England to Win the World Cup!

A Quantitative Guide to the 2010 World Cup

- Quant Models are mathematical methods built to efficiently screen and identify stocks.
- They are based on information and data (analyst upgrades, valuation metrics etc) proven to help predict stock returns.
- Having developed a rather successful Quant Model over the years, we intend to introduce it to our readers and also use its methodology to apply it to a fruitful field for statistics: Football and the World Cup.
- In this Model, we focus on market prices, FIFA Ranking, historical results, our J.P. Morgan Team Strength Indicator etc to come up with a mathematical model built to predict match results.
- Ultimately our Model indicates Brazil as being the strongest team taking part in the tournament. However, due to the fixture schedule our Model predicts the following final outcome:

  - 3rd: **Netherlands**

  - 2nd: **Spain**

  - World Cup Winners: **England**

- Alternatively, we point out that the 3 favourite teams (from market prices recorded on 30 April of 3.9-to-1 for Spain, 5-to-1 for Brazil and 5.4-to-1 for England) represent a 52.5% probability of winning the World Cup.

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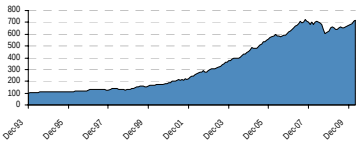
Table 1: World Cup Model "Score"

	Model Score		Model Score
Brazil	1.68	United States	0.01
Spain	1.53	Uruguay	-0.06
England	0.91	Slovakia	-0.13
Netherlands	0.63	Cameroon	-0.18
Argentina	0.48	Australia	-0.27
Slovenia	0.47	Ghana	-0.29
France	0.47	Nigeria	-0.29
Italy	0.43	Switzerland	-0.37
Ivory Coast	0.35	Denmark	-0.52
Portugal	0.30	Paraguay	-0.55
Chile	0.24	Honduras	-0.63
Germany	0.13	Korea Republic	-0.76
Algeria	0.12	New Zealand	-0.81
Serbia	0.03	South Africa	-0.92
Greece	0.03	Japan	-0.96
Mexico	0.02	Korea DPR	-1.11

Source: www.tip-ex.com, fifa.com, J.P. Morgan

Figure 1: J.P. Morgan Cazenove Multi-Factor Quant Model: Long-only vs MSCI World



Source: MSCI, IBES, Factset, J.P. Morgan

Whilst this report should be taken with a pinch of salt, we find it an interesting exercise and an ideal opportunity to lightheartedly explain Quantitative techniques and demystify the typical Quant framework.

See page 67 for analyst certification and important disclosures, including non-US analyst disclosures.

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Introduction

As the big kick-off approaches, we present a Quantitative Guide to the World Cup!

With many investors overwhelmed or instantly turned off by the mere mention of the word 'Quant', we intend to present a simple Quant methodology applied to a field outside of finance: sports and football in general.

Our goal is indeed to highlight potential World Cup winners by applying Quantitative/mathematical methodology traditionally used with balance-sheet, valuations and consensus information to data from the football world.

To do so, we focus on data including:

- probabilities to win from a range of bookmakers and exchanges
- official FIFA World Rankings
- results from previous World Cup tournaments and qualifying competitions
- etc

Quantitative framework to identify possible World Cup winner!

Our goal is to construct a **mathematical Model**[1]**,** similar to ones used by the Quant community to pick up stocks, and run the resulting numbers through a World Cup 'wall chart'.

We then identify who will win the World Cup according to this Quantitative framework.

Handy reference guide to fixtures, prices and rankings

As a handy reference guide, we also provide fixtures and trends in both probabilities to win and FIFA World Rankings for all countries.

Whilst this report should be taken with a pinch of salt, we find it an interesting exercise and an ideal opportunity to lightheartedly present some simple Quantitative techniques within an easy to understand and topical framework.

[1] Also known as "Multi-Factor Quant Model".

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Methodology

What is Quant?

Quantitative Analysis **("Quant") is an investment methodology based on data and mathematical formula to identify Long/Short trading opportunities**.

While to some, Quant sounds overwhelming complex and overly scientific (even 'black box'), it is simply a way of putting together different efficient elements of information.

Typically, those elements of information are valuation metrics, price trends, analyst opinion, quality of the balance-sheet etc (all information which is generally used – consciously or unconsciously – by more fundamental investors when making investment decisions).

In practice, Quants tend to use 4 types of information in their mathematical models:

1. Valuation metrics
2. Market and Analyst sentiment
3. Company fundamentals
4. Price trends

Like most Quants, we have over the years created a "Quant Model" integrating those different sources of information.

This is simply a **mathematical Model** which relies on data and market statistics to produce Long and Short trading ideas.

With this Model being relatively successful[1], and as the sporting field being highly numerical (match scores, win/loss ratios, probability to win etc being available), we decided to translate our Model into the football field focusing primarily on the World Cup.

[1] **See Appendix for the backtesting results**.

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What information is our mathematical Model using?

As previously mentioned, we have over the years developed a rather successful Quant Model.

This mathematical model relies on the following information:

Figure 2: J.P. Morgan Cazenove Quant stock-picking Model[1]

VALUATION METRICS	MARKET & ANALYST SENTIMENT
- PE vs the market - PE vs the sector - Forecast growth	- Recent change in analyst sentiment - Recent change in analyst growth expectations - Recent change in analyst recommendations
COMPANY FUNDAMENTALS	**PRICE TREND**
- ROE - Company Risk	- Long term trend - Short term trend

Source: J.P. Morgan

Running through statistics we consider make sense in the sporting world, we decided to "translate" this Model into a football-specific Model. We do so as follows using the below statistics:

Figure 3: J.P. Morgan Cazenove Quant world cup-picking Model

"VALUATION" METRICS	"MARKET & ANALYST" SENTIMENT
- "Market" Valuations - FIFA World Ranking	- Result Expectations - Recent Team Shape
"COMPANY FUNDAMENTALS"	**PRICE TREND**
- Consistency in Market Sentiment - J.P. Morgan Success Ratio Indicator	- Trend in probability to win - Trend in FIFA's Ranking

Source: J.P. Morgan

[1] See "The New & Improved Q-Snapshot" (September 2008) for more info.

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Our "Valuation" metrics

Quant Models often use Valuation metrics as a source of information.

They intuitively make sense as investors do indeed care about valuations and use valuation metrics to differentiate between stocks.

Backtesting numbers also prove it is worth taking valuations into consideration when making investment decisions (ie, cheap stocks have a tendency to outperform expensive stocks in the long run).

Typically Quant Models use Price to Book, PE, Price-to-sales etc.

When we created our World Cup Model we decided to focus on **FIFA World Ranking** and "**Market" Valuations**.

FIFA World Ranking

World Ranking Points

One could consider that the official FIFA World Ranking[1] points as a reasonable "Valuation" metric.

This calculation identifies successful countries and takes into account:

FIFA already uses a simple Quantitative model to calculate World Ranking Points

1. Match Result: Win/Lose/Draw
2. Match Status: Friendly/Qualifier/World Cup
3. Opposition Strength: (200 - latest ranking position)/100, subject to a minimum value of 0.5.
4. Regional Strength: The average of the regional/confederation 'strength' of the 2 teams.
5. Assessment Period: Results over the past 4 years are included. More recent results are assigned a higher weighting in the calculation.

In fact, the methodology used by FIFA to assign World Ranking Points is a simple Quantitative model in itself.

[1] http://www.fifa.com/worldfootball/ranking/

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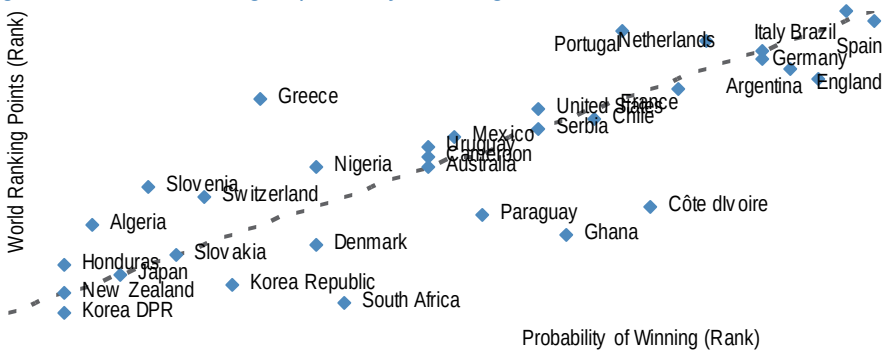
Table 2: FIFA World Ranking

Country	FIFA Ranking Points	FIFA Rank	Country	FIFA Ranking Points	FIFA Rank
Brazil	1611	1	Nigeria	883	20
Spain	1565	2	Australia	883	20
Portugal	1249	3	Slovenia	860	23
Netherlands	1221	4	Switzerland	854	26
Italy	1184	5	Ivory Coast	846	27
Germany	1107	6	Paraguay	822	30
Argentina	1084	7	Algeria	821	31
England	1068	8	Ghana	802	32
France	1044	10	Denmark	767	35
Greece	968	12	Slovakia	742	38
United States	950	14	Honduras	727	40
Chile	948	15	Japan	674	45
Serbia	944	16	Korea Republic	619	47
Mexico	936	17	New Zealand	413	78
Uruguay	902	18	South Africa	369	90
Cameroon	887	19	Korea DPR	292	106

Source: fifa.com (as of 30 April 2010)

The chart below however shows that there are a couple of divergences worth noting while looking at the FIFA ranking and the probability of winning.

Figure 4: FIFA World Ranking vs. probability of winning



Source: fifa.com, tip-ex, J.P. Morgan

Top countries according FIFA World Ranking:

Brazil, Spain, Netherlands, Portugal

As the chart points out, **Portugal**, **Netherlands** and **Greece** offer a disagreement with high FIFA World Ranking and low indicated probability to win the World Cup.

England, **Argentina** and **Ivory Coast** also offer disagreement with a low World Ranking and an indicated high probability of winning.

According to the FIFA World Ranking Factor, Brazil, Spain Netherlands and Portugal are most likely to win the World Cup.

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"Market" Valuations

Probability of winning the World Cup

Probability =1 / (Market Price)

For our second "Valuation metric", we decided to focus on "**Market" Valuations** as expressed by a country's probability of winning the World Cup.

Those are calculated from the underlying odds offered by exchanges and fixed odds bookmakers (i.e. the market price)[1] as a valuation metric.

Table 3: "Market" Valuations ("win only" market)

	Market Price (Probability)	Exchange (Probability)	Market Price	Exchange
Spain	20.2%	19.2%	4.9 to 1	5.2 to 1
Brazil	16.7%	16.1%	6.0 to 1	6.2 to 1
England	15.6%	13.8%	6.4 to 1	7.3 to 1
Argentina	10.6%	9.5%	9.4 to 1	10.5 to 1
Italy	7.5%	6.5%	13.4 to 1	15.5 to 1
Germany	7.0%	6.5%	14.2 to 1	15.5 to 1
Netherlands	7.0%	5.9%	14.2 to 1	17.0 to 1
France	5.9%	5.0%	17.0 to 1	20.0 to 1
Portugal	4.1%	2.9%	24.4 to 1	34.0 to 1
Ivory Coast	3.5%	3.1%	28.4 to 1	32.0 to 1
Chile	2.1%	1.3%	48.2 to 1	75 to 1
Paraguay	2.0%	1.0%	50 to 1	100 to 1
Serbia	1.6%	1.2%	64 to 1	85 to 1
Ghana	1.3%	1.3%	75 to 1	80 to 1
Mexico	1.3%	0.9%	75 to 1	110 to 1
United States	1.3%	1.2%	75 to 1	85 to 1
Cameroon	1.1%	0.7%	93 to 1	140 to 1
Uruguay	1.1%	0.7%	94 to 1	140 to 1
Nigeria	1.0%	0.6%	97 to 1	170 to 1
Denmark	1.0%	0.6%	104 to 1	170 to 1
Australia	0.9%	0.7%	116 to 1	140 to 1
Greece	0.9%	0.4%	117 to 1	240 to 1
South Africa	0.8%	0.7%	126 to 1	150 to 1
Switzerland	0.6%	0.4%	181 to 1	280 to 1
Japan	0.5%	0.2%	201 to 1	510 to 1
Slovakia	0.5%	0.3%	211 to 1	390 to 1
Korea Republic	0.5%	0.4%	221 to 1	275 to 1
Slovenia	0.5%	0.2%	221 to 1	483 to 1
Algeria	0.2%	0.2%	414 to 1	570 to 1
Honduras	0.2%	0.1%	621 to 1	1,000 to 1
Korea DPR	0.1%	0.1%	1,201 to 1	1,000 to 1
New Zealand	0.1%	0.1%	1,901 to 1	1,000 to 1

Source: www.tip-ex.com, J.P. Morgan (as of 30 April 2010)

[1] From www.tip-ex.com, decimal prices using Betfair for exchange prices and the average from a list of 5 fixed odds bookmakers.

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Top countries according to the "Market" Valuation Factor:

Spain, Brazil, England, Argentina

Regardless of whether we look at probabilities from traditional market makers or betting exchanges, we (unsurprisingly) find the countries ordered in a similar manner with only a couple of countries appearing out of sync on the 2 lists.

According to "Market" Valuations Factor: Spain, Brazil, England and Argentina are the most likely to win the World Cup.

Our "Price Trend" metrics

Prices reflect information in the market and provide an opinion in terms of investors' preference towards a stock.

Backtesting numbers also prove that while in disagreement with the efficient market theory, price trends provide important information about future stock performance (stocks trending up having a tendency to outperform stocks trending down in the long run).

Typically Quant Models use 12 months Price Trend, 1 month Price Trend, RSI, technical indicators, etc

Using the World Cup data we have compiled, there are a few ways in which we can replicate these Price Trends.

We came up with 2 Factors for Price Trend: **Trend in Probability to Win** and **Trend in FIFA's Ranking**.

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Trend in Probability to Win

Change in Probability of Winning

To discover which country's probability of winning has increased/decreased the most over a given time period, we can look at a simple change in the market price/probability of a country winning the World Cup.

We calculate the probabilities at a given point in time by taking the average probability from a range of market makers[1].

Consequently, we calculate the **Trend in Probability to Win** for 3 and 6 month durations.

Top countries according to Trend in Probability to Win:

Slovenia, France, Ivory Coast, Greece

Table 4: Trend in Probability to Win[2]

	6mth Trend in Probability to Win	3mth Trend in Probability to Win
Slovenia	53%	-10%
France	25%	-11%
Ivory Coast	20%	-7%
Greece	16%	-11%
Uruguay	15%	0%
Spain	12%	6%
Argentina	9%	21%
England	6%	-6%
United States	5%	4%
Italy	5%	-8%
Nigeria	3%	-13%
Cameroon	2%	-8%
Mexico	1%	4%
Korea Republic	1%	0%
Chile	-3%	-12%
Ghana	-7%	0%
Brazil	-8%	-2%
Netherlands	-8%	1%
Slovakia	-11%	-6%
Honduras	-15%	-10%
Germany	-18%	-5%
South Africa	-19%	3%
Paraguay	-19%	-20%
Serbia	-19%	6%
Switzerland	-20%	-10%
Portugal	-22%	7%
Australia	-22%	-5%
Denmark	-23%	-12%
Japan	-30%	-10%
Korea DPR	-	-5%
Algeria	-	-9%
New Zealand	-	-26%

Source: www.Tip-Ex.com, J.P. Morgan (as of 30 April 2010)

[1] Information kindly provided by www.tip-ex.com
[2] 6 month history of odds was not available for Korea DPR, Algeria and New Zealand.

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According to the Trend in Probability to Win Factor: Slovenia, France[1], Ivory Coast and Greece are the most attractive options, having received the greatest increase in probability over the past 6 months.

Trend in FIFA's Ranking

Change in FIFA's World Ranking Points

Top countries according to the Trend in FIFA's ranking:

Algeria, Slovenia, Serbia, Slovakia

To a similar extent, we can calculate trend in the FIFA World Ranking points over a given period – our **Trend in FIFA's Ranking** metric.

We display each of the 12, 6 and 3 month Factors in the table below but decided to focus on the (longer term) 12 month trend in FIFA's Ranking (as investors would do with regards to Price Momentum).

Table 5: Trend in FIFA's Ranking

	12mth Chg FIFA Ranking	6mth Chg FIFA Ranking	3mth Chg FIFA Ranking		12mth Chg FIFA Ranking	6mth Chg FIFA Ranking	3mth Chg FIFA Ranking
Algeria	64%	5%	0%	United States	6%	-7%	-3%
Slovenia	63%	30%	12%	France	4%	0%	-7%
Serbia	33%	6%	3%	Switzerland	3%	-11%	-8%
Slovakia	30%	-2%	-1%	Korea	0%	-8%	-1%
Chile	28%	4%	1%	England	-1%	-3%	-1%
Brazil	28%	-1%	3%	Cameroon	-1%	-7%	-14%
Portugal	22%	20%	6%	New Zealand	-3%	8%	3%
Australia	22%	4%	2%	Japan	-5%	-8%	-5%
Ivory Coast	20%	-6%	-9%	Spain	-6%	-4%	-4%
Mexico	19%	4%	1%	Netherlands	-7%	-9%	-5%
Nigeria	13%	16%	4%	Italy	-8%	-3%	-2%
Greece	12%	5%	-5%	Paraguay	-9%	-6%	2%
Ghana	12%	8%	7%	Korea DPR	-10%	-19%	-22%
Denmark	9%	-8%	-6%	Argentina	-11%	-2%	0%
Uruguay	8%	8%	-1%	Germany	-19%	-5%	-6%
Honduras	8%	-4%	-1%	South Africa	-21%	-3%	-2%

Source: fifa.com, J.P. Morgan (as of 30 April 2010)

According to the Trend in FIFA's Ranking, Algeria, Slovenia, Serbia and Slovakia have the biggest change in World Ranking Points and should be preferred.

[1] For France, It should be noted that a significant amount of this momentum is associated with price changes around their Play-Off fixture vs. Ireland (18 November 2009) which may lead to some exaggeration.

