

Equity Markets Positioning Model

Introducing the EMP

- **The Equity Markets Positioning Model (EMP)** is a carve-out of the very successful cross-asset Citi RPM model. Here we provide a weekly visualization of positioning in equity markets and discuss its implications for investors.
- **Evaluating investor positioning** is an important analysis in any investment or portfolio management decision process as it can help identify crowded consensus views or identify critical levels of resistance/support. The EMP provides a granular view on market-level equity investor positioning while a related model – [Stock Crowding Model](#) – provides insights into stock-level crowded positions. Together they can help investors understand, both at the market and stock levels, price movements beyond fundamentals.
- **The model uses public futures data** to track when positioning changes and at what prices. The model keeps a tally of both long and short positions and this is used to build a picture of current positioning and profitability for a hypothetical marginal investor.
- **US Equity positioning remains extended long** with positions under pressure after the selloff, while last week European Equity positioning saw some long interest for the first time since spring. We also look at the historical longs in the China A50 index which may keep the index range bound.
- To subscribe to the weekly EMP register on Velocity or ask you sales contact.

NB: Futures trading involves substantial risk of loss.

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Introducing the EMP Model

The Equity Markets Positioning Model (EMP) is a carve-out of the very successful cross-asset Citi RPM model. The aim of the model is to provide information on current equity market positioning and how this might influence subsequent price action. It allows readers to ‘visualize’ the investor exposures in equity futures across multiple markets in order to:

- Quantify the current market positioning and profitability;
- Identify extreme market positions;
- Categorize periods in which price action will be dominated by positioning;

All asset class positioning (including equities) are published daily via the RPM while the EMP is published weekly for those investors specifically interested in equities.

The model calculates a ‘headline’ positioning score between -5 to 5 and provides a visualization of the current and past market. For a discussion on current positioning skip to Current Equity Market Positioning Themes.

How does the model work?

At a micro scale, price action is dominated by the size, level and speed at which investors choose to execute trades with other financial intermediaries. Buy/sell orders can clearly drive prices higher or lower and the EMP attempts to quantify these flows in order to understand the market direction and motivation.

This is a grand ambition, since there is no one market participant who holds a complete view of all market flows and we are only analyzing and aggregating futures trading to extrapolate the positioning across the whole market (i.e. including all cash trading). Based on this information we estimate:

- Market positioning: What is the outstanding market positioning (i.e. has there been net buying or selling in recent history)? At what price and size were these trades executed?
- Market P&L: What is the unrealized profit or loss within the market (given the current outstanding market positioning)? When is this a motivation for investors to risk manage their positions?

We recognize that there are limits to this analysis – incomplete trade visibility, opaque instruments and unknown investor trading strategies create uncertainty in the ‘true’ picture of high-level equity market positioning.

The EMP model calculates the historical equity market positioning (over the last 3mths) and the associated unrealized P&L for the main markets around the world. A breakdown of the assets and contracts used in the EMP are presented in Figure 1 and the calculation methodology is outlined below.

Figure 1. Equity Markets covered by EMP Model

	US	Germany	UK	Europe (€)	US Tech	Japan	Developed World	Emerging Markets
Index	S&P 500	DAX	FTSE 100	ESTOXX50	Nasdaq	Nikkei	MSCI World ex US	MSCI EM
Code	ES	GX	Z	VG	NQ	NI	MFS	MES

Source: Citi Research

NB: Futures trading involves substantial risk of loss.

Positioning Calculations

The model identifies an objective subset of positions entered into (or closed) on a given day and classify these as being the relevant marginal long or short positions that determined the price move that day (thought of as the 'aggressor' and marginal investor). In the report and in our analysis we will simply refer to these positions as longs, shorts and net position, but this will always be a reference to this concept of a marginal positioning. The presumption is then that this subset of marginal positions are the most price sensitive, i.e. more likely to generate new flows (e.g. profit taking or squeezes) in response to future price moves.

In practice the model uses public trade activity data on the exchange traded futures contracts which is available daily (on the following trading day). Naturally, net positioning is always zero for futures, since the exchange matches buyers and sellers and creates and cancels contracts as necessary. However, by tracking the daily *changes* in overall open interest (the number of contracts after the exchange create or cancels contracts) and combining that measure with the change in price we can make a classification for the marginal positioning change on that day as set out in Figure 2. The change in open interest is essentially taken as the relevant change in positions that day and the table determines whether it relates to long or short positions.

Figure 2. Positioning Matrix for Futures Markets

		Open Interest			
		Increasing		Decreasing	
Daily Prices	Increasing	New Longs	Rising prices and increasing open interest implies the 'aggressor' is the buyer pushing the market higher	Cover Shorts	Rising prices and decreasing open interest implies the 'aggressor' is covering shorts (i.e. buying into the rally)
	Decreasing	New Shorts	Falling prices and increasing open interest implies the 'aggressor' is the seller pushing the market lower	Cover Longs	Falling prices and decreasing open interest implies the 'aggressor' is covering longs (i.e. selling into the sell-off)

Source: Citi Research

Performing this analysis on a day by day basis creates a 'trade activity' history over a three month period which can be converted into a snapshot of cumulative positioning and unrealized P&L. To illustrate the methodology, it is useful to look at a worked example. In Figure 3, we present these calculations for S&P 500 futures in early March 2020.

In this period, open interest increased and prices fell, suggesting an increase in the short investor base. The model shows numerous days where new short positions have been opened and relatively few where long positions have been established, in addition to covering for some long and short positions. At the end of the period the cumulative uncovered positions and P&L is simply the sum of the outstanding positions / P&L (see "total" in Figure 3— cumulative positions equate to -459,041 contracts and \$868m in of unrealized P&L).

This positioning can be visualized as a horizontal bar graph ordered by price (see Figure 4). It can be clearly seen that the shorts were centered around 2740-2750 and the positions were significantly in the money. This contrasts with the big long position at 2696 which with a falling market was in a losing position. This snapshot of positioning can be summarized by the cumulative position and unrealized P&L levels.

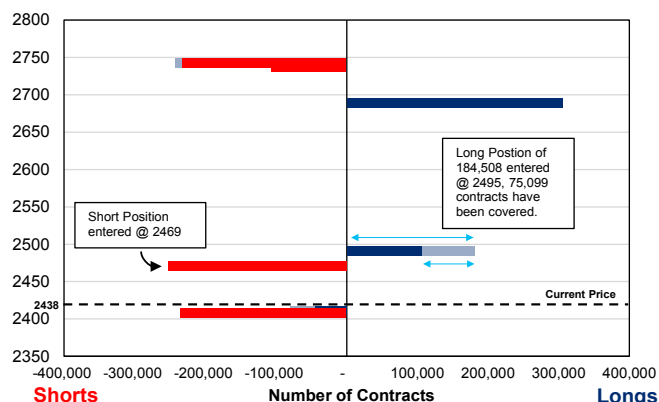
NB: Futures trading involves substantial risk of loss.

Figure 3. Example of positioning for S&P500 during March 2020.

Date	Trade Price	Open Interest	Delta Price	Delta Interest	Trade Activity	Contract Buy/Sell	Cum. Pos.	P&L Snapshot (\$ mil)
06-Mar	2964.0	3,213,000						
09-Mar	2747.8	3,442,251	-7.3%	229,251	New Short	-229,251	-229,251	3,551
10-Mar	2865.8	3,438,501	4.3%	-3,750	Cover Short	3,750	-225,501	-58
11-Mar	2740.3	3,549,717	-4.4%	111,216	New Short	-111,216	-336,717	1,681
12-Mar	2469.0	3,808,784	-9.9%	259,067	New Short	-259,067	-595,784	402
13-Mar	2696.0	4,124,586	9.2%	315,802	New Long	315,802	-279,982	-4,074
16-Mar	2416.3	4,369,586	-10.4%	245,000	New Short	-245,000	-524,982	-266
17-Mar	2495.5	4,554,094	3.3%	184,508	New Long	184,508	-340,474	-531
18-Mar	2414.0	4,628,421	-3.3%	74,327	New Short	-74,327	-414,801	-89
19-Mar	2403.3	4,553,322	-0.4%	-75,099	Cover Long	-75,099	-489,900	216
20-Mar	2438.0	4,522,463	1.4%	-30,859	Cover Short	30,859	-459,041	37
Total							-459,041	868

Source: Citi Research. Futures trading involves substantial risk of loss.

Figure 4. Example visualization of positioning.



Source: Citi Research. Futures trading involves substantial risk of loss.

In EMP, the daily volume weighted average price (VWAP) is used in the calculations (rather than closing prices), since it creates more robust results. In addition, the EMP model chooses to cover trades that have the maximum economic impact (i.e. trades with the largest gains or losses are closed out first). However, in every other aspect, the methodology is identical to the one presented above.

