

MSCI derivatives at Eurex

December 2018



MSCI Indexes have seen high levels of success and growth

Development in three major steps

Historically, MSCI has been the index provider of choice for the buy-side (fund managers, insurances, pension plans, endowments) seeking broad and reliable **benchmarks** to compare with their own performance and looking for tools to analyse risk and returns

1.

MSCI estimates that about **USD 11 trillion** are benchmarked against their indexes

The growing success of indexation via **ETFs and index swaps** has brought MSCI further to the forefront of asset allocation, not only on the investment side, but also in **trading**. Globally, 40% of the ETF assets in equity ETFs are based on MSCI indexes

2.

More than **USD 600 billion** are invested in equity ETFs based on MSCI indexes

With more providers of MSCI related ETFs, swaps and additional structures and a growing competition on pricing these, an increased need for **cheap and efficient hedging tools** (futures & options) arises

3.

In 2017 more than **80 million** MSCI Futures & options traded globally

Derivatives on MSCI Indexes provide cheap and efficient hedging opportunities

Hedging

Sale of futures/buying of puts or collars to protect portfolio value.

Portfolio beta / duration adjustment

Purchase/sale of equity index futures to adjust portfolio beta/duration.

Region / country overlay

Purchase/sale of regional/country equity index futures to increase/decrease exposure to a region/country within the equity portfolio.

Stock picking

Sale of index futures against purchase of cash equity to isolate or mitigate market risk

Cash equitization

Reinvestment of coupon and dividend income and investment of new flows or funds generated via asset sales by purchasing equity index futures

Transition management / tactical asset allocation

Sale of equity index and simultaneous purchase of bond futures to assist in the reallocation of funds from equities to bonds (or vice versa).

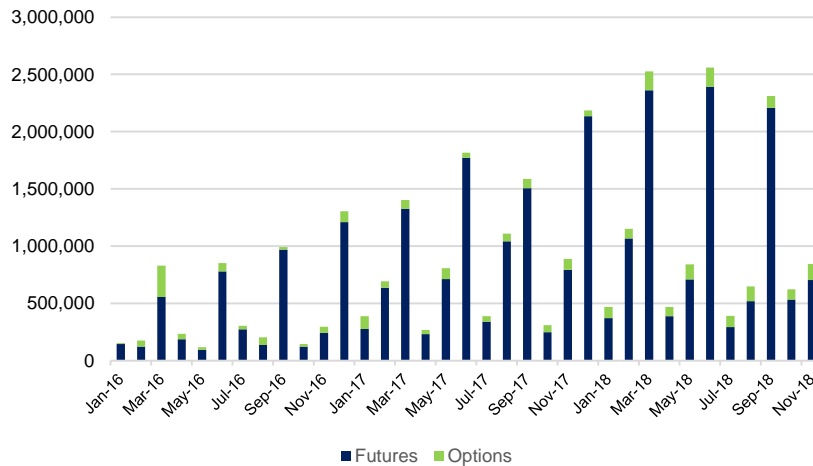
Portfolio yield enhancement

1. Sale of out-of-the-money (OTM) index calls, anticipating limited market upside.
2. Sale of OTM index puts anticipating limited market downside.
3. Sale of OTM index/bond calls and puts, anticipating range bound market conditions.

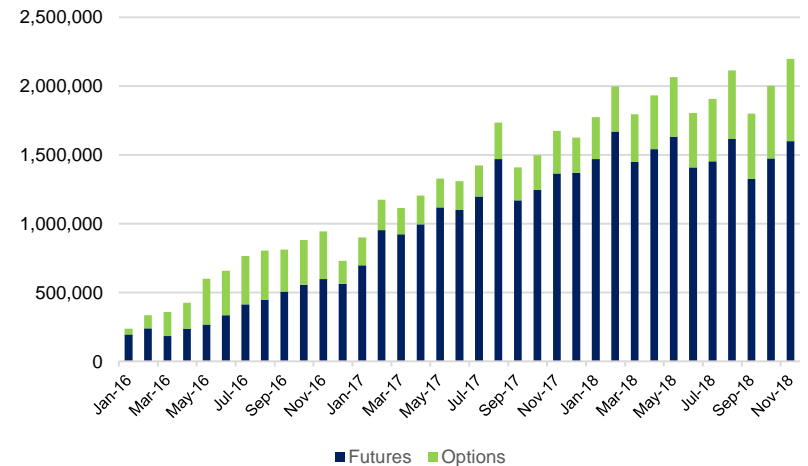
MSCI derivatives at Eurex are becoming an increasingly popular hedging and trading tool

Strong growth in all categories (Block & Book, Futures & Options, Volume & OI)

