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Optimising Floating Exposure: Efficient Frontier Analysis for US SOFR

Borrowers tend to have both fixed and floating rate debt. Floating rate debt averages at a lower cost over time. But its more volatile than fixed rate debt (including mark-to-market). Fixed rate debt is more certain. But adding floating rate debt to the mix gets to a better risk/return outcome, and a lower cost. But how much floating is optimal?

Source: Shutterstock

Calculating Optimal Floating Rate Exposure

Cutting to the chase, we find that 17.5% floating exposure acts to minimise interest rate volatility when compared with a reference of 10yr Fixed. Interest rate costs are also reduced, from 4.5% to 4.2%. This should be viewed as a minimum floating exposure (we explain in the section below how we come to this).

Adding more floating exposure helps bring down rate costs. The cost in terms of higher volatility is not dramatic once it does not stray too far from the bottom of the hook on the efficient frontier. Having 32.5% floating exposure in fact results in the same volatility as being 100% Fixed. And it reduces interest rate costs by a further 25bp, to 3.95%.

Tolerance for slightly more volatility can reduce rate costs further. We can find the tipping point on

the efficient frontier before the trade-off between increased volatility and lower rate cost begins to really slip. At 45% floating, volatility is tolerably low (just before the tipping point), and interest rate costs are cut further to 3.75%.

One important point to make is this analysis is based off not timing the market. It contrasts rolling 10yr exposures with rolling 3mth ones. Clearly a 10yr lock-in has zero volatility for that trade alone, but it still has volatility in terms of mark-to-market.

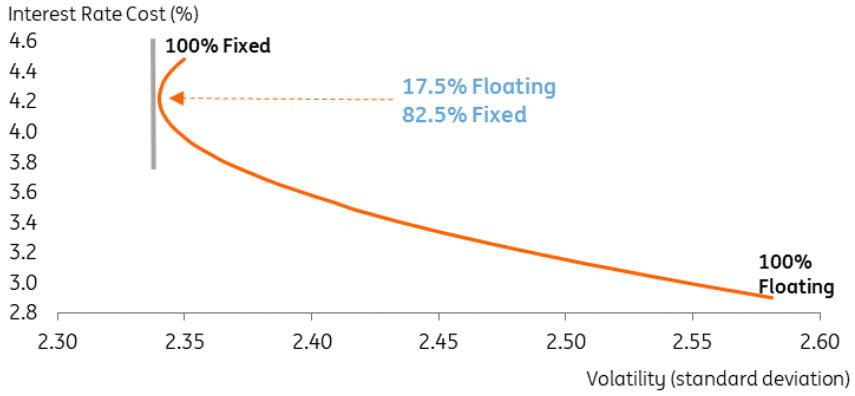
Efficient Frontier Analysis

In the past 35 years, the average interest cost when 100% fixed has been 4.5%, while the average cost when 100% floating has been 2.9%. The respective standard deviations are 2.3% and 2.6%. Lower volatility fixed rate exposure comes at a higher rate cost.

Volatility should *a priori* be higher for floating rate exposures. And the data confirm that interest rate costs have tended to be lower for rolling floating rate exposure, by some 1.6% on average, reflecting the tendency for the term structure to be upward sloping.

The question is how to determine an optimal ratio of floating to fixed rate debt. We map out an efficient frontier between interest rate cost and volatility, based off SOFR rates stretching from the 3mth to the 10yr tenors (spliced to Libor adjusted rates).

Efficient Frontier - Minimum Volatility

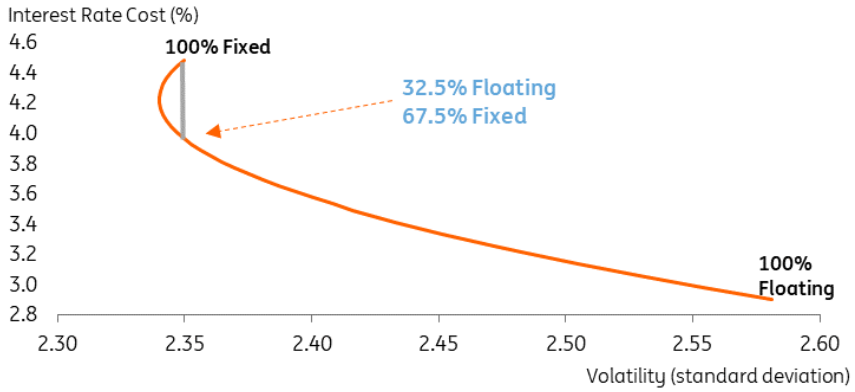


Source: Macrobond, ING estimates

The derived efficient frontier confirms that 100% fixed rate exposure is sub-optimal. By moving down the efficient frontier away from 100% fixed, we find that volatility can be reduced by adding some floating rate exposure. We find that volatility is minimised with about 17.5% of floating rate exposure (above chart). At this point, the average interest rate cost is 4.2%, some 30bp lower than the 4.5% achieved when 100% Fixed.

Average rate costs can be reduced further by adding more floating rate exposure, but at the cost of higher volatility. But the question is how far to push floating rate exposure, while remaining within a tolerant band of volatility. Below is one possibility (below chart).

