

MPA's Daily LME Metals Price & Spreads Report

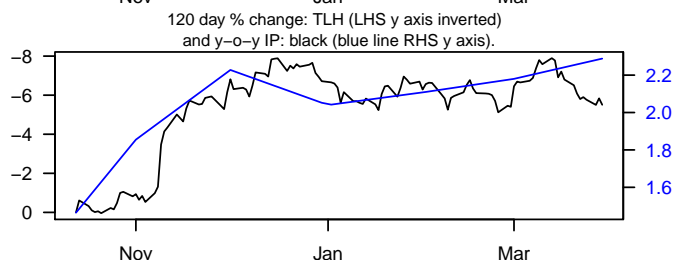
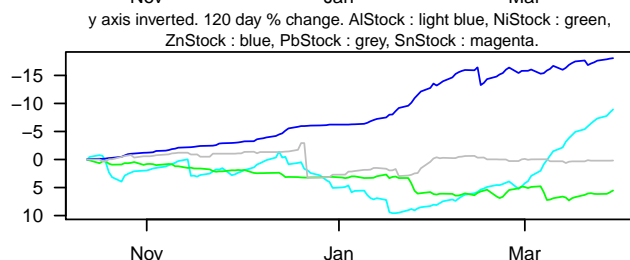
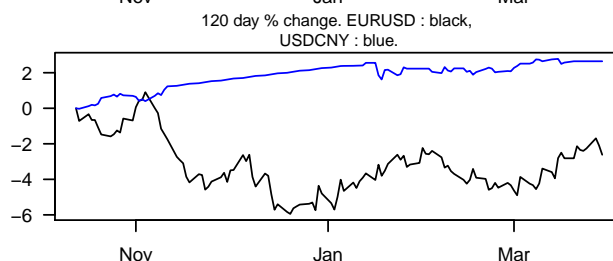
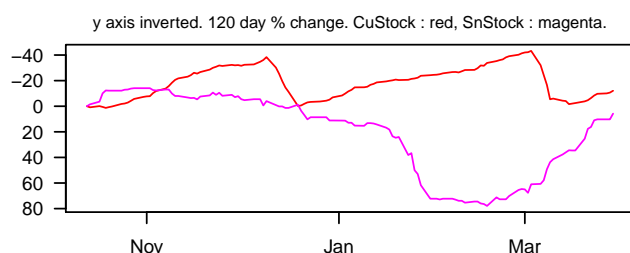
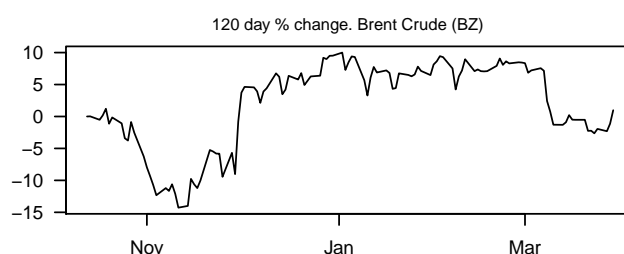
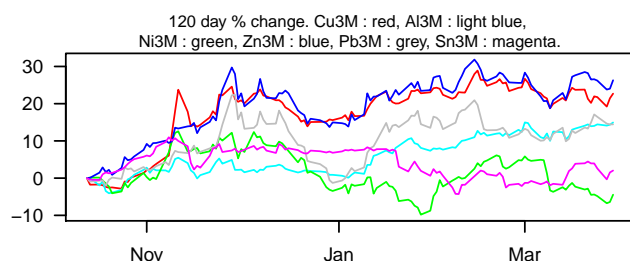
30 March 2017.

Summary Tables. The summary tables below show the last daily 3M prices and the Spreads (3M minus Cash Price) as published on the LME website together with the Modelled, Actual minus Modelled (Difference) , forecast 5 day Resistance, 5 day Mid & 5 day Support, Actual minus Modelled Standard Deviation (Diff. SD), and for the 3M table, the last Momentum Actual|Modelled (Momentum A|M), and for the Spread table, the last Ranked Diff.SD (the higher the Diff.SD, the higher the rank). In estimating future price direction, recent news must also always be considered.

3M	Cu	Al	Ni	Zn	Pb	Sn
Actual	5860	1938	9990	2834	2314	20000
Modelled	5731	1896	10020	2802	2274	20225
Difference	129	42	-30	32	40	-225
5D Resistance	6004	1985	10435	2939	2440	20646
5D Mid	5800	1937	9917	2834	2346	19973
5D Support	5597	1889	9400	2728	2253	19300
Diff. SD	1.36	2.00	-0.15	0.53	0.84	-0.72
A M Momentum	1	1	1	1	-2	2

Spread	Cu	Al	Ni	Zn	Pb	Sn
Actual	13	8	75	25	6	-75
Modelled	16	12	51	11	4	-94
Difference	-3	-4	24	14	2	19
5D Resistance	37	18	74	31	17	75
5D Mid	26	10	51	22	8	-26
5D Support	15	3	28	14	-1	-127
Diff. SD	-0.48	-1.07	1.13	2.21	0.40	0.34
Rank SD	1	2	5	6	4	3

Market Overview. The charts below show the 120 day % change of the LME Base Metals 3M together with that of the drivers (apart from y-o-y IP) considered for use in the models. The actual y-o-y IP chart is shown in the bottom right chart (RHS y axis). These provide an overview of how all the 3M metals prices are moving, along with the drivers that may influence the metal prices.



29 Mar 2017

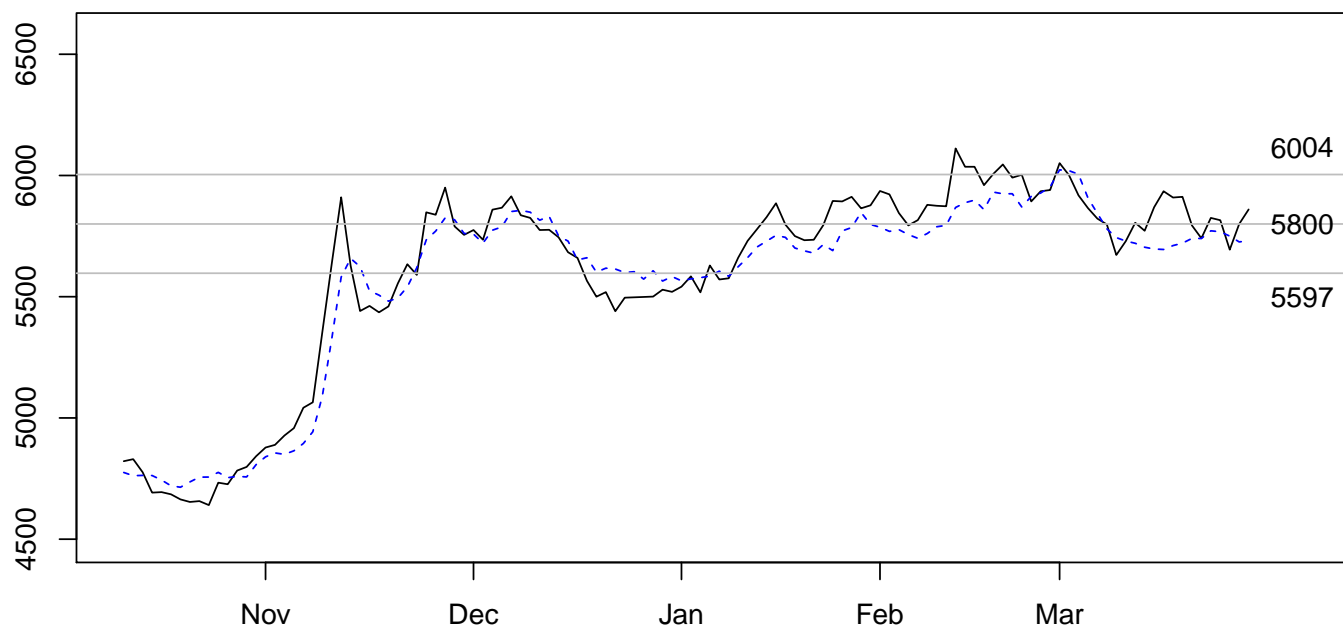
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Copper 3M. Last Actual: \$5860, Last Modelled: \$5731.

The last Actual|Modelled Momentum was 1 (bar colour blue) and the last Actual minus Modelled Standard Deviation was 1.36. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$5597, \$5800, \$6004.

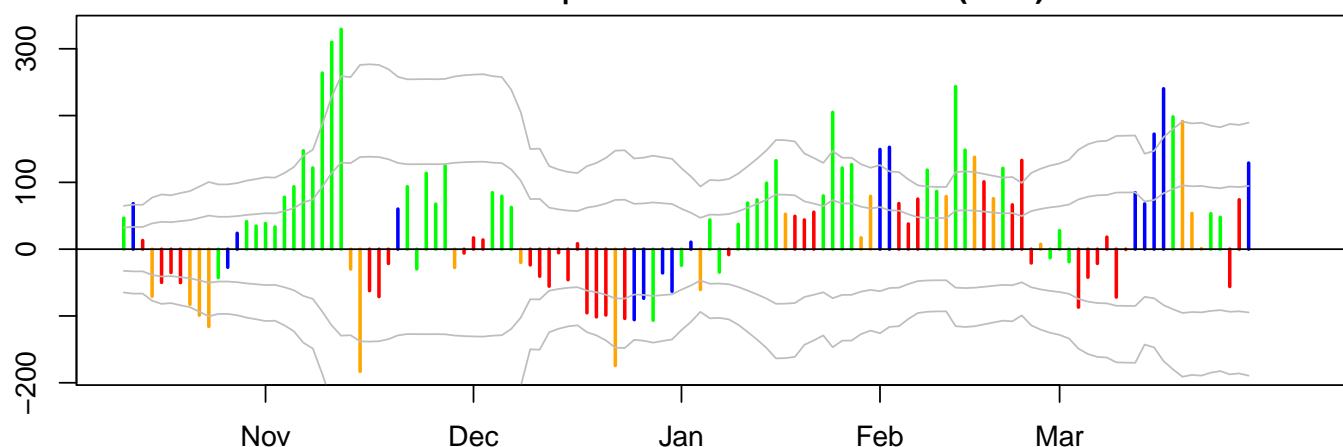
Cu3M (actual: black line, modelled: blue dashed line). 29 Mar 2017

Last Values : Actual \$5860, Modelled \$5731. RSQ = 0.95



Actual minus Modelled. Last Value = \$129 (1.36SD).

Last Actual | Modelled Momentum: 1 (blue).



Bar Colour (Actual | Modelled Momentum) : red (-2), orange (-1), blue (1), green (2).