MSCI Derivatives - Evolution of Volume



MSCI Derivatives - Evolution of Open Interest



- Total trading volume in 2018 has been ~ **13 million contracts** – with an ADV of over 54,000 contracts
- In the same period in 2017, 9.6 mn contracts were traded
- Order book share has gone up from 9% to 13% overall in 2018, with up to 25% in non-roll months

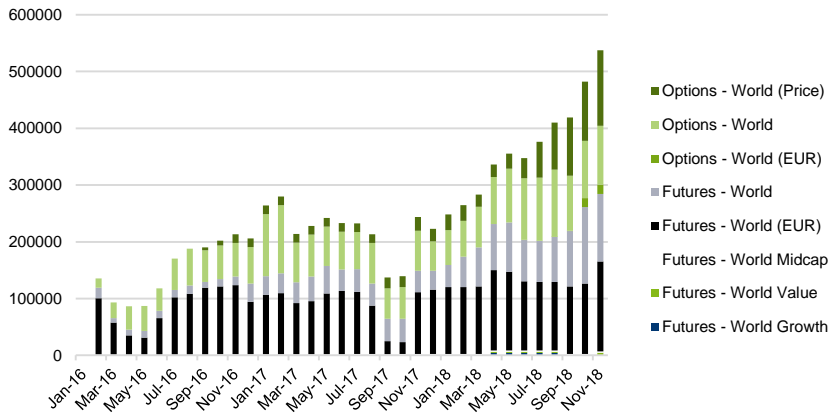
- Open interest in MSCI derivatives is currently at ~ **2.2 mn contracts (EUR 91 billion)**
- This is a growth of 34% vs last year
- MSCI options reached 500K open interest, which is a double the level a year ago



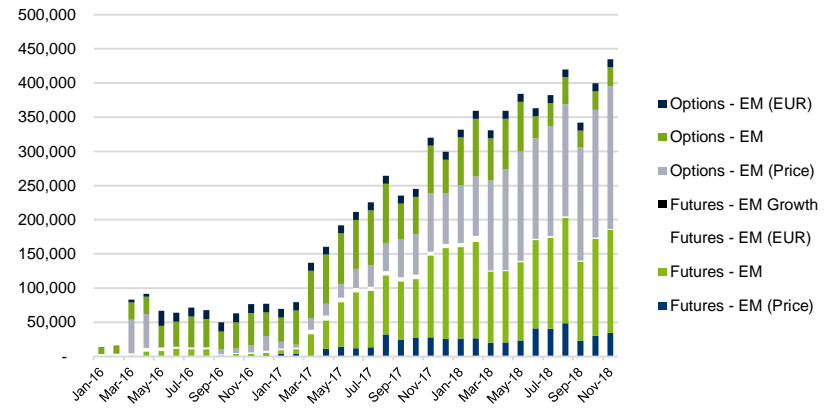
Futures on MSCI World have played a big part in this growth

