 bookmakers. Assume that all bookmakers offer circle knotless for a sonore mitch, omit the difference of knotless bookmakers.
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C Bets Breakdown a) Handicap Stakes	Decision documents in terms or mese summates. Also given are one corresponding quarters obtained from the statistical model.	orrenze servere bookenakers in centro or tense summaries, kao given are the consigning quarties consisted from the statistical model. The probabilities from the model and the bookmakers are also similar in value once the 2°4% take has been accounted for.
 e) Handicap Proc. e) Handicap Ratio d) Price Stakes 	Over Vin Bookmakers EM Model	Over Vin
e (Pride Pol. F) Pride Batio 2008/09 Break down	Imean setu Legizza Media s	Company Metain Std Dev 23% Metain 75% Norminal Vigorism Matoao Ster 0.0571 0.0251 0.5161 0.077 Ladsroker 0.5111 0.0244 0.5192 0.5263 1075
a) Handicap Stakes b) Handicap P&L c) Handicap Ratio	Visitor Chandler 0.4432 0.0470 0.4433 0.5100 0.55221 0.4607 0.0163 0.5101 Singster 0.4432 0.0200 0.4768 0.4422 0.5078 0.4644 0.1045 0.3323 0.4601 0.5310 Piopal 0.4328 0.0200 0.4768 0.4622 0.5078 0.4644 0.1045 0.3323 0.4661 0.5310	Victor Chandler 0.5338 0.0503 0.5010 0.5445 0.5744 100c Singher 0.514 0.0205 0.4826 0.5112 0.5233 1045 Rogal 0.514 0.0205 0.4826 0.5112 0.5243 1045
d) Price Stakes e) Price PhL f.) Price Batio	Fada 0.4594 0.0238 0.4737 0.4688 0.5703 0.4692 0.1046 0.3333 0.4688 0.5390 Ber365 0.4865 0.0224 0.4680 0.4670 0.5065 0.4642 0.1047 0.3519 0.4678 0.5300 Expipert 0.4512 0.0246 0.4730 0.4616 0.4555 0.4664 0.1053 0.3333 0.4701 0.5454	Fada 0.5548 0.0224 0.5000 0.5128 0.5283 105x Bw185 0.5066 0.0229 0.4878 0.5015 0.5283 104x Cargbet 0.5310 0.5210 0.5283 104x
2009/10 Breakdown a) Handicap Stakes b) Handicap PM.	NBet 0.4910 0.0202 0.4756 0.4804 0.5039 0.4647 0.1049 0.3225 0.4673 0.5381 Marsion 0.4907 0.0244 0.4738 0.4872 0.5077 0.4646 0.322 0.4681 0.5381 Shar 0.4966 0.025 0.4756 0.4670 0.5041 0.4553 0.033 0.4681 0.5381	10Bet 0.5061 0.0208 0.4902 0.5025 0.5981 103x Mancion 0.5045 0.0248 0.4694 0.5010 0.5218 103x 35tur 0.516 0.0252 0.4992 0.5578 0.5291 104x
 c) Handicap Ratio d) Price Stakes a) Price Phil 	Yongli 0.4911 0.0226 0.4730 0.4184 0.5078 0.4648 0.0550 0.3325 0.4661 0.5313 Socket 0.4977 0.028 0.4652 0.4172 0.5058 0.4644 0.0146 0.3323 0.4610 0.5381 IBIERee 0.4494 0.025 0.4787 0.4547 0.0147 0.4647 0.0147 0.3323 0.4613 0.5350	Yongli 0.503 0.0248 0.4902 0.5078 0.5263 1045: Sobotet 0.5015 0.0217 0.4431 0.5010 0.5158 1035: BC/Dec 0.004 0.4944 0.5000 0.5158 1035:
f Price Ratio	Hengeing 0.4995 0.0233 0.4730 0.4884 0.5078 0.4686 0.1049 0.3921 0.4679 0.5383 A53388 0.4952 0.0221 0.4731 0.4872 0.5731 0.4680 0.1043 0.3945 0.4691 0.5387 All International 0.4940 0.0222 0.4731 0.4472 0.5077	Hengsing 0.5090 0.0251 0.4902 0.5051 0.5283 1045c A53389 0.5565 0.0241 0.4654 0.5025 0.5246 1055 All International 0.5773 0.0213 0.470 0.5101 0.5256 1055
a) Season (8409 b) Season (840	SE1888 0.4366 0.0213 0.4744 0.4672 0.5077 0.4644 0.1045 0.3323 0.4683 0.5380 Virises 0.4379 0.0222 0.4591 0.4552 0.5052 0.4638 0.1044 0.3323 0.4668 0.5372 0.4590 0.0249 0.4599 0.4520 0.5072 0.4536 0.1044 0.3323 0.4668 0.5372	SE9988 0.5043 0.0215 0.4078 0.5000 0.5216 100% Viside 0.5055 0.0242 0.4078 0.5000 0.5218 104% distributed 0.5060 0.0225 0.4275 0.5705 105%