Finally, the reported numbers in the EMP model are normalized into a range from -5 to +5 (representing large shorts / losses to large longs / profits) in order to compare across asset / instruments.

What output is generated by EMP?

The EMP model provides a snapshot of the current positioning (see Figure 5 to Figure 7). These tables summarize the outstanding exposure and unrealized P&L (for a 3mth period in both futures and ETFs). RPM calculates position in 10yr rates, curves and cross market assets.

Typical output is shown in Figure 5 for cross equity market positioning in futures. In this illustration, investors are currently neutral Eurostoxx 50 contracts. Across most markets and including in MSCI EM futures, investors are on average facing small losses on their positions.

Figure 5. Example of Equity Market Positioning and PnL

All metrics in table are normalised between +5 and -5

Investors currently net long S&P 500 Emini futures

Investors currently neutral EuroStoxx 50

		S&P 500	DAX	FTSE 100	Estoxx 50	Nasdaq	Nikkei	MSCI World ex-US	MSCI EM
	10/09/2020	ES	GX	Z	VG	NQ	NI	MFS	MES
Normalised Scores (-5 / +5)									
Positioning	Future	1.0	0.2	1.2	0.1	5.0	0.8	-1.7	0.7
	ETF	1.5	1.1	-0.5	0.6	1.6	0.9		0.9
	3m Net Pos	1.2	0.6	0.3	0.4	3.3	0.9	-1.7	0.8
	1w Change	-1.0	0.0	0.1	-0.0	-0.8	-0.2	-0.9	-0.7
P&L	Future	-0.4	0.0	-0.3	-0.0	-0.5	0.2	0.3	-0.4
	ETF	1.9	1.5	-0.5	0.7	1.7	1.1		1.1
	3m Net PnL	0.7	0.7	-0.4	0.4	0.6	0.6	0.3	0.3
	1w Change	-1.7	-0.1	0.2	-0.1	-3.7	-0.2	0.3	-1.2

Investors are sitting on small losses in MSCI EM

Source: Citi Research. Note: Futures trading involves substantial risk of loss.

In addition we further breakdown market positioning by analyzing both long and short positions, the average entry price and the position relative to trading over the past three months (Figure 6).

Figure 6. Example of Breakdown of Market Positioning

Net Notional = Longs minus Shorts (in \$blns)

Percentile refers to positioning relative to past 3 years

% Offside refers to what percentage of shorts are below Ref price – indicates risk of short squeeze if market rallies. Opposite for Longs

		S&P 500	DAX	FTSE 100	Estoxx 50	Nasdaq	Nikkei	MSCI World ex-US	MSCI EM
	10/09/2020	ES	GX	Z	VG	NQ	NI	MFS	MES
Futures	Net Notional	18.4	0.5	2.8	1.3	13.0	0.9	-2.6	2.3
	Percentile	55%	45%	56%	39%	100%	54%	5%	51%
Shorts	Notional	-4.5	-1.5	-3.8	-2.1	-2.7	-1.5	-2.6	-0.8
	Percentile	16%	39%	79%	31%	47%	28%	77%	25%
	Avg. Entry	3,381	13,001	6,111	3,307	11,233	23,090	1,895	1,087
	% offside	0%	100%	3%	100%	22%	92%	23%	21%
Longs	Notional	23.0	2.0	6.6	3.4	15.6	2.4	-0.0	3.1
	Percentile	30%	32%	75%	19%	100%	27%	0%	26%
	Avg. Entry	3,399	13,053	6,081	3,316	11,228	23,008	--	1,097
	% offside	85%	0%	86%	0%	54%	19%	--	100%
Ref Price		3,341	13,259	5,990	3,328	11,174	23,230	1,876	1,075
Activity	1-day	4.5	0.1	0.0	2.5	1.9	-0.4	0.0	0.0
	Type	shorts	longs	longs	longs	longs	shorts	shorts	shorts
	1-week	-10.0	0.6	0.3	1.7	1.9	-0.1	0.1	0.7

Average entry price over past 3 months

1 day trading activity in \$blns. Negative (positive) means risks is being cut (added)

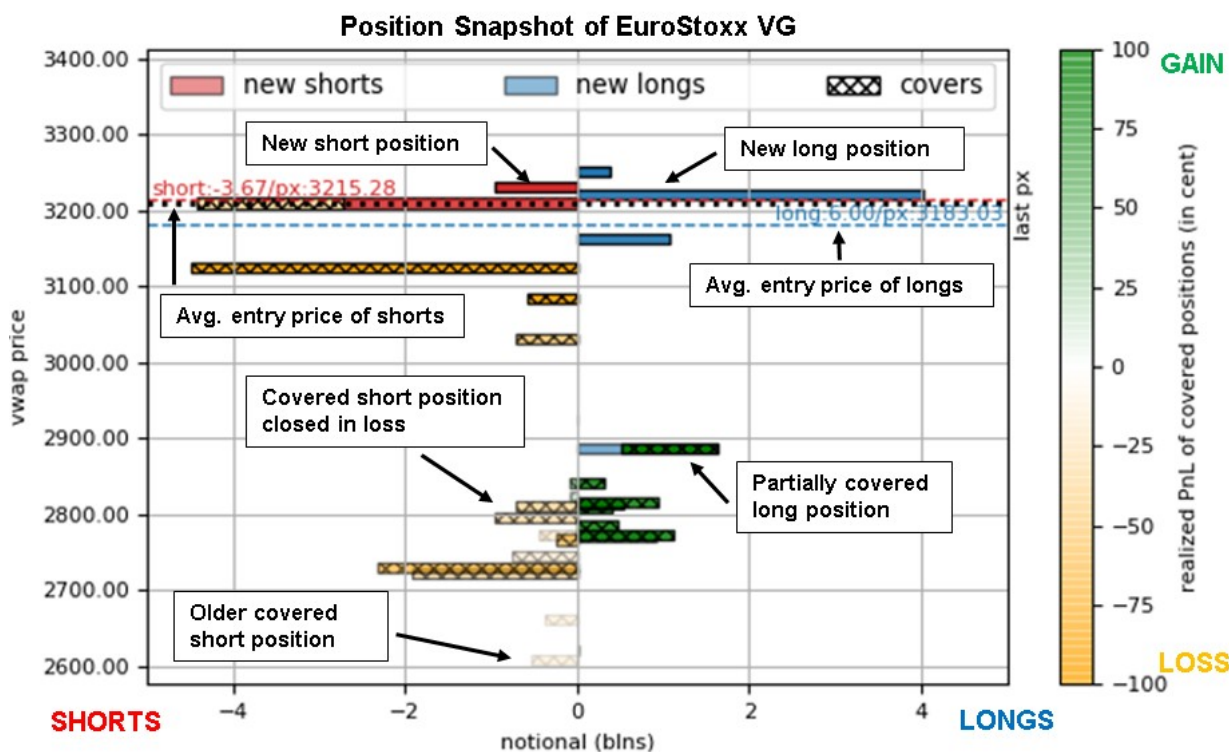
Defines what side the risk is being traded

1 week cumulative trading flow

Source: Citi Research. Note: Futures trading involves substantial risk of loss.

Lastly, a complete visualization of the positioning is presented in Figure 7. This shows the current positioning ordered by VWAP prices over a 3 month period. The bars in the chart illustrate the level at which trades were executed (red = short positions and blue = long positions). The lighter bars imply older trade activity. When a trade is covered the bar is hashed with XXX and the color of the shading represents if it was covered at a gain or loss (yellow=loss, green=gain). The horizontal red and blue dotted lines show the respective average entry price of contracts over the past three months.

Figure 7. Example Snapshot of Position in EuroStoxx Futures – Not Current



Source: Citi Research. Futures trading involves substantial risk of loss.

Current Equity Market Positioning Themes

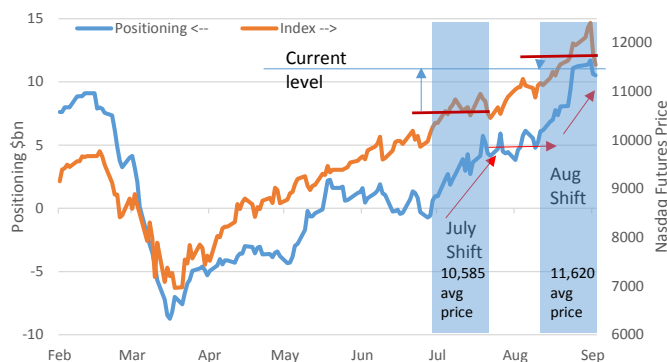
US

The Nasdaq futures price may not have recovered from last week's sell off (trading sideways instead), but positioning has already moved to set new record longs again. Coming in to the selloff investors were carrying an extended net long exposure to the Nasdaq with both positioning and profits much larger than ever seen before in RPM. Through the correction we saw large long unwinds, implying that this was driven by profit taking. The combined effect of the profit taking and sell off is that remaining longs are still historically extremely extended has given up all profits around the current market level (futures around 11,215).