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Our "Market and Analyst Sentiment" metrics

Quant Models often use "sentiment" based information. "Sentiment" metrics are based on translations of investor reaction to market events (like earnings announcement change in dividend policies) and change in analyst expectations about a company.

There is indeed a strong behavioural argument for investors to follow or invest in stocks on which consensus displays strong opinion or on which analysts have recently changed their recommendations, their growth forecasts etc.

Backtesting tests also prove that, amongst other things, over the long run stocks which got recently upgraded by consensus (and/or highly ranked analysts) outperform stocks which got downgraded.

When we created our World Cup Model we decided to focus on country's **Result Expectations** and on our **Recent Team Shape**.

Result Expectations

Result expectations from a team's track record in past World Cups

As an approach to calculating World Cup "expectations", we developed a simple scoring technique to reward countries based purely on their historical World Cup track record as it helps greatly to understand a country's result "expectations".

We call this metric the country's **Result Expectations.** This metric could be associated in the Quant space to "Historical past growth".

For each historical World Cup played, 50 points are therefore assigned to the winner, 25 to the runner up, 15 to 3rd place and 10 to 4th place.

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Top countries according to Result Expectations Factor:

Brazil, Germany, Italy, Argentina

Table 6: Result Expectations

	Top 4 Finish	Result Expectation	Price		Top 4 Finish	Result Expectation	Price
Brazil	10	340	6.0	Mexico	0	0	75
Germany	11	305	14.2	Ghana	0	0	75
Italy	8	275	13.4	Cameroon	0	0	93
Argentina	3	125	9.4	Nigeria	0	0	97
France	5	115	17.0	Denmark	0	0	104
Uruguay	3	70	94	Australia	0	0	116
England	2	60	6.4	Greece	0	0	117
Netherlands	3	60	14.2	South Africa	0	0	126
Portugal	2	25	24.4	Switzerland	0	0	181
Chile	1	15	48.2	Japan	0	0	201
Spain	1	10	4.9	Slovakia	0	0	211
Korea Republic	1	10	221	Slovenia	0	0	221
Ivory Coast	0	0	28.4	Algeria	0	0	413
Paraguay	0	0	50	Honduras	0	0	621
Serbia	0	0	65	Korea DPR	0	0	1,201
United States	0	0	75	New Zealand	0	0	1,901

Source: J.P. Morgan

Using this methodology we, unsurprisingly, find at the top of the country's Result Expectations metric the likes of Brazil, Germany, Italy and Argentina.

Recent Team Shape

Average Ranking Points won per match

Top countries according to Recent Team Shape Factor:

Netherlands, Spain, Brazil, Portugal

To incorporate recent form and shape (what could be associated with "Recent Growth"), we use the **Recent Team Shape** metrics.

This is calculated by taking the average FIFA World Ranking points earned over a given time period.

We provide the data for the last 3, 6 and 12 month period but focus on the team "shape" over the 12 months.

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Table 7: Recent Team shape

	12mth Recent Team Shape	6mth Recent Team Shape	3mth Recent Team Shape		12mth Recent Team Shape	6mth Recent Team Shape	3mth Recent Team Shape
Netherlands	1,121	1,283	0	Denmark	646	483	600
Spain	1,039	846	866	United States	646	658	1,014
Brazil	894	777	184	Algeria	626	601	546
Portugal	859	936	999	Mexico	618	857	516
Chile	811	676	1,169	Uruguay	592	631	665
Slovakia	794	743	619	New Zealand	592	592	592
England	779	790	465	Paraguay	566	1,188	1,103
Serbia	752	597	656	Ghana	563	329	159
Italy	747	844	673	Argentina	528	520	1,040
Switzerland	734	715	543	Slovenia	520	635	518
Côte dIvoire	731	577	204	Nigeria	477	562	682
France	729	618	759	Honduras	470	532	370
Greece	702	630	875	Japan	446	0	0
Germany	690	689	906	Korea DPR	422	0	0
Cameroon	689	956	854	Korea Republic	411	0	0
Australia	662	0	0	South Africa	0	0	0

Source: fifa.com, J.P. Morgan (as of 31 December 2009)

We only include World Cup qualifying and World Cup Finals results in this calculation as opposed to all international fixtures used in the official FIFA rankings.

As there have been no World Cup fixtures in 2010, we take this data from 31 December 2009.

According to 12 month Recent Team Shape[1], Netherlands, Spain, Brazil and Portugal are the preferred countries[2].

[1] With South Africa not having played a qualifying fixture over the past 12 months, Korea Republic, Korea DPR, Japan and Honduras rank the worst on Recent Form, although again shorting/laying these countries has little profit margin.
[2] Interestingly, **Argentina** scores poorly on this metric, implying that they have recently fared poorly against stronger opposition.

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Our "Fundamentals" metrics

Lastly, we wanted to mention that Equity Quant Models indeed often use Fundamentals/Balance Sheet as source of information.

We are all aware that fundamentals do matter and can help greatly in separating sound companies from riskier counterparties.

Backtesting numbers also prove that metrics like ROE, ROA, leverage etc are worth taking in consideration when making investment decisions ("better" stocks outperforming less good expensive stocks over the long run).

When we created our World Cup Model we decided to focus on **Consistency in Market Sentiment** and on our **"J.P. Morgan Cazenove Success Ratio" Indicator**.

Consistency in Market Sentiment

Agreement within the "market" on the probability of a team winning.

Using "market" information and prices, the **Consistency in Market Sentiment** metric aims to look at the uniformity of probability offered across a range of "probability to win" providers[1] .

This ensures that we reward *both* a high probability of winning and a high level of agreement between probability providers.

Our metric is calculated as:

Average(Probability of Winning) / (Max(Probability of Winning)-Min(Probability of Winning))

[1] Using 5 fixed odd bookmakers (from www.tip-ex.com)

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Whilst this may not provide us with any concrete information as to who may win the World Cup (although it can be argued that if "price providers" are in agreement on the favorites' probability to win then one can be more confident that the country will progress in the tournament) it will provide us with an idea as to where potential issues and opportunities exist.

This also gives us confidence in the country probability and the lack of surprise at play.

Top countries according to Consistency in Market Sentiment:

Brazil, England, Spain, Ivory Coast

Table 8: Consistency in Market Sentiment

	Consistency in Market Sentiment	Latest Odds		Consistency in Market Sentiment	Latest Odds
Brazil	33.33	6.0	Portugal	3.2	24.4
England	13.80	6.4	Italy	3.0	13.4
Spain	9.20	4.9	South Africa	2.5	126
Ivory Coast	8.87	28.4	Uruguay	2.3	94
Argentina	8.59	9.4	Chile	2.2	48
Germany	6.87	14.2	Japan	1.9	201
Ghana	5.39	75	Korea Republic	1.9	221
United States	5.39	75	Slovakia	1.9	211
Mexico	5.19	75	Greece	1.5	117
Nigeria	4.84	97	Denmark	1.4	104
Cameroon	4.45	93	Paraguay	1.4	50
Australia	4.24	116	Slovenia	1.4	221
France	4.13	17	Algeria	1.3	413
Netherlands	3.94	14.2	Honduras	1.0	621
Switzerland	3.42	181	New Zealand	1.0	1,901
Serbia	3.39	64	Korea DPR	0.8	1,201

Source: tip-ex, J.P. Morgan (30 April 2010)

According to the Consistency in Market Sentiment Factor we can be most confident that Brazil, England, Spain and Ivory Coast provide less risk in terms of result surprise and that they are correctly priced[1].

[1] It is interesting to note that Brazil, England and Spain account for 52.5% of total probability of winning the World Cup, also constituting the top 3 positions according to the above "Consistency in Market Sentiment" Factor. One can conclude that it would be a surprise if one of these nations were to *not* win the World Cup.

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J.P. Morgan Cazenove Success Ratio Indicator

Win Ratio adjusted for opponent's strength

A likened translation of company fundamentals is to check the strength of a country's Win Ratio by scaling for the strength of the opponent played.

This metric could be associated to the "strength of a balance-sheet" Factor.

The ratio is calculated by computing the Win Ratio (ie proportion of wins from the total number of games played) and scaling it by the FIFA World Ranking (ie higher for a strong team and small for a weak team).

Below we present the Win Ratio of team over various periods (table 9).

Those numbers are then adjusted according to opponent's strength as displayed next page on Table 10).

Table 9: Win Ratio

	12mth Win Ratio	6mth Win Ratio	3mth Win Ratio		12mth Win Ratio	6mth Win Ratio	3mth Win Ratio
Netherlands	100% (5)	100% (1)	0% (0)	Brazil	63% (8)	50% (4)	0% (2)
Spain	100% (6)	100% (4)	100% (2)	Australia	60% (5)	0% (0)	0% (0)
England	83% (6)	67% (3)	50% (2)	Mexico	60% (10)	80% (5)	50% (2)
Germany	83% (6)	75% (4)	50% (2)	Slovenia	57% (7)	80% (5)	67% (3)
Ivory Coast	80% (5)	50% (2)	0% (1)	Denmark	57% (7)	25% (4)	50% (2)
Portugal	75% (8)	83% (6)	100% (4)	Argentina	50% (8)	50% (4)	100% (2)
Algeria	71% (7)	75% (4)	67% (3)	Greece	50% (8)	50% (6)	75% (4)
Cameroon	67% (6)	100% (4)	100% (2)	Honduras	50% (10)	60% (5)	50% (2)
Ghana	67% (6)	33% (3)	0% (2)	New Zealand	50% (2)	50% (2)	50% (2)
Italy	67% (6)	75% (4)	50% (2)	Nigeria	50% (6)	67% (3)	100% (2)
Serbia	67% (6)	33% (3)	50% (2)	Paraguay	43% (7)	100% (3)	100% (1)
Slovakia	67% (6)	50% (4)	50% (2)	Uruguay	40% (10)	50% (6)	50% (4)
France	67% (9)	57% (7)	75% (4)	Japan	40% (5)	0% (0)	0% (0)
Switzerland	67% (6)	50% (4)	50% (2)	Korea DPR	40% (5)	0% (0)	0% (0)
United States	67% (9)	75% (4)	100% (1)	Korea Republic	40% (5)	0% (0)	0% (0)
Chile	63% (8)	50% (4)	100% (2)	South Africa	0% (0)	0% (0)	0% (0)

Source: fifa.com, J.P. Morgan (31 December 2009 - number of games played in brackets)

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Success Ratio= Win Ratio x Average Opposition Strength

Top countries according to Success Ratio:

Netherlands, Spain, Chile, Brazil

Table 10: J.P. Morgan Cazenove Success Ratio Indicator

	Success Ratio		Success Ratio
Netherlands	586.2	Switzerland	375.2
Spain	536.3	Germany	363.9
Chile	503.7	Cameroon	356.4
Brazil	481.6	Honduras	342.5
England	464.9	Greece	341.6
Serbia	430.4	Uruguay	335.5
Portugal	423.3	Australia	331.0
United States	419.6	Denmark	329.1
Slovakia	412.0	Ghana	324.9
Argentina	402.9	Slovenia	317.6
Paraguay	395.2	New Zealand	262.0
Algeria	395.1	Japan	245.3
Mexico	387.8	Nigeria	233.8
Ivory Coast	385.6	Korea DPR	192.1
France	382.5	Korea Republic	172.0
Italy	380.2	South Africa	0.0

Source: fifa.com, J.P. Morgan

According to our J.P. Morgan Cazenove Success Ratio Indicator, Netherlands, Spain, Chile and Brazil should be preferred[1].

Having defined the underlying metrics, we next merge them into our mathematical ("Multi-Factor Quant Model") framework.

The methodology is explained in detail in the following section.

[1] It is also worth noting that the following have the lowest number of defeats over the last 12 months: Japan, Korea DPR, United States, Slovenia, Uruguay, Mexico, Honduras, Paraguay, Argentina

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Creating a World Cup Quant Model

No World Cup analysis would be complete without a traditional World Cup 'wall chart'!

Having defined the relevant metrics and criteria identifying potential World Cup winners, we decided to create an appropriate weighting scheme and mathematical formula to generate our match result predictions.

In the following section we therefore create our simple Quant Model and illustrate how the resulting scores can be used to calculate individual match outcomes and ultimately result in a World Cup winner.

Quant Model creation

As the below table illustrates, we allocate different weights to the various metrics we use.

Figure 5: World Cup Multi Factor Model

"VALUATION" METRICS -- 40%		"MARKET & ANALYST" SENTIMENT -- 15%	
- "Market" Valuations	-- *50%*	- Result Expectations	-- *33%*
- FIFA World Ranking	-- *50%*	- Recent Team Shape	-- *67%*
"COMPANY FUNDAMENTALS" -- 15%		**PRICE TREND -- 30%**	
- Consistency in Market Sentiment	-- *50%*	- Trend in probability to win	-- *50%*
- J.P. Morgan Success Ratio Indicator	-- *50%*	- Trend in FIFA's Ranking	-- *50%*

Source: J.P. Morgan

Whilst the weights of the underlying Factors were decided arbitrarily, we argue that they are indicative of the importance of each of the underlying datasets (similar to what Quant managers would do with Quant Factors).

With "Market" Valuations and FIFA World Ranking clearly being the driving metrics in identifying the strongest candidates, we assign them a significant proportion (20%) of the Model weight.

We also see the change in these 2 metrics (ie their "Momentum") as strong indicators. We therefore allocate these favourable weights with the Model.

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Ranking produced by our World Cup Model

The metrics presented below, once aggregated following the methodology presented in appendix II[1], culminate in a single score for each country. This "score" helps us understand match scores and winners.

The table below ranks the teams according to the overall score generated by our mathematical Model.

Top countries according to World Cup Model

Brazil, Spain, England, Netherlands

Table 11: World Cup Model

	Model Score	Groups (from 1 to 8)		Model Score	Groups (from 1 to 8)
Brazil	1.68	8	United States	0.01	4
Spain	1.53	8	Uruguay	-0.06	4
England	0.91	8	Slovakia	-0.13	4
Netherlands	0.63	8	Cameroon	-0.18	4
Argentina	0.48	7	Australia	-0.27	3
Slovenia	0.47	7	Ghana	-0.29	3
France	0.47	7	Nigeria	-0.29	3
Italy	0.43	7	Switzerland	-0.37	3
Ivory Coast	0.35	6	Denmark	-0.52	2
Portugal	0.30	6	Paraguay	-0.55	2
Chile	0.24	6	Honduras	-0.63	2
Germany	0.13	6	Korea Republic	-0.76	2
Algeria	0.12	5	New Zealand	-0.81	1
Serbia	0.03	5	South Africa	-0.92	1
Greece	0.03	5	Japan	-0.96	1
Mexico	0.02	5	Korea DPR	-1.11	1

Source: tip-ex.com, fifa.com, J.P. Morgan

According to this Model, Brazil is the strongest team in the World Cup competition!

How to deal with draws and penalty shoot-outs?

However, it is a (more than distinct) possibility that matches will result in a draw during the World Cup. Using just the above model scores, this would be an impossibility.

Consequently, we also allocated the different countries into groups (or "performance buckets" from 1 to 8) that we will use as our primarily source of country ranking.

[1] See Appendix II: "Z-Score Normalization – Getting Technical !"

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We can then run the Model through each of the 64 scheduled fixtures assigning win, lose or draw to each match depending on the Group the country is in.

In the case of a drawn match in the knockout phase, we decided to introduce a methodology defining a "**Scoring Ability**" and a "**Goalkeeper Ability**".

As a penalty shoot-out introduces a further level of uncertainty, we decided not only to focus on the ability of a team to score goals; we also focused on the goalkeeper's ability to stop them.

We therefore create a **Penalty Shoot-out metric** that we calculate as follows:

Figure 6: "Penalty Shoot-out" metric: combining "Ability to Score" with "Goalkeeper Ability"

$$\left(\frac{\text{Nbr of goals scored}}{\text{Nbr of games played}} * 50\%\right) - \left(\frac{\text{Nbr of goals conceded}}{\text{Nbr of games played}} * 50\%\right)$$

Source: J.P. Morgan

As the table below shows England have an impressive score on our "Penalty Shoot-out" metric.

Table 12: Penalty Shoot-out metric: combining "Ability to Score" with "Goal-keeper Ability" (from -3 to +3)

	Scoring Ability	Goalkeeper Ability	Penalty Shoot Out Metric		Scoring Ability	Goalkeeper Ability	Penalty Shoot Out Metric
England	3.00	0.30	1.65	Italy	-0.04	-0.10	-0.07
Spain	1.88	0.69	1.29	Japan	-0.34	0.13	-0.11
Netherlands	0.58	1.68	1.13	Ghana	-0.30	0.04	-0.13
Germany	1.49	0.69	1.09	Switzerland	-0.04	-0.49	-0.27
Ivory Coast	1.04	0.51	0.78	Slovakia	0.73	-1.28	-0.28
Cameroon	0.18	1.35	0.77	Korea DPR	-1.99	1.26	-0.36
New Zealand	0.34	0.69	0.52	Algeria	-0.99	0.24	-0.37
Nigeria	-0.30	1.02	0.36	Greece	-0.14	-0.62	-0.38
Australia	-0.89	1.54	0.33	France	-0.30	-0.62	-0.46
Portugal	-0.46	1.02	0.28	Mexico	0.34	-1.28	-0.47
United States	1.02	-0.59	0.22	Honduras	-0.08	-1.28	-0.68
Slovenia	-0.18	0.51	0.17	Paraguay	-0.79	-0.59	-0.69
Brazil	0.02	0.25	0.14	Uruguay	-0.62	-1.48	-1.05
Denmark	-0.42	0.69	0.13	Chile	-0.08	-2.16	-1.12
Serbia	0.73	-0.49	0.12	South Africa	-1.90	-0.62	-1.26
Korea	-0.48	0.69	0.11	Argentina	-1.04	-1.72	-1.38

Source: J.P. Morgan

We can then populate our World Cup 'wall chart'!