Standard Deviation (SD) Lines (-2,-1, 1, 2): grey.

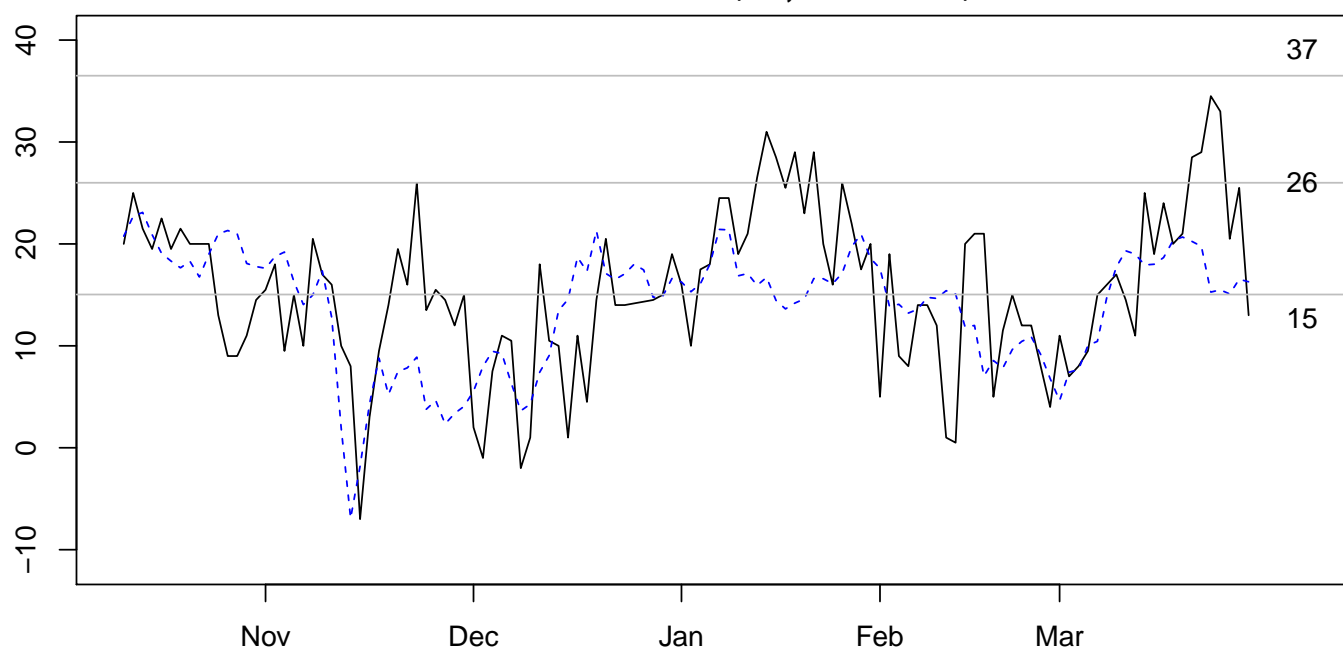
The information above is the output of a mathematical model and is not investment or trading advice. Price direction and volatility may change suddenly on breaking news. Historical Price Data for Copper 3M as published on the LME website. Model, A|M Momentum, and SR Forecast Levels by Metal Price Analytics Ltd.

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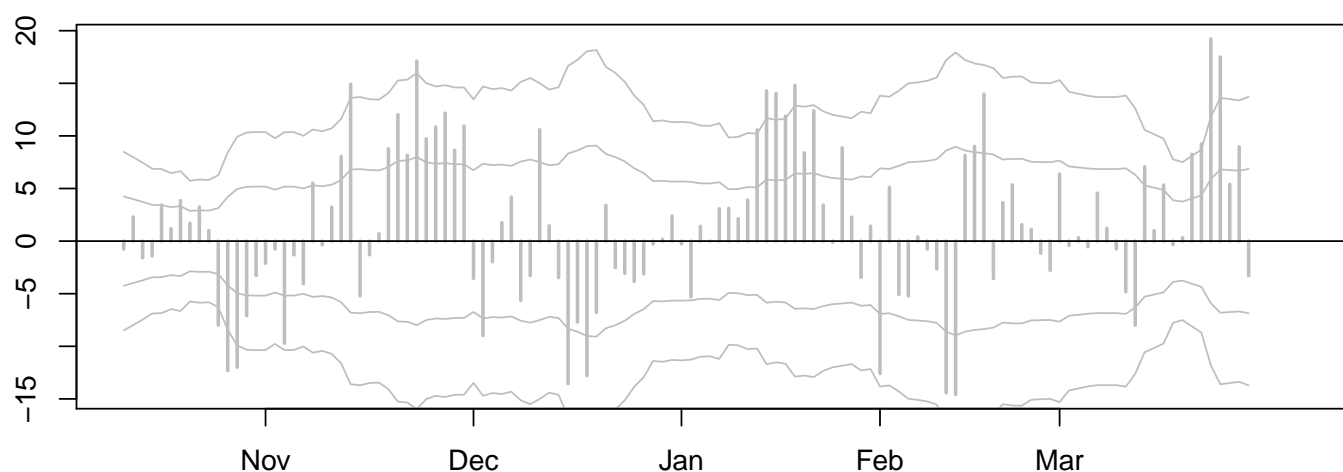
Copper 3M minus Copper Cash Spread. Last Actual: \$13, Last Modelled: \$16.

The last Actual minus Modelled Standard Deviation was -0.48. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$15, \$26, \$37.

Cu Spread (actual: black line, modelled: blue dashed line). 29 Mar 2017
Last Values : Actual \$13, Modelled \$16.



Actual minus Modelled. Last Value = \$-3 (-0.48SD)



Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

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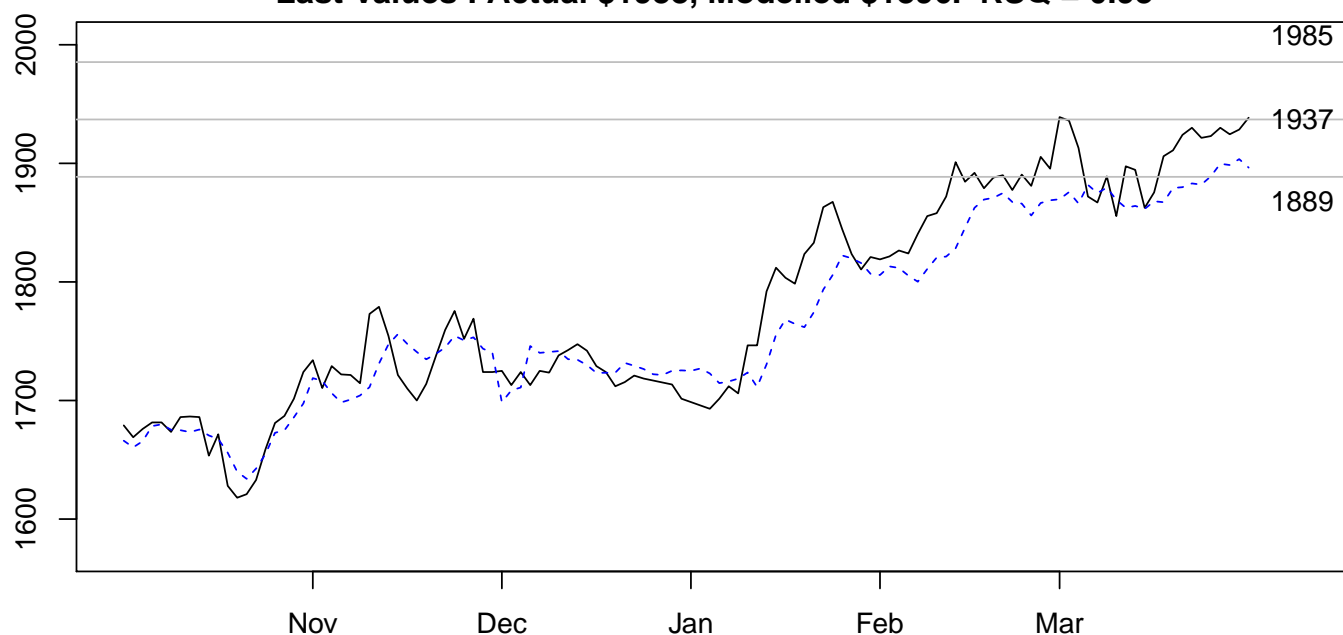
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Aluminium 3M. Last Actual: \$1938, Last Modelled: \$1896.

The last Actual|Modelled Momentum was 1 (bar colour blue) and the last Actual minus Modelled Standard Deviation was 2.00. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$1889, \$1937, \$1985.

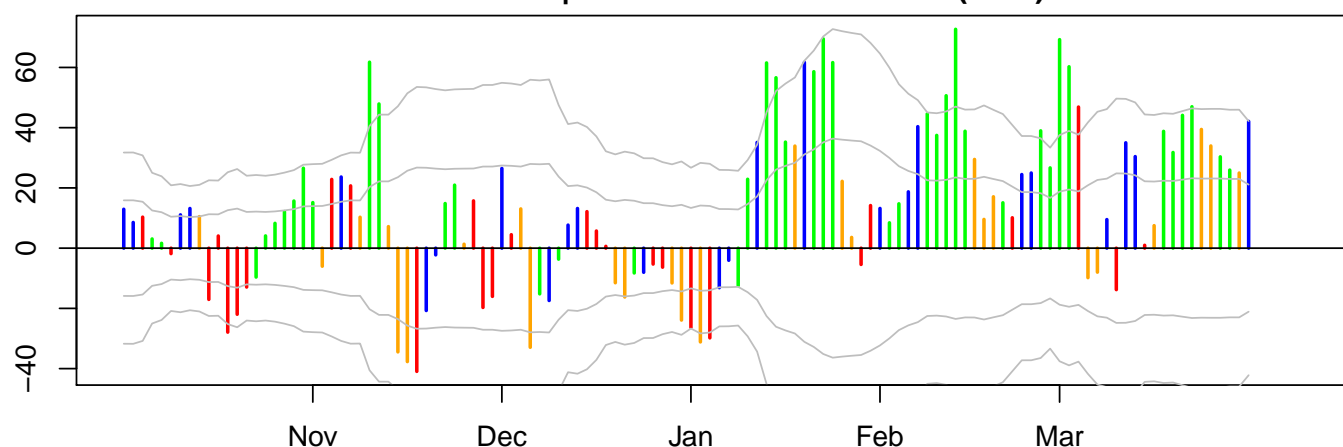
Al3M (actual: black line, modelled: blue dashed line). 29 Mar 2017

Last Values : Actual \$1938, Modelled \$1896. RSQ = 0.93



Actual minus Modelled. Last Value = \$42 (2.00SD).