At 11,230, half of longs are offside split between the early and the late entrants. The first round of entries (longs) in July had an average index level of 10,585 and are still in profit relative to the current 11,200 range while those in the second round had an average index level of 11,620 and will be in loss (Figure 8).

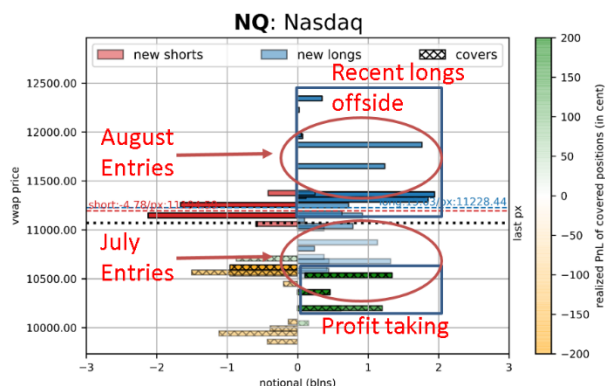
The next key level to the upside is 11,360 where less than 25% of longs are offside and the pressure on the large long positions will have materially eased and support further extension. But currently positioning remains very extended and under some pressure, leading to an asymmetric risk profile of further long unwinds as we go in to the roll week.

Figure 8. Nasdaq Unprecedented Consensus Long Building



Source: Citi Research & Bloomberg Note: Futures trading involves substantial risk of loss.

Figure 9. Position over for Nasdaq Futures – 10/9/2020



Source: Citi Research & Bloomberg Note: Futures trading involves substantial risk of loss.

S&P 500 futures is a much more traded contract and currently positioning is less extended by historical standards than the Nasdaq. Still, futures positioning here is also long and recent long positions are in loss after markets retraced last week. Last week saw a large shift reducing this net long by \$10bn. Remaining longs are still under pressure with over half of positions offside below 3370.

The lighter positioning leaves room for new longs from investors looking to deploy cash on a dip. Momentum recovers above 3,420 where profits are building and more than 75% of longs onside. Meanwhile, the risk is that investors seek to cover losses or protect remaining profits by unwinding more longs which instead could drive the market lower again. The critical level is 3,345, below which more than 75% of longs offside and pressure to unwind further is building

Interestingly and in contrast to futures positioning, ETF inflows to US equities were particularly strong back in May but have remained negligible since. Additionally these ETFs have not seen strong inflows in the recent weeks of rally. As a result there is a larger profit buffer on the mark to market of ETF positions and less immediate pressure to unwind. However, the inflows in May were large by historical standards and should investors believe that momentum has turned negative and want to reduce the long positions the reversal flows could significantly add to the negative pressure on both indices.

Europe

Current positioning is much more balanced in Europe. Both Eurostoxx 50 and DAX have been largely neutral all through the summer months, but saw early signs of long interest last week and the longs are in profit above 3,315 / 13,050, respectively.

FTSE 100 has seen support recently and is moderately long. However, these longs are under some pressure with more than 75% of positions (\$5bn) in loss below 6,030. Watch for a break above 6,150 which will ease the pressure on longs and see profits building.

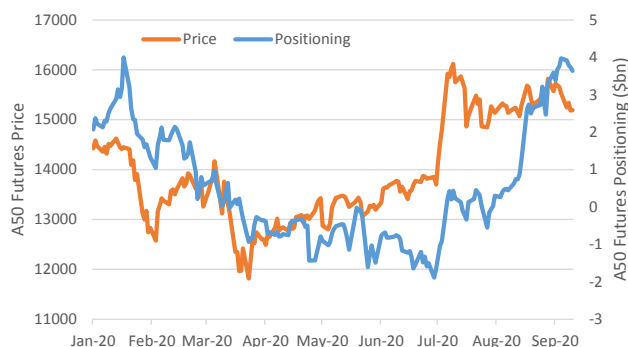
China

The sharp rally in China A50 in early July caught out investors who were net short the market. The ensuing short squeeze likely contributed to the size of the rally, but left investors only neutrally positioned at the end. Since then investors have been building up to what is now a near historical record net long position. Since the market has been trading range bound in this period, investors are left without profit or loss on average.

It is unclear why the momentum in positioning has not driven more performance of the market. A possible explanation is that the A50 is largely retail driven (as our Asia team notes in [Searching for Alpha - China A Alpha – Sector-relative Value Is Powerful, Choose Sector Mappings Wisely](#)), while the futures market mainly indicates institutional positioning. Fund flows (Figure 11) through Stock Connect Northbound flows, which monitor retail activity paints a similar picture, with strong retail building up since March, but tapering off from mid-July.

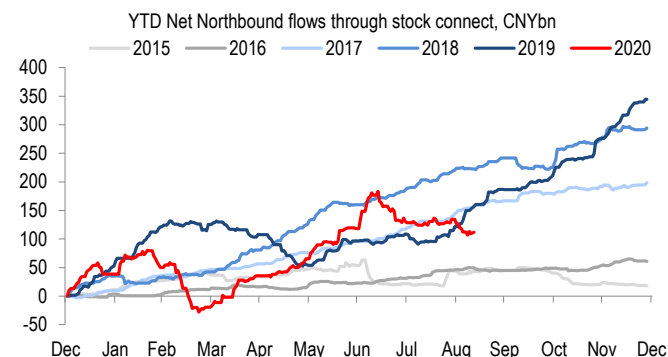
This means positioning supports continued range bound trading but with an asymmetric risk to the downside as positioning already is very extended long. If the futures break below 15,215 more than 75% of these longs are offside and under high pressure to unwind and limit losses. Meanwhile, if the market moves above 15,500 positive momentum may be regained as less than 25% of positions would be offside.

Figure 10. A50 Futures Positioning and Price, YTD



Source: Citi Research. Futures trading involves substantial risk of loss.

Figure 11. Retail Investor (China North Bound) Flows



Source: CEIC, Citi Research

Figure 12. Equity Futures Positioning Ranked

10/09/2020	By Position			By 1w change				By PnL				By Position	
	Pos	PnL		Change	Pos	PnL		PnL	Pos	Percentile			
Nasdaq	5.0	-0.5	VIX	0.7	0.2	0.1	DM xUS	0.3	-1.7	Nasdaq	100%		
China A50	4.6	-0.8	DAX	0.3	0.2	0.0	Nikkei	0.2	0.8	China A50	99%		
FTSE	1.2	-0.3	Nasdaq	0.3	5.0	-0.5	VIX	0.1	0.2	Vstoxx	82%		
S&P Mini	1.0	-0.4	Vstoxx	0.2	0.5	-0.4	DAX	0.0	0.2	VIX	77%		
Nikkei	0.8	0.2	EuroStoxx	0.2	0.1	0.0	EuroStoxx	0.0	0.1	FTSE	56%		
MSCI EM	0.7	-0.4	FTSE	0.1	1.2	-0.3	FTSE	-0.3	1.2	S&P Mini	55%		
Vstoxx	0.5	-0.4	Nikkei	-0.3	0.8	0.2	MSCI EM	-0.4	0.7	Nikkei	54%		
DAX	0.2	0.0	China A50	-0.4	4.6	-0.8	S&P Mini	-0.4	1.0	MSCI EM	51%		
VIX	0.2	0.1	S&P Mini	-0.7	1.0	-0.4	Vstoxx	-0.4	0.5	DAX	45%		
EuroStoxx	0.1	0.0	DM xUS	-0.9	-1.7	0.3	Nasdaq	-0.5	5.0	EuroStoxx	39%		
DM xUS	-1.7	0.3	MSCI EM	-1.2	0.7	-0.4	China A50	-0.8	4.6	DM xUS	5%		

Source: Citi Research Note: Futures trading involves substantial risk of loss.
Futures trading involves substantial risk of loss.