Open interest of the main benchmarks

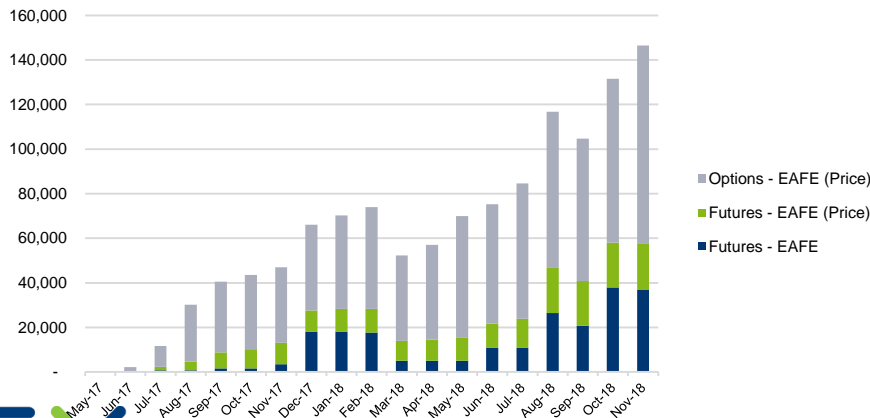
MSCI World Derivatives



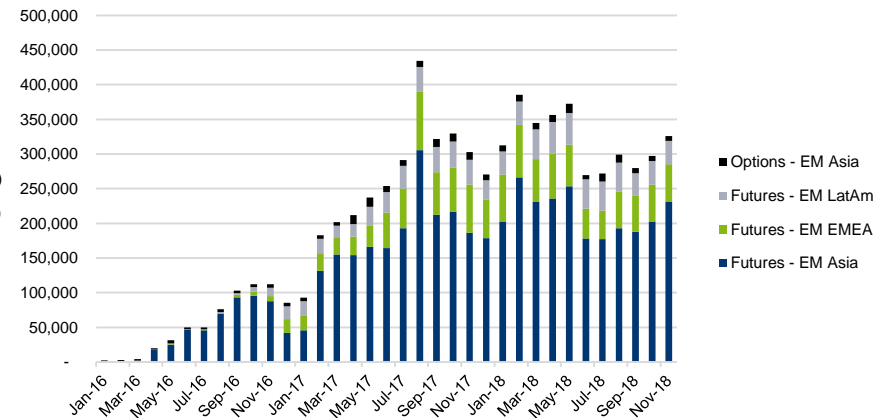
MSCI EM Derivatives



MSCI EAFE Derivatives





MSCI EM Regions Derivatives



However growth has also come from futures on other MSCI regional and country indexes

Eurex Code	Index name	% Off-book (November)	% Agency (Cleared vol.) (November)	Notional Value per Contract (USD)	ADV 2018	Volume (November)	Volume in EUR (November)	Open Interest as of November 30, 2018	Open Interest in EUR as of November 30, 2018
FMEA	MSCI Emerging Markets Asia	98.74%	15.69%	51,100	7,574	150,377	6,665,538,298	230,669	10,468,814,367
FMWO	MSCI World	70.83%	13.75%	58,330	4,708	152,358	7,726,024,564	118,707	6,148,647,962
FMEM	MSCI Emerging Markets	92.93%	2.06%	45,850	2,395	47,553	1,891,950,382	150,846	6,144,759,248
FMNA	MSCI North America	0.00%	0.00%	77,170	1,423	96	6,439,205	84,797	5,801,168,466
FMWN	MSCI World	75.37%	18.34%	29,792	5,034	82,435	2,162,913,335	158,742	4,179,638,530
FMED	MSCI Europe	97.48%	0.00%	60,815	932	36,367	1,996,810,321	74,106	3,985,422,291
FMGS	MSCI USA	99.14%	0.00%	112,750	216	5,828	594,576,689	39,452	3,930,286,733
FMEU	MSCI Europe	55.28%	37.02%	23,150	7,625	44,616	919,163,805	151,345	3,096,403,650
FMJP	MSCI JAPAN	90.97%	3.73%	61,090	2,438	14,097	757,076,908	36,150	1,950,360,225
FMFA	MSCI EAFE	93.39%	0.00%	55,310	252	1,317	64,731,542	36,732	1,813,892,438
FMFP	MSCI EAFE	94.63%	2.71%	90,525	271	4,900	395,742,927	20,974	1,678,733,427
FMGC	MSCI Canada	96.25%	13.46%	68,320	659	2,348	147,236,492	25,142	1,521,111,885
FMEF	MSCI Emerging Markets	89.38%	0.45%	49,785	594	15,685	679,788,451	34,186	1,503,994,441
FMEE	MSCI Emerging Markets EMEA	67.97%	11.48%	30,490	2,077	8,664	232,365,088	54,593	1,469,148,772
FMEL	MSCI Emerging Markets Latin Am.	83.80%	24.42%	48,220	1,659	8,637	369,908,529	33,466	1,422,217,554
FMUS	MSCI USA	86.63%	0.65%	72,690	329	2,924	185,070,404	21,647	1,392,733,982
FMAU	MSCI Australia	99.12%	0.00%	35,510	1,108	31,912	997,406,083	40,565	1,271,688,071
FMDK	MSCI UK	0.00%	0.00%	59,000	400	5	262,138	18,522	962,054,758
FMCN	MSCI China Free	84.31%	21.51%	39,480	2,001	21,183	718,390,253	21,428	746,753,711
FMMU	MSCI EMU	9.58%	0.00%	20,599	624	2,087	38,168,715	32,536	592,317,880
FMGA	MSCI North America	-	-	118,720	22	-	-	5,143	538,052,557
FMWP	MSCI World	64.90%	0.00%	20,310	275	12,455	222,119,795	28,478	510,288,969
FMHK	MSCI Hong Kong	58.43%	4.58%	62,060	356	1,987	107,114,093	8,435	460,955,700
FMMY	MSCI Malaysia	26.91%	0.00%	37,340	553	996	33,000,990	13,350	438,849,371
FMMX	MSCI Mexico	35.61%	9.27%	20,650	645	1,025	19,112,887	21,797	396,318,030

- **90 Futures** are currently listed at Eurex
- Out of those, 61 products have open interest
- The table shows the top 25 MSCI futures in terms of notional open interest