Last Actual | Modelled Momentum: 1 (blue).



Bar Colour (Actual | Modelled Momentum) : red (-2), orange (-1), blue (1), green (2).

Standard Deviation (SD) Lines (-2,-1, 1, 2): grey.

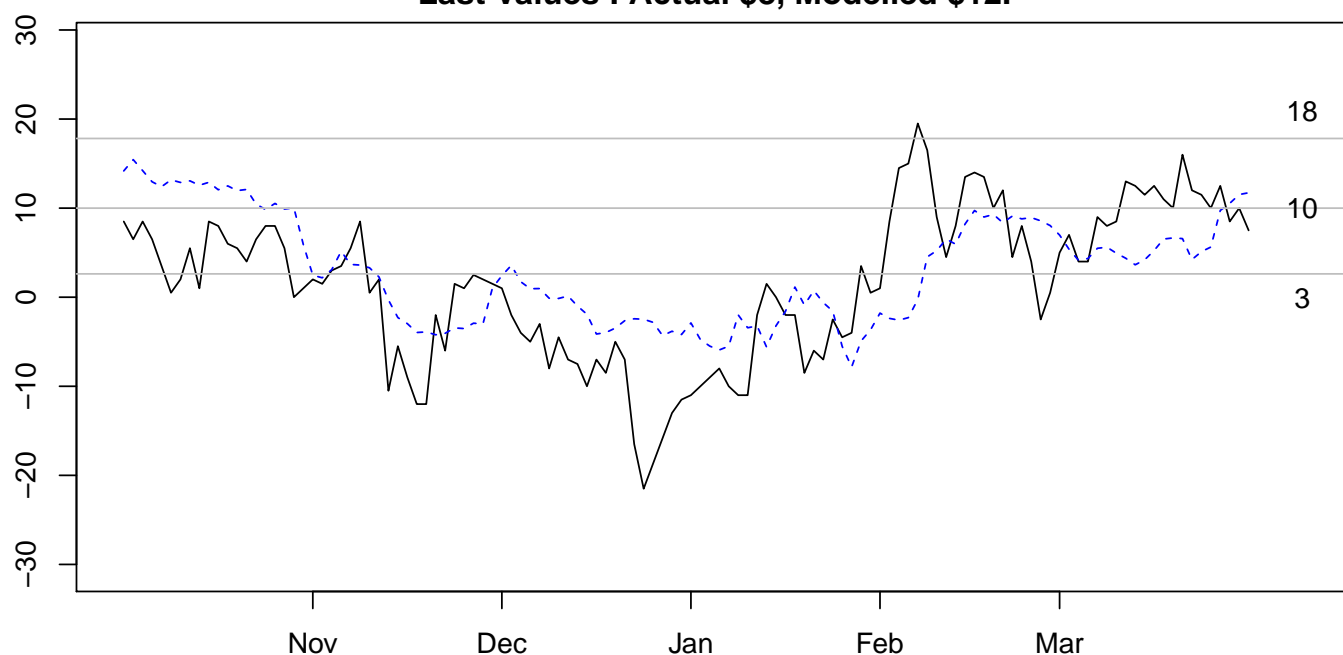
The information above is the output of a mathematical model and is not investment or trading advice. Price direction and volatility may change suddenly on breaking news. Historical Price Data for Aluminium 3M as published on the LME website. Model, A|M Momentum, and SR Forecast Levels by Metal Price Analytics Ltd.

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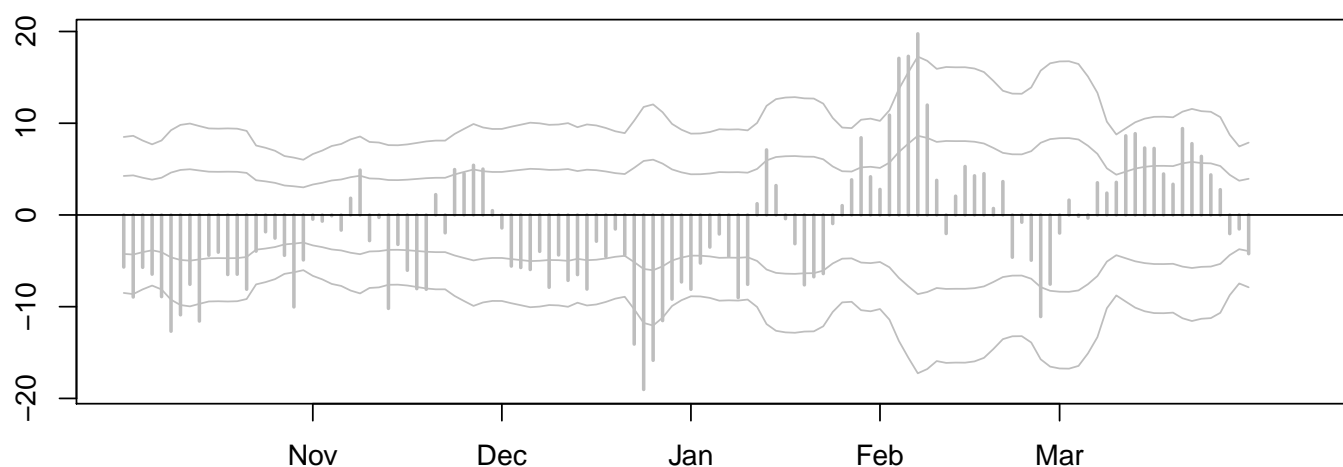
Aluminium 3M minus Aluminium Cash Spread. Last Actual: \$8, Last Modelled: \$12.

The last Actual minus Modelled Standard Deviation was -1.07. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$3, \$10, \$18.

AI Spread (actual: black line, modelled: blue dashed line). 29 Mar 2017
Last Values : Actual \$8, Modelled \$12.



Actual minus Modelled. Last Value = \$-4 (-1.07SD)



Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

The information above is the output of a mathematical model and is not investment or trading advice. Price direction and volatility may change suddenly on breaking news. Historical Price Data for Aluminium 3M and Aluminium Cash as published on the LME website. Model and SR Forecast Levels by Metal Price Analytics Ltd.

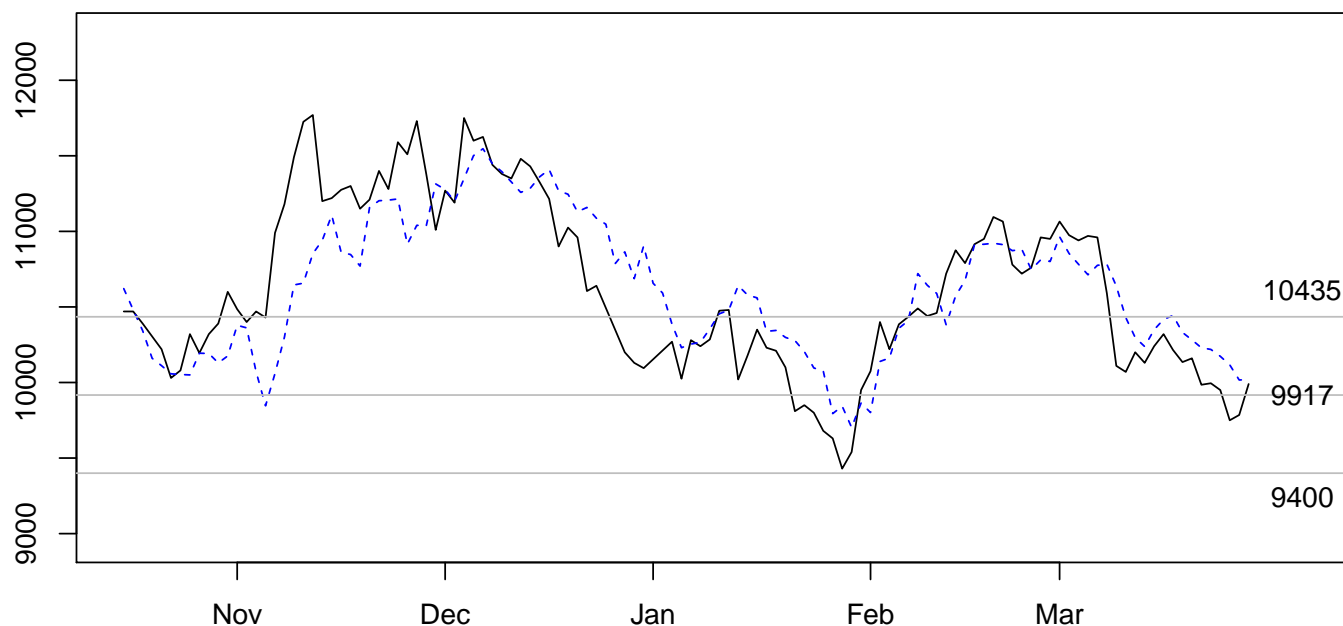
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Nickel 3M. Last Actual: \$9990, Last Modelled: \$10020.

The last Actual|Modelled Momentum was 1 (bar colour blue) and the last Actual minus Modelled Standard Deviation was -0.15. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$9400, \$9917, \$10435.

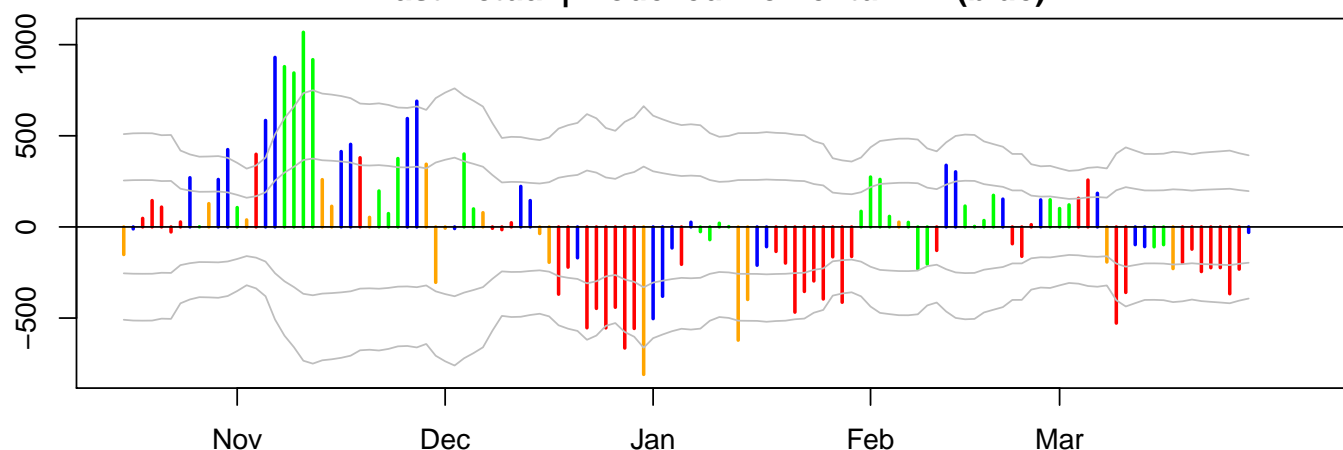
Ni3M (actual: black line, modelled: blue dashed line). 29 Mar 2017

Last Values : Actual \$9990, Modelled \$10020. RSQ = 0.64



Actual minus Modelled. Last Value = \$-30 (-0.15SD).