Figure 13. Equity Markets - Summary Table of Current Positioning in Futures and ETF

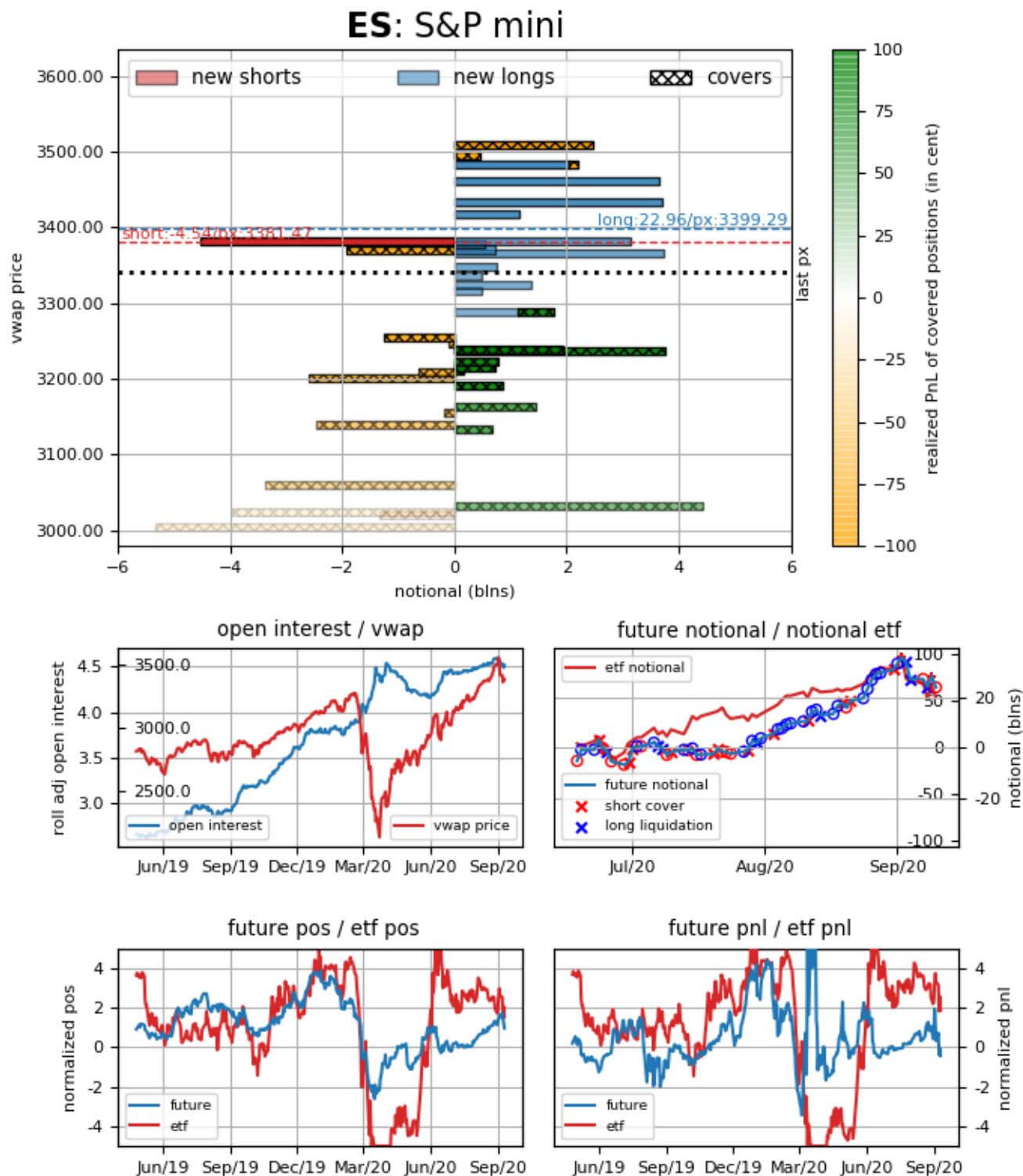
		S&P 500	DAX	FTSE 100	Estoxx 50	Nasdaq	Nikkei	MSCI World ex-US	MSCI EM
(\$bn)	10/09/2020	ES	GX	Z	VG	NQ	NI	MFS	MES
Futures	Net Notional	18.4	0.5	2.8	1.3	13.0	0.9	-2.6	2.3
	Percentile	55%	45%	56%	39%	100%	54%	5%	51%
Shorts	Notional	-4.5	-1.5	-3.8	-2.1	-2.7	-1.5	-2.6	-0.8
	Percentile	16%	39%	79%	31%	47%	28%	77%	25%
	Avg. Entry	3,381	13,001	6,111	3,307	11,233	23,090	1,895	1,087
	% offside	0%	100%	3%	100%	22%	92%	23%	21%
Longs	Notional	23.0	2.0	6.6	3.4	15.6	2.4	-0.0	3.1
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	Ref Price	3,341	13,259	5,990	3,328	11,174	23,230	1,876	1,075
Activity	1-day	4.5	0.1	0.0	2.5	1.9	-0.4	0.0	0.0
	Type	shorts	longs	longs	longs	longs	shorts	shorts	shorts
	1-week	↓ -10.0	↗ 0.6	↗ 0.3	↗ 1.7	↗ 1.9	↘ -0.1	↗ 0.1	↗ 0.7
Normalised Scores (-5 / +5)									
Positioning	Future	1.0	0.2	1.2	0.1	5.0	0.8	-1.7	0.7
	ETF	1.5	1.1	-0.5	0.6	1.6	0.9		0.9
	3m Net Pos	1.2	0.6	0.3	0.4	3.3	0.9	-1.7	0.8
	1w Change	-1.0	0.0	0.1	-0.0	-0.8	-0.2	-0.9	-0.7
P&L	Future	-0.4	0.0	-0.3	-0.0	-0.5	0.2	0.3	-0.4
	ETF	1.9	1.5	-0.5	0.7	1.7	1.1		1.1
	3m Net PnL	0.7	0.7	-0.4	0.4	0.6	0.6	0.3	0.3
	1w Change	-1.7	-0.1	0.2	-0.1	-3.7	-0.2	0.3	-1.2

Source: Citi Research, Futures trading involves substantial risk of loss.

Equity Market Positioning Charts

S&P 500

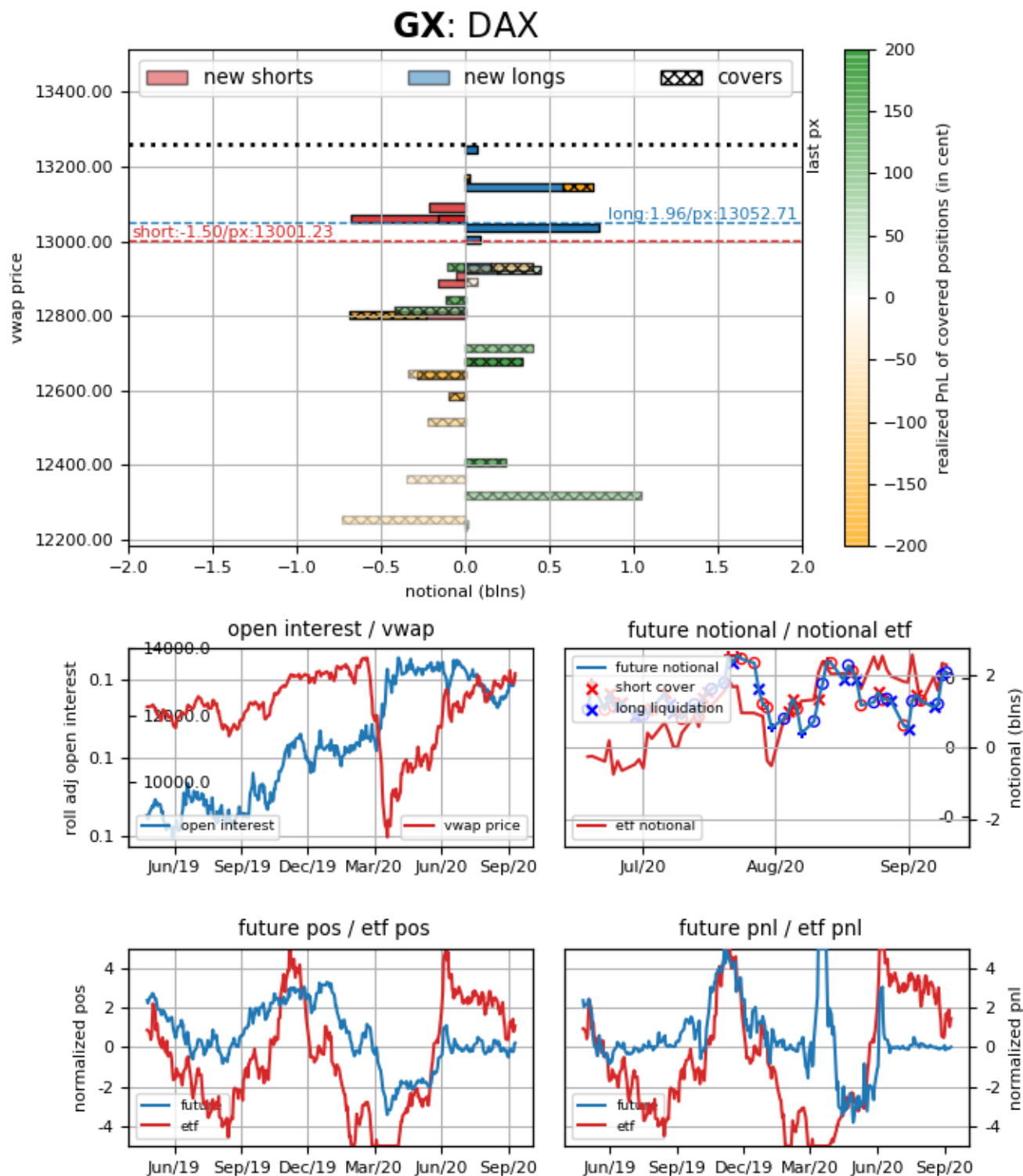
Figure 14. S&P 500 mini contract (ES) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