 EM regional Index
 DM Regional Index

Eurex's diversity of futures on MSCI Indexes allows for lower margin rates

- In the past, most exchanges were using similar margining models for their derivatives markets (like RBM at Eurex, SPAN at ICE, SGX or CME)
- Whereas RBM and SPAN calculate risks on a per product basis only, **Eurex PRISMA offers portfolio margining:** the better the portfolio is diversified, the higher are the margin offsets which can be granted
- Margin offsets are calculated separately for Agency business and Proprietary business. Under PRISMA, all open positions of a member on their Prop (P-) or Market Maker (M-) accounts are analyzed combinedly and offsets are granted for all prop positions

Name	Eurex	Notional (USD)	Long	Short	Initial Margin (in EUR)	Total Initial Portfolio Margin Without PRISMA (EUR)	Total Initial Portfolio Margin With PRISMA (EUR)	Margin savings
MSCI EM	FMEM	100,000,000	2,316	0	10,929,176 €	21,816,758 €	8,453,359 €	61%
MSCI China	FMCN	25,000,000	647	0	3,450,628 €			
MSCI India	FMIN	10,000,000	185	0	1,201,503 €			
MSCI EM Asia	FMEA	50,000,000	0	1,032	4,969,846 €			
MSCI EM Latin America	FMEL	10,000,000	0	223	3,450,628 €			

Margin rate per notional: 4.3%

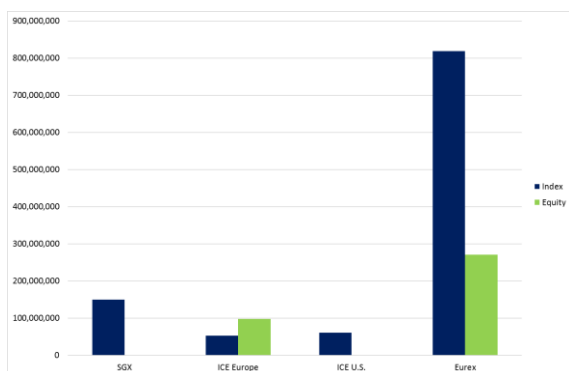
*Calculation Date: 11 April 2018 **Near month Expiration: 18 June 2018



Eurex's diversity of Equity Futures allows for even lower margin rates

Eurex is one of the biggest providers of equity derivatives, thus highest margin offsets can be generated

Annual volume in Equity & Index Derivatives (2017)



Open interest in Index Derivatives (May 2018)

SGX	3.5 mn contracts
ICE EU	3.1 mn contracts
ICE US	2.2 mn contracts
Eurex	50.0 mn contracts

*Calculation Date: 11 April 2018 **Near month Expiration: 18 June 2018

Name	Eurex	Notional (USD)	Long	Short	Initial Margin (in EUR)	Total Initial Portfolio Margin Without PRISMA (EUR)	Total Initial Portfolio Margin With PRISMA (EUR)	Margin savings
MSCI World Futures	FMW N	100,000,000	4,102	0	8,089,603 €	14,833,374 €	4,396,306 €	70%
DAX® Futures	FDAX	10,000,000	33	0	732,111 €			
EURO STOXX 50® Index Futures	FESX	50,000,000	0	1,497	3,570,720 €			
EURO STOXX® Banks Futures	FESB	20,000,000	0	3,255	2,440,941 €			

*Calculation Date: 11 April 2018 **Near month Expiration: 18 June 2018

Margin rate per notional: 2.4%



Eurex's PRISMA methodology offers lower margin rates for spreads

Portfolio Pair	Product Name	Product Code (Eurex)	Position	Position Size	Initial Margin for the Portfolio (in EUR)	Notional in EUR	Total Portfolio Notional with PRISMA (EUR)	Margin rate per Notional with PRISMA
1	MSCI Europe (EUR/NTR)	FMEU	Long	3	1,372 €	66,450 €	136,599 €	1.0%
	EURO STOXX 50® Index Futures	FESX	Short	2		70,149 €		
2	MSCI EM (USD/NTR)	FMEM	Long	1	1,046 €	43,187 €	91,612 €	1.1%
	MSCI EM Asia (USD/NTR)	FMEA	Short	1		48,426 €		
3	MSCI EM (USD/Price)	FMEF	Long	1	1,058 €	46,834 €	95,260 €	1.1%
	MSCI EM Asia (USD/NTR)	FMEA	Short	1		48,426 €		
4	MSCI World (USD/NTR)	FMWO	Long	1	2,309 €	52,798 €	101,223 €	2.3%
	MSCI EM Asia (USD/NTR)	FMEA	Short	1		48,426 €		
5	MSCI World (USD/Price)	FMWP	Long	2	1,893 €	37,038 €	83,872 €	2.3%
	MSCI EM (USD/Price)	FMEF	Short	1		46,834 €		
6	MSCI EM (USD/NTR)	FMEM	Long	1	1,740 €	43,187 €	86,140 €	2.0%
	MSCI EM Latin America (USD/NTR)	FMEL	Short	1		42,953 €		