Last Actual | Modelled Momentum: 1 (blue).



Bar Colour (Actual | Modelled Momentum) : red (-2), orange (-1), blue (1), green (2).

Standard Deviation (SD) Lines (-2,-1, 1, 2): grey.

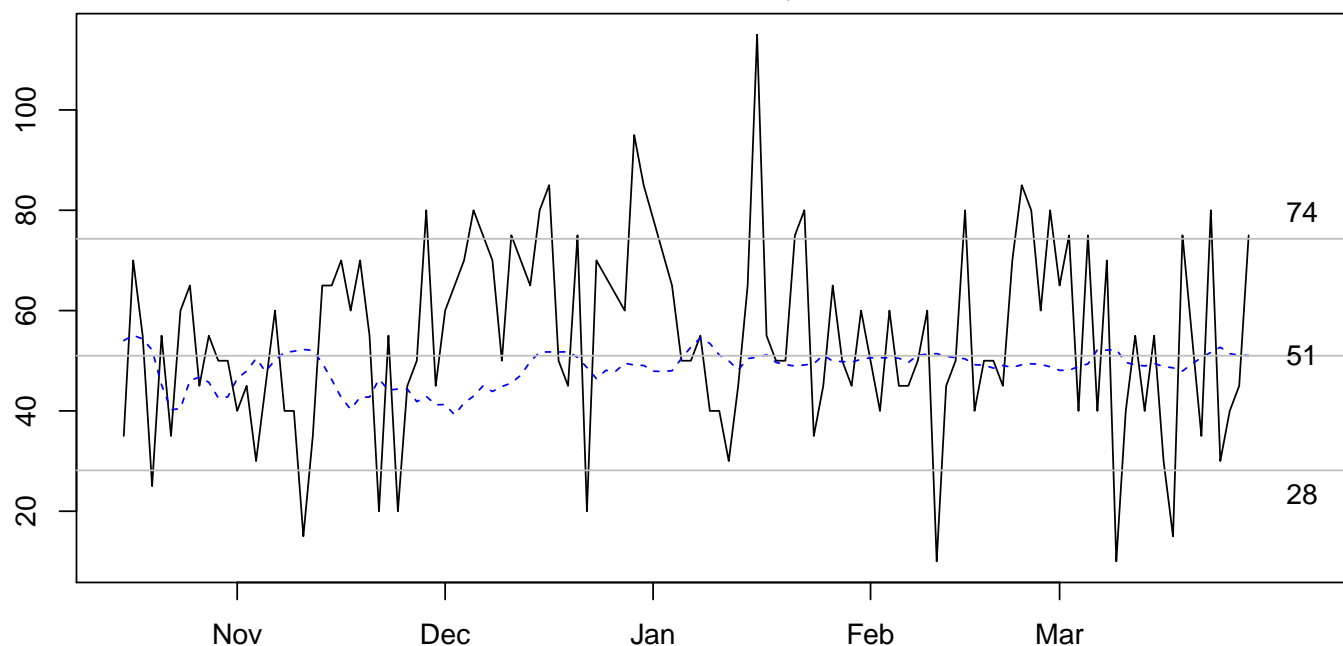
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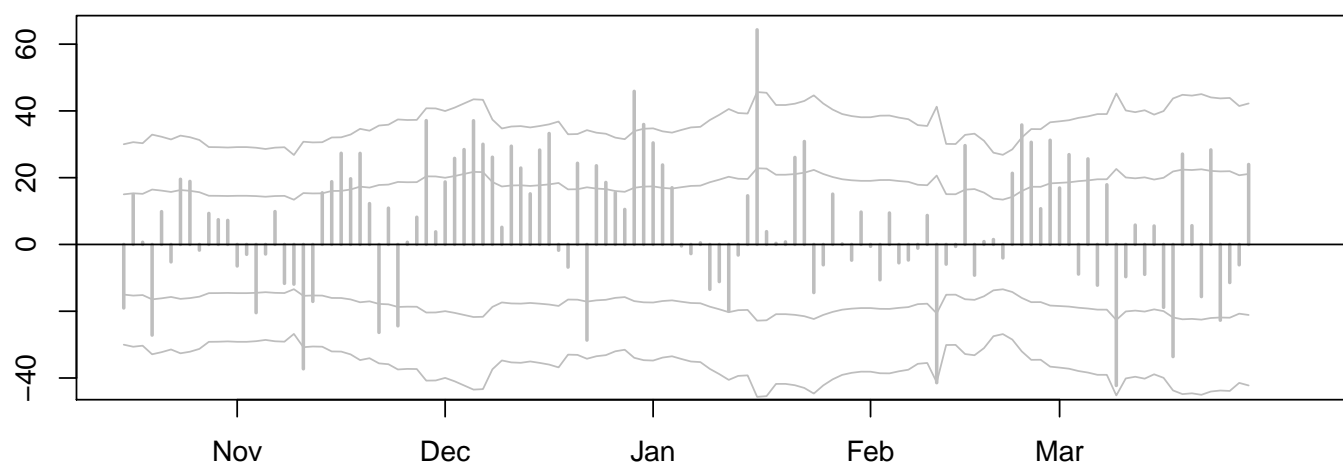
Nickel 3M minus Nickel Cash Spread. Last Actual: \$75, Last Modelled: \$51.

The last Actual minus Modelled Standard Deviation was 1.13. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$28, \$51, \$74.

Ni Spread (actual: black line, modelled: blue dashed line). 29 Mar 2017
Last Values : Actual \$75, Modelled \$51.



Actual minus Modelled. Last Value = \$24 (1.13SD)



Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

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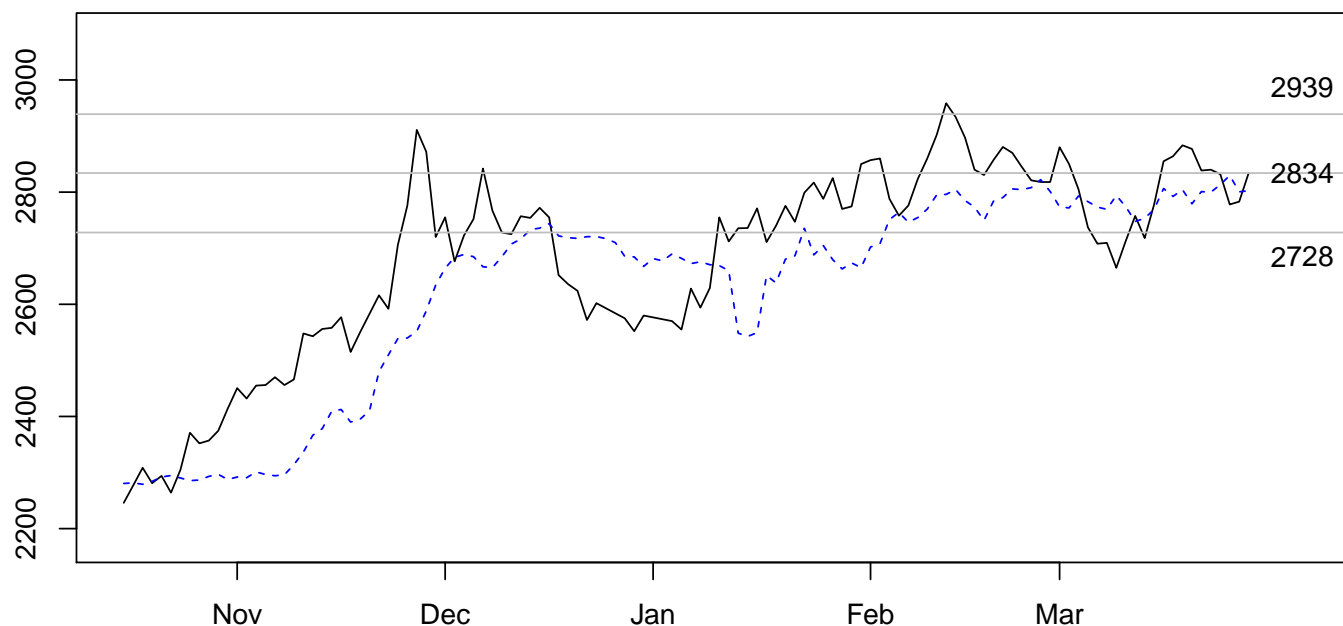
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Zinc 3M. Last Actual: \$2834, Last Modelled: \$2802.

The last Actual|Modelled Momentum was 1 (bar colour blue) and the last Actual minus Modelled Standard Deviation was 0.53. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$2728, \$2834, \$2939.

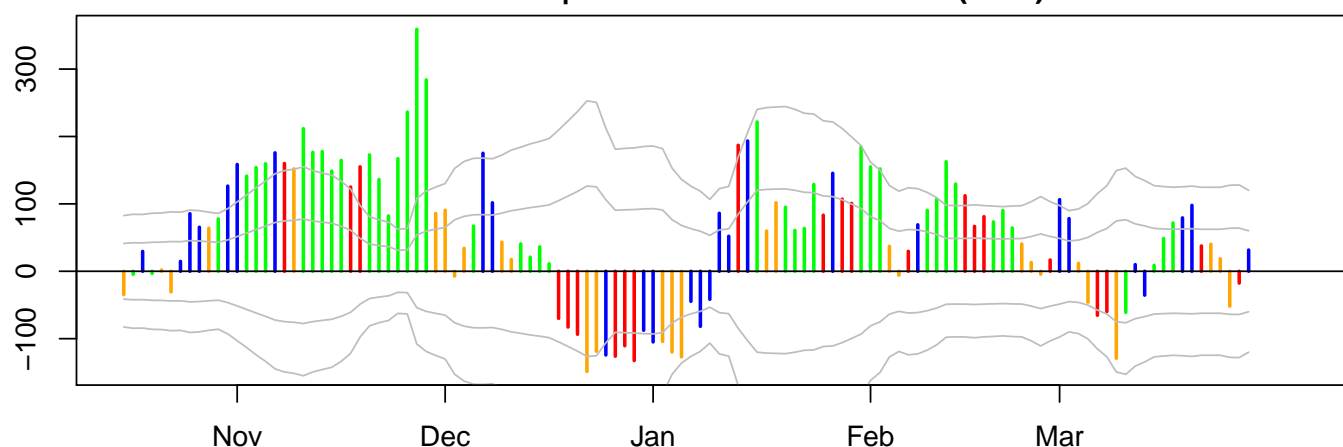
Zn3M (actual: black line, modelled: blue dashed line). 29 Mar 2017

Last Values : Actual \$2834, Modelled \$2802. RSQ = 0.72



Actual minus Modelled. Last Value = \$32 (0.53SD).