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The World Cup Wall Chart

Figure 7: Group Phase

Jun 11, 2010	14:00	South Africa		W	Mexico	Johannesburg - JSC
Jun 11, 2010	18:30	Uruguay		W	France	Cape Town
Jun 12, 2010	14:00	Argentina	W		Nigeria	Johannesburg - JEP
Jun 12, 2010	11:30	Korea Republic		W	Greece	Nelson Mandela Bay
Jun 12, 2010	18:30	England	W		USA	Rustenburg
Jun 13, 2010	11:30	Algeria		W	Slovenia	Polokwane
Jun 13, 2010	18:30	Germany	W		Australia	Durban
Jun 13, 2010	14:00	Serbia	W		Ghana	Tshwane/Pretoria
Jun 14, 2010	11:30	Netherlands	W		Denmark	Johannesburg - JSC
Jun 14, 2010	14:00	Japan		W	Cameroon	Mangaung / Bloemfontein
Jun 14, 2010	18:30	Italy	W		Paraguay	Cape Town
Jun 15, 2010	11:30	New Zealand		W	Slovakia	Rustenburg
Jun 15, 2010	14:00	Côte d'Ivoire	D	D	Portugal	Nelson Mandela Bay
Jun 15, 2010	18:30	Brazil	W		Korea DPR	Johannesburg - JEP
Jun 16, 2010	11:30	Honduras		W	Chile	Nelspruit
Jun 16, 2010	14:00	Spain	W		Switzerland	Durban
Jun 16, 2010	18:30	South Africa		W	Uruguay	Tshwane/Pretoria
Jun 17, 2010	18:30	France	W		Mexico	Polokwane
Jun 17, 2010	14:00	Greece	W		Nigeria	Mangaung / Bloemfontein
Jun 17, 2010	11:30	Argentina	W		Korea Republic	Johannesburg - JSC
Jun 18, 2010	11:30	Germany	W		Serbia	Nelson Mandela Bay
Jun 18, 2010	14:00	Slovenia	W		USA	Johannesburg - JEP
Jun 18, 2010	18:30	England	W		Algeria	Cape Town
Jun 19, 2010	14:00	Ghana	D	D	Australia	Rustenburg
Jun 19, 2010	11:30	Netherlands	W		Japan	Durban
Jun 19, 2010	18:30	Cameroon	W		Denmark	Tshwane/Pretoria
Jun 20, 2010	11:30	Slovakia	W		Paraguay	Mangaung / Bloemfontein
Jun 20, 2010	14:00	Italy	W		New Zealand	Nelspruit
Jun 20, 2010	18:30	Brazil	W		Côte d'Ivoire	Johannesburg - JSC
Jun 21, 2010	11:30	Portugal	W		Korea DPR	Cape Town
Jun 21, 2010	14:00	Chile	W		Switzerland	Nelson Mandela Bay
Jun 21, 2010	18:30	Spain	W		Honduras	Johannesburg - JEP
Jun 22, 2010	14:00	Mexico	W		Uruguay	Rustenburg
Jun 22, 2010	14:00	France	W		South Africa	Mangaung / Bloemfontein
Jun 22, 2010	18:30	Nigeria	W		Korea Republic	Durban
Jun 22, 2010	18:30	Greece		W	Argentina	Polokwane
Jun 23, 2010	14:00	Slovenia		W	England	Nelson Mandela Bay
Jun 23, 2010	14:00	USA		W	Algeria	Tshwane/Pretoria
Jun 23, 2010	18:30	Ghana		W	Germany	Johannesburg - JSC
Jun 23, 2010	18:30	Australia		W	Serbia	Nelspruit
Jun 24, 2010	14:00	Slovakia		W	Italy	Johannesburg - JEP
Jun 24, 2010	14:00	Paraguay	W		New Zealand	Polokwane
Jun 24, 2010	18:30	Denmark	W		Japan	Rustenburg
Jun 24, 2010	18:30	Cameroon		W	Netherlands	Cape Town
Jun 25, 2010	14:00	Portugal		W	Brazil	Durban
Jun 25, 2010	14:00	Korea DPR		W	Côte d'Ivoire	Nelspruit
Jun 25, 2010	18:30	Chile		W	Spain	Tshwane/Pretoria
Jun 25, 2010	18:30	Switzerland	W		Honduras	Mangaung / Bloemfontein

Source: tip-ex, fifa.com, J.P. Morgan (W=Win, D= Draw). Kick Off in London time)

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Figure 8: Knockout Phase

Round of 16						
Jun 26, 2010	14:00	France	W		Greece	Nelson Mandela Bay
Jun 26, 2010	18:30	England	W		Serbia	Rustenburg
Jun 27, 2010	14:00	Germany		W	Slovenia	Mangaung / Bloemfontein
Jun 27, 2010	18:30	Argentina	W		Mexico	Johannesburg
Jun 28, 2010	14:00	Netherlands	W		Slovakia	Durban
Jun 28, 2010	18:30	Brazil	W		Chile	Johannesburg
Jun 29, 2010	14:00	Italy	W		Cameroon	Tshwane/Pretoria
Jun 29, 2010	18:30	Spain	W		Portugal	Cape Town
Quarter Final						
Jul 2, 2010	14:00	Netherlands	W (pen)		Brazil	Nelson Mandela Bay
Jul 2, 2010	18:30	France		W	England	Johannesburg
Jul 3, 2010	14:00	Argentina		W (pen)	Slovenia	Cape Town
Jul 3, 2010	18:30	Italy		W	Spain	Johannesburg
Semi Final						
Jul 6, 2010	18:30	England	W (pen)		Netherlands	Cape Town
Jul 7, 2010	18:30	Slovenia		W	Spain	Durban
3rd Place Play Off						
Jul 10, 2010	18:30	Netherlands	W		Slovenia	Nelson Mandela Bay
Final						
Jul 11, 2010	18:30	England	W (pen)		Spain	Johannesburg

Source: tip-ex, fifa.com, J.P. Morgan (W=Win, D=Draw, W (pen) = Victory via penalties. Kick Off in London time.

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Conclusion

Quant analysis is a practice often considered as “too complex” by a large part of the investment community.

In this document we explained that, on the contrary, Quant is far from complex as Quants merely try to remove human based opinions when they make investment decisions.

Instead they use information and data points they consider relevant to investment in a systematic and efficient manner.

Once they have found data sets thought to exert influence over future returns, they backtest them and make sure they can be used on a day-to-day basis to generate alpha.

As Quants use only numerical/statistical data for their market analysis, it seemed that sound Quant/mathematical Models could be used in fields outside Finance to make accurate predictions.

With the amount of statistical information now available for Football fans, we thought it would be a very fruitful ground for investigation.

We therefore decided to “translate” our successful stock-picking Quant Model and adapt it to predict the outcome of the World Cup matches and ultimately provide the World Cup winner.

As explained in the document, we focused on very intuitive data (comprising recent team performance, FIFA ranking, probability to win etc).

Ultimately, we used our mathematical Model and applied it on a match by match basis and predicted winners.

Whilst our Model points towards Brazil as being the strongest team to take part in the World Cup, our “World Cup Wall Chart” indicates that thanks to the actual fixtures determined by the schedule, we believe England will be the winner of the 2010 World Cup.

We also highlight that the 3 favourites according to both our model and market prices (Brazil, Spain and England) offer a combined probability of 52.5% of winning the World Cup (as per prices on 30 April).

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Appendix I: Fixtures, Prices and Rankings

France

Table 13: Qualifying Results

Date	Home				Away
06-Sep-08	Austria	3	-	1	France
10-Sep-08	France	2	-	1	Serbia
11-Oct-08	Romania	2	-	2	France
28-Mar-09	Lithuania	0	-	1	France
01-Apr-09	France	1	-	0	Lithuania
12-Aug-09	Faroe Islands	0	-	1	France
05-Sep-09	France	1	-	1	Romania
09-Sep-09	Serbia	1	-	1	France
10-Oct-09	France	5	-	0	Faroe Islands
14-Oct-09	France	3	-	1	Austria
14-Nov-09	Republic of Ireland	0	-	1	France
18-Nov-09	France	1	-	1	Republic of Ireland

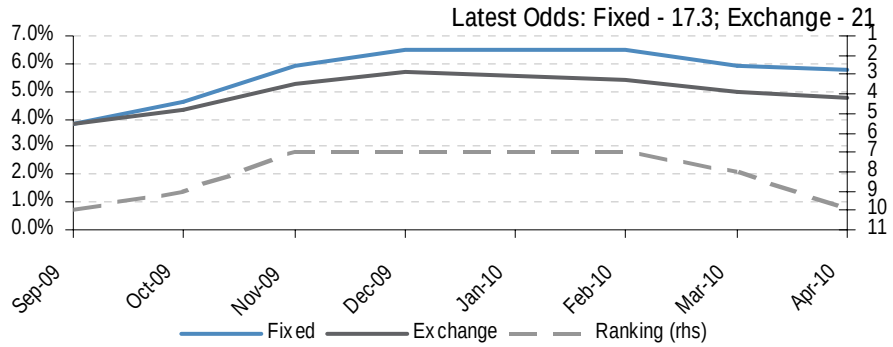
Source: fifa.com, J.P. Morgan

Table 14: World Cup Fixtures – Group A

Date	Time	Home		Away	Model Prediction
Fri Jun 11, 2010	18:30	Uruguay	v	France	France
Thu Jun 17, 2010	18:30	France	v	Mexico	France
Tue Jun 22, 2010	14:00	France	v	South Africa	France

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 9: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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J.P.Morgan

Mexico

Table 15: Qualifying Results

Date	Home				Away
15-Jun-08	Belize	0	-	2	Mexico
21-Jun-08	Mexico	7	-	0	Belize
20-Aug-08	Mexico	2	-	1	Honduras
06-Sep-08	Mexico	3	-	0	Jamaica
10-Sep-08	Mexico	2	-	1	Canada
11-Oct-08	Jamaica	1	-	0	Mexico
15-Oct-08	Canada	2	-	2	Mexico
19-Nov-08	Honduras	1	-	0	Mexico
11-Feb-09	United States	2	-	0	Mexico
28-Mar-09	Mexico	2	-	0	Costa Rica
01-Apr-09	Honduras	3	-	1	Mexico
06-Jun-09	El Salvador	2	-	1	Mexico
10-Jun-09	Mexico	2	-	1	Trinidad and Tobago
12-Aug-09	Mexico	2	-	1	United States
05-Sep-09	Costa Rica	0	-	3	Mexico
09-Sep-09	Mexico	1	-	0	Honduras
10-Oct-09	Mexico	4	-	1	El Salvador
14-Oct-09	Trinidad and Tobago	2	-	2	Mexico

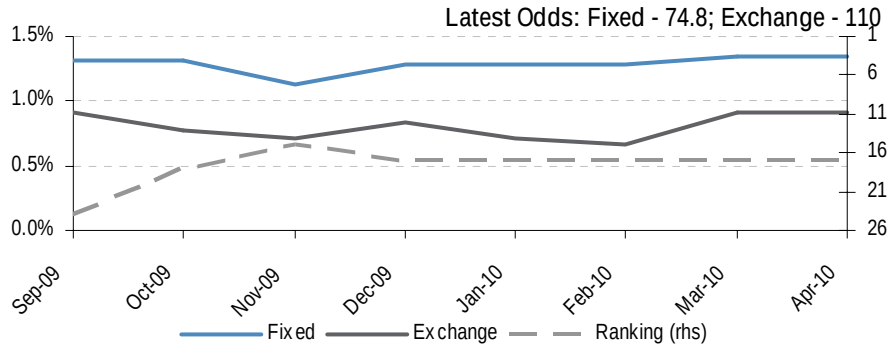
Source: fifa.com, J.P. Morgan

Table 16: World Cup Fixtures – Group A

Date	Time	Home		Away	Model Prediction
Fri Jun 11, 2010	14:00	South Africa	v	Mexico	Mexico
Thu Jun 17, 2010	18:30	France	v	Mexico	France
Tue Jun 22, 2010	14:00	Mexico	v	Uruguay	Mexico

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 10: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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South Africa

Table 17: Qualifying Results

Date	Home				Away
01-Jun-08	Nigeria	2	-	0	South Africa
07-Jun-08	South Africa	4	-	1	Equatorial Guinea
14-Jun-08	Sierra Leone	1	-	0	South Africa
21-Jun-08	South Africa	0	-	0	Sierra Leone
06-Sep-08	South Africa	0	-	1	Nigeria
11-Oct-08	Equatorial Guinea	0	-	1	South Africa

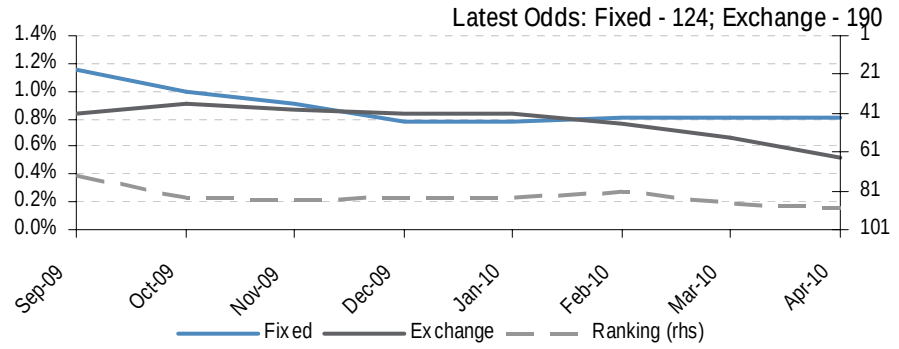
Source: fifa.com, J.P. Morgan

Table 18: World Cup Fixtures – Group A

Date	Time	Home		Away	Model Prediction
Fri Jun 11, 2010	14:00	South Africa	v	Mexico	Mexico
Wed Jun 16, 2010	18:30	South Africa	v	Uruguay	Uruguay
Tue Jun 22, 2010	14:00	France	v	South Africa	France

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 11: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Uruguay

Table 19: Qualifying Results

Date	Home				Away
13-Oct-07	Uruguay	5	-	0	Bolivia
17-Oct-07	Paraguay	1	-	0	Uruguay
18-Nov-07	Uruguay	2	-	2	Chile
21-Nov-07	Brazil	2	-	1	Uruguay
14-Jun-08	Uruguay	1	-	1	Venezuela
17-Jun-08	Uruguay	6	-	0	Peru
06-Sep-08	Colombia	0	-	1	Uruguay
10-Sep-08	Uruguay	0	-	0	Ecuador
11-Oct-08	Argentina	2	-	1	Uruguay
14-Oct-08	Bolivia	2	-	2	Uruguay
28-Mar-09	Uruguay	2	-	0	Paraguay
01-Apr-09	Chile	0	-	0	Uruguay
06-Jun-09	Uruguay	0	-	4	Brazil
10-Jun-09	Venezuela	2	-	2	Uruguay
05-Sep-09	Peru	1	-	0	Uruguay
09-Sep-09	Uruguay	3	-	1	Colombia
10-Oct-09	Ecuador	1	-	2	Uruguay
14-Oct-09	Uruguay	0	-	1	Argentina
14-Nov-09	Costa Rica	0	-	1	Uruguay
18-Nov-09	Uruguay	1	-	1	Costa Rica

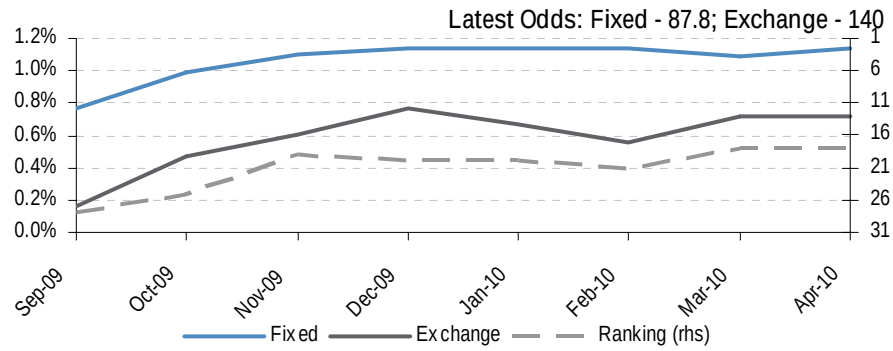
Source: fifa.com, J.P. Morgan

Table 20: World Cup Fixtures – Group A

Date	Time	Home		Away	Model Prediction
Fri Jun 11, 2010	18:30	Uruguay	v	France	France
Wed Jun 16, 2010	18:30	South Africa	v	Uruguay	Uruguay
Tue Jun 22, 2010	14:00	Mexico	v	Uruguay	Mexico

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 12: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Argentina

Table 21: Qualifying Results

Date	Home				Away
13-Oct-07	Argentina	2	-	0	Chile
16-Oct-07	Venezuela	0	-	2	Argentina
17-Nov-07	Argentina	3	-	0	Bolivia
20-Nov-07	Colombia	2	-	1	Argentina
15-Jun-08	Argentina	1	-	1	Ecuador
18-Jun-08	Brazil	0	-	0	Argentina
06-Sep-08	Argentina	1	-	1	Paraguay
10-Sep-08	Peru	1	-	1	Argentina
11-Oct-08	Argentina	2	-	1	Uruguay
15-Oct-08	Chile	1	-	0	Argentina
28-Mar-09	Argentina	4	-	0	Venezuela
01-Apr-09	Bolivia	6	-	1	Argentina
06-Jun-09	Argentina	1	-	0	Colombia
10-Jun-09	Ecuador	2	-	0	Argentina
05-Sep-09	Argentina	1	-	3	Brazil
09-Sep-09	Paraguay	1	-	0	Argentina
10-Oct-09	Argentina	2	-	1	Peru
14-Oct-09	Uruguay	0	-	1	Argentina

