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Expiring Monthly Interview with
Robert Krause and
Charles Barwis
CEO and CBDO of The Volatility Exchange

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Robert Krause – CEO & Chairman of the Board (over 25 years of futures exchange experience, investment banking, managed futures, and hedge funds. He developed the idea of VolContracts and patented the concept)

Charles Barwis – Chief Business Development Officer (over 25 years of exchange experience including trading technology and infrastructure development, former pit trader, and off-floor trader)

One of the most exciting product announcements of 2010 was a new series of realized volatility futures contracts on major FX pairs, to be offered by CME Group, based on the VolContracts methodology licensed from [The Volatility Exchange](#). *Expiring Monthly* sat down with Robert Krause and Charles Barwis to learn more about the new contracts and prospects for future offerings.

Expiring Monthly: *What was the impetus for The Volatility Exchange and the VolContracts?*

Robert Krause (RK): In 1993, the CBOE wanted to trade in volatility. I don't know what the mandate was exactly, or exactly how they approached Robert Whaley, but they essentially went to him and said, "Go design something." As I said, I don't know exactly how that conversation went, but Robert Whaley gets this mandate and I think what he does is sit there and think about the two kinds of volatility that are out there: historical and implied. And then as soon as you frame it as historical volatility and put that in the box, you can't trade on that. That's ridiculous—it happened already. So it must be implied. Implied is forward-looking, so it's got to be that.

I think that was an error in the thought process. But then, that's what came out as the VIX, and the VIX index. Whether that's a good method or not, it's very complicated, however you do it.

What do you get when you create an index of implied volatility? Implied, in theory, is supposed to be the market's forecast of realized volatility or actual risk. We've seen the academic papers about whether it is a good forecast or whether it may be a biased forecast. Maybe it's a little too high almost all of the time or those kinds of things. But at its heart, at its core, you're trying to forecast how volatile or how risky we will be in the future. And in the VIX index case, that's a forecast for the next thirty days.

Now, we trade a VIX futures contract, and it settles to the VIX index. Futures are also a forecasting mechanism. So that forecasting mechanism of futures on the VIX index is trying to forecast where the index is going to expire; where that index is going to be at expiration. But the index itself is a forecast of future volatility. So what are you trading weeks and months before? You're trying to forecast

$$\sqrt{\frac{252}{n} \sum_{t=1}^n R_t^2}$$

where everybody will be forecasting future volatility will be. That's a very different exercise than forecasting the actual, realized volatility itself.

Another way to think of it: they call VIX the "fear gauge." You're trying to speculate on how fearful the market will be next month, next quarter, or next year. Whether that fear is founded or not doesn't matter. What does the market think? It's a very different exercise.

I came up with an analogy: let's suppose we were trading futures on temperatures thirty days from now (December 15). So it would be mid-January and we're going to try to forecast the temperature in New York. You think that with global warming and the fact that we've already had our cold spell this week, it might actually get up to about 40 degrees. I say, "No way, that's the heart of January and it's going to be zero." The current market is twenty, so you're a buyer and I'm a seller. Analogous to the VolContract™, let's wait thirty days until the fifteenth of January and we'll see what the temperature is and we'll settle the contract. In the analogous VIX case, we turn on the Weather Channel and it says it's going to be warm a month from now, so you win!

And what happens thirty days from now when we get there? Well, VIX doesn't care, it's already forecasting February fifteenth. So it's always forecasting the tomorrow that never comes.

EM: *So in your analogy then, the VIX index would be like us thinking of that what the thirty-day weather forecast will say when we turn on the TV a month from now.*

RK: Right, right.

EM: *There are some advantages that seem apparent to me in trading realized or historical volatility, rather than implied. Do you see this contract as suitable for a portfolio hedging function or as a replacement for the implied-based products people are using now?*

RK: Oh, absolutely. In fact, we've done some research on this and it appears to be a much better hedging vehicle for an options book than a VIX futures overlay would be. In fact, you're an options trader, so you will understand that there are sensitivities of options called delta, gamma, theta, and vega. Those are the main ones. There are all kinds of sub-ones: color, charm, speed,

etc. But essentially you can affect or change your delta by trading the underlying. So you hedge your delta risk that way. But then you still are left with vega, theta, and gamma. VIX can more or less hedge your vega if the time frames match.

Ours matches the time frame. In other words, our realized-volatility instrument expires when the options expire, so the time frame matches. VolContracts actually do just as well with the vega component as the VIX would if it expired using the same time frame. But VolContracts also hedge the gamma component, so our VolContracts—or hedging with realized volatility—can hedge your vega and your gamma, so all you're really worrying about now is the theta component, which is relatively known and set. VolContracts actually do a very good job of hedging an options market-maker book.