Last Actual | Modelled Momentum: 1 (blue).



Bar Colour (Actual | Modelled Momentum) : red (-2), orange (-1), blue (1), green (2).

Standard Deviation (SD) Lines (-2,-1, 1, 2): grey.

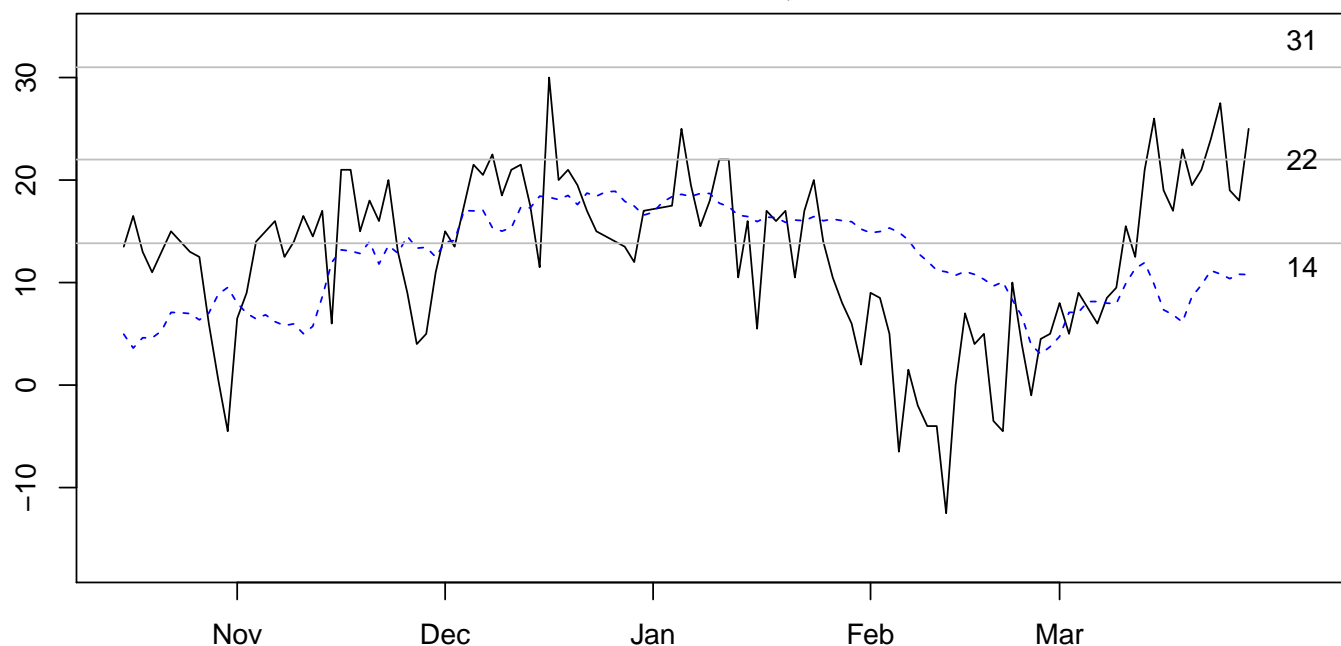
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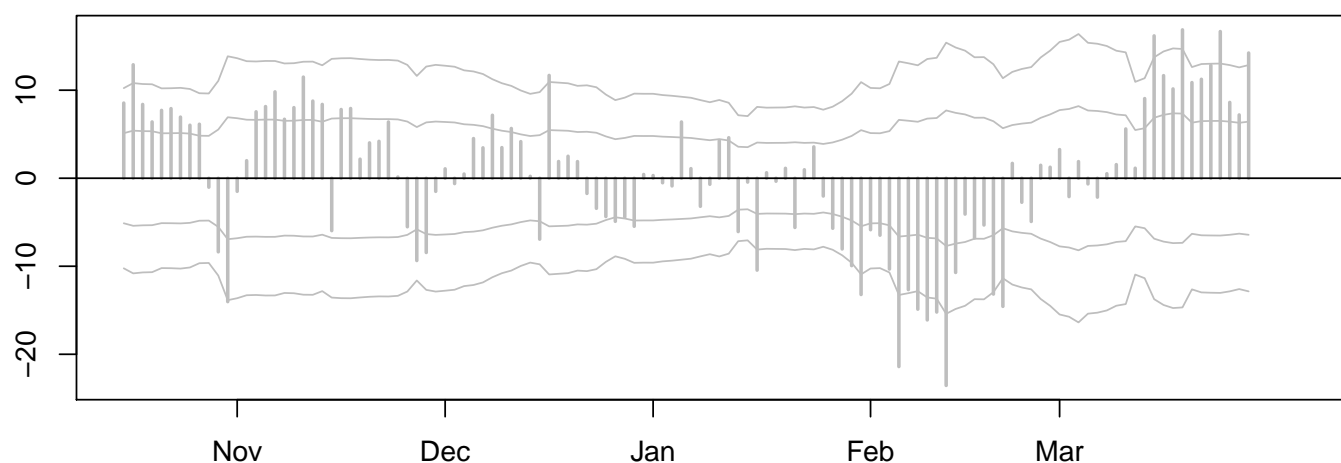
Zinc 3M minus Zinc Cash Spread. Last Actual: \$25, Last Modelled: \$11.

The last Actual minus Modelled Standard Deviation was 2.21. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$14, \$22, \$31.

Zn Spread (actual: black line, modelled: blue dashed line). 29 Mar 2017
Last Values : Actual \$25, Modelled \$11.



Actual minus Modelled. Last Value = \$14 (2.21SD)



Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

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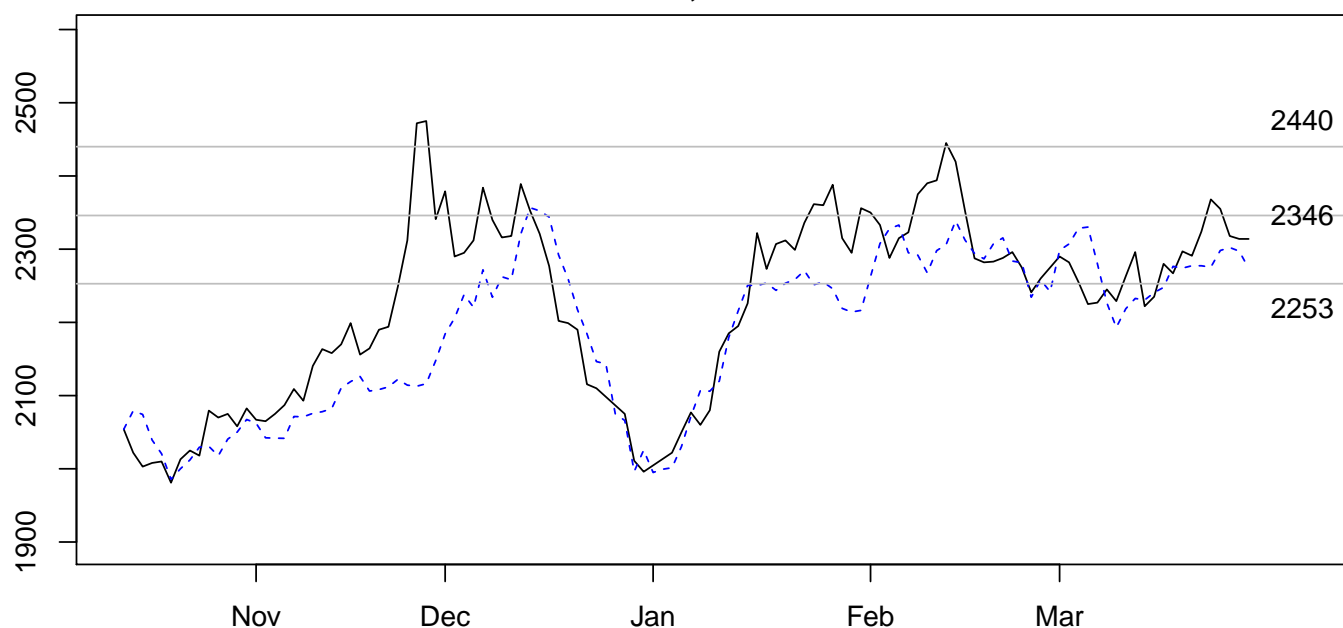
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Lead 3M. Last Actual: \$2314, Last Modelled: \$2274.

The last Actual|Modelled Momentum was -2 (bar colour red) and the last Actual minus Modelled Standard Deviation was 0.84. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$2253, \$2346, \$2440.

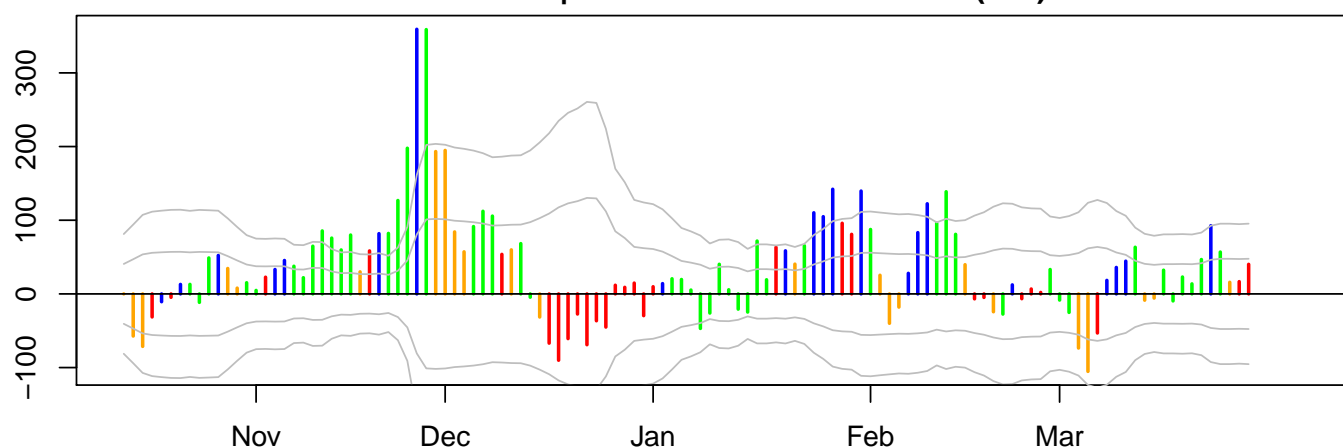
Pb3M (actual: black line, modelled: blue dashed line). 29 Mar 2017

Last Values : Actual \$2314, Modelled \$2274. RSQ = 0.68



Actual minus Modelled. Last Value = \$40 (0.84SD).