Efficient Frontier – Match volatility of 100% Fixed



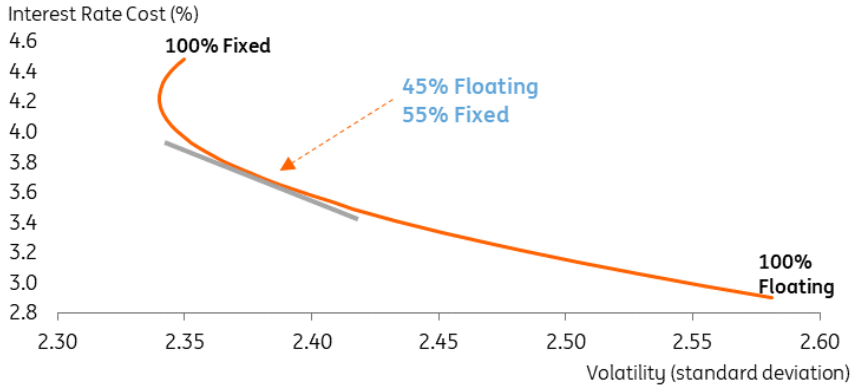
Source: Macrobond, ING estimates

At 100% Fixed, certainty is maximised. At 82.5% fixed, volatility is minimised (first chart). Moving further along the efficient frontier from left to right we can hit a point where volatility is the same as at 100% Fixed, but at lower interest rate cost (second chart).

Here, a tolerable increase in uncertainty is introduced, as volatility is still quite low (as low as it would be if 100% Fixed). Floating rate exposure increases to 32.5%, and the average interest rate cost falls to just under 3.95%, compared with 4.5% if 100% Fixed.

We could make a further push to the right along the efficient frontier by finding the point where the trade-off between volatility and interest rate cost hits a tipping point. We illustrate this below (below chart). At 45% Floating, the average interest cost is cut to around 3.75%, and the rate cost versus volatility ratio is not too far from the bottom of the hook on the efficient frontier.

Efficient Frontier – At turn of volatility vs interest rate cost trade-off



Source: Macrobond, ING estimates

The following table has a summary of the exercise (below chart). As a technical note, the standard deviation as a proportion of the average interest rate cost rises as average interest rates fall (right-hand column). Not an issue as it is driven by lower rate costs.

Efficient Frontier Summary (based off data back to 1988)

	Percent Fixed	Percent Floating	Average Interest Rate Cost (%)	Standard Deviation	STD as % Mean
Fully Fixed	100.0	0.0	4.47	2.34	52
Minimise Volatility	82.5	17.5	4.19	2.33	56
Match Vol to 100% Fixed	67.5	32.5	3.95	2.33	59
Tipping point for volatility	55.0	45.0	3.75	2.35	63
Fully Floating	0.0	100.0	2.88	2.56	89

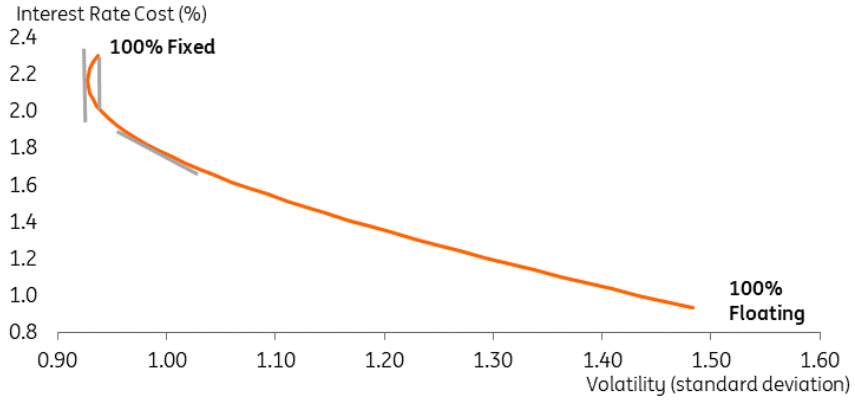
Source: Macrobond, ING estimates

Alternative Analysis (back to 2008)

Some might object to using data through a relativity high rates regime (1980s and 1990s) and then a low rates regime (post GFC and pandemic). But we'd argue that this is the best way to do an unbiased long-run analysis. That said, if interested in how things would look if we took the last 15 years, it's done below.

Observations show the average 10yr SOFR rate is 2.3% since 2008, and the average 3mth SOFR rate is 0.9%. Rates volatility is lower but much higher in the 3mth rate when calculated as standard deviation as proportion of mean. Volatility is minimised with 10% floating, and up to 37.5% floating is doable before the 'tipping point'.

Efficient Frontier – Based off data back to 2008



Source: Macrobond, ING estimates

Efficient Frontier Summary (based off data back to 2008)

	Percent Fixed	Percent Floating	Average Interest Rate Cost (%)	Standard Deviation	STD as % Mean
Fully Fixed	100.0	0.0	2.31	0.94	41
Minimise Volatility	90.0	10.0	2.17	0.93	43
Match Vol to 100% Fixed	77.5	22.5	2.00	0.94	47
Tipping point for volatility	62.5	37.5	1.79	0.99	55
Fully Floating	0.0	100.0	0.93	1.48	159

Source: Macrobond, ING estimates

That said, we feel we've moved away from such a low rates environment and find the analysis using the longer time frame is more representative of the future.

Conclusion

Bottom line, floating rate exposure should be no less than 17.5% to achieve lowest volatility.

At 32.5% floating, volatility is in fact equal to that of being 100% Fixed. Stretching to 45% floating is volatility tolerable, sitting at the vol tipping point. This full sequence moves from a rate cost of 4.5% to 3.75% (vs 2.9% floating) on data back to 1988. This all assumes not timing the market, and setting rolling 3mth versus 10yr exposures over time.

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