E Conclusion	Yong/Gao 0.4320 0.0270 0.4741 0.4197 0.5078 0.4641 0.1045 0.3325 0.4679 0.5310 Nikebet 0.4655 0.0233 0.4652 0.4646 0.5056 0.4628 0.1052 0.3833 0.4674 0.5364 CTDex	YongliGao 0.5003 0.0216 0.4926 0.5076 0.5243 104% Nikebet 0.5012 0.0222 0.4431 0.4975 0.5981 103%
	Virgine 0.491 0.0221 0.4744 0.4996 0.5077 0.4445 0.1044 0.3329 0.4636 0.5333 PrinacleSports 0.499 0.0227 0.4718 0.4472 0.5077 0.4453 0.1042 0.3328 0.4617 0.5333 PrinacleSports 0.499 0.0227 0.4718 0.4472 0.5077 0.4453 0.1042 0.3330 0.4617 0.5333	Vingie 0.5075 0.0222 0.4078 0.5016 0.5236 1001 Pinack/Sports 0.5056 0.0222 0.4074 0.5016 0.5236 1001 Pinack/Sports 0.5056 0.0222 0.4074 0.5025 0.5236 1001 Pinack/Sports 0.5056 0.0222 0.4074 0.5025 0.5236 1001
	Sample Outcol Outcol<	Stepset 0.0594 0.0224 0.4876 0.5004 0.0224 0.4876 0.5004 0.5288 1005 12Bet 0.5043 0.0240 0.4894 0.5000 0.5288 1005
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	Average 0.4909 0.0233 0.4723 0.4983 0.50688 0.4665 0.052 0.3928 0.4683 0.5390	Average 0.512 0/24 0.491 0/5/3 0/52/2)
	Under Vin Bookmakers EM Model	Under Vin probability = 1/ (Under Price + 1) Under Vin
	Mesan Sid Dev 25% Median 75% Mesan Sid 50% Macao-Siot 0.5167 0.023 0.5501 0.5210 0.5514 0.5120 0.5514 0.5120 0.5514 0.5120 0.5514 0.5120 0.5514 0.5120 0.5514 0.5120 0.5514 0.5120 0.5125	Company Mean Std Dev 25x Median 75x Masur-Siot 0.540 0.024 0.528 0.5056 Laterokes 0.5280 0.0284 0.5339 0.5195
	Wiotor Chandler 0.5010 0.0427 0.4621 0.5000 0.5312 0.5312 0.1310 0.4510 0.5100 0.6205 Singbet 0.5072 0.0200 0.4822 0.5078 0.522 0.5356 0.0455 0.4620 0.5310 0.6077 Rogal 0.5072 0.0200 0.4822 0.5078 0.5225 0.5356 0.4045 0.4620 0.5310 0.6077	Viotor Chandler 0.54/5 0.04/10 0.50/0 0.54/4 0.57/0 Singlet 0.52/2 0.21/2 0.51/0 0.52/6 0.54/6 Royal 0.52/2 0.21/2 0.51/0 0.54/6 0.54/0
	Fada 0.5988 0.0218 0.4687 0.5122 0.52631 0.5548 0.0046 0.4630 0.5312 0.5667 Ber305 0.5195 0.0224 0.4695 0.5130 0.5230 0.5568 0.0447 0.4500 0.5312 0.6067 Ber305 0.5195 0.0224 0.4695 0.5130 0.5230 0.5568 0.0447 0.4620 0.5322 0.6001 Europhet 0.5109 0.0244 0.4695 0.5135 0.5270 0.5314 0.9569 0.0167	Fada 0.5238 0.0244 0.5758 0.5756 Bw1205 0.5305 0.5238 0.5789 0.5444 Exerpter 0.5511 0.0273 0.5261 0.5784
	Hiller 0.0582 0.022 0.4981 0.0518 0.5244 0.5353 0.0449 0.4639 0.5321 0.6075 Mansion 0.5083 0.0244 0.4523 0.5128 0.5212 0.5552 0.0149 0.4639 0.5219 0.6078 JSNa 0.5094 0.0269 0.4596 0.5101 0.5215 0.5147 0.0149 0.4611 0.5191 0.0069	NBet 0.5251 0.6214 0.5162 0.5263 0.5465 Manxion 0.5277 0.0254 0.5051 0.5263 0.5465 Strat 0.5313 0.0265 0.5162 0.5535 0.5545
	Yongi 0.5089 0.0226 0.4822 0.518 0.5270 0.5352 0.0506 0.4617 0.5379 0.6075 Stocket 0.552 0.0216 0.4814 0.5128 0.5316 0.5576 0.0146 0.4520 0.5316 0.5576 0.0147 0.5320 0.0017 IBCRM 0.5196 0.0255 0.5526 0.5576 0.0147 0.4520 0.5377 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520 0.5077 0.0147 0.4520	Yongli 0.5217 0.0240 0.5102 0.5231 0.5464 Stobet 0.5257 0.0232 0.5102 0.5250 0.5464 BICBer 0.5242 0.0248 0.5510 0.5253 0.5459
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	Yongtiliso 0.5100 0.021 0.4422 0.510 0.525 0.014 0.4620 0.521 0.0175 Mikeber 0.5135 0.0233 0.4974 0.5154 0.5318 0.5372 0.4052 0.4620 0.5322 0.6107	Oragilian 0.0210 0.0210 0.0310 0.4814 0.444 Matexet 0.5231 0.0213 0.5142 0.5464
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	Average 0.5091 0.0233 0.4912 0.5117 0.5277 0.5349 0.1052 0.4610 0.5317 0.6074	Average 0.5292 0.0253 0.5097 0.5005 0.5484