Last Actual | Modelled Momentum: -2 (red).



Bar Colour (Actual | Modelled Momentum) : red (-2), orange (-1), blue (1), green (2).

Standard Deviation (SD) Lines (-2,-1, 1, 2): grey.

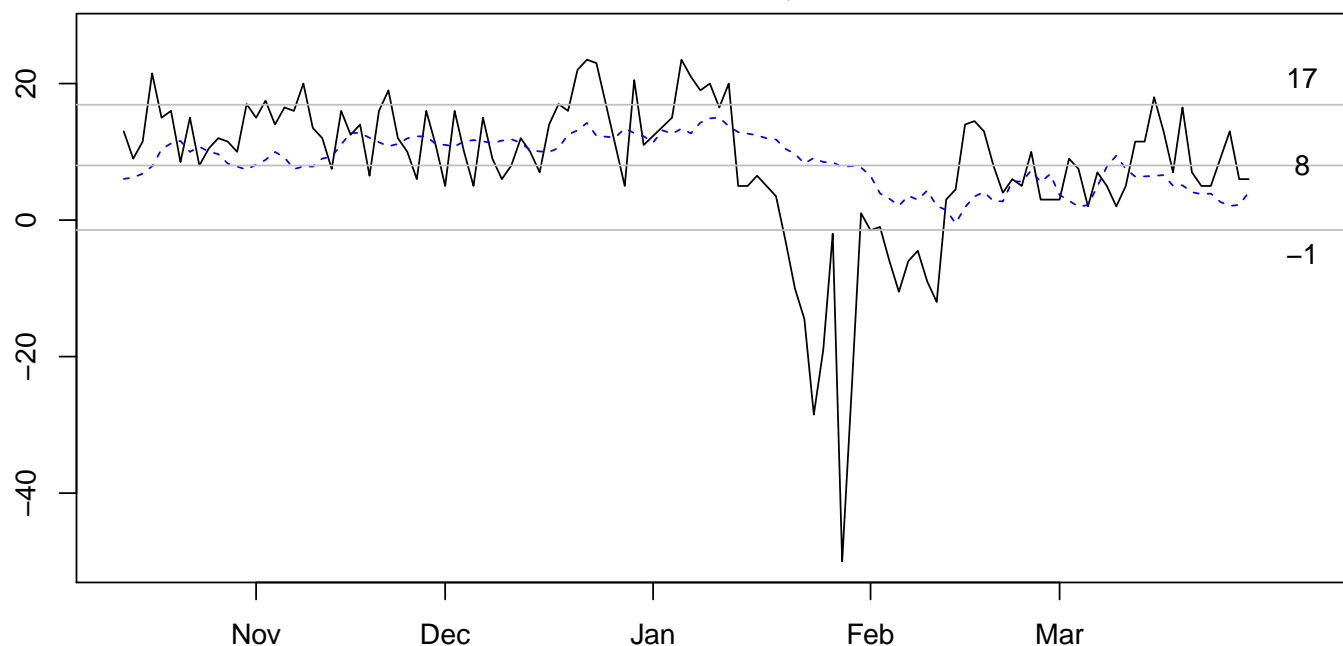
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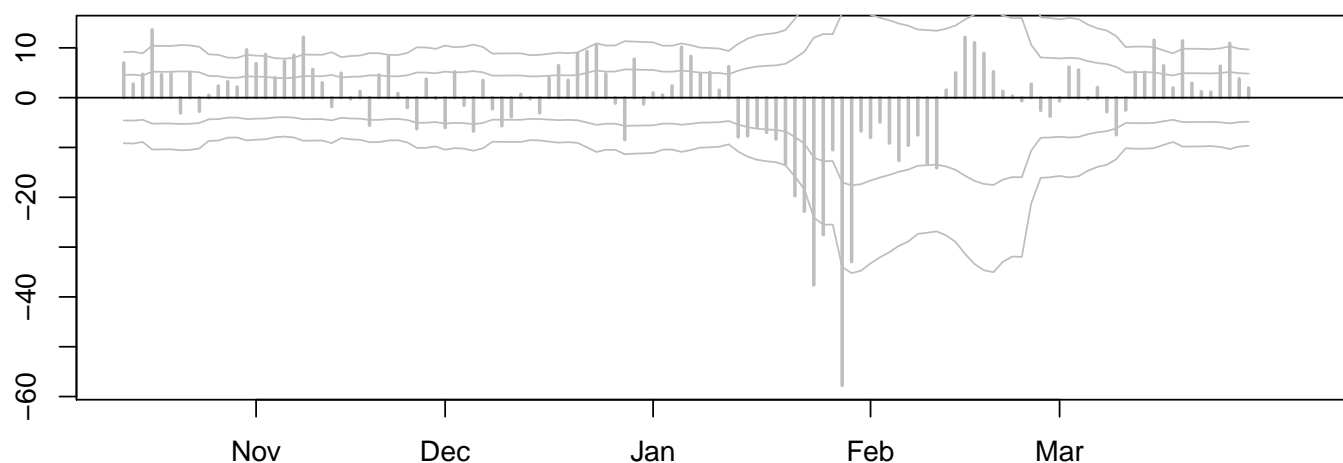
Lead 3M minus Lead Cash Spread. Last Actual: \$6, Last Modelled: \$4.

The last Actual minus Modelled Standard Deviation was 0.40. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$-1, \$8, \$17.

Pb Spread (actual: black line, modelled: blue dashed line). 29 Mar 2017
Last Values : Actual \$6, Modelled \$4.



Actual minus Modelled. Last Value = \$2 (0.40SD)



Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

The information above is the output of a mathematical model and is not investment or trading advice. Price direction and volatility may change suddenly on breaking news. Historical Price Data for Lead 3M and Lead Cash as published on the LME website. Model and SR Forecast Levels by Metal Price Analytics Ltd.

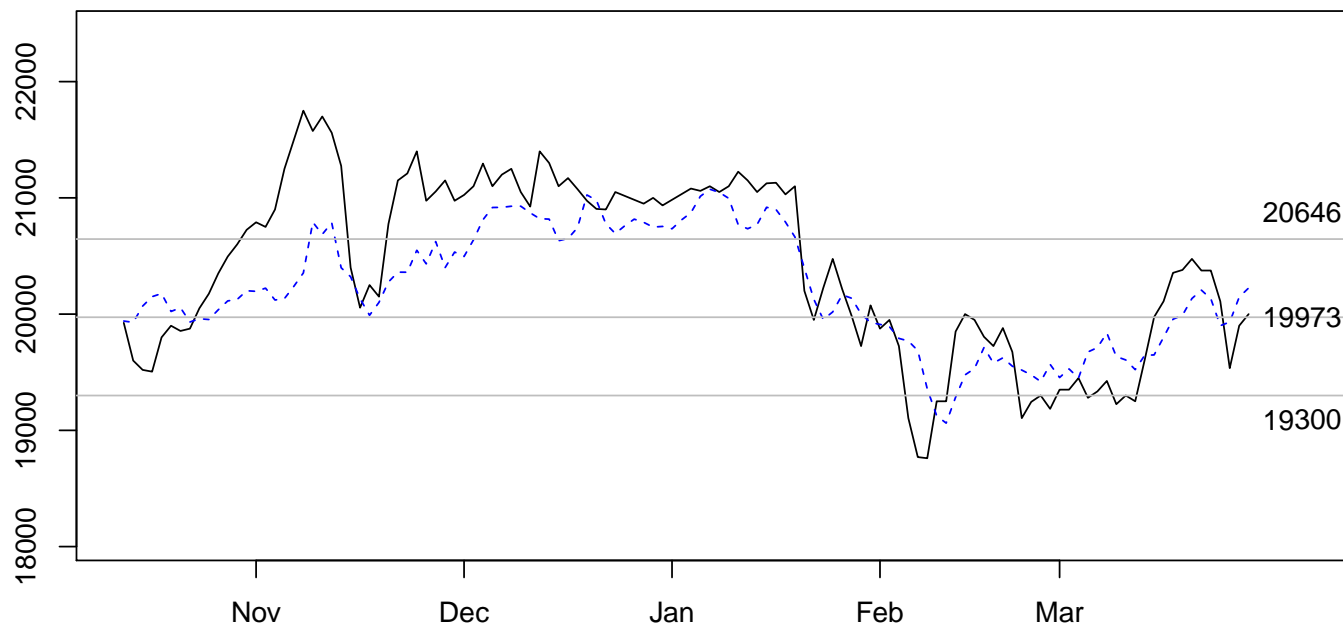
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Tin 3M. Last Actual: \$20000, Last Modelled: \$20225.

The last Actual|Modelled Momentum was 2 (bar colour green) and the last Actual minus Modelled Standard Deviation was -0.72. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$19300, \$19973, \$20646.

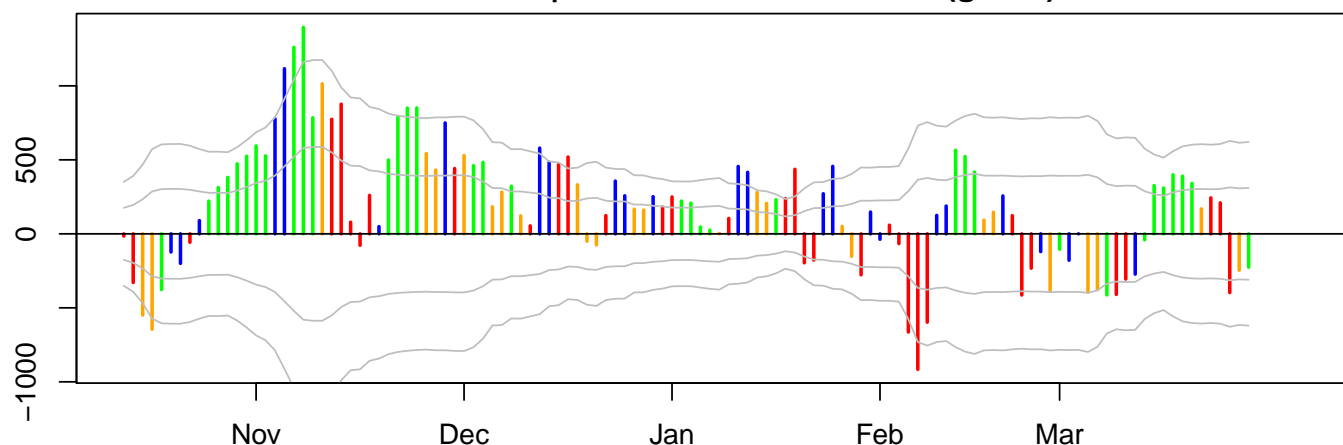
Sn3M (actual: black line, modelled: blue dashed line). 29 Mar 2017

Last Values : Actual \$20000, Modelled \$20225. RSQ = 0.75



Actual minus Modelled. Last Value = \$-225 (-0.72SD).