DAX

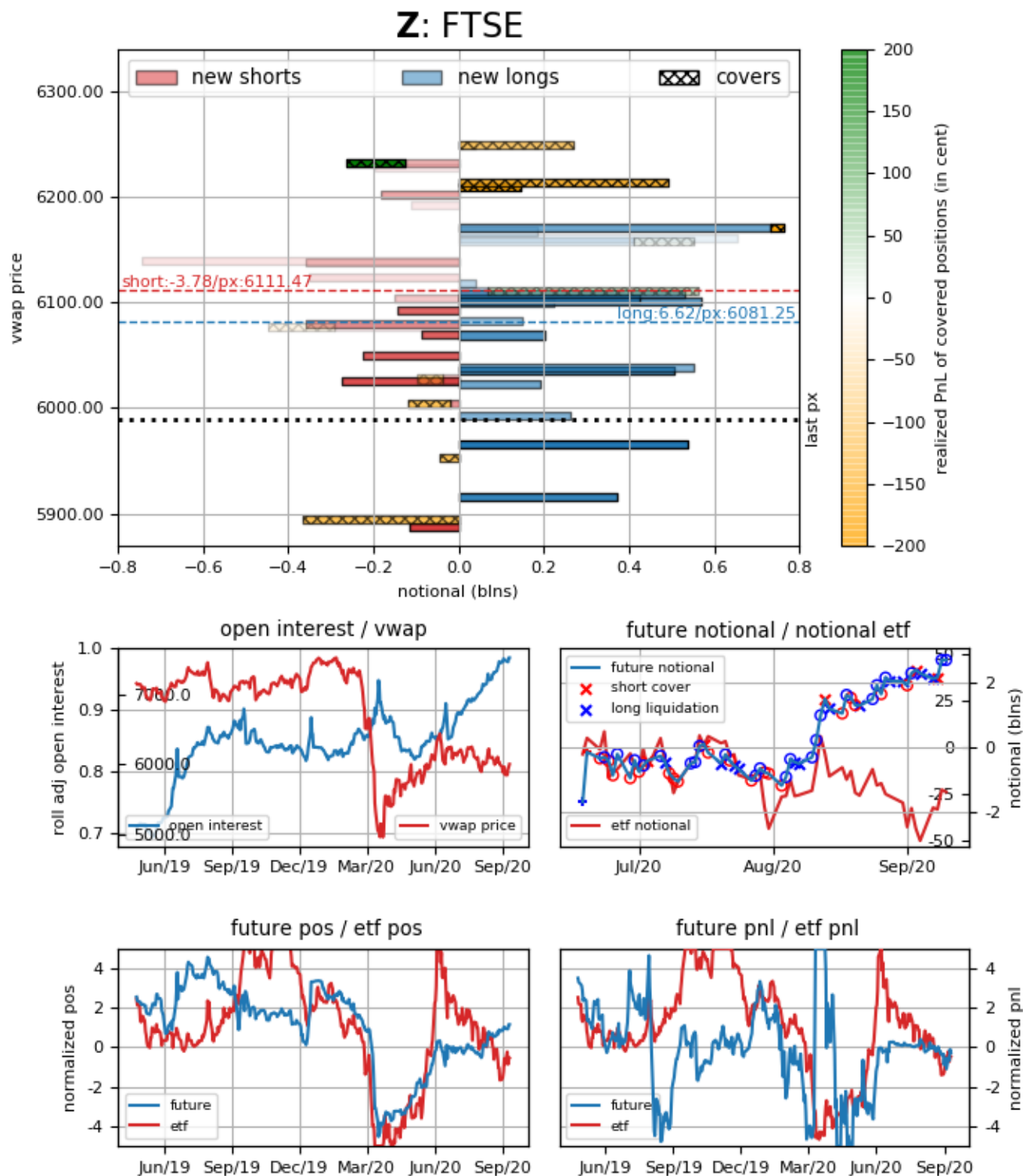
Figure 15. DAX contracts (GX) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

FTSE 100

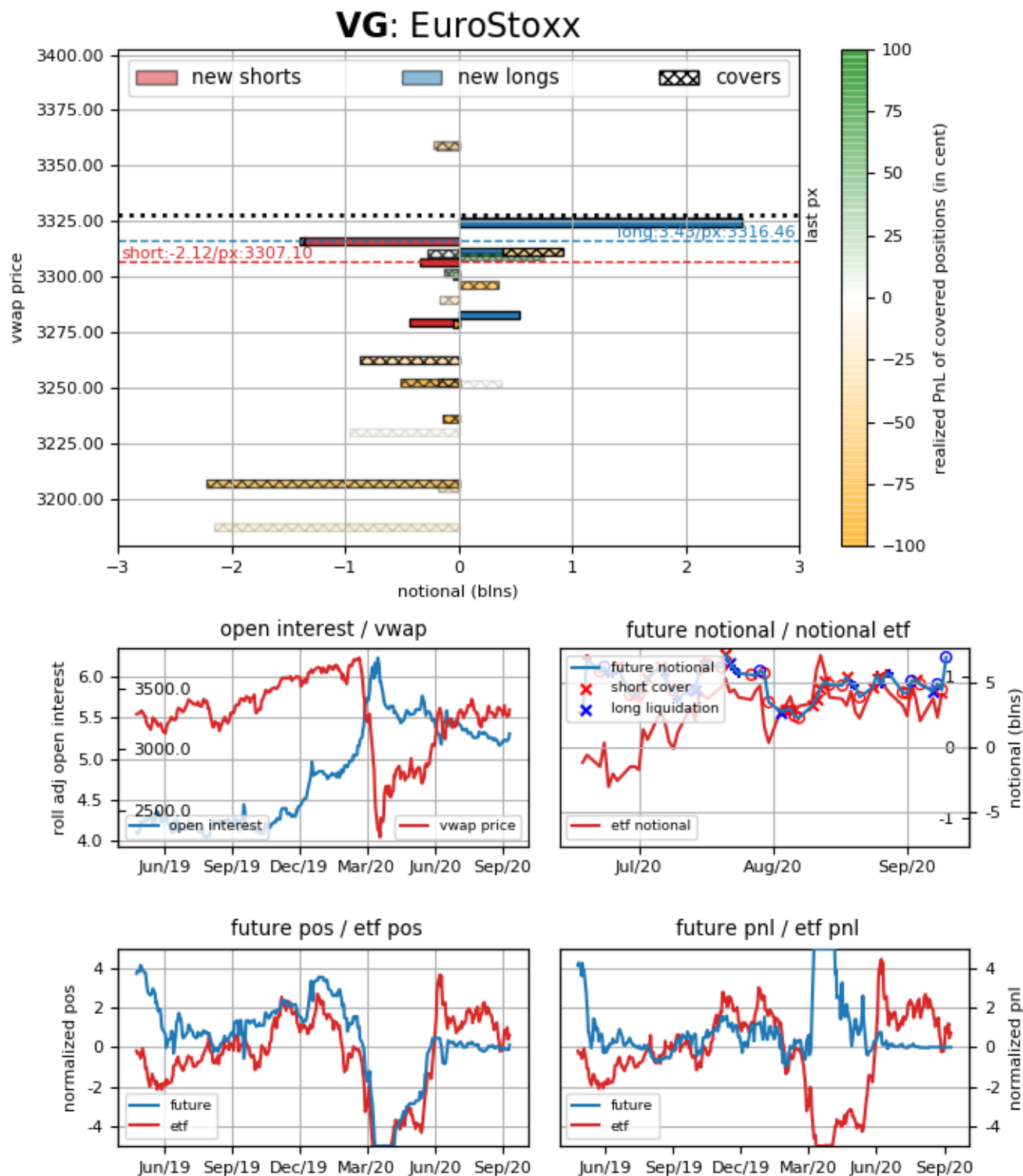
Figure 16. FTSE100 contracts (Z) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