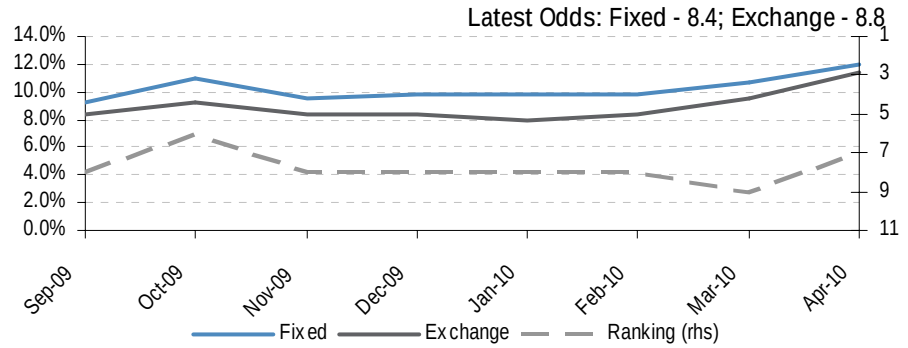
Source: fifa.com, J.P. Morgan

Table 22: World Cup Fixtures – Group B

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	14:00	Argentina	v	Nigeria	Argentina
Thu Jun 17, 2010	11:30	Argentina	v	Korea Republic	Argentina
Tue Jun 22, 2010	18:30	Greece	v	Argentina	Argentina

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 13: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Greece

Table 23: Qualifying Results

Date	Home				Away
06-Sep-08	Luxembourg	0	-	3	Greece
10-Sep-08	Latvia	0	-	2	Greece
11-Oct-08	Greece	3	-	0	Moldova
15-Oct-08	Greece	1	-	2	Switzerland
28-Mar-09	Israel	1	-	1	Greece
01-Apr-09	Greece	2	-	1	Israel
05-Sep-09	Switzerland	2	-	0	Greece
09-Sep-09	Moldova	1	-	1	Greece
10-Oct-09	Greece	5	-	2	Latvia
14-Oct-09	Greece	2	-	1	Luxembourg
14-Nov-09	Greece	0	-	0	Ukraine
18-Nov-09	Ukraine	0	-	1	Greece

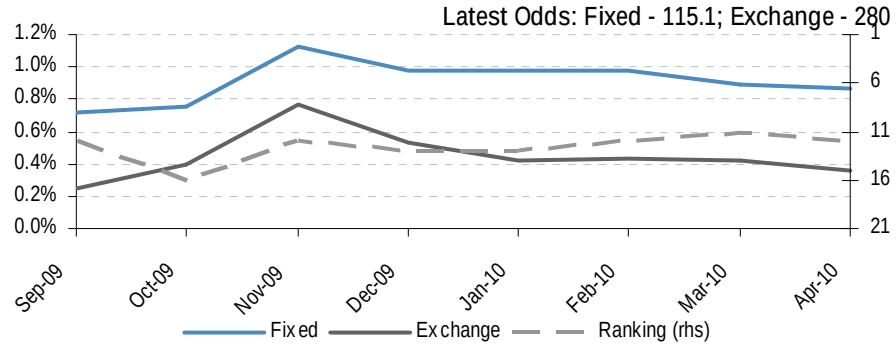
Source: fifa.com, J.P. Morgan

Table 24: World Cup Fixtures – Group B

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	11:30	Korea Republic	v	Greece	Greece
Thu Jun 17, 2010	14:00	Greece	v	Nigeria	Greece
Tue Jun 22, 2010	18:30	Greece	v	Argentina	Argentina

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 14: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Korea Republic

Table 25: Qualifying Results

Date	Home				Away
06-Feb-08	Korea Republic	4	-	0	Turkmenistan
26-Mar-08	Korea DPR	0	-	0	Korea Republic
31-May-08	Korea Republic	2	-	2	Jordan
07-Jun-08	Jordan	0	-	1	Korea Republic
14-Jun-08	Turkmenistan	1	-	3	Korea Republic
22-Jun-08	Korea Republic	0	-	0	Korea DPR
10-Sep-08	Korea DPR	1	-	1	Korea Republic
15-Oct-08	Korea Republic	4	-	1	United Arab Emirates
19-Nov-08	Saudi Arabia	0	-	2	Korea Republic
11-Feb-09	Iran	1	-	1	Korea Republic
01-Apr-09	Korea Republic	1	-	0	Korea DPR
06-Jun-09	United Arab Emirates	0	-	2	Korea Republic
10-Jun-09	Korea Republic	0	-	0	Saudi Arabia
17-Jun-09	Korea Republic	1	-	1	Iran

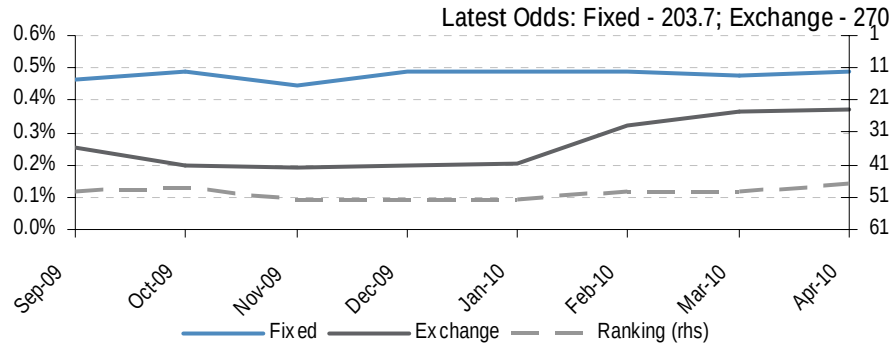
Source: fifa.com, J.P. Morgan

Table 26: World Cup Fixtures – Group B

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	11:30	Korea Republic	v	Greece	Greece
Thu Jun 17, 2010	11:30	Argentina	v	Korea Republic	Argentina
Tue Jun 22, 2010	18:30	Nigeria	v	Korea Republic	Nigeria

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 15: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Nigeria

Table 27: Qualifying Results

Date	Home				Away
01-Jun-08	Nigeria	2	-	0	South Africa
07-Jun-08	Sierra Leone	0	-	1	Nigeria
15-Jun-08	Equatorial Guinea	0	-	1	Nigeria
21-Jun-08	Nigeria	2	-	0	Equatorial Guinea
06-Sep-08	South Africa	0	-	1	Nigeria
11-Oct-08	Nigeria	4	-	1	Sierra Leone
29-Mar-09	Mozambique	0	-	0	Nigeria
07-Jun-09	Nigeria	3	-	0	Kenya
20-Jun-09	Tunisia	0	-	0	Nigeria
06-Sep-09	Nigeria	2	-	2	Tunisia
11-Oct-09	Nigeria	1	-	0	Mozambique
14-Nov-09	Kenya	2	-	3	Nigeria

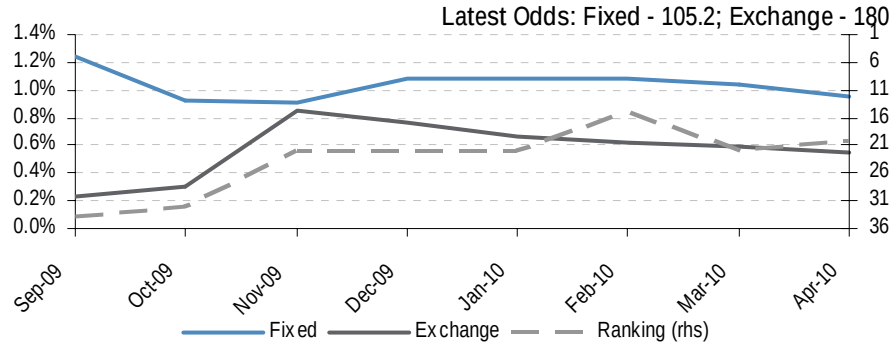
Source: fifa.com, J.P. Morgan

Table 28: World Cup Fixtures – Group B

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	14:00	Argentina	v	Nigeria	Argentina
Thu Jun 17, 2010	14:00	Greece	v	Nigeria	Greece
Tue Jun 22, 2010	18:30	Nigeria	v	Korea Republic	Nigeria

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 16: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Algeria

Table 29: Qualifying Results

Date	Home				Away
31-May-08	Senegal	1	-	0	Algeria
06-Jun-08	Algeria	3	-	0	Liberia
14-Jun-08	Gambia	1	-	0	Algeria
20-Jun-08	Algeria	1	-	0	Gambia
05-Sep-08	Algeria	3	-	2	Senegal
11-Oct-08	Liberia	0	-	0	Algeria
28-Mar-09	Rwanda	0	-	0	Algeria
07-Jun-09	Algeria	3	-	1	Egypt
20-Jun-09	Zambia	0	-	2	Algeria
06-Sep-09	Algeria	1	-	0	Zambia
11-Oct-09	Algeria	3	-	1	Rwanda
14-Nov-09	Egypt	2	-	0	Algeria
18-Nov-09	Algeria	1	-	0	Egypt

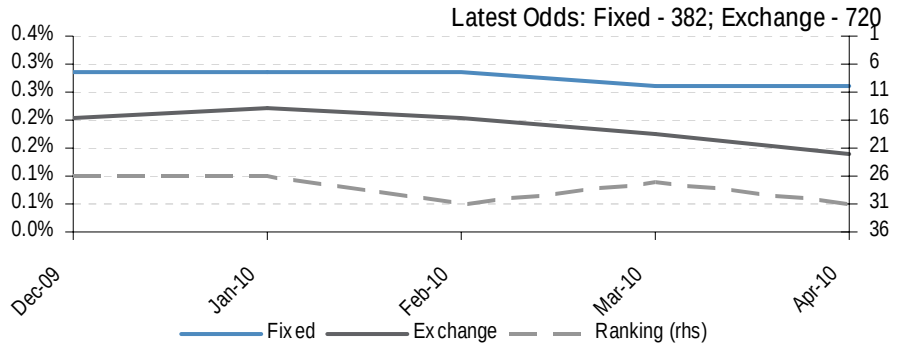
Source: fifa.com, J.P. Morgan

Table 30: World Cup Fixtures – Group C

Date	Time	Home		Away	Model Prediction
Sun Jun 13, 2010	11:30	Algeria	v	Slovenia	Slovenia
Fri Jun 18, 2010	18:30	England	v	Algeria	England
Wed Jun 23, 2010	14:00	USA	v	Algeria	Algeria

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 17: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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England

Table 31: Qualifying Results

Date	Home				Away
06-Sep-08	Andorra	0	-	2	England
10-Sep-08	Croatia	1	-	4	England
11-Oct-08	England	5	-	1	Kazakhstan
15-Oct-08	Belarus	1	-	3	England
01-Apr-09	England	2	-	1	Ukraine
06-Jun-09	Kazakhstan	0	-	4	England
10-Jun-09	England	6	-	0	Andorra
09-Sep-09	England	5	-	1	Croatia
10-Oct-09	Ukraine	1	-	0	England
14-Oct-09	England	3	-	0	Belarus

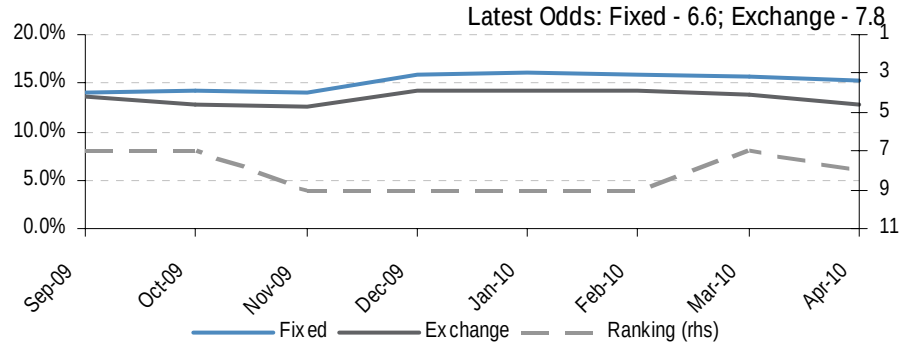
Source: fifa.com, J.P. Morgan

Table 32: World Cup Fixtures – Group C

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	18:30	England	v	USA	England
Fri Jun 18, 2010	18:30	England	v	Algeria	England
Wed Jun 23, 2010	14:00	Slovenia	v	England	England

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 18: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Slovenia

Table 33: Qualifying Results

Date	Home				Away
06-Sep-08	Poland	1	-	1	Slovenia
10-Sep-08	Slovenia	2	-	1	Slovakia
11-Oct-08	Slovenia	2	-	0	Northern Ireland
15-Oct-08	Czech Republic	1	-	0	Slovenia
28-Mar-09	Slovenia	0	-	0	Czech Republic
01-Apr-09	Northern Ireland	1	-	0	Slovenia
12-Aug-09	Slovenia	5	-	0	San Marino
09-Sep-09	Slovenia	3	-	0	Poland
10-Oct-09	Slovakia	0	-	2	Slovenia
14-Oct-09	San Marino	0	-	3	Slovenia
14-Nov-09	Russia	2	-	1	Slovenia

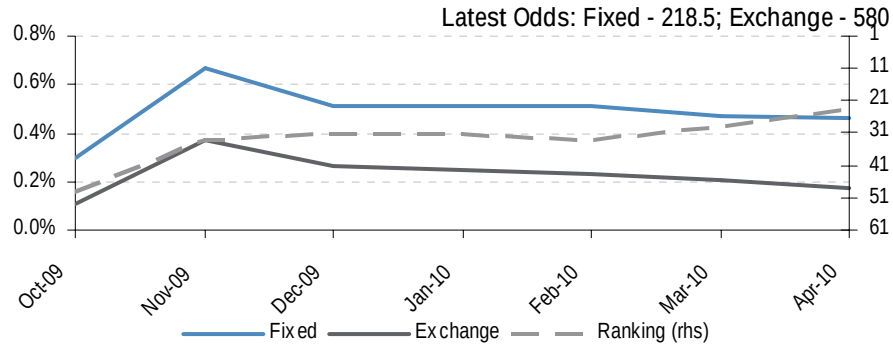
Source: fifa.com, J.P. Morgan

Table 34: World Cup Fixtures – Group C

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	18:30	England	v	USA	England
Fri Jun 18, 2010	14:00	Slovenia	v	USA	Slovenia
Wed Jun 23, 2010	14:00	USA	v	Algeria	Algeria

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 19: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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USA

Table 35: Qualifying Results

Date	Home				Away
15-Jun-08	USA	8	-	0	Barbados
22-Jun-08	Barbados	0	-	1	USA
20-Aug-08	Guatemala	0	-	1	USA
06-Sep-08	Cuba	0	-	1	USA
10-Sep-08	USA	3	-	0	Trinidad and Tobago
11-Oct-08	USA	6	-	1	Cuba
15-Oct-08	Trinidad and Tobago	2	-	1	USA
19-Nov-08	USA	2	-	0	Guatemala
11-Feb-09	USA	2	-	0	Mexico
28-Mar-09	El Salvador	2	-	2	USA
01-Apr-09	USA	3	-	0	Trinidad and Tobago
03-Jun-09	Costa Rica	3	-	1	USA
06-Jun-09	USA	2	-	1	Honduras
12-Aug-09	Mexico	2	-	1	USA
05-Sep-09	USA	2	-	1	El Salvador
09-Sep-09	Trinidad and Tobago	0	-	1	USA
10-Oct-09	Honduras	2	-	3	USA

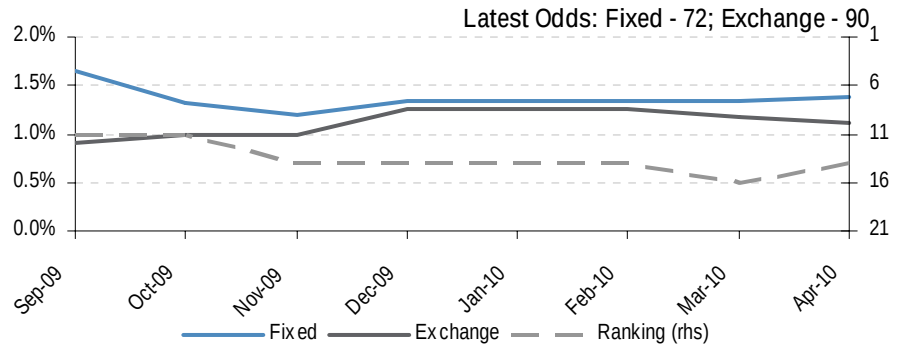
Source: fifa.com, J.P. Morgan

Table 36: World Cup Fixtures – Group C

Date	Time	Home		Away	Model Prediction
Sat Jun 12, 2010	18:30	England	v	USA	England
Fri Jun 18, 2010	14:00	Slovenia	v	USA	Slovenia
Wed Jun 23, 2010	14:00	USA	v	Algeria	Algeria

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 20: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Australia

Table 37: Qualifying Results

Date	Home				Away
06-Feb-08	Australia	3	-	0	Qatar
26-Mar-08	China PR	0	-	0	Australia
01-Jun-08	Australia	1	-	0	Iraq
07-Jun-08	Iraq	1	-	0	Australia
14-Jun-08	Qatar	1	-	3	Australia
22-Jun-08	Australia	0	-	1	China PR
10-Sep-08	Uzbekistan	0	-	1	Australia
15-Oct-08	Australia	4	-	0	Qatar
19-Nov-08	Bahrain	0	-	1	Australia
11-Feb-09	Japan	0	-	0	Australia
01-Apr-09	Australia	2	-	0	Uzbekistan
06-Jun-09	Qatar	0	-	0	Australia
10-Jun-09	Australia	2	-	0	Bahrain
17-Jun-09	Australia	2	-	1	Japan

