



TICK SIZES AND THEIR EFFECT  
ON THE BUY-SIDE

T S Y Z E A D C O R Y L G J U T K E X P A F S Z  
Q E O H F X K S G U T Y Z E S D C O R N Q K E X  
B Y N D E Q S **[ONE-TICK MARKETS]** Z E J X B Y D  
F H B M Y D A B Q T X U V D L O P R X H K G T R  
D R Y X J R S D F B Q L Y E N T K Z X A F R O V

One-tick markets refer to products that are tick-constrained most of the time. By tick-constrained we mean that the minimum tick size (the increment by which prices are allowed to fluctuate) specified for a contract is so large that it puts a floor on the bid:offer and prevents natural spread tightening.

This is a little like a car manufacturer mandating that its cars must be sold in minimum increments of \$250k. Fine, perhaps, if you are buying an entire fleet in one go. Rather costly if you — like the majority of consumers — are buying one or two cars.

It can be hard to launch a futures product successfully. However, once launched, there tends to be little external competition. Therefore products may not evolve at the pace they do in other more fungible marketplaces<sup>[1]</sup>.

**Perhaps it will surprise you to learn that many major contracts are tick-constrained more than 99% of the time. Often tick sizes were set at times when liquidity was mostly provided by human traders, spreads were much wider, and the ability of market makers to price an asset precisely was less evolved.**

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<sup>1</sup> Rival futures contracts are not fungible (unlike, say, equities or FX traded across venues A and B) and of course clearing and margin constraints exacerbate this phenomenon. Network effects combine to dictate a situation where activity for a single futures product clusters on a given venue and may often remain there indefinitely, unlike one sees in highly electronic FX or equity products.

T S Y Z E A D C O R Y L G J U T K E X P A F S Z  
Q E O H F X K S G U T Y Z E S D C O R N Q K E X  
B Y N D E Q S U **[SPREAD vs DEPTH]** R Z E J X B Y D  
F H B M Y D A B Q T X U V D L O P R X H K G T R  
D R Y X J R S D F B Q L Y E N T K Z X A F R O V

Setting the right tick size for each product is a balancing act. As the minimum tick size often has the effect of determining the spreads for major futures products, this balancing act can have a big effect on the transaction costs paid by institutional investors, as we will explore later.

The tick size must be large enough to allow liquidity to cluster at a price point and to make price improvement meaningful so that market makers are assuming meaningful risk when stepping in front of and improving an existing price<sup>[2]</sup>. On the other hand, a tick size that is too wide results in the buy-side crossing unnecessarily wide spreads and paying inflated transaction costs.

**A good rule of thumb is that minimum tick sizes (set by futures exchanges) balance well as 25-50% of a product's average spread. This allows liquidity to cluster and provides depth at the touch but, crucially, without the minimum tick size becoming an obstacle to market makers quoting the highest rates they can.**

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<sup>2</sup> Tick sizes that are over-small may also prove highly problematic for a variety of reasons. See [here](#) and [here](#) for discussion.

