So far, we have discussed how to get arbitrage profit from CDX skew, and the key idea is that the bank expects the skew will converge to zero.

But, what if the skew does not converge? What happens the skew gets more negative?

Before discussing this, let’s recap what the skew is. Skew is calculated by subtracting model spread to composite spread. So the skew gets more negative means difference between spreads become larger.

What we also need to know is that composite spread is marked to market, but model spread is not marked to market because it is traded in over-the-counter market.

Keeping this information in mind, let’s analyze what happens if the skew gets more negative.

First of all, skew gets more negative means change in model spread is larger than change in composite spread, and it can be separated to two cases.

First, both changes are positive. In this case, cash flow from model spread, which is in short position, is zero because it is not marked to market, and there is positive cash flow from composite spread position because it gets larger.

Conversely, if both changes are negative, there is negative cash flow from long position, and it is not offset by short position. It can be problem, we will discuss later. In sum, what we need to know is the only spread which affects intermediate cash flow of the strategy is composite.

Marking-to-market problem makes firm need more cash. Of course, if the skew diverges, there will be negative return at terminal date of the strategy, therefore the firm needs additional cash.

However, even if the skew converges to zero, the bank should pay in additional cash in intermediate period because the value of long position is not offset by short position.

What makes worse is that normally, skew note has high leverage, it means that slight change in value of long position can occur higher needs of additional cash.

So, how to overcome this caveat? Simply, if the bank can manually make short position value marked-to-market, the value of long position will be offset, so there’s no problem!

But is it possible? I don’t know, and maybe not. It depends on the market condition.

So, how this feature affects risk and reward characteristics? It has considerable impacts. It will increase notes issuer’s credit risk, because issuer must be ready to fulfill margin, and margin will be high because of high leverage. And it may need additional cash because of the mismatch between long and short position.

For example, let’s assume that selling order for CDS index increases dramatically. Then long positon value will be decreased immediately and drastically. Therefore, the bank should make sufficient funds to hold its long position. However, there is no offset cash flow from short position, because it is not marked-to-market!. So there might be possibility of default due to lack of cash.

Next, what financial problem the skew bond solve? First, what is the “financial engineering problem?” From the very first lecture note of the class, it is written that financial engineers create, analyze, and trade derivative products. So financial engineering is very relevant to handle derivatives. And it also says that derivatives exists because it can get around market imperfections. Therefore, we can say that financial engineering is a kind of dealing with market imperfections. So, in this case, financial engineering problem is equivalent to how the skew note deal with market imperfections.

So, what market imperfections are in here? First, there is a corporate tax difference among nations. There are different nations, different amount of taxes. Firms know there is a opportunity to pay less taxes, but cannot. But financial engineering solves this problem by make several swap contractions. As you can see in question 2, Citi bank can transfer their wealth to SPV in Ireland, and reduce tax costs. Second, there are lots of regulation which make market imperfect. In this case, for investor side, because of Solvency II, insurance companies cannot invest in high-yield notes because it breaks the rule. However, using the skew note, investors can get higher yield and satisfy Solvency. Finally, for issuer, they cannot make profit from skew arbitrage trading because risk prop-trading is prohibited. However, by embedding the trading into the notes, they can get arbitrage profit. Consequently, the skew notes makes market more efficient and perfect, and all firms become profitable. Win-Win. That’s the problem skew notes solved.