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* \mathcal{E} 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 decat 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.



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

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



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 2008/09 and 2009/10.

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a) Teason 0800 b) Teason 0800	This spreadsheet toot the efficie Fitsely, pet the English soccer in HomePhole - (KangPrine - 1)/ J	eneg of Azian Han høtshes døta, then HomePrice + Awa	Sinap odde pr rompile odds (Price + 2)	rices of 28 be b price bases	ookmakars vi Son DM mode AvaajPe	th a scientifi L and follow ob + (Home	t befing strø by apply Dirc Price + t) / (H	eggbared i e&Coles IB omePrice -	n sEM moo Comodel si Avcap ^o sice -	H (Espectati implyplaced Z)	on Malinia Nets on onl	urice) 5 often "CM	model10	ookmakar)	n teo n	4 96																		
2 Detributions a) Handcop Status b) Handcop Fist a) Handcop Fist a) Handcop Fist	Total returns in Season 2	*****																																
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2005/00 Dreak.down	130 90550 120 2057	BCC54 BCC82 20180 34592	1005.24 1024.30 305.33	1032.76 KH	90.30 EV2.4 14.00 990.0 65.72 367.5	5 K025.08	2010.11 20 1006.10 275.06	HK 0 51	5.50 999. 175 201	0 102.75 0 34.35	102134	201135 2 990.32 36132	002.00	02008 20 992.44 10 394.47 20	08.23 899 28.43 50 27.75 30	ALGA 2110 (4.63 111 (2.68 30)	KI6 995	70 999.0 30 200.0	02929	2080.30 990.82 361.32	101152 H	2500 10 2500 10	60.43 800 76.75 35	6.00 89999 6.04 89999 0.16 89999	600% 600%	8505 8505	911.20 377.54	MAR.	AAA 806	1 1007 1 1007	6 8585.	658A	67.0.A. 67.0.A. 67.0.A.	244
K)Handicap PRL k)Handicap Platio	1.30 FB.39 1.43 53.22	123,20 128,50 52,52 44,26	122.52 \$1.26	\$28.34 T \$2.60 T	88.80 196.0 \$2.09 45.0	6 122.N 51.31	127.06 48.43	128.98 E	1.76 TBJ 148 282	12 11.41 15 50.77	128.47 \$1.29	1674 2824	\$2.08 \$2.08	127.25 11 52.22	05.38 12 47.1 0	12.87 13 50.35 40	181 183 157 383	58 TK.8 25 28.2	125.71 47.42	16.74 29.24	\$2.78 45.60	\$2.N %	8.38 10 47.8 5	8.47 809/5 8.28 809/5	856% 856%	85915. 85915.	53.47	MAR I	AAX 856	A 85617	BASK.	BTAX.	87.8.1 8 87.8.1 8	PAA PAA
d)Pice States e)Pice Pic	150 %.0 160 3.79	9.02 9.2	20.20	5.30	236 127	5 5.05	5.91	105	6.10 9. 5.90 6.1	41 9.47 XI 6.82	17.81 5.87	6.30	5.35	500	506 1	1L09 1 1L25 1	2.0 9.	41 9.4	1 N.17 5.90	6.80	6.30	5.05	506 I	52.8 866A 5.97 866A	856/A 856/A	856% 856%	7.29	MAR.	NAX 856	4 8167 4 8167	#14X	MAR.	enax e	PAA
2005/0 Dredidown	180 8.00	2.62 2.62	0.80	0.30	030 00	E E C E	E.OB	1.00	1.00 0.0	0 0.00	0.80	0.30	0.00	0.00	6.08	LOB I	100 0.	00 0.0	0.00	0.80	0.30	0.00	000	00 8045	85655	85015	0.00	MAR I	AAA #56	1. B10/2	#141A	8533	#14.1 ·	244
6)Handcop PbL e)Handcop Parlo	2.30 8.00 2.30 8.00	0.00 0.00	0.80	0.30	030 00	0 E.08 E.08	E.CO	8.00 8.00	1.00 0.1	0 0.80	0.80	0.30	0.00	608	6.08 6.08	LOB I	100 8.0	00 0.0	0.00	0.80	0.30	0.00	608	608 856A	856VA 856VA	8561A 8561A	0.00	MAR I	AAR 856	A 8557	t BTAR	BTAX. BTAX	BAA B	FAX FAX
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a) Season (fr)	Total betting states place	ed in Season 2	****																															_
S/Search town	(EMOden =Prob) Slot	#2 Chandle	Singlet 1	Rogal Fa	1997 200	Easplet	108H M	nino 28 0 28	W Yong	i Sacder	IBCBH	2 Al	\$3388 w	error Ser	2008	CHE ALLER CHE	t 10 75 77	Alkebe	STSBet	Yingke 1	Sports SA	agbo 108	Bet 128	et Bris	#0	HI	HGC H	mei B	neiair Inna AAA BAA	tor SNAN	repools	James 1	United C	oral PAA