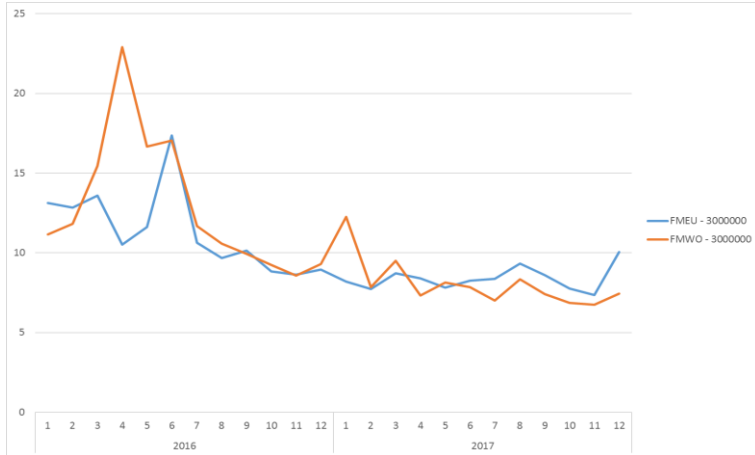
*Calculation Date: July 31, 2018 **Near month Expiration: 21 September 2018



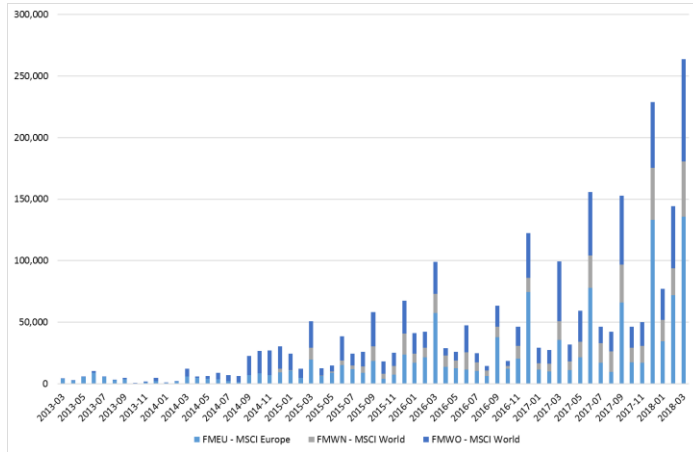
Order books on MSCI futures are now getting better more permanently (I / II)

Already very liquid orderbooks in Futures on MSCI Europe & World (USD & EUR)

ELM in FMWO and FMEU for a 3mn EUR order



Order book volumes in MSCI Europe & World



- Eurex has already the best orderbook picture for World (FMWO) and MSCI Europe (FMEU)
- Average impact for a 3mn EUR order (according to Eurex Liquidity Measure - ELM) has decreased from ~15bps in 2016 to ~8bps in Q4, 2017
- In both products we can observe that the first algo-driven firms have started trading
- Eurex anticipates new members that focus on ETF strategies

Order snapshot MSCI Europe

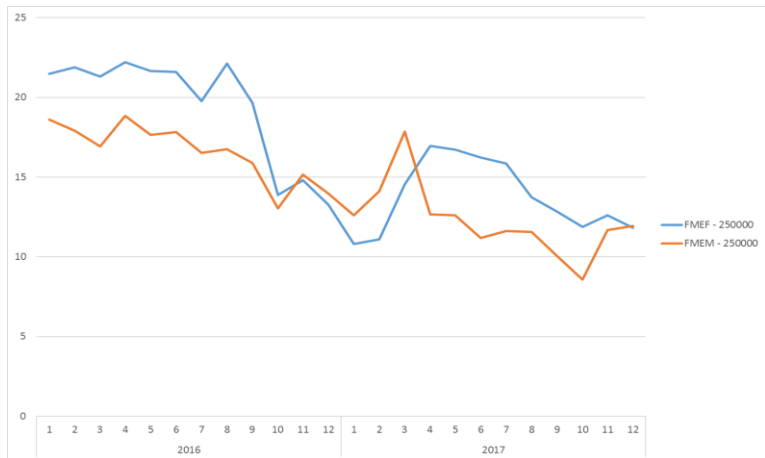
Contract	Curr	CPrevSetlPrc	CNetChg	CBQty	CBid	CAsk	CAQty
FMEU Jun18	EUR	208.2000	-1.3000	252	206.55	206.65	30
				261	206.50	206.70	221
				391	206.45	206.75	301
				282	206.40	206.80	201
				201	206.35	206.85	201
				1	206.30	206.90	202
				1	205.95	207.00	50
				500	204.70	207.05	50
						207.10	50
						207.15	50