Last Actual | Modelled Momentum: 2 (green).



Bar Colour (Actual | Modelled Momentum) : red (-2), orange (-1), blue (1), green (2).

Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

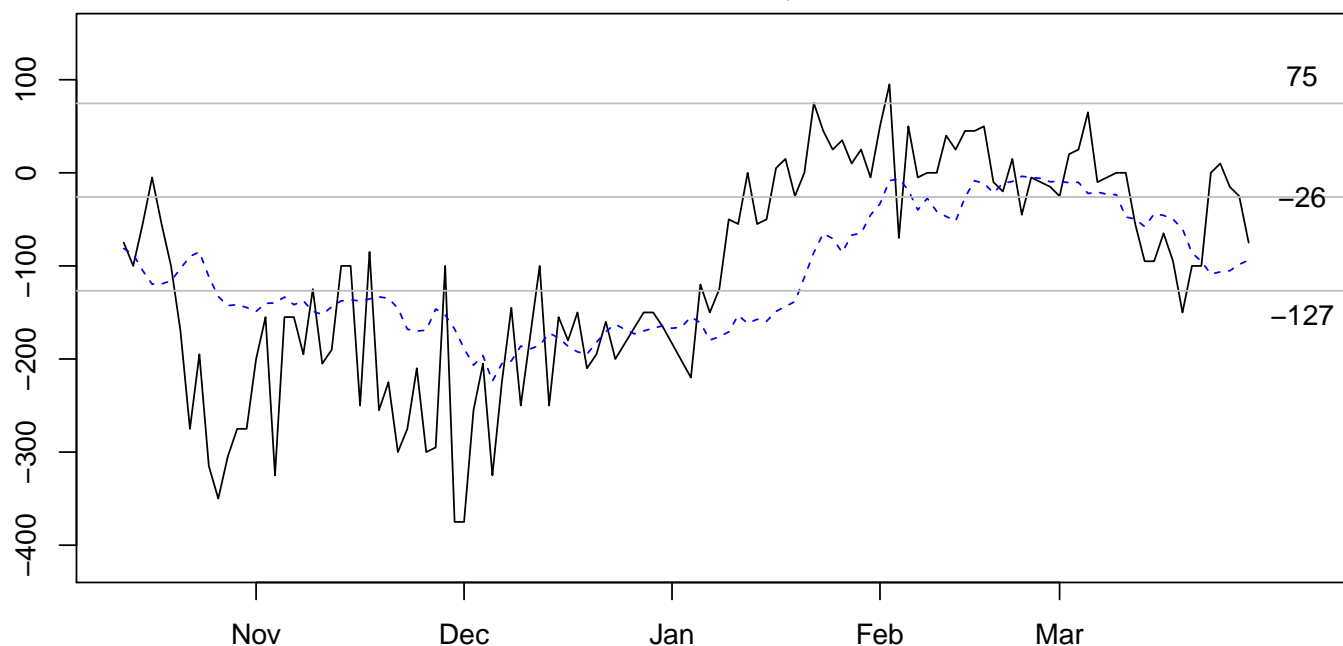
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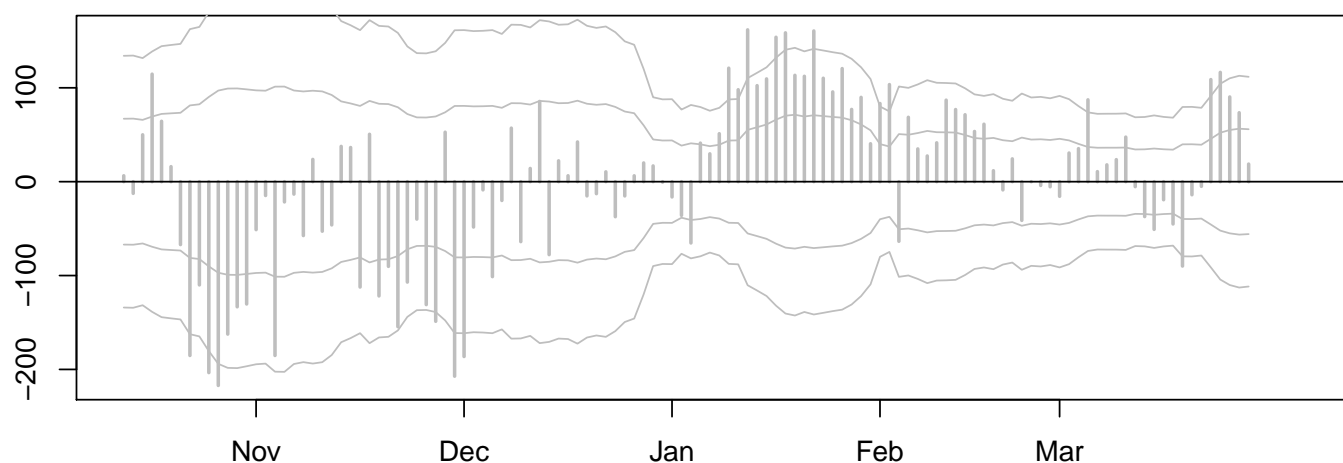
Tin 3M minus Tin Cash Spread. Last Actual: \$-75, Last Modelled: \$-94.

The last Actual minus Modelled Standard Deviation was 0.34. (When the Standard Deviation is above 2 or below -2 there is an increasing likelihood of the actual price retracing towards the modelled). The 5 Day Forecast Support, Mid and Resistance levels are: \$-127, \$-26, \$75.

Sn Spread (actual: black line, modelled: blue dashed line). 29 Mar 2017
Last Values : Actual \$-75, Modelled \$-94.



Actual minus Modelled. Last Value = \$19 (0.34SD)



Standard Deviation (SD) Lines (-2, -1, 1, 2): grey.

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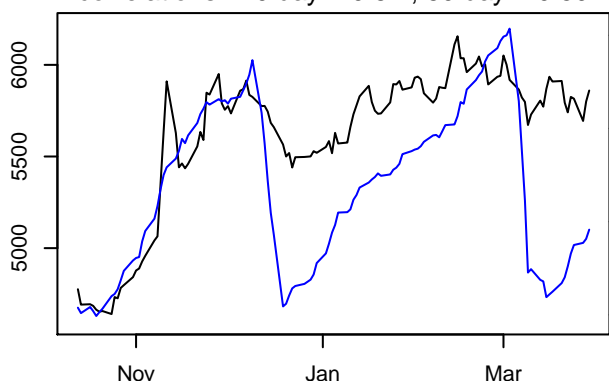
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3M Price and Opening Stock Data as published on the LME website to: 29 Mar 2017

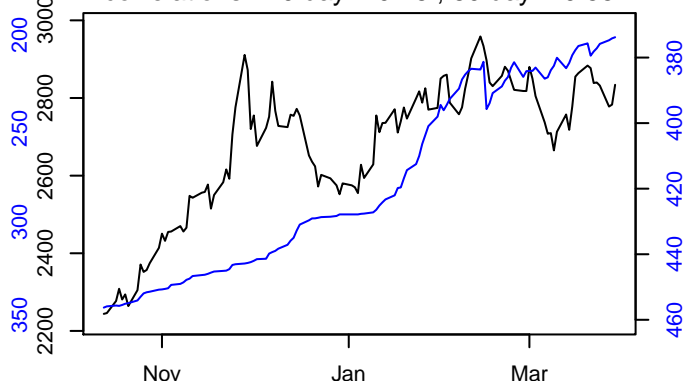
The charts below show the 3M price and LME opening stocks for Copper, Aluminium, Nickel, Zinc, Lead and Tin. For ease of comparison the LME price and stock level are plotted on the same chart. LME Price (LHS y axis, black line) and LME Stock (RHS inverted y axis, blue line).

The 120 day correlation and 60 day correlation are also shown to monitor if the LME stock contribution is increasing in importance. One would expect that the price would have an inverse relationship to LME stocks but at different times other drivers play an important role.

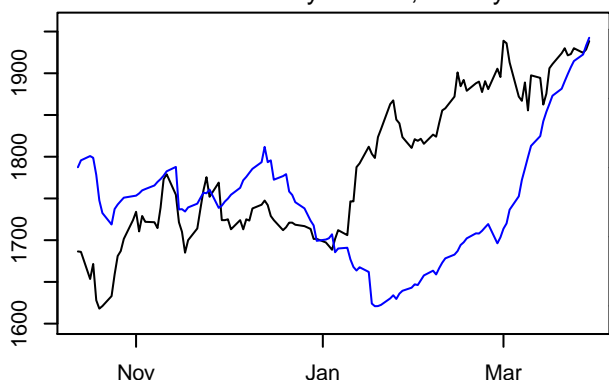
Cu3M and LME Copper Stock.
correlations 120 day: -0.64 , 60 day: -0.59



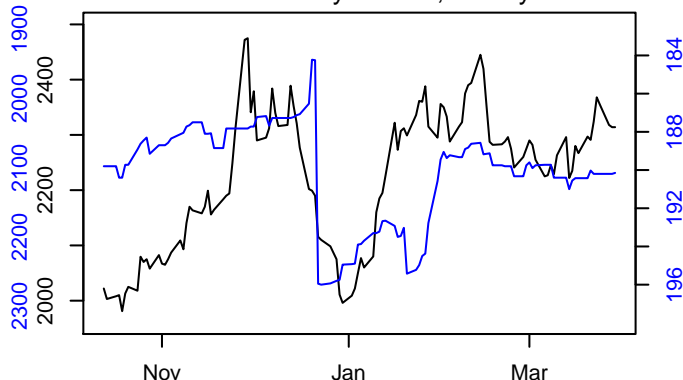
Zn3M and LME Zinc Stock.
correlations 120 day: -0.76 , 60 day: -0.55