# [EUROSTOXX50]

## Case study

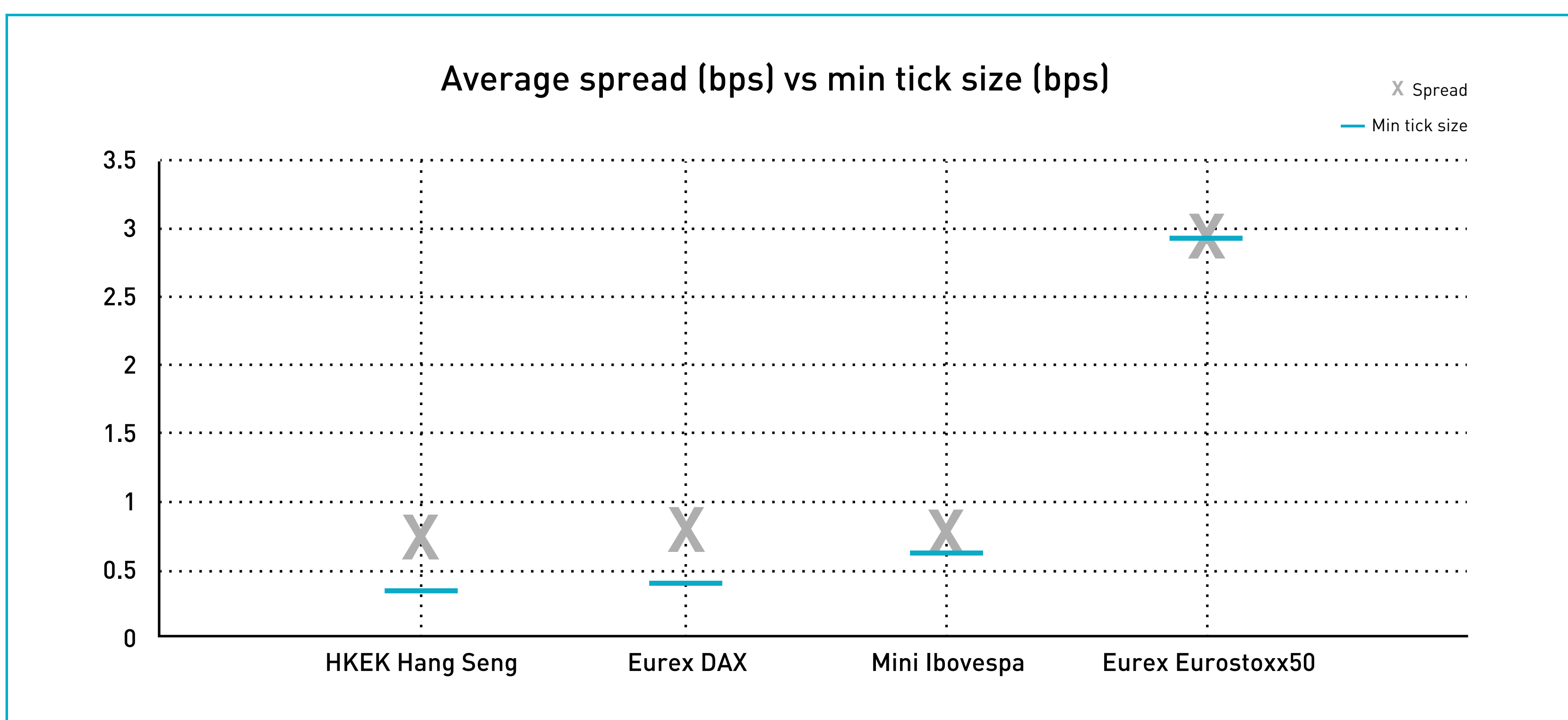
The concepts and arguments around one-tick markets are best explored through a case study.

Contract	ADV, USD m	Tick Size, bps	Avg Spread, bps	Cash Basket Avg Spread, bps	One Tick Percentage	Contract Notional, USDm
Hang Seng	37,560	0.36	0.64	11.92	40.01%	176,890
DAX	28,641	0.40	0.73	3.40	20.0%	359,872
Mini Ibovespa	6,457	0.64	0.72	6.21	87.9%	3,960
Eurex Eurostoxx50	28,449	2.93	2.94	3.06	99.9%	39,705

This table was calculated using exchange data for the period 9/07/2018 to 5/10/2018.

Eurex Eurostoxx50 (FESX) is tick-constrained 99.9% of the time<sup>[3]</sup>. It is a clear outlier when compared to peer contracts. Despite having a more liquid underlying basket than the DAX contract, we can see that FESX has a basis points spread that is more than 4x wider. It is far wider, even, than the Mini Ibovespa future.

This outsized spread appears to be a result of the huge tick size: market makers are not allowed to quote tighter than the minimum tick size and thus the spread is floored by this 99.9% of the trading day. The outlier spread width is visually obvious as is the spread-flooring property of its minimum tick size.