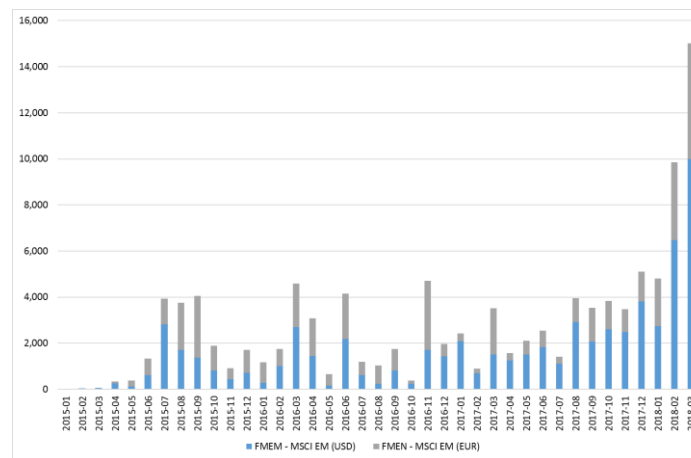
Order books on MSCI futures are now getting better more permanently (II / II)

In other contracts (like MSCI EM), order book further improved in 2018

ELM in FMEM and FMEF for a 250K EUR order



Order book volumes in MSCI EM (NTR, USD & EUR)



- MSCI EM Futures (both, NTR index (FMEM), as well as, Price index (FMEF) are tightening as well.
- Average impact for a 250K EUR order in EM has decreased from ~20bps in 2016 to ~11bps in Q4, 2017
- In January 2018 it tightened to 7bps, however, ICE US has a Best Bid / Ask spread of just 1.5bp during European hours and <1bp during US hours
- These levels are expected to be reached at Eurex once algo firms participate, which is usually a function of ADV

