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Determination Optimum Strike Price of FX Option Call Spread with USD/IDR Volatility and Garman–Kohlhagen Model Analysis

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Abstract : On September 2016 Bank Indonesia (BI) release regulation no.18/18/PBI/2016 that permit bank clients for using the FX option call spread USD/IDR. Basically, this product is a combination between clients buy FX call option (pay premium) and sell FX call option (receive premium) to protect against currency depreciation while also capping the potential upside with cheap premium cost. BI classifies this product as a structured product. The structured product is combination at least two financial instruments, either derivative or non-derivative instruments. The call spread is the first structured product against IDR permitted by BI since 2009 as response the demand increase from Indonesia firms on FX hedging through derivative for protecting market risk their foreign currency asset or liability. The composition of hedging products on Indonesian FX market increase from 35% on 2015 to 40% on 2016, the majority on swap product (FX forward, FX swap, cross currency swap). Swap is formulated by interest rate difference of the two currency pairs. The cost of swap product is 7% for USD/IDR with one year USD/IDR volatility 13%. That cost level makes swap products seem expensive for hedging buyers. Because call spread cost (around 1.5-3%) cheaper than swap, the most Indonesian firms are using NDF FX call spread USD/IDR on offshore with outstanding amount around 10 billion USD. The cheaper cost of call spread is the main advantage for hedging buyers. The problem arises because BI regulation requires the call spread buyer doing the dynamic hedging. That means, if call spread buyer choose strike price 1 and strike price 2 and volatility USD/IDR exchange rate surpass strike price 2, then the call spread buyer must buy another call spread with strike price 1’ (strike price 1’ = strike price 2) and strike price 2’ (strike price 2’ > strike price 1‘). It could make the premium cost of call spread doubled or even more and dismiss the purpose of hedging buyer to find the cheapest hedging cost. It is very crucial for the buyer to choose best optimum strike price before entering into the transaction. To help hedging buyer find the optimum strike price and avoid expensive multiple premium cost, we observe ten years 2005-2015 historical data of USD/IDR volatility to be compared with the price movement of the call spread USD/IDR using Garman–Kohlhagen Model (as a common formula on FX option pricing). We use statistical tools to analysis data correlation, understand nature of call spread price movement over ten years, and determine factors affecting price movement. We select some range of strike price and tenor and calculate the probability of dynamic hedging to occur and how much it’s cost. We found USD/IDR currency pairs is too uncertain and make dynamic hedging riskier and more expensive. We validated this result using one year data and shown small RMS. The study result could be used to understand nature of FX call spread and determine optimum strike price for hedging plan.

Keywords : FX call spread USD/IDR, USD/IDR volatility statistical analysis, Garman–Kohlhagen Model on FX Option USD/IDR, Bank Indonesia Regulation no.18/18/PBI/2016
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