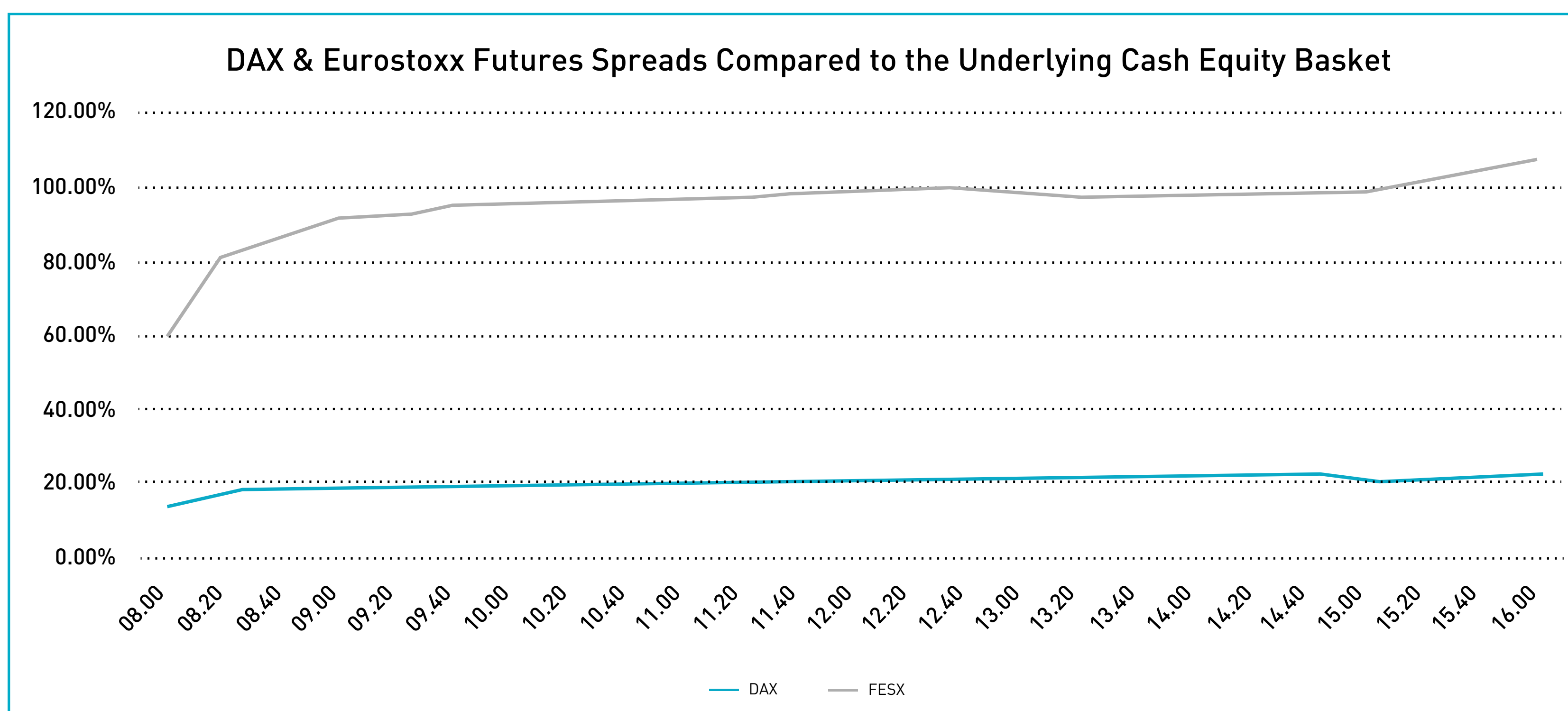
This chart was calculated using the data from the previous table

<sup>3</sup> This figure is calculated during trading hours when the underlying cash equities markets are open. Even when the underlying markets are shut the futures contract is tick-constrained 99.7% of the time

Although the evidence is already compelling, a good checksum for equity index futures is to compare each futures contract vs the weighted spread of the underlying basket of cash equities.

Again, FESX is an outlier. Other products have a far smaller overall spread than the underlying basket (as you'd expect) whereas FESX is at times even wider than its underlying basket.

A direct comparison of DAX vs FESX is again revealing. Throughout the day the DAX future tends to trade at around 20% of the width of its underlying basket whereas FESX often trades at the same width as its underlying basket and sometimes even wider!



This chart was calculated using exchange data for the period 9/07/2018 to 5/10/2018.

Our research suggests that FESX tick sizes should currently be set to EUR 0.1 rather than EUR 1 today i.e. 10% of current tick size. DAX by comparison already has a natural tick size.

A reduction in tick size would near certainly result in reduced spreads and execution costs for the buy-side in much the same way that decimalisation did in US equities and global FX.

Currently there is virtually no price competition in this product — at best, only 0.3% of the time — and the buy-side are the ones who will pay greater transaction costs when crossing the spread due to the tick constraint.

## [BUT ON THE OTHER HAND...]

### Wouldn't depth at the touch reduce?

Well, sure. One would expect a far tighter spread and a reduced but still plentiful touch depth.

The average trade size in Eurostoxx50 is significantly less than 0.5mio<sup>[4]</sup> - in fact even the 90th percentile trade size is 2mio EUR - whilst the average touch depth is 27.5mio. This is a huge disconnect.