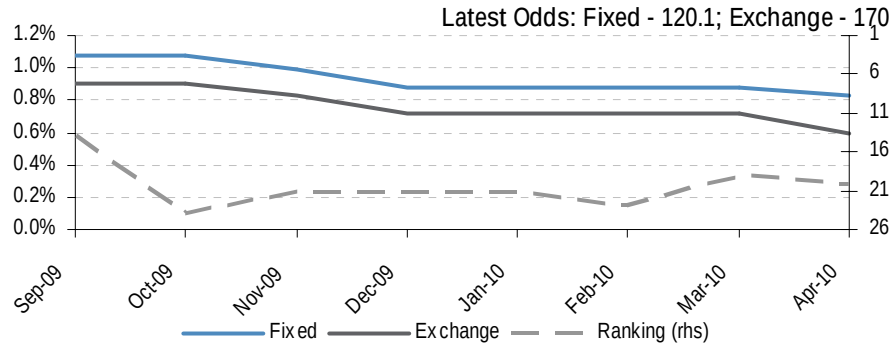
Source: fifa.com, J.P. Morgan

Table 38: World Cup Fixtures – Group D

Date	Time	Home		Away	Model Prediction
Sun Jun 13, 2010	18:30	Germany	v	Australia	Germany
Sat Jun 19, 2010	14:00	Ghana	v	Australia	Draw
Wed Jun 23, 2010	18:30	Australia	v	Serbia	Serbia

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 21: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Germany

Table 39: Qualifying Results

Date	Home				Away
06-Sep-08	Liechtenstein	0	-	6	Germany
10-Sep-08	Finland	3	-	3	Germany
11-Oct-08	Germany	2	-	1	Russia
15-Oct-08	Germany	1	-	0	Wales
28-Mar-09	Germany	4	-	0	Liechtenstein
01-Apr-09	Wales	0	-	2	Germany
12-Aug-09	Azerbaijan	0	-	2	Germany
09-Sep-09	Germany	4	-	0	Azerbaijan
10-Oct-09	Russia	0	-	1	Germany
14-Oct-09	Germany	1	-	1	Finland

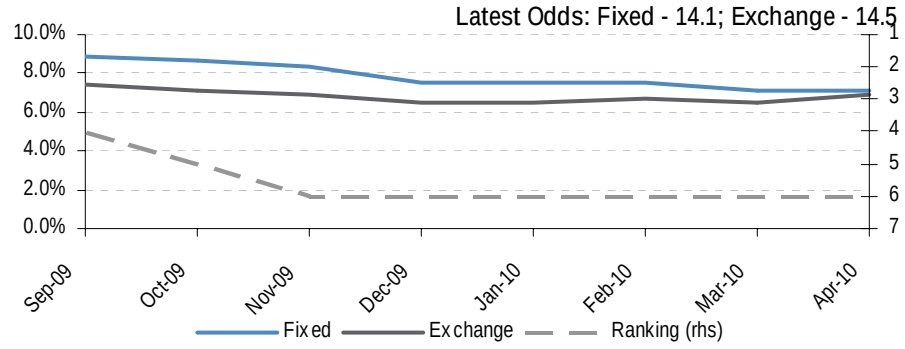
Source: fifa.com, J.P. Morgan

Table 40: World Cup Fixtures – Group D

Date	Time	Home		Away	Model Prediction
Sun Jun 13, 2010	18:30	Germany	v	Australia	Germany
Fri Jun 18, 2010	11:30	Germany	v	Serbia	Germany
Wed Jun 23, 2010	18:30	Ghana	v	Germany	Germany

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 22: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Ghana

Table 41: Qualifying Results

Date	Home				Away
01-Jun-08	Ghana	3	-	0	Libya
08-Jun-08	Lesotho	2	-	3	Ghana
14-Jun-08	Gabon	2	-	0	Ghana
22-Jun-08	Ghana	2	-	0	Gabon
05-Sep-08	Libya	1	-	0	Ghana
11-Oct-08	Ghana	3	-	0	Lesotho
29-Mar-09	Ghana	1	-	0	Benin
07-Jun-09	Mali	0	-	2	Ghana
20-Jun-09	Sudan	0	-	2	Ghana
06-Sep-09	Ghana	2	-	0	Sudan
11-Oct-09	Benin	1	-	0	Ghana
15-Nov-09	Ghana	2	-	2	Mali

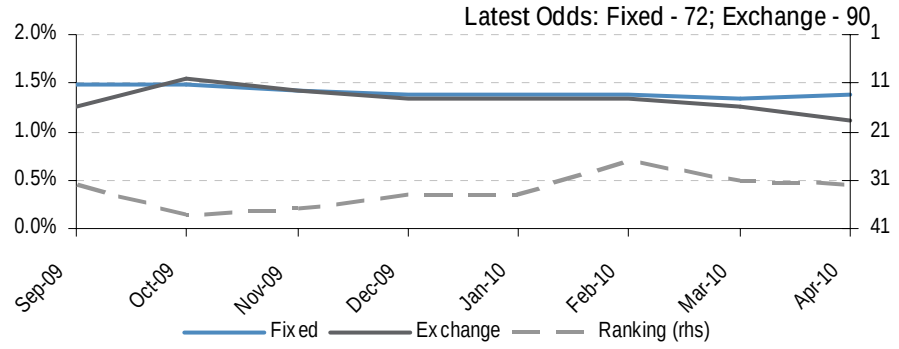
Source: fifa.com, J.P. Morgan

Table 42: World Cup Fixtures – Group D

Date	Time	Home		Away	Model Prediction
Sun Jun 13, 2010	14:00	Serbia	v	Ghana	Serbia
Sat Jun 19, 2010	14:00	Ghana	v	Australia	Draw
Wed Jun 23, 2010	18:30	Ghana	v	Germany	Germany

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 23: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Serbia

Table 43: Qualifying Results

Date	Home				Away
06-Sep-08	Serbia	2	-	0	Faroe Islands
10-Sep-08	France	2	-	1	Serbia
11-Oct-08	Serbia	3	-	0	Lithuania
15-Oct-08	Austria	1	-	3	Serbia
28-Mar-09	Romania	2	-	3	Serbia
06-Jun-09	Serbia	1	-	0	Austria
10-Jun-09	Faroe Islands	0	-	2	Serbia
09-Sep-09	Serbia	1	-	1	France
10-Oct-09	Serbia	5	-	0	Romania
14-Oct-09	Lithuania	2	-	1	Serbia

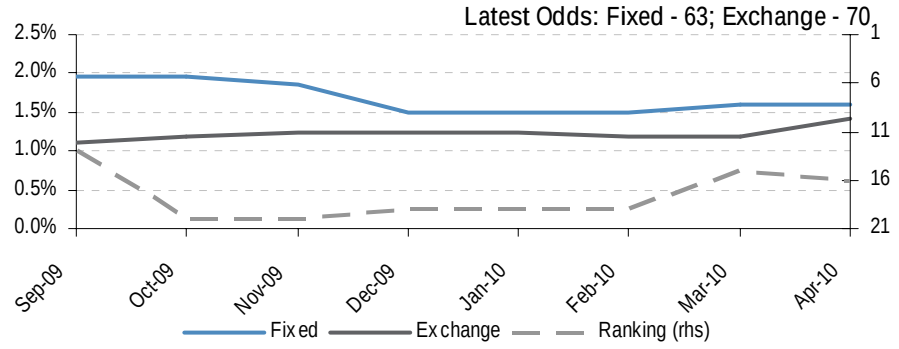
Source: fifa.com, J.P. Morgan

Table 44: World Cup Fixtures – Group D

Date	Time	Home		Away	Model Prediction
Sun Jun 13, 2010	14:00	Serbia	v	Ghana	Serbia
Fri Jun 18, 2010	11:30	Germany	v	Serbia	Germany
Wed Jun 23, 2010	18:30	Australia	v	Serbia	Serbia

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 24: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Cameroon

Table 45: Qualifying Results

Date	Home				Away
31-May-08	Cameroon	2	-	0	Cape Verde Islands
08-Jun-08	Mauritius	0	-	3	Cameroon
14-Jun-08	Tanzania	0	-	0	Cameroon
21-Jun-08	Cameroon	2	-	1	Tanzania
06-Sep-08	Cape Verde Islands	1	-	2	Cameroon
11-Oct-08	Cameroon	5	-	0	Mauritius
28-Mar-09	Togo	1	-	0	Cameroon
07-Jun-09	Cameroon	0	-	0	Morocco
05-Sep-09	Gabon	0	-	2	Cameroon
09-Sep-09	Cameroon	2	-	1	Gabon
10-Oct-09	Cameroon	3	-	0	Togo
14-Nov-09	Morocco	0	-	2	Cameroon

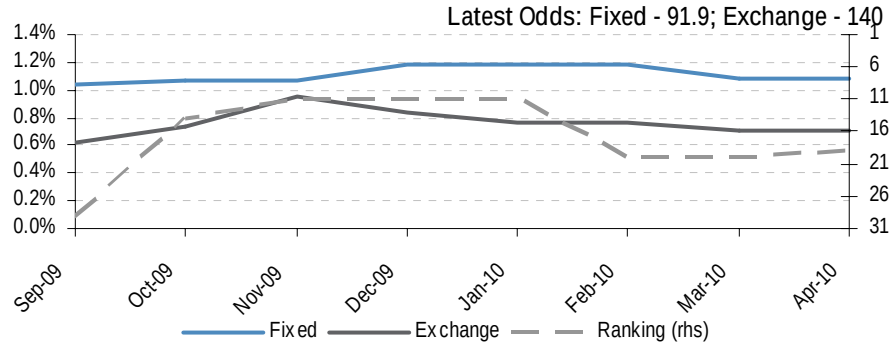
Source: fifa.com, J.P. Morgan

Table 46: World Cup Fixtures – Group E

Date	Time	Home		Away	Model Prediction
Mon Jun 14, 2010	14:00	Japan	v	Cameroon	Cameroon
Sat Jun 19, 2010	18:30	Cameroon	v	Denmark	Cameroon
Thu Jun 24, 2010	18:30	Cameroon	v	Netherlands	Netherlands

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 25: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Denmark

Table 47: Qualifying Results

Date	Home				Away
06-Sep-08	Hungary	0	-	0	Denmark
10-Sep-08	Portugal	2	-	3	Denmark
11-Oct-08	Denmark	3	-	0	Malta
28-Mar-09	Malta	0	-	3	Denmark
01-Apr-09	Denmark	3	-	0	Albania
06-Jun-09	Sweden	0	-	1	Denmark
05-Sep-09	Denmark	1	-	1	Portugal
09-Sep-09	Albania	1	-	1	Denmark
10-Oct-09	Denmark	1	-	0	Sweden
14-Oct-09	Denmark	0	-	1	Hungary

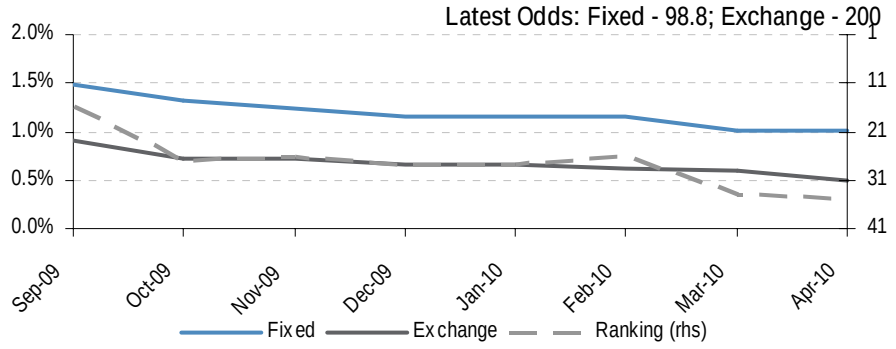
Source: fifa.com, J.P. Morgan

Table 48: World Cup Fixtures – Group E

Date	Time	Home		Away	Model Prediction
Mon Jun 14, 2010	11:30	Netherlands	v	Denmark	Netherlands
Sat Jun 19, 2010	18:30	Cameroon	v	Denmark	Cameroon
Thu Jun 24, 2010	18:30	Denmark	v	Japan	Denmark

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 26: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Japan

Table 49: Qualifying Results

Date	Home				Away
06-Feb-08	Japan	4	-	1	Thailand
26-Mar-08	Bahrain	1	-	0	Japan
02-Jun-08	Japan	3	-	0	Oman
07-Jun-08	Oman	1	-	1	Japan
14-Jun-08	Thailand	0	-	3	Japan
22-Jun-08	Japan	1	-	0	Bahrain
06-Sep-08	Bahrain	2	-	3	Japan
15-Oct-08	Japan	1	-	1	Uzbekistan
19-Nov-08	Qatar	0	-	3	Japan
11-Feb-09	Japan	0	-	0	Australia
28-Mar-09	Japan	1	-	0	Bahrain
06-Jun-09	Uzbekistan	0	-	1	Japan
10-Jun-09	Japan	1	-	1	Qatar
17-Jun-09	Australia	2	-	1	Japan

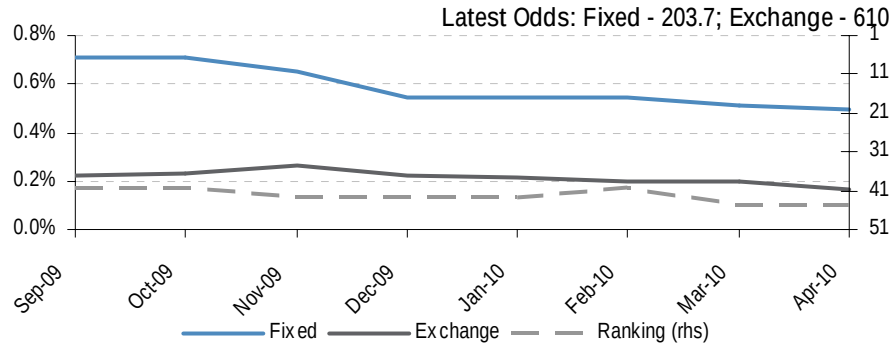
Source: fifa.com, J.P. Morgan

Table 50: World Cup Fixtures – Group E

Date	Time	Home		Away	Model Prediction
Mon Jun 14, 2010	14:00	Japan	v	Cameroon	Cameroon
Sat Jun 19, 2010	11:30	Netherlands	v	Japan	Netherlands
Thu Jun 24, 2010	18:30	Denmark	v	Japan	Denmark

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 27: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Netherlands

Table 51: Qualifying Results

Date	Home				Away
10-Sep-08	FYR Macedonia	1	-	2	Netherlands
11-Oct-08	Netherlands	2	-	0	Iceland
15-Oct-08	Norway	0	-	1	Netherlands
28-Mar-09	Netherlands	3	-	0	Scotland
01-Apr-09	Netherlands	4	-	0	FYR Macedonia
06-Jun-09	Iceland	1	-	2	Netherlands
10-Jun-09	Netherlands	2	-	0	Norway
09-Sep-09	Scotland	0	-	1	Netherlands

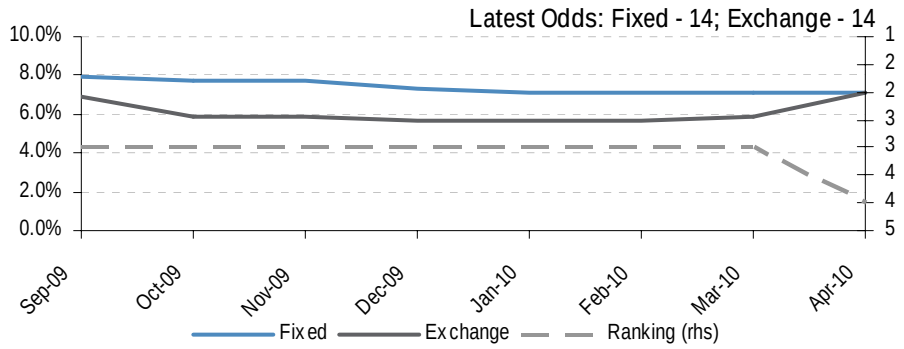
Source: fifa.com, J.P. Morgan

Table 52: World Cup Fixtures – Group E

Date	Time	Home		Away	Model Prediction
Mon Jun 14, 2010	11:30	Netherlands	v	Denmark	Netherlands
Sat Jun 19, 2010	11:30	Netherlands	v	Japan	Netherlands
Thu Jun 24, 2010	18:30	Cameroon	v	Netherlands	Netherlands

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 28: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Italy

Table 53: Qualifying Results

Date	Home				Away
06-Sep-08	Cyprus	1	-	2	Italy
10-Sep-08	Italy	2	-	0	Georgia
11-Oct-08	Bulgaria	0	-	0	Italy
15-Oct-08	Italy	2	-	1	Montenegro
28-Mar-09	Montenegro	0	-	2	Italy
01-Apr-09	Italy	1	-	1	Republic of Ireland
05-Sep-09	Georgia	0	-	2	Italy
09-Sep-09	Italy	2	-	0	Bulgaria
10-Oct-09	Republic of Ireland	2	-	2	Italy
14-Oct-09	Italy	3	-	2	Cyprus

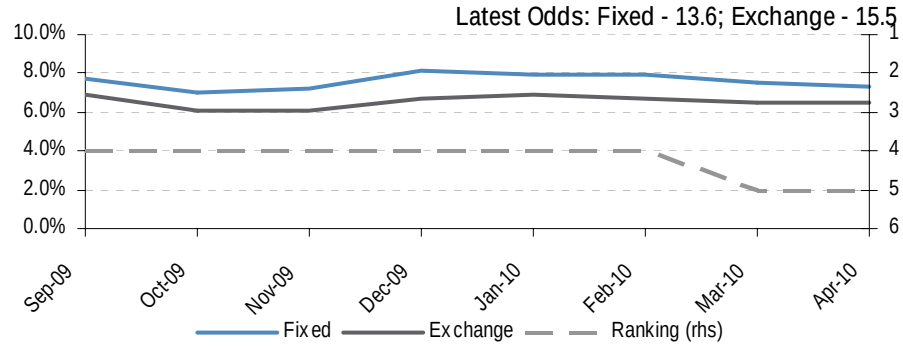
Source: fifa.com, J.P. Morgan

Table 54: World Cup Fixtures – Group F

Date	Time	Home		Away	Model Prediction
Mon Jun 14, 2010	18:30	Italy	v	Paraguay	Italy
Sun Jun 20, 2010	14:00	Italy	v	New Zealand	Italy
Thu Jun 24, 2010	14:00	Slovakia	v	Italy	Italy

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 29: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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New Zealand