	130 1972 129 297	1017 1024 269 270	1026 294	NQ7 299	NIS NO 271 28	2 1033 8 371	WD 377	1010 276	808 X0 258 2	4 1006 71 222	N(8) 282	\$005 225	890 256	1007 278	162N 208	896 1 175	833 10 377 3	62 100 72 2	1032 282	N085 221	\$009 290	1003 279	1024 208	11 H 804/5 293 804/5	856% 856%	8561A	205	MAR I	AAX 856	A 8541	BASK.	BTAX. BTAX	BAA B	788. 888.
	1.00 122 1.40 43	10 12 40 4	20 47	47	2 4 4	43	41	00	122	2 E E	5	15 34	22	45	4	47	50 5	5 1	1 10	15 34	8	22	4	41 806/A	8561A 8561A	#56% #56%	40	MAR.	NAX 956	14 81419 14 81419 14 81419	1 8143. 8143.	618.K.	614A	7.8.A. 6.8.A.
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	130 - 45.40	-6.06 -22.9 -7.70 -20.6	-440	5.76	482 -278 6032 -219 7278 -200	-9445	-6.51	-2.90	0.41 -4.3	a 5.40 6.70	534 1015	48	-7.8	-1253	402	4.07 -4	104 -41	20 43	421	4.0	282	400	457 f	AV469 102.2	8567A	8567A	-22.61	MAR.	AAA 856	V. 1547 V. 1547 V. 1547	MAR.	814.K. 814.K.	614A	
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	230 8.00 230 8.00	0.00 0.00 0.00 0.00	0.80	0.80	030 00	E 08	E.08 E.08	8.00 8.00	1.00 0.0	0 0.80	0.80	0.30	030	608 608	E08 E08	LOB I	L00 8.0	00 0.0	0.80	0.80	0.30	030	608 608	008 85955 008 85955	859/5 859/5 859/5	850%. 850%	0.80	MAR I	AAX 856 AAX 856	10 85010 10 85010	BASK BASK	853X	BAA B	7.8.5. 17.8.5.
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Above figure shows a staking breakdown on every single edge on Asian Handicap odds price without vigorish of total soccer matches in season 2008/09.

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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.

Research AH (OddsProb)



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



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.

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Above figure shows a staking breakdown on every single edge on Goal Line odds price without vigorish of total soccer matches in season 2008/09.



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)



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.

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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, somemore 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 model¹⁴ 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

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 $^{^{14}\}mathrm{Refer}$ to Testing Inefficiency of Sports-Book makers by Kelly Model

- Author Profile: ®yo, Eng Lian Hu
- GitHub: Source Code
- Additional session information

[1] "2016-05-05 21:21:34 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
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"

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 Ladbrokes¹⁵ 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 Scibrokes¹⁶ 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 Ryo 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 (Ryo 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.

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.

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- I tried to convert the xlxs 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 (R)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

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

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