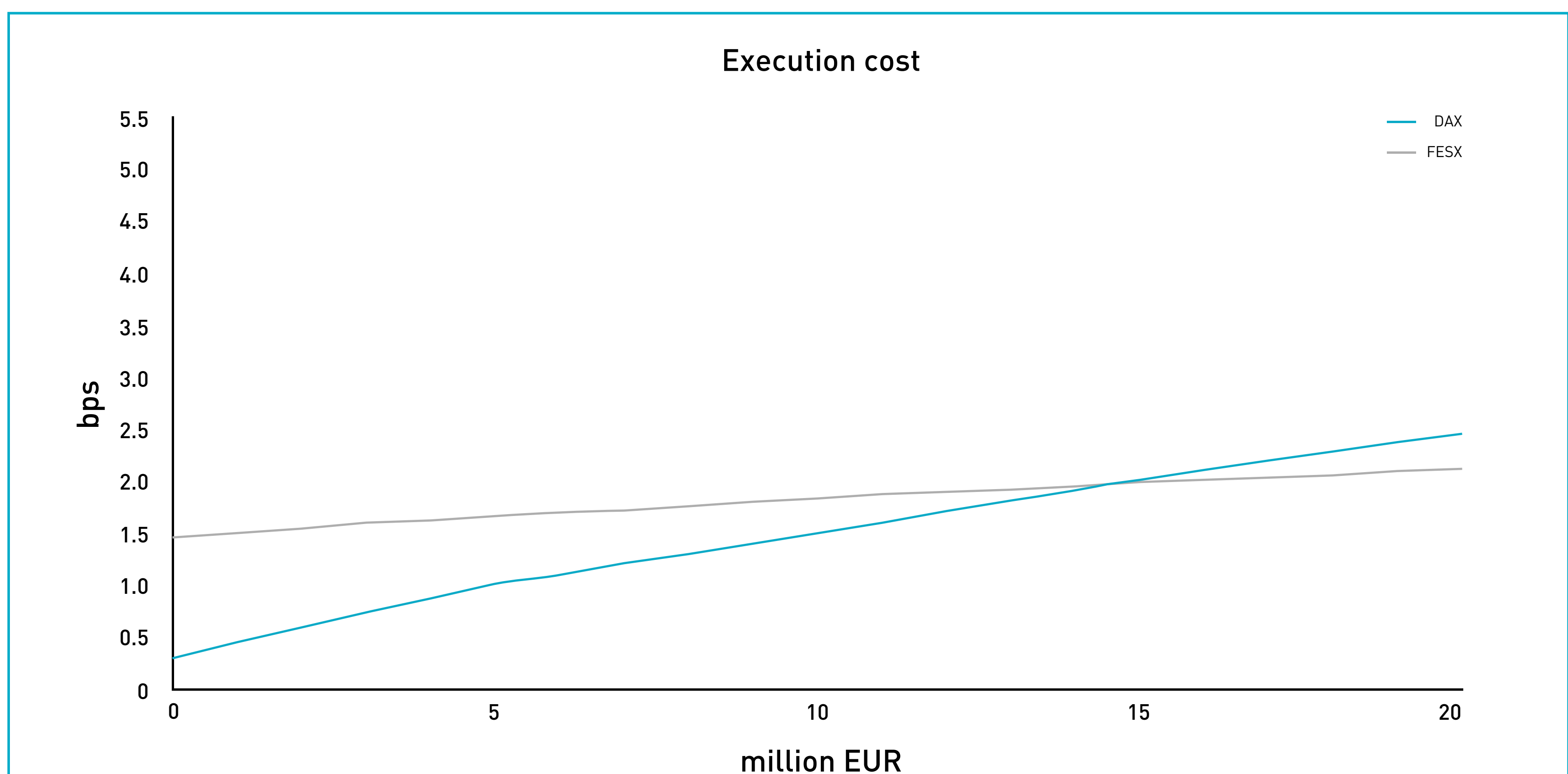
This additional, rarely used touch depth is excessive and expensive: it would be better to have the option of a tight touch spread for normal-sized trades and the ability to sweep multiple levels when unusually large size is required.

### How about when I have size to do?

Let's look at some data.

As can be seen below, it is cheaper to risk-transfer any size up to almost 15mio EUR in a single clip with DAX (with its sensible tick size) vs FESX.

This is despite the DAX contract having a much less liquid underlier and a large contract size (~\$360k vs. ~\$40k), which impedes retail participation. 15mio covers 99% of all 'on exchange' trades in this product<sup>[5]</sup>. Market design should be set with the 99% in mind, not the 1% of trades.