Table 55: Qualifying Results

Date	Home				Away
17-Oct-07	Fiji	0	-	2	New Zealand
17-Nov-07	Vanuatu	1	-	2	New Zealand
21-Nov-07	New Zealand	4	-	1	Vanuatu
06-Sep-08	New Caledonia	1	-	3	New Zealand
10-Oct-09	Bahrain	0	-	0	New Zealand
14-Nov-09	New Zealand	1	-	0	Bahrain

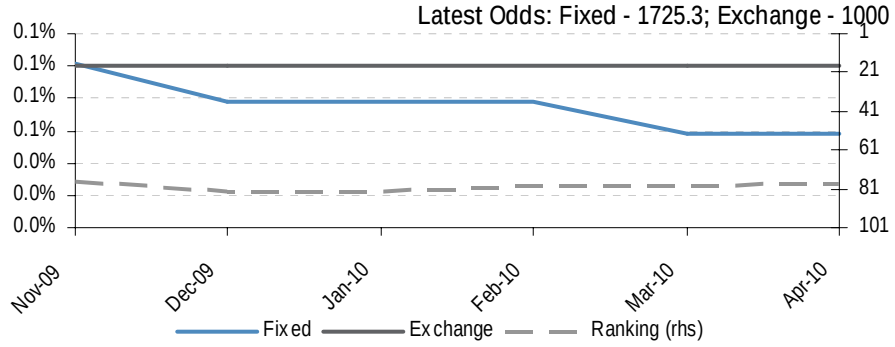
Source: fifa.com, J.P. Morgan

Table 56: World Cup Fixtures – Group F

Date	Time	Home		Away	Model Prediction
Tue Jun 15, 2010	11:30	New Zealand	v	Slovakia	Slovakia
Sun Jun 20, 2010	14:00	Italy	v	New Zealand	Italy
Thu Jun 24, 2010	14:00	Paraguay	v	New Zealand	Paraguay

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 30: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Paraguay

Table 57: Qualifying Results

Date	Home				Away
13-Oct-07	Peru	0	-	0	Paraguay
17-Oct-07	Paraguay	1	-	0	Uruguay
17-Nov-07	Paraguay	5	-	1	Ecuador
21-Nov-07	Chile	0	-	3	Paraguay
15-Jun-08	Paraguay	2	-	0	Brazil
18-Jun-08	Bolivia	4	-	2	Paraguay
06-Sep-08	Argentina	1	-	1	Paraguay
09-Sep-08	Paraguay	2	-	0	Venezuela
11-Oct-08	Colombia	0	-	1	Paraguay
15-Oct-08	Paraguay	1	-	0	Peru
28-Mar-09	Uruguay	2	-	0	Paraguay
01-Apr-09	Ecuador	1	-	1	Paraguay
06-Jun-09	Paraguay	0	-	2	Chile
10-Jun-09	Brazil	2	-	1	Paraguay
05-Sep-09	Paraguay	1	-	0	Bolivia
09-Sep-09	Paraguay	1	-	0	Argentina
10-Oct-09	Venezuela	1	-	2	Paraguay

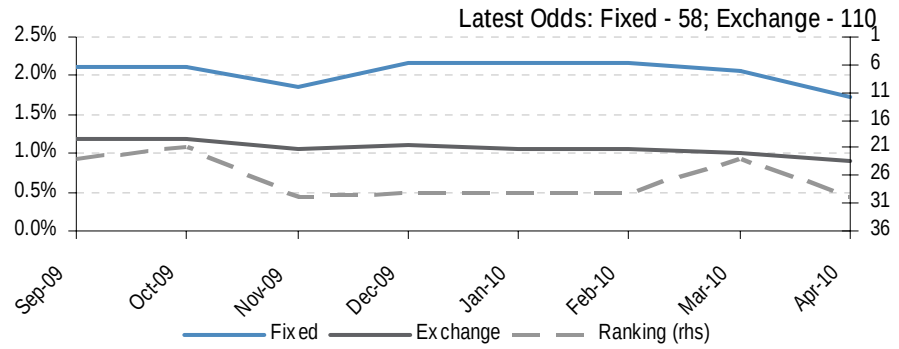
Source: fifa.com, J.P. Morgan

Table 58: World Cup Fixtures – Group F

Date	Time	Home		Away	Model Prediction
Mon Jun 14, 2010	18:30	Italy	v	Paraguay	Italy
Sun Jun 20, 2010	11:30	Slovakia	v	Paraguay	Slovakia
Thu Jun 24, 2010	14:00	Paraguay	v	New Zealand	Paraguay

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 31: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Slovakia

Table 59: Qualifying Results

Date	Home				Away
06-Sep-08	Slovakia	2	-	1	Northern Ireland
10-Sep-08	Slovenia	2	-	1	Slovakia
11-Oct-08	San Marino	1	-	3	Slovakia
15-Oct-08	Slovakia	2	-	1	Poland
01-Apr-09	Czech Republic	1	-	2	Slovakia
06-Jun-09	Slovakia	7	-	0	San Marino
05-Sep-09	Slovakia	2	-	2	Czech Republic
09-Sep-09	Northern Ireland	0	-	2	Slovakia
10-Oct-09	Slovakia	0	-	2	Slovenia
14-Oct-09	Poland	0	-	1	Slovakia

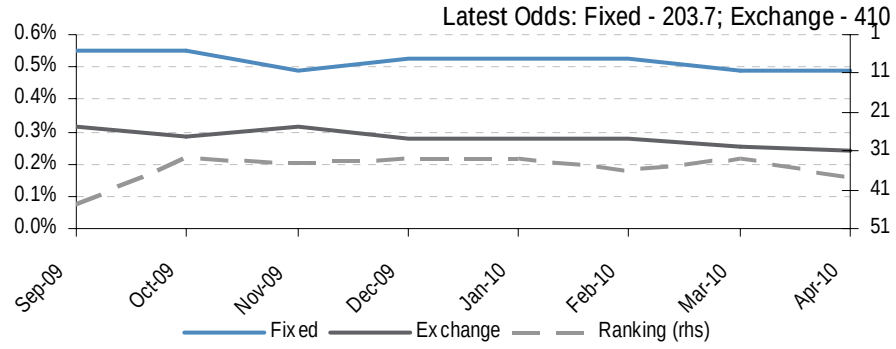
Source: fifa.com, J.P. Morgan

Table 60: World Cup Fixtures – Group F

Date	Time	Home		Away	Model Prediction
Tue Jun 15, 2010	11:30	New Zealand	v	Slovakia	Slovakia
Sun Jun 20, 2010	11:30	Slovakia	v	Paraguay	Slovakia
Thu Jun 24, 2010	14:00	Slovakia	v	Italy	Italy

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 32: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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J.P.Morgan

Brazil

Table 61: Qualifying Results

Date	Home				Away
14-Oct-07	Colombia	0	-	0	Brazil
17-Oct-07	Brazil	5	-	0	Ecuador
18-Nov-07	Peru	1	-	1	Brazil
21-Nov-07	Brazil	2	-	1	Uruguay
15-Jun-08	Paraguay	2	-	0	Brazil
18-Jun-08	Brazil	0	-	0	Argentina
07-Sep-08	Chile	0	-	3	Brazil
10-Sep-08	Brazil	0	-	0	Bolivia
12-Oct-08	Venezuela	0	-	4	Brazil
15-Oct-08	Brazil	0	-	0	Colombia
29-Mar-09	Ecuador	1	-	1	Brazil
01-Apr-09	Brazil	3	-	0	Peru
06-Jun-09	Uruguay	0	-	4	Brazil
10-Jun-09	Brazil	2	-	1	Paraguay
05-Sep-09	Argentina	1	-	3	Brazil
09-Sep-09	Brazil	4	-	2	Chile
11-Oct-09	Bolivia	2	-	1	Brazil
14-Oct-09	Brazil	0	-	0	Venezuela

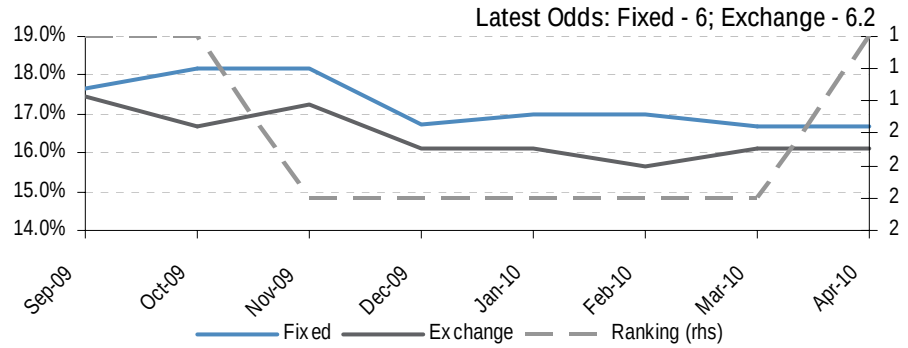
Source: fifa.com, J.P. Morgan

Table 62: World Cup Fixtures – Group G

Date	Time	Home		Away	Model Prediction
Tue Jun 15, 2010	18:30	Brazil	v	Korea DPR	Brazil
Sun Jun 20, 2010	18:30	Brazil	v	Ivory Coast	Brazil
Fri Jun 25, 2010	14:00	Portugal	v	Brazil	Brazil

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 33: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Ivory Coast

Table 63: Qualifying Results

Date	Home				Away
01-Jun-08	Ivory Coast	1	-	0	Mozambique
08-Jun-08	Madagascar	0	-	0	Ivory Coast
14-Jun-08	Botswana	1	-	1	Ivory Coast
22-Jun-08	Ivory Coast	4	-	0	Botswana
07-Sep-08	Mozambique	1	-	1	Ivory Coast
11-Oct-08	Ivory Coast	3	-	0	Madagascar
29-Mar-09	Ivory Coast	5	-	0	Malawi
07-Jun-09	Guinea	1	-	2	Ivory Coast
20-Jun-09	Burkina Faso	2	-	3	Ivory Coast
05-Sep-09	Ivory Coast	5	-	0	Burkina Faso
10-Oct-09	Malawi	1	-	1	Ivory Coast

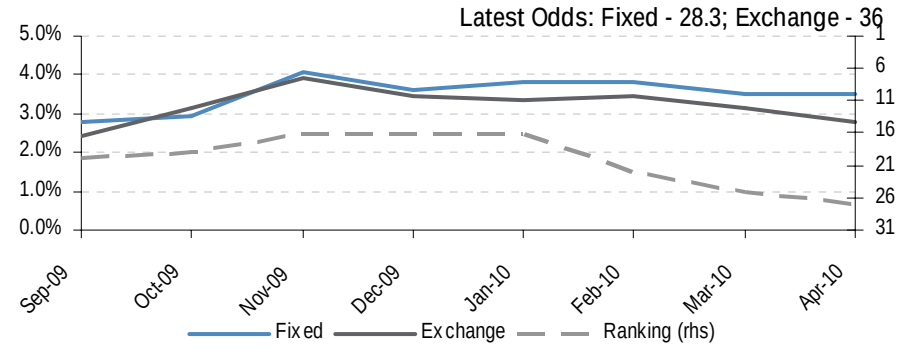
Source: fifa.com, J.P. Morgan

Table 64: World Cup Fixtures – Group G

Date	Time	Home		Away	Model Prediction
Tue Jun 15, 2010	14:00	Ivory Coast	v	Portugal	Draw
Sun Jun 20, 2010	18:30	Brazil	v	Ivory Coast	Brazil
Fri Jun 25, 2010	14:00	Korea DPR	v	Ivory Coast	Ivory Coast

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 34: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Korea DPR

Table 65: Qualifying Results

Date	Home				Away
06-Feb-08	Jordan	0	-	1	Korea DPR
26-Mar-08	Korea DPR	0	-	0	Korea Republic
02-Jun-08	Turkmenistan	0	-	0	Korea DPR
07-Jun-08	Korea DPR	1	-	0	Turkmenistan
14-Jun-08	Korea DPR	2	-	0	Jordan
22-Jun-08	Korea Republic	0	-	0	Korea DPR
06-Sep-08	United Arab Emirates	1	-	2	Korea DPR
10-Sep-08	Korea DPR	1	-	1	Korea Republic
15-Oct-08	Iran	2	-	1	Korea DPR
11-Feb-09	Korea DPR	1	-	0	Saudi Arabia
28-Mar-09	Korea DPR	2	-	0	United Arab Emirates
01-Apr-09	Korea Republic	1	-	0	Korea DPR
06-Jun-09	Korea DPR	0	-	0	Iran
17-Jun-09	Saudi Arabia	0	-	0	Korea DPR

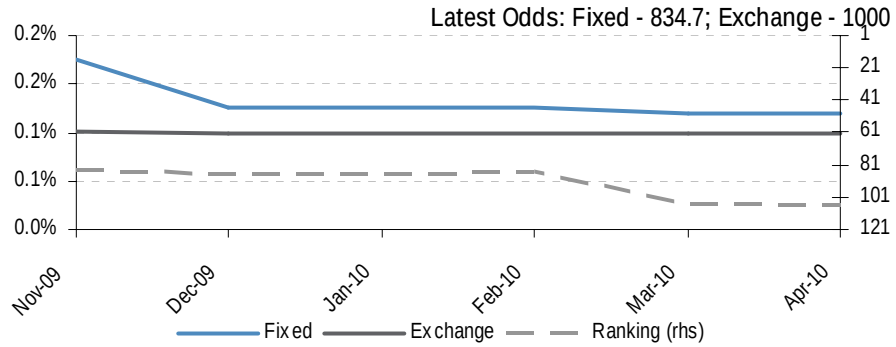
Source: fifa.com, J.P. Morgan

Table 66: World Cup Fixtures – Group G

Date	Time	Home		Away	Model Prediction
Tue Jun 15, 2010	18:30	Brazil	v	Korea DPR	Brazil
Mon Jun 21, 2010	11:30	Portugal	v	Korea DPR	Portugal
Fri Jun 25, 2010	14:00	Korea DPR	v	Ivory Coast	Ivory Coast

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 35: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Portugal

Table 67: Qualifying Results

Date	Home				Away
06-Sep-08	Malta	0	-	4	Portugal
10-Sep-08	Portugal	2	-	3	Denmark
11-Oct-08	Sweden	0	-	0	Portugal
15-Oct-08	Portugal	0	-	0	Albania
28-Mar-09	Portugal	0	-	0	Sweden
06-Jun-09	Albania	1	-	2	Portugal
05-Sep-09	Denmark	1	-	1	Portugal
09-Sep-09	Hungary	0	-	1	Portugal
10-Oct-09	Portugal	3	-	0	Hungary
14-Oct-09	Portugal	4	-	0	Malta
14-Nov-09	Portugal	1	-	0	Bosnia-Herzegovina
18-Nov-09	Bosnia-Herzegovina	0	-	1	Portugal

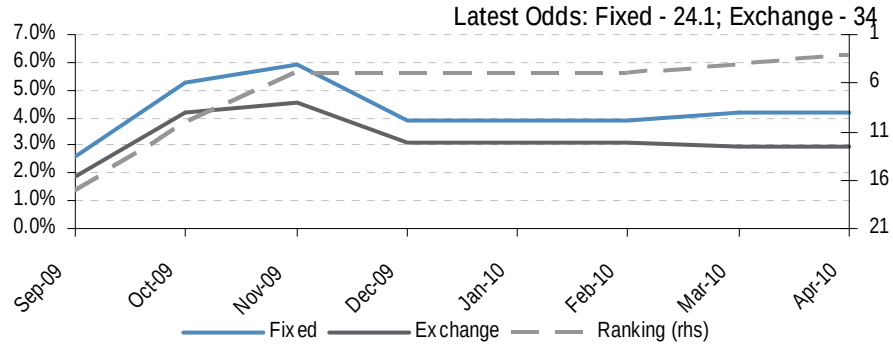
Source: fifa.com, J.P. Morgan

Table 68: World Cup Fixtures – Group G

Date	Time	Home		Away	Model Prediction
Tue Jun 15, 2010	14:00	Ivory Coast	v	Portugal	Draw
Mon Jun 21, 2010	11:30	Portugal	v	Korea DPR	Portugal
Fri Jun 25, 2010	14:00	Portugal	v	Brazil	Brazil

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 36: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Chile

Table 69: Qualifying Results

Date	Home				Away
13-Oct-07	Argentina	2	-	0	Chile
17-Oct-07	Chile	2	-	0	Peru
18-Nov-07	Uruguay	2	-	2	Chile
21-Nov-07	Chile	0	-	3	Paraguay
15-Jun-08	Bolivia	0	-	2	Chile
19-Jun-08	Venezuela	2	-	3	Chile
07-Sep-08	Chile	0	-	3	Brazil
10-Sep-08	Chile	4	-	0	Colombia
12-Oct-08	Ecuador	1	-	0	Chile
15-Oct-08	Chile	1	-	0	Argentina
29-Mar-09	Peru	1	-	3	Chile
01-Apr-09	Chile	0	-	0	Uruguay
06-Jun-09	Paraguay	0	-	2	Chile
10-Jun-09	Chile	4	-	0	Bolivia
05-Sep-09	Chile	2	-	2	Venezuela
09-Sep-09	Brazil	4	-	2	Chile
10-Oct-09	Colombia	2	-	4	Chile
14-Oct-09	Chile	1	-	0	Ecuador