EuroStoxx

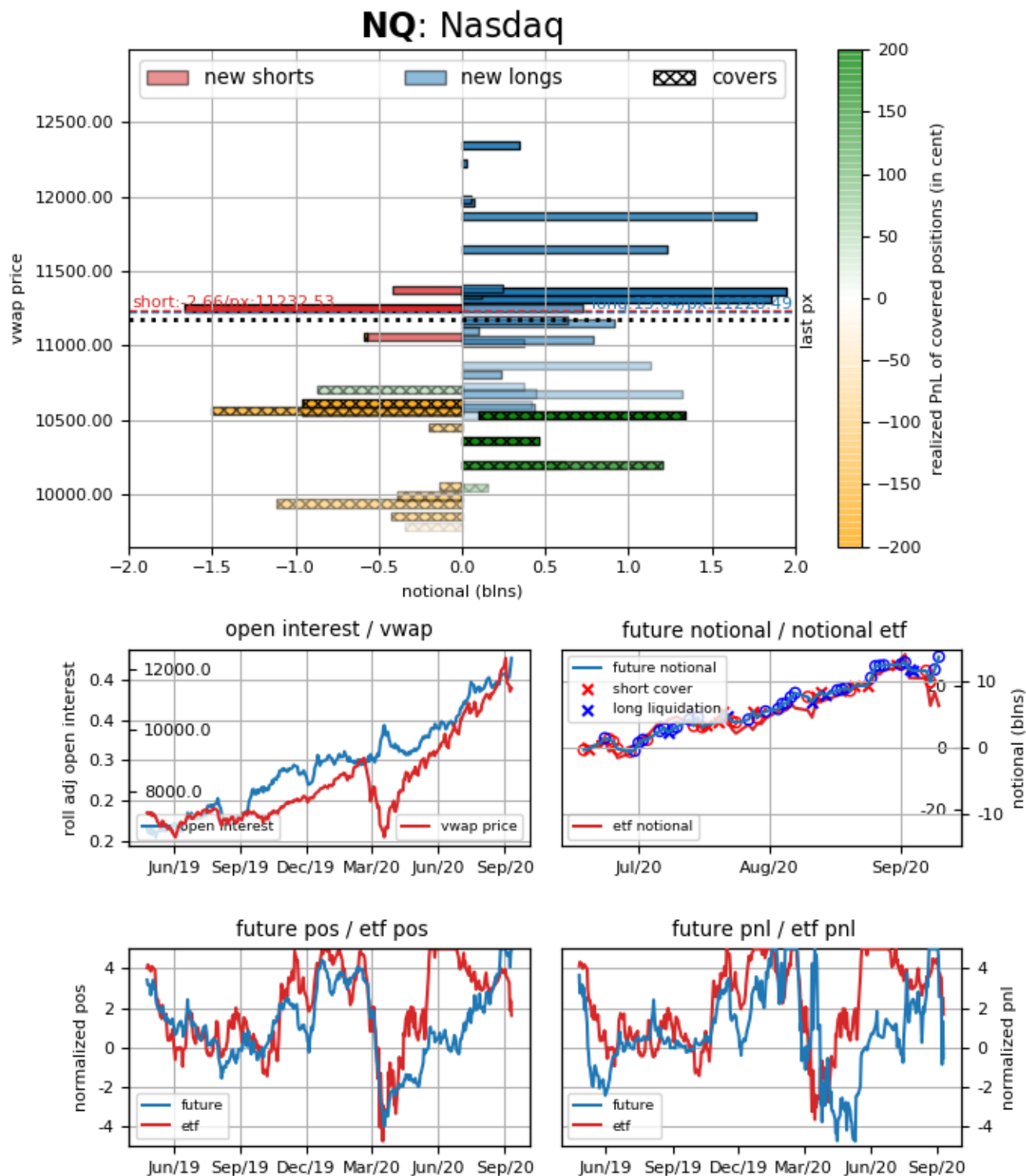
Figure 17. Eurostoxx50 contracts (VG) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

NASDAQ

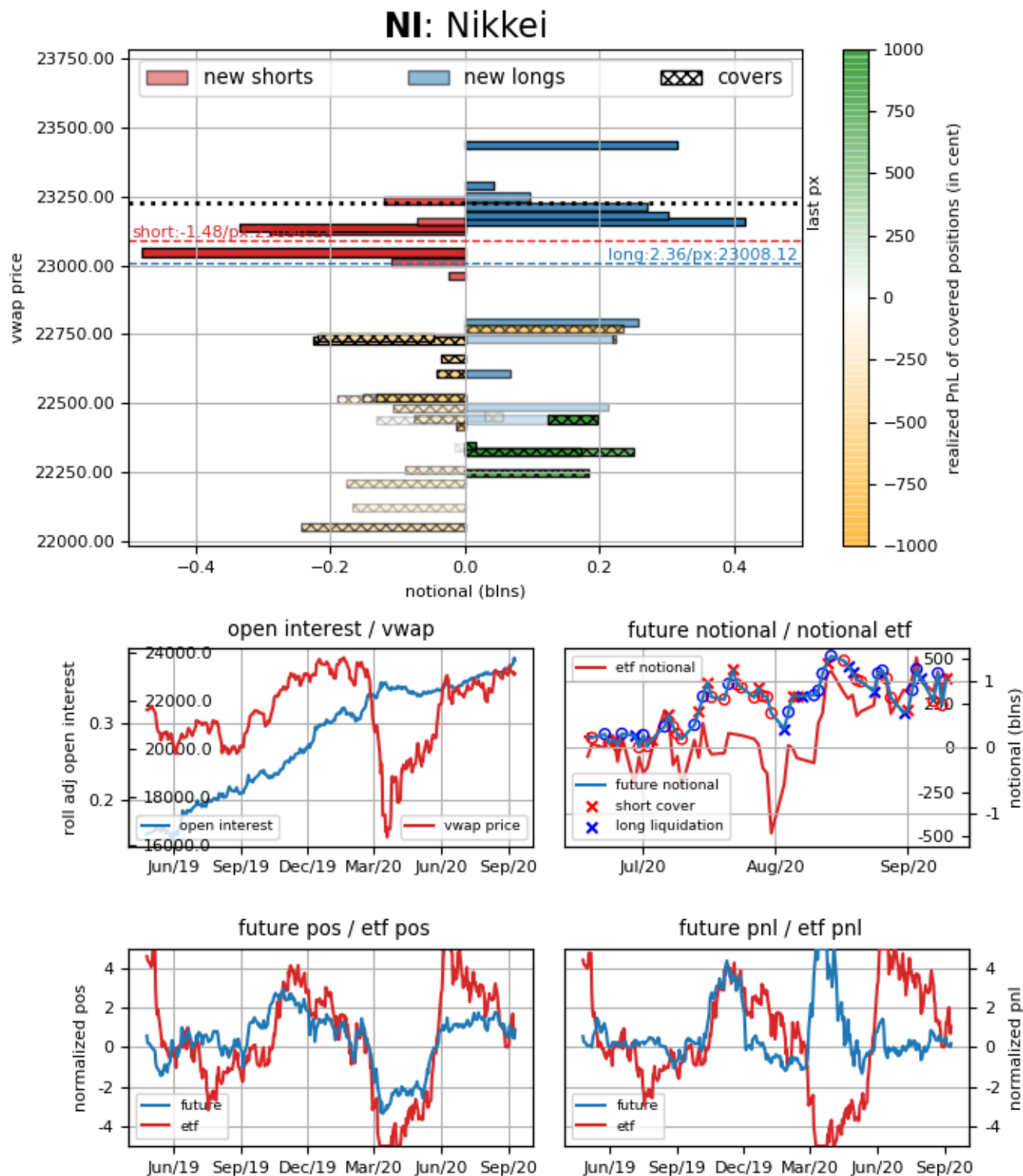
Figure 18. Nasdaq contracts (NQ) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