<sup>4</sup> This was calculated using exchange data for the period 9/07/2018 to 5/10/2018.

<sup>5</sup> This was calculated using exchange data for the period 9/07/2018 to 5/10/2018.

## ■ What about in times of market stress?

### Liquidity always disappears when you need it the most.

Unfortunately tick size — large or small — won't really make much difference in these situations.

The VIX future by way of example is extremely tick-constrained (96.8% of the time) and yet, during recent market stress on 06/02/2018, its touch depth dropped from an average of 1,350 contracts during US hours in Q4 2017 to just 25 lots.

Liquidity does disappear in times of market stress and having an artificially wide tick does nothing to prevent this unfortunate reality. In fact, it may make things worse: execution methodologies can become 'lazy' and unprepared for extreme situations, trained from historic data to place reliance on excess touch liquidity that is there most of the time but, crucially, not when it is needed the most.

## ■ OK, but I do need stable prices I can hit and my technology isn't the best.

Absolutely. Too small tick sizes are also problematic as, amongst other things, they can create flickering pricing that is hard to hit.

Sensibly set tick sizes of 25-50% of average spread result in prices that are sticky enough to be readily executable for end-user participants with regular technology and market access.

A contract like DAX has perfectly sensible tick sizes and may prove a good example, if you wish to review your historical trading experience in a product with this kind of tick size range.

## ■ OK, I think this is reasonable. What can I do about it?

You need to contact two people and request a tick size reduction: your exchange coverage person and your futures broker.

Feel free to share the information within this note with them and have a fact-based discussion. Get their thoughts, share yours and see what the data show.

There are many tick-constrained markets on major futures markets. The same concepts apply to all of them and we are happy to discuss these in depth with you so you can make up your own mind. A curated and non exhaustive list of major contracts, which are heavily tick-constrained, is below.

Ticker	Name	Venue	Future Type	Current Tick Size	Proposed Tick Size
WD0bmf	Mini USD BRL Futures	BVSP	FX	0.0005	0.0001
WINbmf	Mini Ibovespa Futures	BVSP	Equity Index	5	1
VXcboe	VIX Futures	CBOE	Volatility	0.05	0.01
6Acme	AUDUSD Futures	CME	FX	0.0001	0.00002
CLcme	WTI Futures	CME	Energy	0.01	0.002
EScme	S&P 500 E-Mini Futures	CME	Equity Index	0.25	0.05
GCcme	Gold Futures	CME	Metal	0.1	0.02
HGcme	Copper Futures	CME	Metal	0.0005	0.0001
Slcme	Silver Futures	CME	Metal	0.005	0.001
ZBcme	US Treasury Bond Futures	CME	Treasury	One 32nd	1/16 of a 32nd
ZCcme	Corn Futures	CME	Ags	0.25	0.05
ZNcme	10-Year Treasury Note Futures	CME	Treasury	1/2 of a 32nd	1/16 of a 32nd
FESXeurex	Eurostoxx50 Futures	EUREX	Equity Index	1	0.1
FGBLeurex	Euro-Bund Futures	EUREX	Treasury	0.01	0.002
Gice	Low Sulphur Gasoil Futures	ICE	Energy	0.25	0.05
Rliffe	Long Gilt Futures	ICE	Treasury	0.01	0.002
JGBLjpx	10 Year JGB Futures	OSE	Treasury	0.01	0.002
NK225jpx	Nikkei 225 Futures	OSE	Equity Index	10	2
NK225Mjpx	Mini Nikkei 225 Futures	OSE	Equity Index	5	1
TOPIXjpx	Topix Futures	OSE	Equity Index	0.5	0.1

This table was calculated using exchange data for the period. 27/11/2017 to 30/11/2018.

**If this seems like an esoteric micro-structure issue, try this thought experiment:**

Take all the volume you trade in these products each year and calculate the \$ savings to you and your investors if your effective spreads had been reduced by 50%, 25%, or even 10%.

That is something tangible and worth our collective time and effort. Thank you for reading and we would love to hear your opinions.



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Q E O H F X K S G U T Y Z E S D C O R N Q K E X  
B Y N D E Q S **[IMPORTANT NOTICE]** Z E J X B Y D  
F H B M Y D A B Q T X U V D L O P R X H K G T R  
D R Y X J R S D F B Q L Y E N T K Z X A F R O V

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