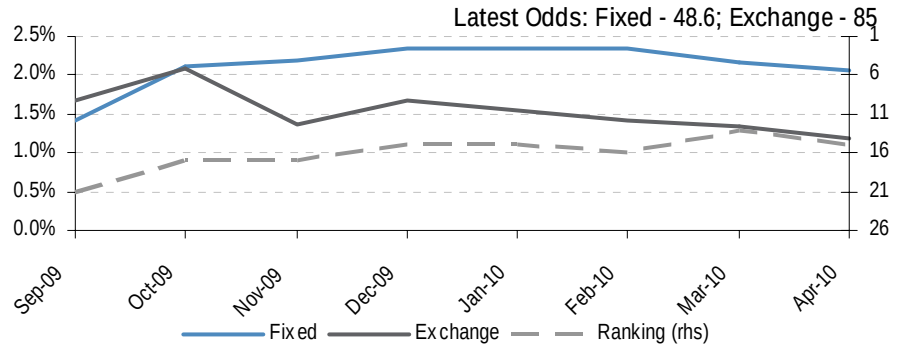
Source: fifa.com, J.P. Morgan

Table 70: World Cup Fixtures – Group H

Date	Time	Home		Away	Model Prediction
Wed Jun 16, 2010	11:30	Honduras	v	Chile	Chile
Mon Jun 21, 2010	14:00	Chile	v	Switzerland	Chile
Fri Jun 25, 2010	18:30	Chile	v	Spain	Spain

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 37: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Honduras

Table 71: Qualifying Results

Date	Home				Away
04-Jun-08	Honduras	4	-	0	Puerto Rico
14-Jun-08	Puerto Rico	2	-	2	Honduras
20-Aug-08	Mexico	2	-	1	Honduras
06-Sep-08	Canada	1	-	2	Honduras
10-Sep-08	Honduras	2	-	0	Jamaica
11-Oct-08	Honduras	3	-	1	Canada
15-Oct-08	Jamaica	1	-	0	Honduras
19-Nov-08	Honduras	1	-	0	Mexico
11-Feb-09	Costa Rica	2	-	0	Honduras
28-Mar-09	Trinidad and Tobago	1	-	1	Honduras
01-Apr-09	Honduras	3	-	1	Mexico
06-Jun-09	United States	2	-	1	Honduras
10-Jun-09	Honduras	1	-	0	El Salvador
12-Aug-09	Honduras	4	-	0	Costa Rica
05-Sep-09	Honduras	4	-	1	Trinidad and Tobago
09-Sep-09	Mexico	1	-	0	Honduras
10-Oct-09	Honduras	2	-	3	United States
14-Oct-09	El Salvador	0	-	1	Honduras

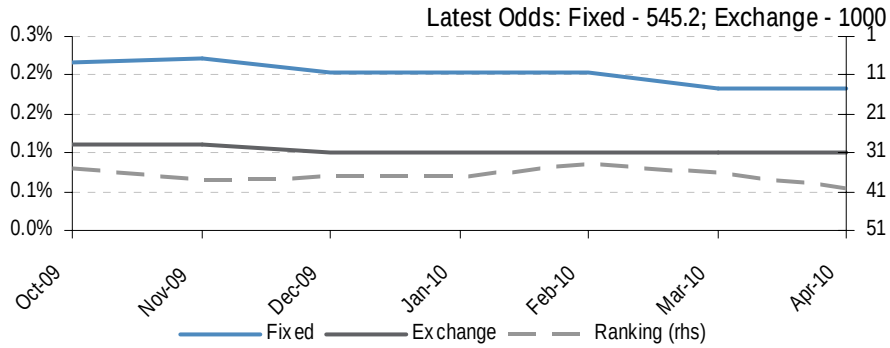
Source: fifa.com, J.P. Morgan

Table 72: World Cup Fixtures – Group H

Date	Time	Home		Away	Model Prediction
Wed Jun 16, 2010	11:30	Honduras	v	Chile	Chile
Mon Jun 21, 2010	18:30	Spain	v	Honduras	Spain
Fri Jun 25, 2010	18:30	Switzerland	v	Honduras	Switzerland

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 38: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Spain

Table 73: Qualifying Results

Date	Home				Away
06-Sep-08	Spain	1	-	0	Bosnia-Herzegovina
10-Sep-08	Spain	4	-	0	Armenia
11-Oct-08	Estonia	0	-	3	Spain
15-Oct-08	Belgium	1	-	2	Spain
28-Mar-09	Spain	1	-	0	Turkey
01-Apr-09	Turkey	1	-	2	Spain
05-Sep-09	Spain	5	-	0	Belgium
09-Sep-09	Spain	3	-	0	Estonia
10-Oct-09	Armenia	1	-	2	Spain
14-Oct-09	Bosnia-Herzegovina	2	-	5	Spain

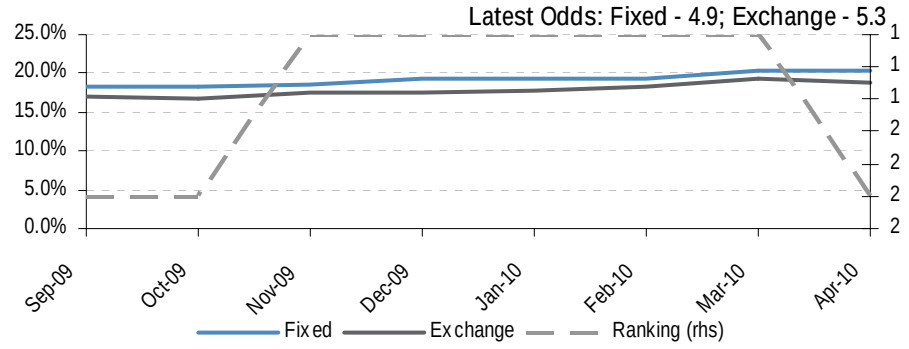
Source: fifa.com, J.P. Morgan

Table 74: World Cup Fixtures – Group H

Date	Time	Home		Away	Model Prediction
Wed Jun 16, 2010	14:00	Spain	v	Switzerland	Spain
Mon Jun 21, 2010	18:30	Spain	v	Honduras	Spain
Fri Jun 25, 2010	18:30	Chile	v	Spain	Spain

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 39: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Switzerland

Table 75: Qualifying Results

Date	Home				Away
06-Sep-08	Israel	2	-	2	Switzerland
10-Sep-08	Switzerland	1	-	2	Luxembourg
11-Oct-08	Switzerland	2	-	1	Latvia
15-Oct-08	Greece	1	-	2	Switzerland
28-Mar-09	Moldova	0	-	2	Switzerland
01-Apr-09	Switzerland	2	-	0	Moldova
05-Sep-09	Switzerland	2	-	0	Greece
09-Sep-09	Latvia	2	-	2	Switzerland
10-Oct-09	Luxembourg	0	-	3	Switzerland
14-Oct-09	Switzerland	0	-	0	Israel

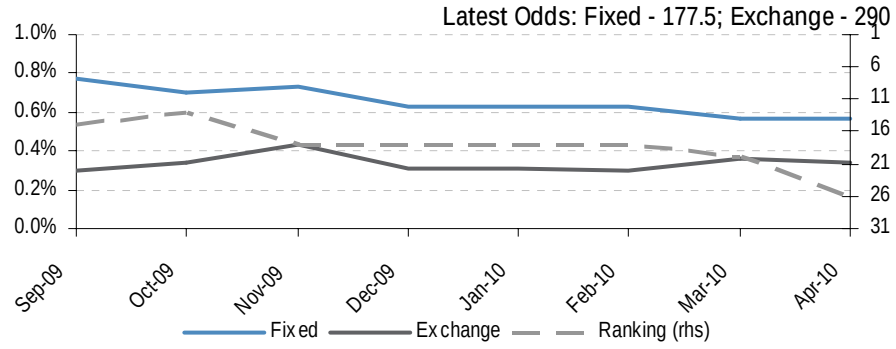
Source: fifa.com, J.P. Morgan

Table 76: World Cup Fixtures – Group H

Date	Time	Home		Away	Model Prediction
Wed Jun 16, 2010	14:00	Spain	v	Switzerland	Spain
Mon Jun 21, 2010	14:00	Chile	v	Switzerland	Chile
Fri Jun 25, 2010	18:30	Switzerland	v	Honduras	Switzerland

Source: fifa.com, J.P. Morgan (Times in GMT)

Figure 40: Probability of Winning and FIFA World Ranking, recent history



Source: tip-ex, J.P. Morgan

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Appendix II: Quant Factor Analysis - Equity Model

In this section, we illustrate the historical performance of Quantitative (Equity) Factors 'comparable' to those analysed in the World Cup Factor Companion, highlight relevant performance characteristics and provide the latest long/short opportunities arising from the Factor.

Test universe – MSCI AC World

In each case, our test universe is MSCI AC World (i.e. including both developed and emerging markets and currently encompassing around 2400 stocks).

Universe split into 10 portfolios according to sector normalised Factor scores

We split the universe into *deciles* (i.e. 10 portfolios), and assign the top 10 % as our long and bottom 10% as our short portfolio, according to *Sector Normalised* Factor scores.

Market Neutral and equally weighted portfolios

Portfolios are equally weighted and rebalanced on a monthly basis from December 1993 to date.

Ideally, we look for a monotonic distribution of returns across the portfolios with portfolio 1 outperforming portfolio2, portfolio 2 outperforming portfolio 3.... and portfolio 9 outperforming portfolio 10.

From a statistical perspective we also look at:

IC > 5% considered good

Information Coefficient (IC): This sounds more complicated than it actually is. We calculate the IC as the correlation between the model scores at the start of a month and the realised returns come the end of the month. We repeat this for each month in the test take the average over time. An IC in excess of 5% is considered 'good'.

Hit Rate in excess of 65% considered good

Hit Rate: We look at the percentage of months in which the strategy was successful on a long./short basis – how many months did portfolio 1 outperform portfolio 10? A 'good' strategy will outperform upwards of 65% of the time.

The larger the T-Stat, the more confidence we have that the two portfolios are different

T-Stat: the difference of two means test. This determines how confident we are that there is a significant difference between the return characteristics of portfolio 1 and portfolio 10. A T-Stat > 2 (roughly and set at the 95% confidence limit) implies that we can reject the null hypothesis that ‘there is no significant difference between the two deciles’ and that we are 95% confident that the two deciles are different.

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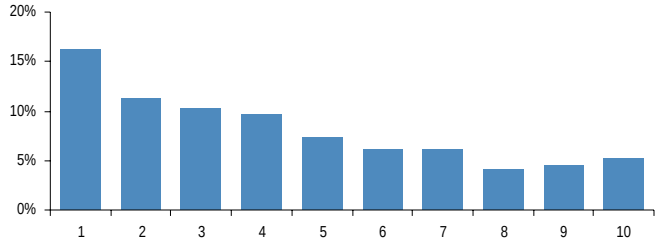
Value

12 month Forward Earnings Yield (P/E) – Long/Short

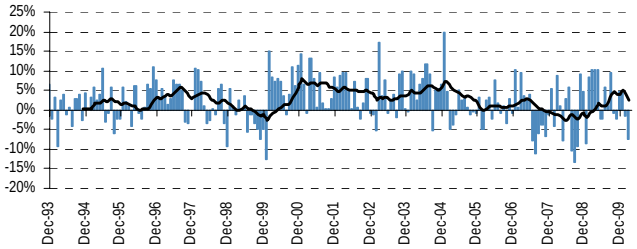
A pro-rata of consensus FY1 and FY2 forecasts are used to create a 12 month forward earnings estimate. Stocks with the lowest yield are assigned to portfolio 10, highest yield to portfolio 1

Figure 41: Backtest Results

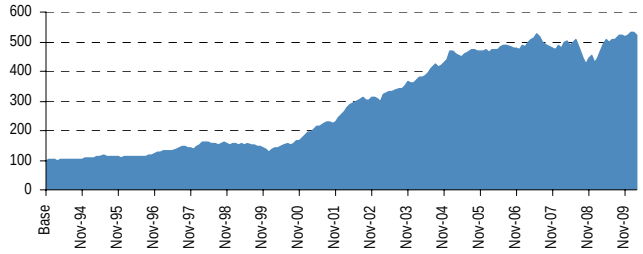
Portfolio Spread (Annualised Returns)



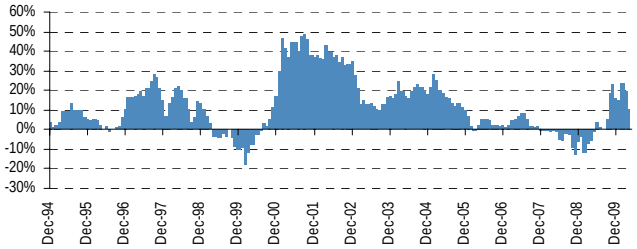
Information Coefficient



Cumulative Returns



12 Month Rolling Returns (Drawdown Analysis)

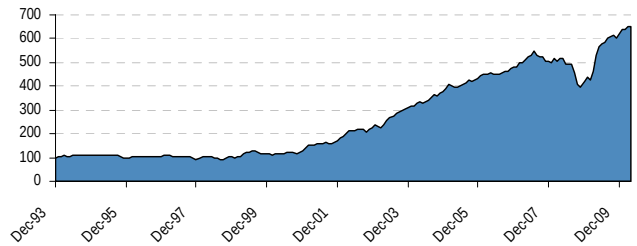


Portfolio Statistics

Port	Avg Ret	Ann Ret	St Dev	%Out Perf.
1	1.5%	16.3%	6%	65%
10	0.6%	5.3%	5%	45%
	Total Test			
	Avg Ret	**Rank IC**	**Avg IC**	**Avg Assets**
Universe	0.8%	3.0%	2.4%	2041

Long Short Strategy Statistics Portfolio 1 less Portfolio 10				
	Avg Ret	**Ann Ret**	**Std Devn**	**%Out Perf.**
Long/Short	0.9%	10.62%	2.6%	**62%**
	T-Stat			**Avg Assets**
Long/Short	**4.71**			409

Long Only Returns Relative to Benchmark



Source: MSCI, Factset, J.P. Morgan

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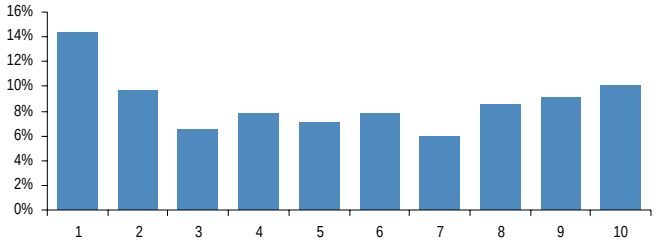
Price Momentum

12 month Price Momentum – Long/Short

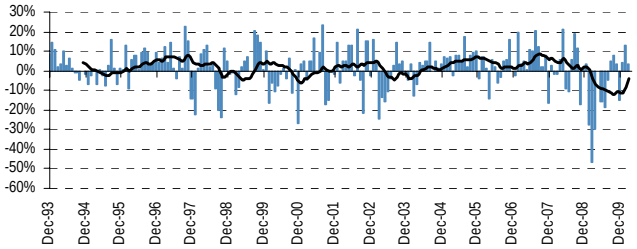
The 12 month Price Momentum Factor is calculated by ranking stocks according to their total return over the past 12 months. Stocks with the highest Price Momentum are assigned to portfolio 1, lowest to portfolio 10.

Figure 42: Backtest Results

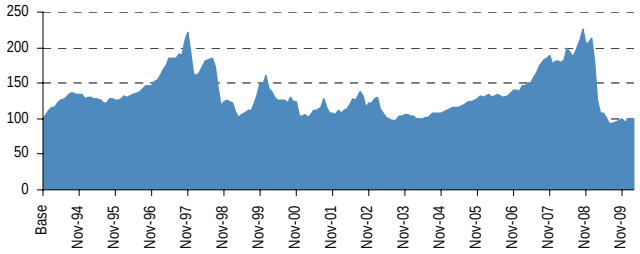
Portfolio Spread (Annualised Returns)



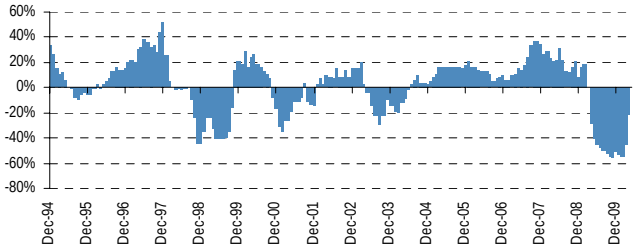
Information Coefficient



Cumulative Returns



12 Month Rolling Returns (Drawdown Analysis)



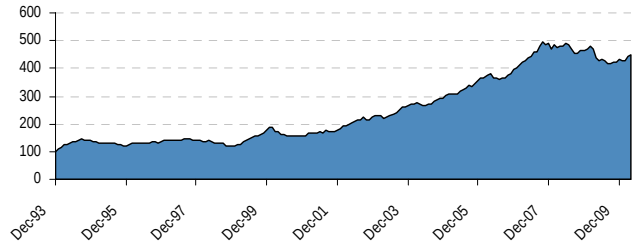
Portfolio Statistics

Port	Avg Ret	Ann Ret	St Dev	%Out Perf.
1	1.2%	14.3%	5%	66%
10	1.1%	10.1%	7%	43%

	Total Test Avg Ret	Rank IC	Avg IC	Avg Assets
Universe	0.8%	1.2%	1.4%	2245

Long Short Strategy Statistics Portfolio 1 less Portfolio 10				
	Avg Ret	Ann Ret	Std Devn	%Out Perf.
Long/Short	0.2%	0.01%	5.5%	**61%**
	T-Stat			Avg Assets
Long/Short	**0.42**			450

Long Only Returns Relative to Benchmark



Source: MSCI, Factset, J.P. Morgan

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J.P.Morgan

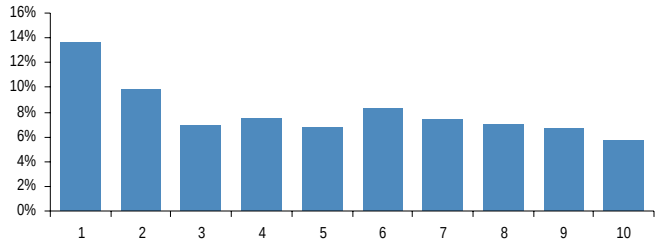
Growth/Earnings

Composite Forward Earnings Momentum – Long/Short

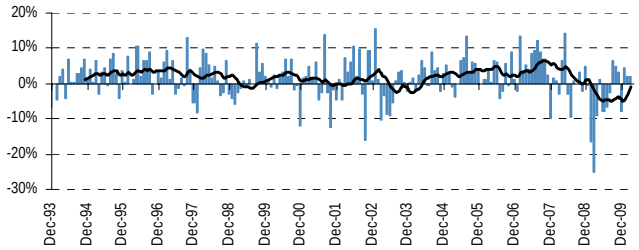
We calculate the change in FY1consensus EPS over the last month and the past 3 months and the change in FY2 consensus EPS over the past month and the past 3 months. The final Composite Earnings Momentum Factor is taken as an average of the above 4 metrics. Stocks with the highest Earnings Momentum are assigned to portfolio, lowest to portfolio 10.