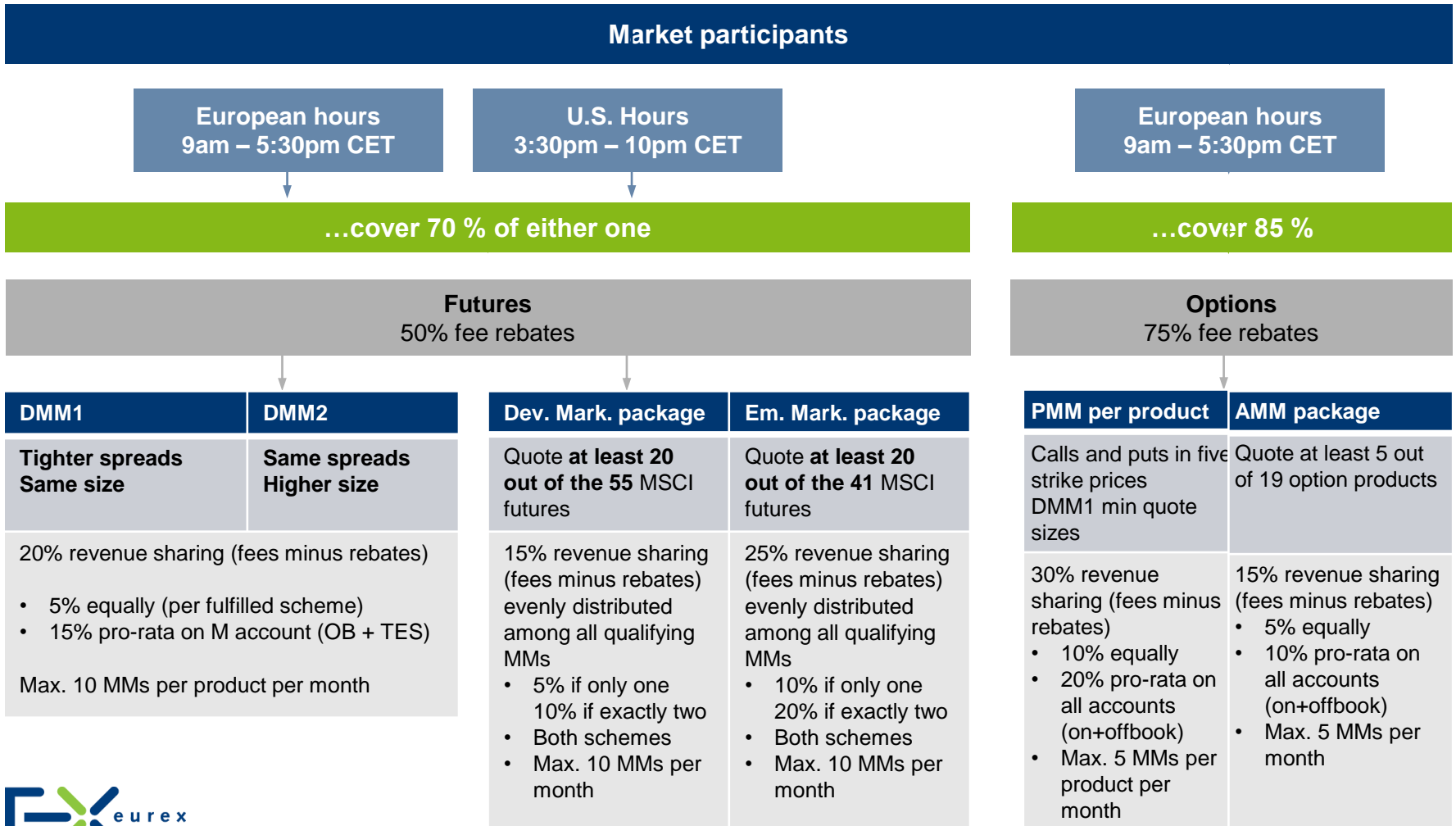
Order snapshot MSCI EM

Contract	Curr	CPrevSetlPrc	CNetChg	CBQty	CBid	CAsk	CAQty	CLst
FMEM Jun18	USD	549.800	-8.100	13	542.6	542.8	23	542.8
				15	542.5	543.2	10	
				23	542.3	543.3	15	
				10	542.2	543.4	13	
				38	537.6	547.6	38	



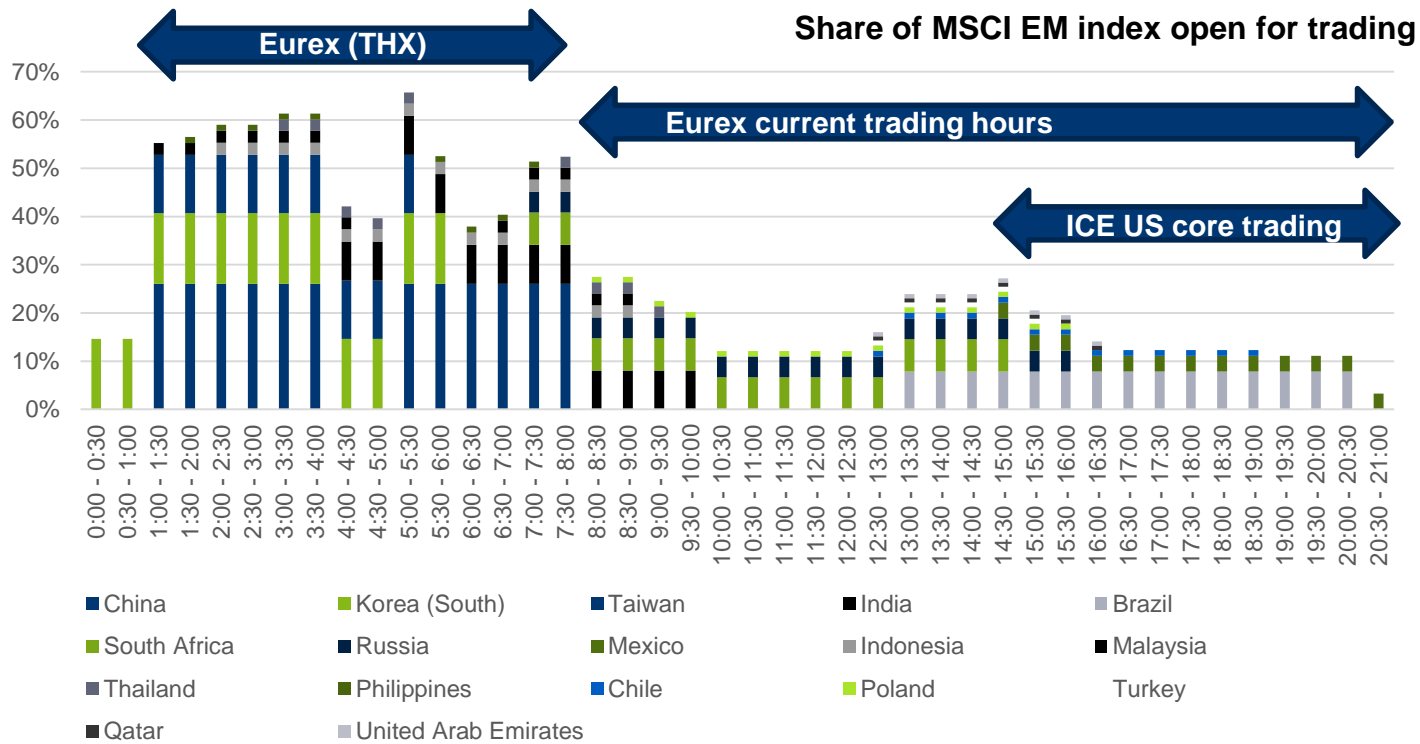
An attractive revenue sharing program is helping attract market makers and develop order books