Nikkei

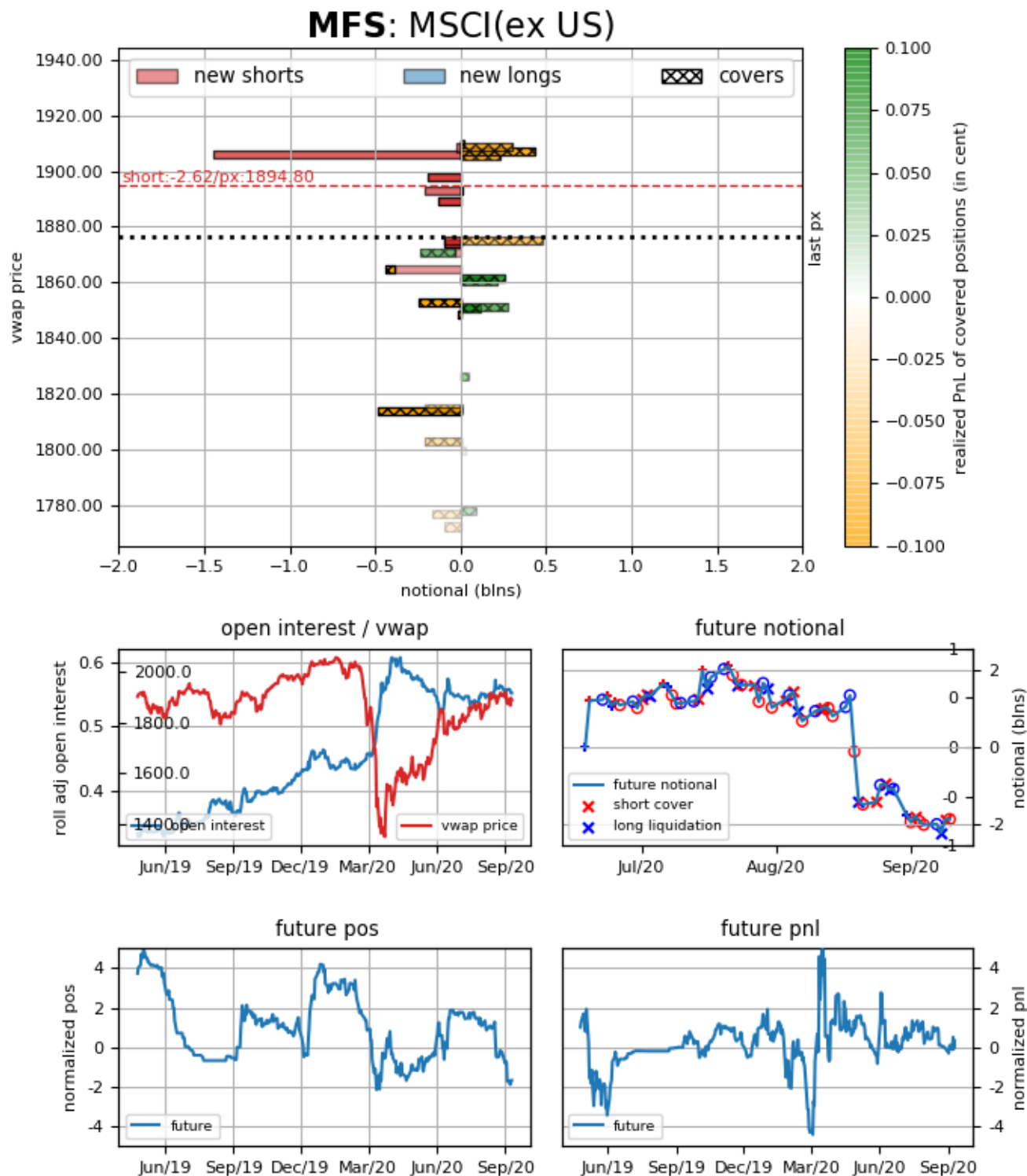
Figure 19. Nikkei contracts (NI) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

MSCI Dev World

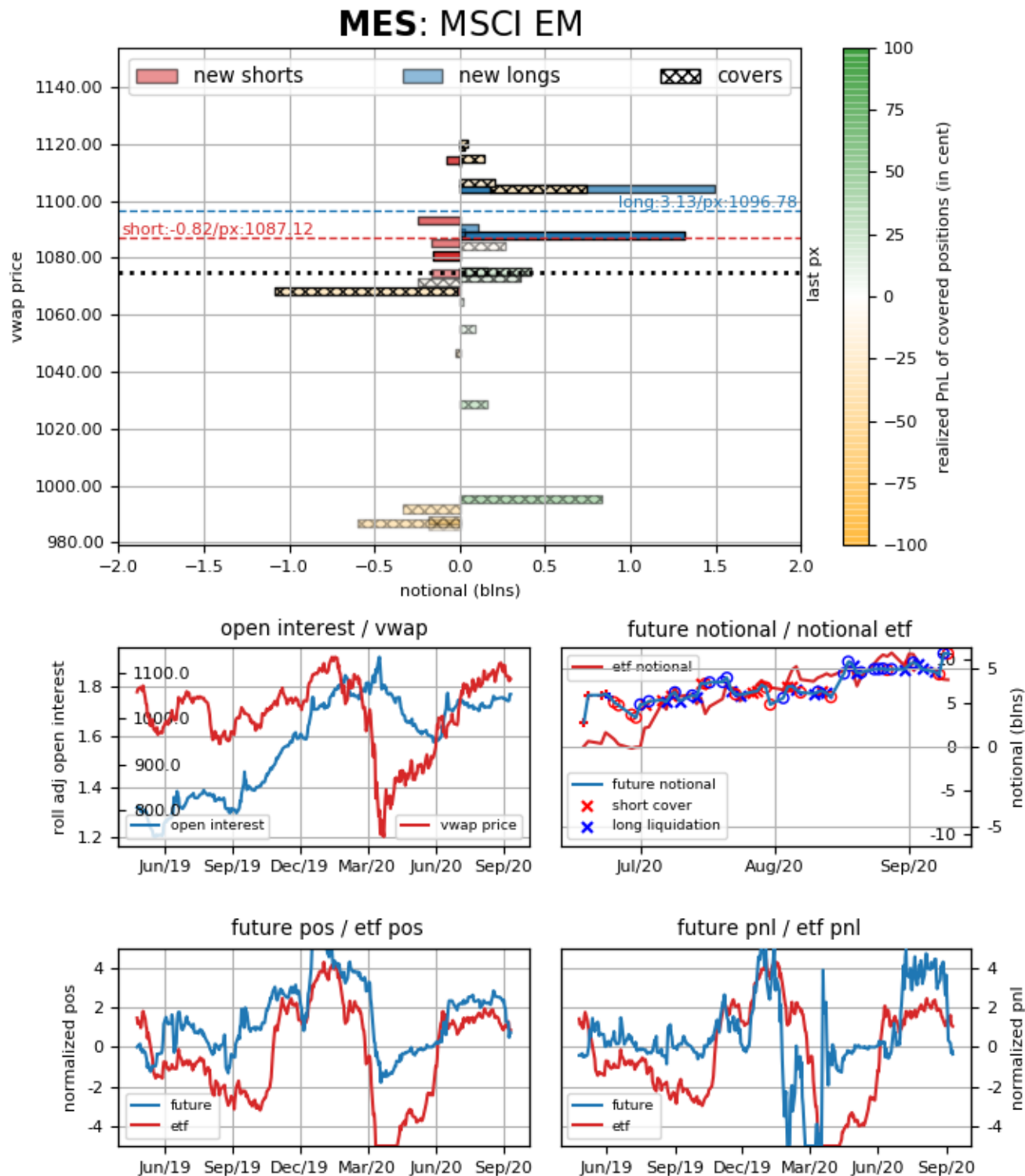
Figure 20. MFS – MSCI DM ex-US Futures - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

