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Market Structure

## Strengthening the capital rules at Taiwan Futures Exchange

*To determine the amount of margin and capital that market participants may use to trade options and futures, the Taiwan Futures Exchange (TAIFEX) uses an adjusted net capital (ANC) ratio. Haircuts in the ANC formula can mis-characterize certain options positions, however. In this paper, we weigh up TAIFEX's capital rules and suggest fixes to make them more effective.*

Capital rules are designed to ensure that market participants maintain sufficient capital to cover their trading risks. While specifics vary across jurisdictions, most formulas compare the amount of margin deployed by a market participant against its net capital. Net capital is typically computed by subtracting a market participant's current liabilities from its current assets.

The Taiwan Futures Exchange (TAIFEX) adapted its capital rules from the US several decades ago in the form of an adjusted net capital (ANC) ratio. To calculate the ANC ratio, authorities divide a market participant's ANC by the amount of margin used. Calculating the ANC requires subtracting all liabilities from adjusted current assets.

It's critical that any capital rules designed to protect investors don't end up doing more harm than good. Well-meaning rules can lead to unintended consequences by making it more difficult for investors to transact during volatility, for instance.

As we'll demonstrate below, haircuts applied to certain elements in the ANC formula can have exactly this effect. We suggest authorities scrap these haircuts. This would provide a more accurate reflection of the risks of a portfolio, and offer better protection to investors as a result.

### Formulas

$$ANC \text{ ratio} = \frac{ANC}{margin}$$

$$ANC = \text{adjusted cash} + \text{broker deposit} + [50\% * \text{proprietary trading margin}] \\ + [99\% * \text{proprietary trading excess margin}] \\ + [40\% * \text{proprietary trading long options market value}] \\ - \text{proprietary trading short options market value} - \text{debt} + \text{operating bond} \\ + \text{financial assets}$$

## Long options example

The shortcomings of the ANC formula are easy to see when considering certain options spreads commonly held by market participants. Take the bear put spread, for example. One of the features of this spread – where market participants sell low-strike puts and simultaneously buy higher-strike puts – is that it limits the maximum loss of the position to the net capital spent. Consider the following example:

### Sample bear put spread

Side	Expiry	Strike	Premium	Kind	Position	Value
Sell	202202	18500	240	put	-1	-12000
Buy	202202	18700	416	put	1	20800

The net value of the spread shown in the table above is positive (8,800) thanks to its limited risk. Because the risk (as well as the potential profit) is limited, under the TAIFEX spread margin rule, the margin requirement for such a position would be zero:

TAIFEX spread margin requirement	Max loss	Max profit
0	Net premium paid $(416 - 240) = 176$ points (limited risk)	$(18700 - 18500) - 176$ $= 24$ points (limited profit)

But look what happens when we apply the ANC formula to this position. As the table below shows, applying the 40% haircut slashes the value of the position to -3,680.

Haircut	Long option value	Short option value	ANC net option value
40%	8,320	-12,000	-3,680
-	20,800	-12,000	8,800

The result is that the spread goes from being a positive asset to a negative asset. What's worse, the problem is exacerbated in a falling market. As markets decline, the rising put premium makes the value of the spread even more deeply negative, widening the gap to its true value. This can lead to the absurd outcome of forcing the market participant to liquidate the position even though it remains a profitable one. Not only does the ANC formula fail to value this position accurately, it can actively discourage market participants from building these types of risk-limited spreads.

## SPAN margin example

Another way to demonstrate the flaws in the ANC formula is by comparing it with the calculation of the SPAN (Standard Portfolio Analysis of Risk) margin. The SPAN margin is a globally-accepted standard that measures the risk of a portfolio by determining the amount of margin that should be posted to cover potential losses. Consider the portfolio of options and futures below:

Side	Expiry	Price	Kind	Position	Value
Sell	202202	18282	future	-500	-

Side	Expiry	Strike	Premium	Kind	Position	Value
Buy	202202	18200	165	call	10,000	-82.5m
Sell	202202	18300	102	call	-10,000	-51m
Buy	202202	18350	78	call	10,000	39m
Sell	202202	18400	171	put	-10,000	-85.5m
Sell	202202	18500	240	put	-10,000	-120m
Sell	202202	18550	15	call	-10,000	-7.5m
Buy	202202	18600	325	put	10,000	162.5m
Buy	202202	18700	416	put	10,000	208m

For this portfolio, we get a required SPAN margin of zero, indicating that the risks of the portfolio are offset. When the net option value is higher than the SPAN risk margin, which is the case above, no SPAN margin is required:

Long option value	Short option value	Net option value	SPAN risk margin	SPAN margin
492m	-264m	228m	195,061,503	0 (-32,938,497)

(1) SPAN (Standard Portfolio Analysis of Risk) margin = SPAN risk margin – Net option value  
= 195,061,503 - 228,000,000 = -32,938,497

(2) When the net option value is positive, the risk margin requirement is lower; in this example, the net option value is positive and larger than the SPAN risk margin, so the required SPAN margin is zero

Now look what happens when we apply the 40% haircut. Once more, it turns the net option value from positive to negative. In other words, the ANC isn't accurately reflecting the risk of the portfolio.

Haircut	Long option value	Short option value	ANC net option value
40%	<b>196.8m</b>	-264m	<b>-67.2m</b>
-	492m	-264m	228m

## Proprietary trading margin example

Another shortcoming in the ANC formula is the 50% haircut applied to the proprietary trading margin. TAIFEX uses a "fully paid pre-margin" system to protect against risks. This is sufficient to cover the risks of market participants' positions because a broker or clearing member can collect this margin when their client sends an order. However, by applying a 50% haircut to this margin, authorities are effectively doublecounting the risk. We're also hard-pressed to find the rationale for imposing a 50% haircut on margin in any study or research report we have consulted.

## Conclusion

The ANC ratio, like all capital rules, should protect investors from excessive leverage while preserving their ability to transact during volatility. However, in the case of the ANC ratio at TAIFEX, it isn't difficult to imagine the vicious cycle that could unfold as a result of its flawed methodology.

Picture a falling market. Market participants looking to buy back short options positions could find dealers reluctant to sell too many options because they're concerned with maintaining a healthy ANC ratio. This would lead to higher demand for a dwindling pool of options, driving up prices for these contracts, which in turn would increase these dealers' short positions, compelling them to buy back more options in order to increase their ANC ratio. This vicious cycle could continue until all under-capitalized short positions are liquidated or well-capitalized sellers come into the market.

Such an outcome could be avoided by scrapping the 40% and 50% haircuts. Though TAIFEX adapted its ANC ratio from the US, the latter has long since reformed it. Singapore has phased it out completely, opting for a liquidity risk-based approach instead. The changes outlined in this paper would be a small but significant step toward modernizing TAIFEX's capital rules.

## About Optiver

Optiver is a global market maker with offices in Amsterdam, London, Chicago, Austin, Sydney, Shanghai, Hong Kong, Singapore and Taipei. Over thirty-five years ago, we started business as a single trader on the floor of Amsterdam's European Options Exchange. Today, we are a leading liquidity provider, with close to 2,000 employees in offices around the world, united in our commitment to improve the market by competitive pricing, execution and thorough risk management. By providing liquidity on multiple exchanges across the world in various financial instruments we participate in the safeguarding of healthy and efficient markets. We provide liquidity to financial markets using our own capital, at our own risk, trading a wide range of products: listed derivatives, cash equities, ETFs, bonds and foreign currencies.