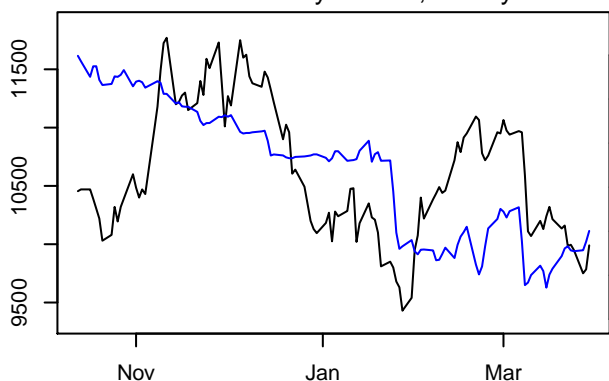
Al3M and LME Aluminium Stock.
correlations 120 day: -0.13 , 60 day: -0.62



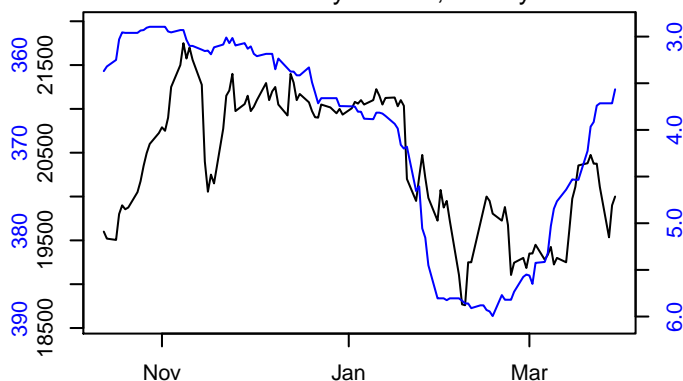
Pb3M and LME Lead Stock.
correlations 120 day: -0.23 , 60 day: -0.33



Ni3M and LME Nickel Stock.
correlations 120 day: -0.35 , 60 day: 0.07



Sn3M and LME Tin Stock.
correlations 120 day: -0.70 , 60 day: -0.69



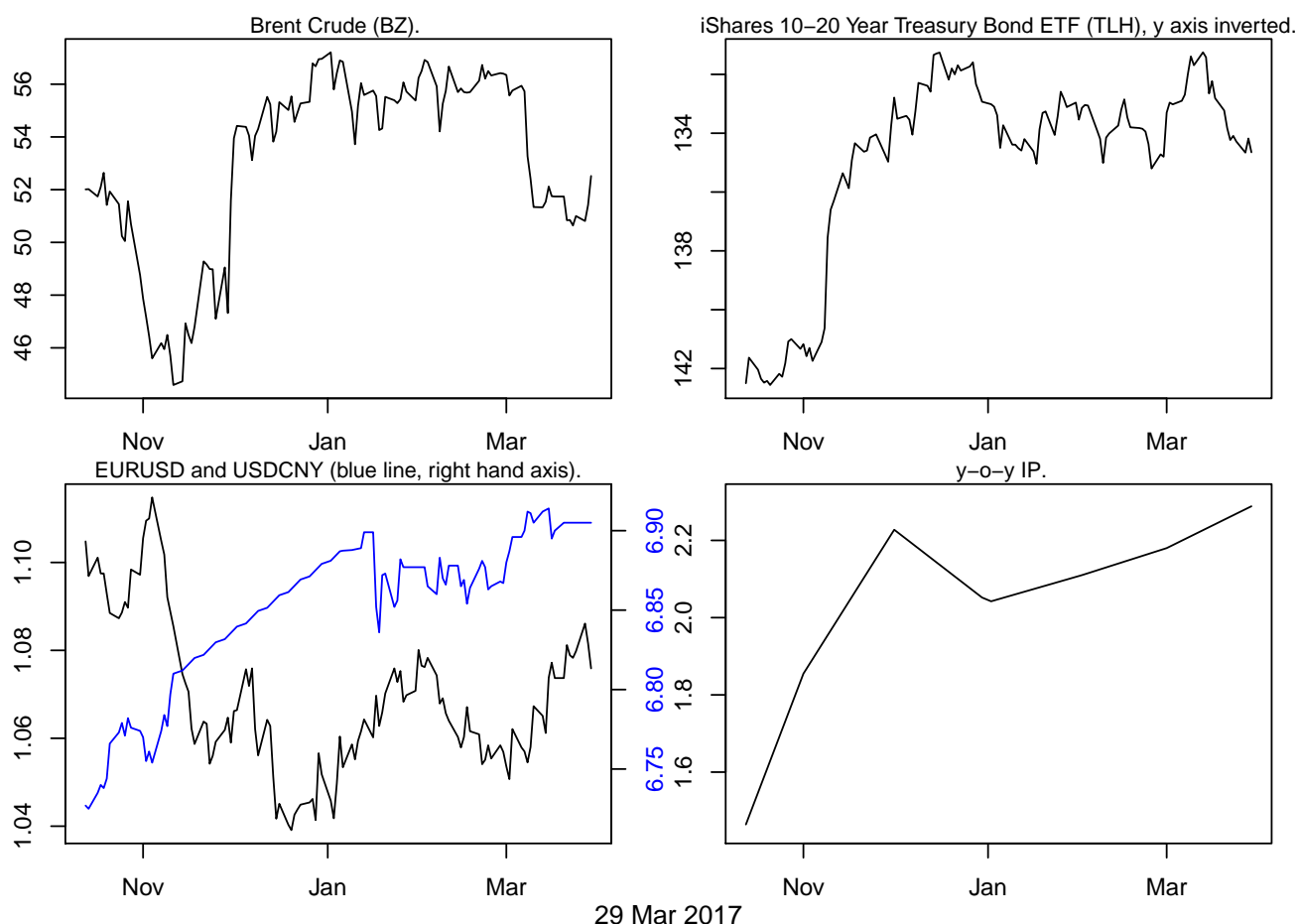
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Price Data to: 29 Mar 2017

The LME base metal prices are expected to be supported by low exchange stocks, high y-o-y global industrial production growth, high energy prices and a weak American dollar. The iShares 10-20 Year Treasury Bond price ETF

(a proxy for Treasury Bond price strength) and the Yuan may also play a contributing factor. Charts of the LME stock were shown on the previous page, charts of the other drivers considered are shown below.



LME 3M Metal Price and Drivers Correlation Tables for 120 and 60 Trading Days for Brent Crude Oil (BZ), iShares 10-20 Year Treasury Bond price ETF (TLH), EURUSD (EUR\$), USDCNY (\$CNY), y-o-y Industrial Production (yoyIP) and LME Stock (Stock).

COR 120	BZ	TLH	EUR\$	\$CNY	yoyIP	Stock
Cu	0.44	-0.85	-0.60	0.81	0.89	-0.64
Al	0.26	-0.48	-0.16	0.68	0.67	-0.13
Ni	-0.30	-0.07	-0.19	-0.25	0.13	-0.35
Zn	0.44	-0.76	-0.49	0.79	0.87	-0.76
Pb	0.23	-0.58	-0.27	0.53	0.73	-0.23
Sn	-0.29	0.00	-0.06	-0.19	-0.03	-0.70

COR 60	BZ	TLH	EUR\$	\$CNY	yoyIP	Stock
Cu	0.33	-0.06	-0.13	-0.31	0.15	-0.59
Al	-0.44	-0.19	0.22	0.24	0.84	-0.62
Ni	0.40	0.11	-0.68	-0.19	0.05	0.07
Zn	0.04	0.08	0.19	-0.21	0.31	-0.55
Pb	-0.05	-0.03	0.41	-0.26	0.19	-0.33
Sn	-0.04	0.23	0.08	0.02	-0.43	-0.69

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Appendix.

- **p1** Summary Tables and Overview.
- **p2-p13** Actual and Modelled charts.
- **p14** LME Metal 3M Price and Stock charts.
- **p15** Price Driver charts and correlation tables.
- **p16** Appendix.

The Daily Report.

The daily report looks at the LME Base Metal 3M prices and the 3M minus Cash Spreads over a period of the last 120 days. These prices are then compared to price models that are constructed from fundamental drivers that move the Base Metal prices. As supporting material, price charts of the drivers along with correlation tables are also provided.

The Price Drivers.

The Price Drivers considered by MPA for the daily models are (i) LME exchange stocks (ii) the rate of global Industrial Production growth (source CHR's "Global IP Watch"), (iii) Euro to Dollar exchange rate (EURUSD), for the strength / weakness of the dollar, (iv) the price of Brent Crude oil (BZ), energy being a significant input cost in the supply curve, (v) the iShares 10-20 Year Treasury Bond price ETF, as a proxy for Treasury Bond strength and (vi) the Dollar to Chinese Yuan Exchange Rate (USDCNY).

Summary Tables and Overview p1.

The Summary Tables at the top of page 1 summarise the model output for the LME 3M metals and spreads as shown on p2-13.

The charts at the bottom of p1 show the 120 day % change of the LME Base Metals and drivers (apart from y-o-y IP, which is shown as is). These charts provide an overview of how all the 3M metals prices are moving along with the drivers that may influence the metal prices.

Actual and Modelled Charts p2-13.

The upper chart shows the actual and modelled prices and the forecast 5 day support, mid and resistance lines. The lower chart shows the actual minus modelled price difference (coloured or grey bars) and the 20 day standard deviation grey lines (-2,-1,1,2). When the price difference is over

or under two standard deviations there is an increasing probability that the actual price will retrace towards the modelled value. In order to help determine whether the price is continuing to move away from the model or is beginning to retrace towards it, the short term momentum of the actual and modelled price is also calculated for the 3M price (Actual|Modelled momentum) and is ranked from -2 to 2. When the short term actual and modelled momentum are both down: -2 (red bar). When the short term actual momentum is down but the modelled is up: -1, (orange bar). When the short term actual momentum is up but the modelled is down: 1 (blue bar). When the short term actual momentum and the modelled are both up: 2 (green bar). The momentum is not shown in the case of the spreads as it is more useful in markets that show a persistent trend over a longer time period.

Driver Charts and Tables p14-15.

The charts of the LME exchange stocks, along with the metal 3M prices are shown on p14.

The charts of the other individual drivers are shown on p15 along with 120 day and 60 day correlation tables. The driver charts and correlation tables help to show the importance of each of the individual drivers and how their importance varies through time.

Disclaimer:

Care has been taken to present accurate information. The model outputs are mathematically generated from the relationships between the metal and selected drivers which have an influence on the price. They are not trading or investment advice. Neither Metal Price Analytics Ltd nor its staff can accept any liability for modelling uncertainty or error.

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