MSCI EM

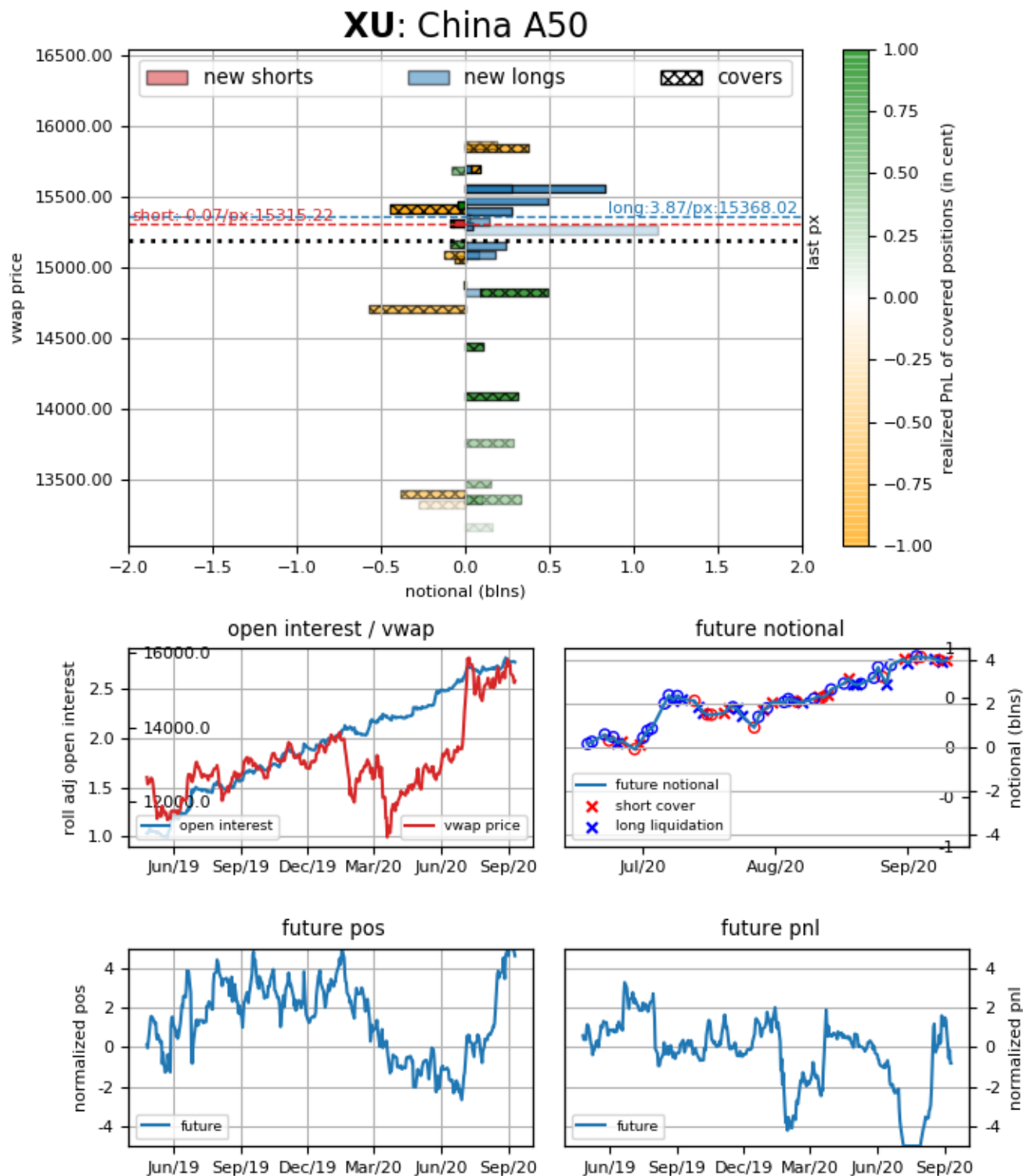
Figure 21. MSCI EM Equity contracts (MES) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

China A50

Figure 22. MSCI EM Equity contracts (MES) - position snapshot and time-series



Source: Citi Research, Bloomberg Note: Futures trading involves substantial risk of loss.

Previously Published Research

Figure 23. Research Reports (since 2009)

Report	Date Published
Searching for Alpha: Combining ESG and Risk Premia Investment – A Double Screen Approach	11-Sep-2020
Searching for Alpha: Factoring Short Interest – Measuring and Profiting from Information in Shorts	8-Sep-2020
Searching for Alpha: Machine Learning – Attributing Higher-Order Interactions: SHAP Value as Factor Selection Criterion	28-May-2020
Searching for Alpha: Machine Learning – Leveraging Return Forecasts	28-Feb-2020
Searching for Alpha: China A Alpha - Sector-relative Value Is Powerful, Choose Sector Mappings Wisely	21-Feb-2020
Searching for Alpha: Machine Learning – Beyond Random Forests for Stock Selection	03-Oct-2019
Searching for Alpha: Earnings Surprise: Managing Expectations	23-Sep-2019
Searching for Alpha: Machine Learning – Interpreting Machine Learning Predictions	5-Mar-2019
Searching for Alpha: GAAP vs. Non-GAAP - Which Earnings does the Market Price?	7-Feb-2019
Searching for Alpha: Style Crowding in Asia - Getting Ahead of the Crowd	21-Nov-2018
Searching for Alpha: Earnings Surprise – Using Machine Learning to Forecast Earnings Surprises & Returns	17-Sep-2018
Searching for Alpha: The ESG Edge – A Step Forward	13-Sep-2018
Searching for Alpha: Machine Learning – Interacting Machine Learning and Factors	3-Sep-2018
Measuring the Crowded Trade: Introduction to our Crowding Composite for Individual Stocks	3-May-2018
Searching for Alpha: Profiting from Capex – Look to Capex Announcements	14-Mar-2018
Searching for Alpha: Tactical Style Rotation – Using Risk and Return to Manage Style Exposure	7-Sep-2017
Searching for Alpha: Big Data – Navigating New Alternative Datasets	10-Mar-2017
Searching for Alpha: Betting Against Accurate Beta	13-Feb-2017
Searching for Alpha: Competitive Advantage – Survival of the Fittest	19-Sep-2016
Searching for Alpha: Financial Strength Redux	9-Sep-2016
Searching for Alpha: Dynamic Style Weighting – Risk-Based Equity Style Allocation	14-Apr-2016
No Shorts Please: Long-Only Pure Style Portfolios	4-Mar-2016
Industry Alpha insights: Banks – One Size Does Not Fit All	18-Feb-2016
Under the Microscope: Stock Momentum Conflation	21-Sep-2015
Searching for Alpha: Macro Moves Markets	15-Sep-2015
Searching for Alpha: Style Performance, Trading Volumes and Investor Agreement	23-Mar-2015
World Radar Screen: Refining Our Global Search for Alpha	13-Mar-2015
Searching for Alpha: Networking with Analysts: Modelling Analyst Forecast Dependence	18-Feb-2015
The Rise of Low Risk Investing: Is it Getting Crowded Out There	01-Oct-2014
Under the Microscope: Five Innovations in Momentum Investing	27-Mar-2014
Searching for Alpha: Timing Price Momentum	07-Mar-2014
Equity Risk Premia Investing: A New Methodology For Monitoring Style Performance	27-Nov-2013
Stock Market Country Selection: Changes to a Well Established Model	23-Jul-2013
Searching for Alpha: Digging for Dividends – QUARI QUALity with A Reliable Income	02-Jul-2013
Global Theme Machine: An Objective Way of Identifying Attractive Investment Themes	24-Jun-2013
Searching for Alpha: Purifying Analyst Recommendations – Removing Beta to get to the Alpha	25-Mar-2013
Searching for Alpha: Tangible Benefits of Intangibles – Brand, Respect & Intellectual Capital	06-Nov-2012
Low-Risk Portfolio Strategies: Sharpe Ratio Maximisation and Multi-Asset Applications	09-Mar-2012
Macro Risk and Style Rotation: A Guide Rather than a Prescription	28-Feb-2012
Searching for Alpha: Accruals Volatility – A New Approach to Quality Investing	14-Sep-2011
Industry Alpha Insights: Four Approaches to Tactical Industry Selection	24-Aug-2011
Industry Alpha Insights: Quantifying Industry Specific Fundamentals	17-Mar-2011
Low-Risk Equity Portfolios: More than just Minimum Variance	18-Nov-2010
Under the Microscope: Measuring Systemic Risk – The Absorption Ratio	15-Nov-2010
Under the Microscope: Optionality in Valuation	14-Jun-2010
Searching for Alpha: Earnings Surprise – Still Profiting from Surprises	31-Mar-2010
Searching for Alpha: Optimising Style Rotation Strategies	15-Oct-2009

Source: Citi Research

Citi Quant Research Team

Figure 24. Citi Quantitative Research Teams

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1 Citigroup Global Markets Ltd; 2 Citigroup Global Markets Asia Limited; 3 Citigroup Pty Limited, 4 Citigroup Global Markets Inc., 5 Citigroup Global Markets India Private Limited

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Appendix A-1

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Data current as of 30 Jun 2020	12 Month Rating			Catalyst Watch		
	Buy	Hold	Sell	Buy	Hold	Sell
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% of companies in each rating category that are investment banking clients	66%	64%	60%	70%	63%	66%
Citi Research Quantitative World Radar Screen Model Coverage	30%	40%	30%			
% of companies in each rating category that are investment banking clients	37%	36%	36%			
Citi Research Quantitative Latam Radar Screen Model Coverage	21%	59%	20%			
% of companies in each rating category that are investment banking clients	63%	66%	75%			
Citi Research Quantitative Asia Radar Screen Model Coverage	20%	60%	20%			
% of companies in each rating category that are investment banking clients	37%	31%	29%			
Citi Research Quantitative Australia Radar Screen Model Coverage	47%	0%	53%			
% of companies in each rating category that are investment banking clients	25%	0%	38%			

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