Liquidity provision schemes in 2018



Eurex's extended trading hours (THX) in end-2018 will help to bring more flow

THX crucial to compete in EM / Chinese markets



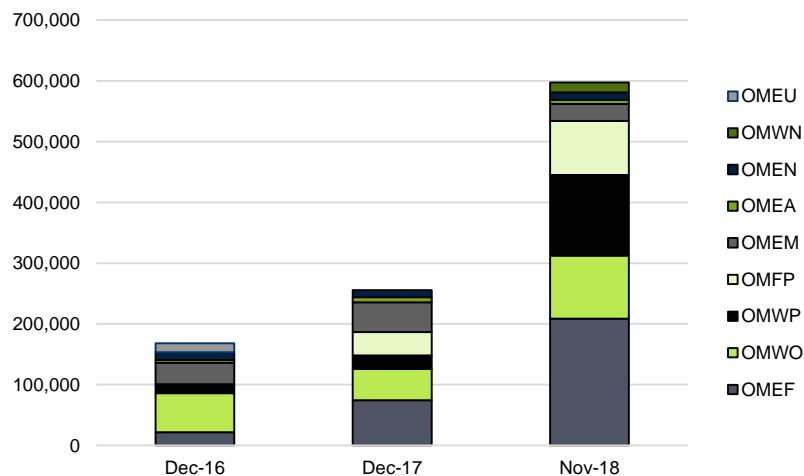
- The MSCI EM index is dominated by Asian countries (~70% of the weight), however, 90% of futures trading is currently done during US trading hours.
- Most of the global equity desks are located in Europe. Eurex is therefore much better placed in the trading day to cover EM trading



Eurex's MSCI Options are gaining momentum as well

Based on higher liquidity in MSCI Futures, the options are getting traction as well

Evolution of MSCI Options OI



- Eurex is the main global market for MSCI options
- Offering F&O on one platform offers advantages in hedging, margining, strategy trading
- Focus is on EM, World & EAFE indices, whereby (in opposite to MSCI Futures) the main interest is on price indices
- 18 bn EUR are currently invested in 7 different options
- Market Making quotation (on-screen) is still fairly thin

Eurex Code	Index name	Curr	Index Type**	Index Code (Close)	Options Bloomberg	Mult	Tick	Min. Block Size	% Off-book (November)	% Agency (Cleared vol.) (November)	ADV 2018	Volume (November)	Volume in EUR (November)	Open Interest as of November 30, 2018	Open Interest in EUR as of November 30, 2018
OMEF	MSCI Emerging Markets	USD	Price	MSEUEGF Index	DMSCIEF1 <Index> OMON	50	0.1	1	100.00%	7.07%	2,119	46,683	2,027,651,287	208,605	8,957,804,296
OMFP	MSCI EAFE	USD	Price	MSDUEAFE Index	DMSCIEA1 <Index> OMON	50	0.1	1	100.00%	20.08%	508	19,470	1,502,422,557	88,759	6,944,876,310
OMWO	MSCI World	USD	NTR	NDUWUW Index	M1WO <Index> OMON	10	0.1	100	96.74%	22.09%	1,116	31,605	1,533,258,983	103,971	4,813,611,515
OMWP	MSCI World	USD	Price	MSDUWI Index	MXWO <Index> OMON	10	0.1	10	100.00%	2.41%	581	33,255	567,646,067	132,728	2,235,774,417
OMEM	MSCI Emerging Markets	USD	NTR	NDUEEGF Index	M1EF <Index> OMON	100	0.1	50	100.00%	13.74%	931	8,274	331,686,965	27,868	1,068,717,317
OMEN	MSCI Emerging Markets	EUR	NTR	MSDEEEMN Index	MBEF <Index> OMON	100	0.1	1	100.00%	0.00%	0	30	1,125,000	11,688	395,586,500
OMWN	MSCI World	EUR	NTR	MSDEWIN Index	MBWO <Index> OMON	100	0.1	10	-	-	69	-	-	16,326	392,223,600
OMEA	MSCI Emerging Markets Asia	USD	NTR	NDUEEGFA Index	M1MS <Index> OMON	100	0.1	50	-	-	129	-	-	7,230	338,718,197



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