Figure 43: Backtest Results

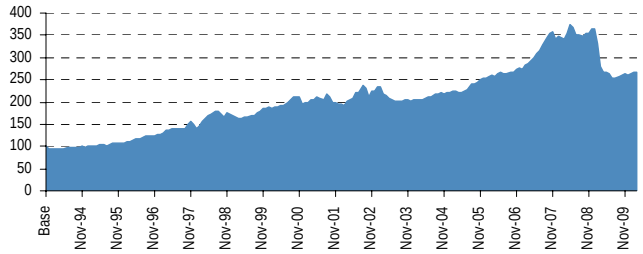
Portfolio Spread (Annualised Returns)



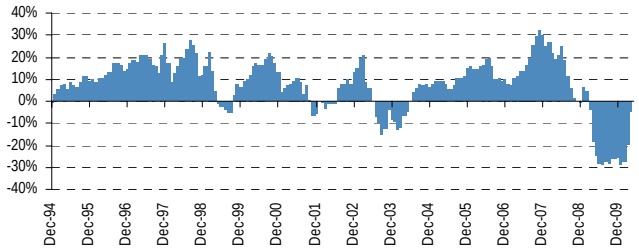
Information Coefficient



Cumulative Returns



12 Month Rolling Returns (Drawdown Analysis)

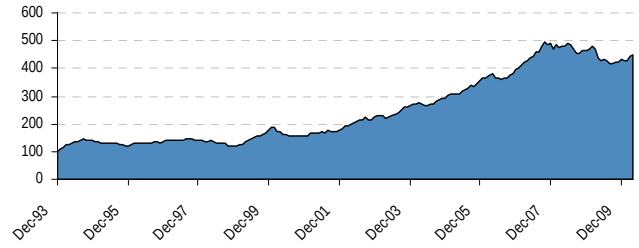


Portfolio Statistics

Port	Avg Ret	Ann Ret	St Dev	%Out Perf.
1	1.2%	13.6%	5%	68%
10	0.7%	5.7%	6%	45%
	Total Test			
	Avg Ret	Rank IC	Avg IC	Avg Assets
Universe	0.8%	2.1%	1.6%	2033

Long Short Strategy Statistics Portfolio 1 less Portfolio 10				
	Avg Ret	Ann Ret	Std Devn	%Out Perf.
Long/Short	0.5%	6.22%	2.8%	64%
	T-Stat			Avg Assets
Long/Short	2.72			407

Long Only Returns Relative to Benchmark



Source: MSCI, Factset, J.P. Morgan

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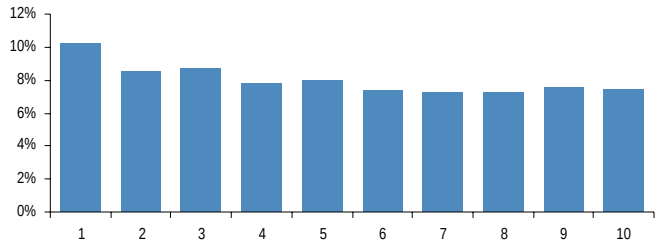
Quality

Historical ROE – Long/Short

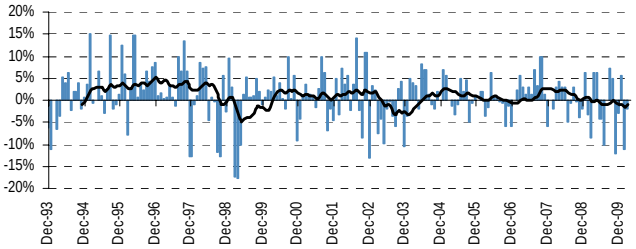
Stocks are ranked on their historical Return on Equity (ROE). Stocks with the highest ROE are allocated to portfolio 1, lowest to portfolio 10.

Figure 44: Backtest Results

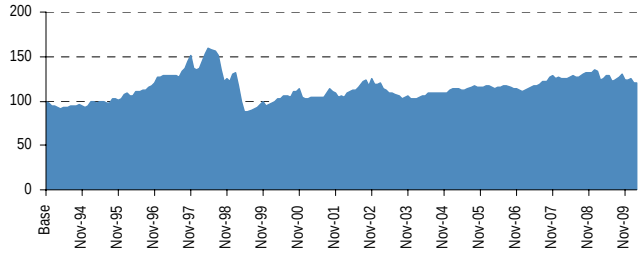
Portfolio Spread (Annualised Returns)



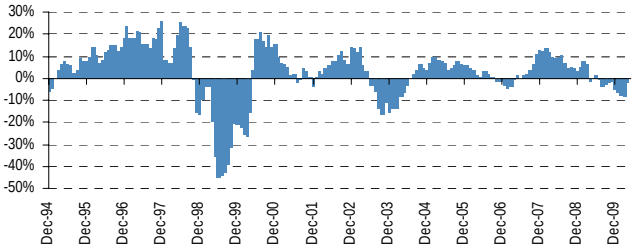
Information Coefficient



Cumulative Returns



12 Month Rolling Returns (Drawdown Analysis)

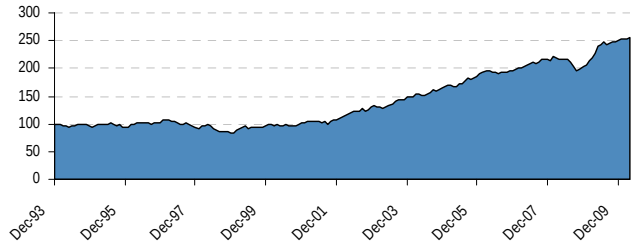


Portfolio Statistics

Port	Avg Ret	Ann Ret	St Dev	%Out Perf.
1	0.9%	10.3%	5%	51%
10	0.8%	7.4%	6%	45%
	Total Test			
	Avg Ret	Rank IC	Avg IC	Avg Assets
Universe	0.8%	1.6%	0.8%	2300

Long Short Strategy Statistics Portfolio 1 less Portfolio 10				
	Avg Ret	Ann Ret	Std Devn	%Out Perf.
Long/Short	0.1%	1.13%	3.2%	61%
	T-Stat			Avg Assets
Long/Short	0.64			461

Long Only Returns Relative to Benchmark



Source: MSCI, Factset, J.P. Morgan

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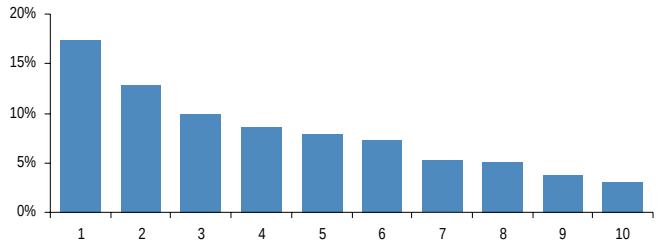
Multi Factor Model

Blended combination of Price, Value, Growth and Quality – Long/Short

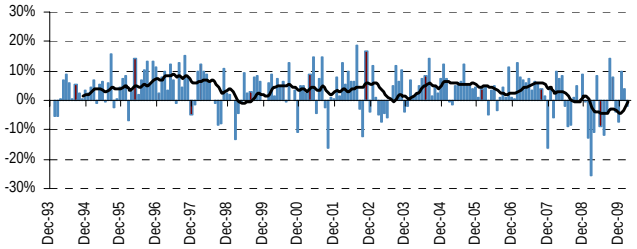
Stocks are ranked according to their Scores on our Multi Factor Quant Model. Stocks with the highest ranking are allocated to portfolio 1, lowest to portfolio 10.

Figure 45: Backtest Results

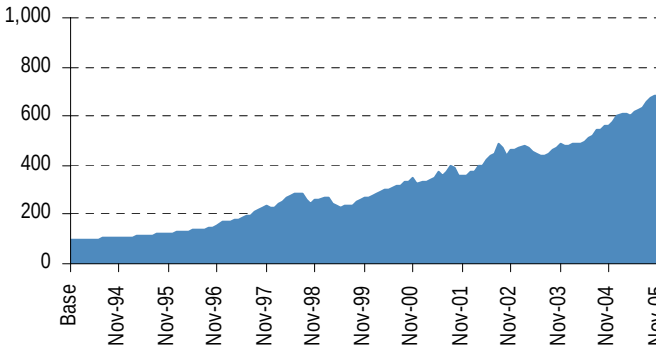
Portfolio Spread (Annualised Returns)



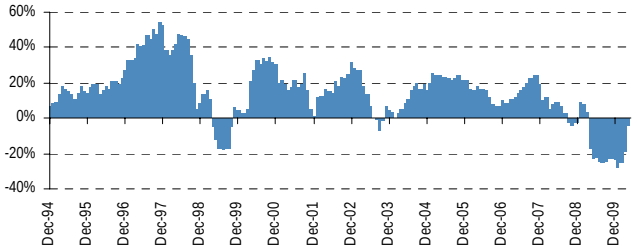
Information Coefficient



Cumulative Returns



12 Month Rolling Returns (Drawdown Analysis)

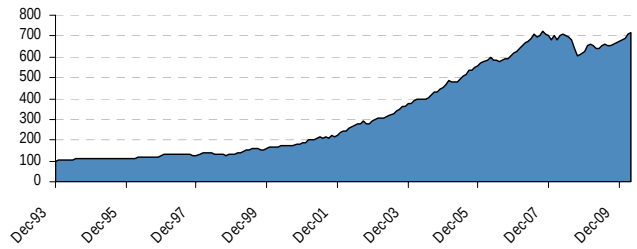


Portfolio Statistics

Port	Avg Ret	Ann Ret	St Dev	% Out Perf.
1	1.5%	17.4%	5%	73%
10	0.4%	3.0%	6%	34%
	Total Test			
	Avg Ret	Rank IC	Avg IC	Avg Assets
Universe	0.8%	3.8%	3.3%	2038

Long Short Strategy Statistics Portfolio 1 less Portfolio 10				
	Avg Ret	Ann Ret	Std Devn	% Out Perf.
Long/Short	1.0%	12.50%	3.2%	73%
	T-Stat			Avg Assets
Long/Short	4.48			408

Long Only Returns Relative to Benchmark



Source: MSCI, Factset, J.P. Morgan

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Current Long Opportunities

Below we highlight the top 25 long opportunities arising from the Multi-Factor Model defined above.

Table 77: Long Opportunities, Multi-Factor Model – MSCI AC World

BBG	Name	Country	Sector	Model Score
WDC US	WESTERN DIGITAL	UNITED STATES	Information Technology	3.00
VTBR RM	VTB BANK OJSC	RUSSIA	Financials	3.00
VED LN	VEDANTA RESOURCES	BRITAIN	Materials	2.88
SESA IN	SESA GOA	INDIA	Materials	2.87
2338 HK	WEICHAI POWER	CHINA	Industrials	2.81
ITMG IJ	INDO TAMBANGRAYA MEGAH	INDONESIA	Energy	2.81
CPF TB	CHAROEN POKPHAND FOODS PUB	THAILAND	Consumer Staples	2.76
STX US	SEAGATE TECHNOLOGY	CAYMAN ISLANDS	Information Technology	2.73
XEC US	CIMAREX ENERGY	UNITED STATES	Energy	2.66
8001 JP	ITOCHU	JAPAN	Industrials	2.62
ASII IJ	ASTRA INTERNATIONAL	INDONESIA	Consumer Discretionary	2.58
ACI US	ARCH COAL	UNITED STATES	Energy	2.57
UOL SP	UOL	SINGAPORE	Financials	2.56
TSN US	TYSON FOODS	UNITED STATES	Consumer Staples	2.52
6665 JP	ELPIDA MEMORY	JAPAN	Information Technology	2.50
IFX GR	INFINEON TECHNOLOGIES	GERMANY	Information Technology	2.48
WCRX US	WARNER CHILCOTT	IRELAND	Health Care	2.39
THYAO TI	TURK HAVA YOLLARI AO	TURKEY	Industrials	2.33
8002 JP	MARUBENI	JAPAN	Industrials	2.30
5214 JP	NIPPON ELECTRIC GLASS	JAPAN	Information Technology	2.28
HSY US	HERSHEY	UNITED STATES	Consumer Staples	2.27
3900 HK	GREENTOWN CHINA	CHINA	Financials	2.26
SSA LI	SISTEMA JSFC	RUSSIA	Telecommunication Services	2.24
SLM US	SLM	UNITED STATES	Financials	2.23
751 HK	SKYWORTH DIGITAL HLDGS	HONG KONG	Consumer Discretionary	2.23

Source: Factset, J.P. Morgan

Table 78: Long Opportunities, Multi-Factor Model, MSCI Europe

BBG	Name	Country	Sector	Model Score
VED LN	VEDANTA RESOURCES PLC	BRITAIN	Materials	2.88
IFX GR	INFINEON TECHNOLOGIES AG	GERMANY	Information Technology	2.48
OML LN	OLD MUTUAL PLC	BRITAIN	Financials	2.13
SKFB SS	SKF AB-B SHARES	SWEDEN	Industrials	2.02
PP FP	PPR	FRANCE	Consumer Discretionary	1.97
NXT LN	NEXT PLC	BRITAIN	Consumer Discretionary	1.92
ORNBV FH	ORION OYJ-CLASS B	FINLAND	Health Care	1.82
AV/ LN	AVIVA PLC	BRITAIN	Financials	1.79
VPK NA	VOPAK	NETHERLANDS	Industrials	1.78
STERV FH	STORA ENSO OYJ-R SHS	FINLAND	Materials	1.76
BATS LN	BRITISH AMERICAN TOBACCO PLC	BRITAIN	Consumer Staples	1.71
FUM1V FH	FORTUM OYJ	FINLAND	Utilities	1.71
TIT IM	TELECOM ITALIA SPA	ITALY	Telecommunication Services	1.70
JMT PL	JERONIMO MARTINS	PORTUGAL	Consumer Staples	1.69
UMI BB	UMICORE	BELGIUM	Materials	1.67
BT/A LN	BT GROUP PLC	BRITAIN	Telecommunication Services	1.65
CNA LN	CENTRICA PLC	BRITAIN	Utilities	1.63
LUN DC	H LUNDBECK A/S	DENMARK	Health Care	1.60
LGEN LN	LEGAL & GENERAL GROUP PLC	BRITAIN	Financials	1.57
ISYS LN	INVENSYS PLC	BRITAIN	Industrials	1.56
KAZ LN	KAZAKHMYS PLC	BRITAIN	Materials	1.55
DBK GR	DEUTSCHE BANK AG-REGISTERED	GERMANY	Financials	1.52
HEIO NA	HEINEKEN HOLDING NV	NETHERLANDS	Consumer Staples	1.51
KN FP	NATIXIS	FRANCE	Financials	1.46
ULVR LN	UNILEVER PLC	BRITAIN	Consumer Staples	1.44

Source: Factset, J.P. Morgan

Regarding our Long/Short opportunities, past performance is not indicative of future results. These are theoretical screens that should not be regarded as implicit or explicit recommendations. The stocks are selected on the basis of factual or consensus data; J.P. Morgan has not undertaken fundamental analysis on the names outside of our coverage universe.

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Appendix III: Z-Score Normalisation - Getting Technical!

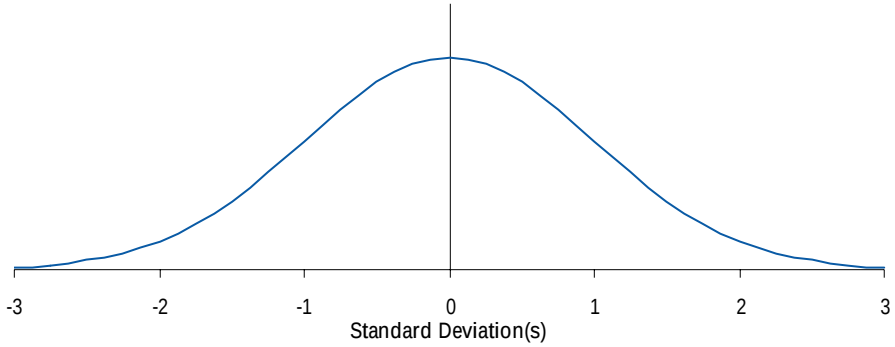
To reach a ranking for a stock, we typically convert stock level data to a Quantitative Factor by a process called Z-Score normalisation.

For Each stock, we deduct the universe average and divide this by the universe standard deviation.

$$QuantFactor_i = \frac{RawScore_i - Average(RawScore)}{StdDev(RawScore)}$$

Consequently if a stock has a Z-Score of 2 we can say that it is 2 standard deviations above the norm. We often truncate Z-Scores at +/- 3 as larger values can be distortive and are often the result of a data error.

Figure 46: Z-Score Normalisation – The Bell Curve



Source: J.P. Morgan

By normalizing the raw data, we can combine many different Factors or ideas and consequently combine scores to create a multi-Factor model

e.g.

$$QuantFactor = \frac{DY_i + PM_i}{2}$$

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Where DY is Dividend Yield and PM is Price Momentum

Generally, we can assign different weights (k) to each Quant Factor (QF) when creating a multi-Factor Model consisting of n individual Factors:

$$QuantAlphaModel_i = k_1 QF_{1,i} + k_2 QF_{2,i} + \ldots + k_n QF_{n,i}$$

We can then quantify the usefulness of a signal over time by looking at a simple long/short model for the Factor going long the top ntile and short the bottom ntile according to the underlying Factor score.

i.e. For deciles, long top 10%, short bottom 10%

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