EM: *One aspect of the structure of the contract is that there's a period before realized volatility actually starts accruing to the contract. Could you explain that?*

RK: The best way is probably with an example. Let's suppose that the underlying was gold, so we can consider the gold cash price, or we can look at gold futures. Let's say that we were using gold futures and



just to make it simple, let's just say that they expired at the end of the month. Now we'll talk about whole months.

Let's suppose we were trying to trade December gold volatility. On December first, we would get the settlement price of gold futures and we would now have one data point. We don't care about the open, the high, low, any of the trades within the day, just the settlement point. Then on December second, where did it settle? And now we have two data points. We go through the month of December collecting all of the settlement prices and by December thirty-first, we have all the information that we need with about twenty or twenty-one trading days for the month.

We plug that into a fairly simple standard-deviation calculation, one that you can find in the back of any high-school statistics book, and that is very similar to the one used for over-the-counter volatility swaps and variance swaps. What it gives you is the inter-day volatility for a period—in our case, one month. The contract we would trade is a futures-style format or contract. It would settle and expire on December thirty-first to the volatility over the month of December.

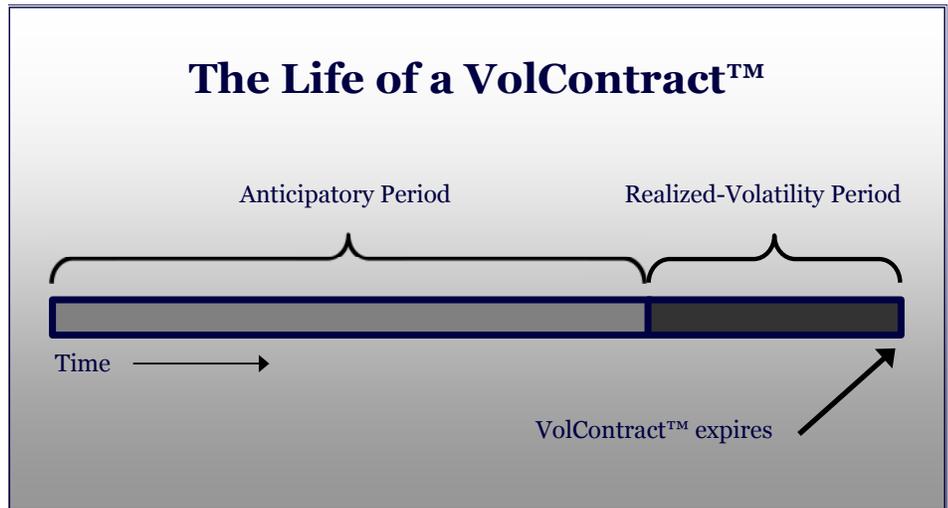


FIGURE 1 The Life of a VolContract

Now we could trade long before December first, so we could list, depending on market demand, really any time, but say three, four, five, six months ahead of time. So July, August, September, October, November, everybody would be trying to forecast where realized volatility will be, our goal being realized volatility for the month of December.

Think about something; with a gold VIX, you are trying to forecast the same thing as a VolContract with thirty days to go, just as in my temperature example. Right now, we're both trying to forecast what the temperature will be January fifteenth, so the price of VIX-like products or the price of our product should be almost the same during

the period before realized volatility accrues to the contract, adjusting maybe for the anomaly of how the two are calculated. But they should be roughly the same because we're both forecasting the same period on the same day. And that would equate to the beginning of the realized-volatility period, say December first; from December first back. In my case when I started in July, July, August, September, October, November, and up to December first, VolContracts can give you what VIX gives you if you get out by the start of the realized volatility period—a pure forecasting mechanism.

EM: How is this different from a volatility swap?



RK: It's almost exactly the same, except it is standardized, centrally cleared, transparent . . .

Charles Barwis (CB): Less counterparty risk.

RK: Less or no counterparty risk.

EM: What are your expectations for the liquidity of the products, especially in terms of how a market maker would hedge this?

RK: There are lots of hedges available. One is the options market, obviously. Instead of assuming that you have an options book and are trying to hedge it with VolContracts, you can say, well I'm making markets in VolContracts; now how can I hedge this exposure? So you can go back into the options market and hedge it that way. You can also enter the over-the-counter market and hedge it with volatility swaps.

EM: Right.

RK: But there's also an interesting trade here that's available, within the day, that's not apparent at first glance. Let me explain what I mean. Let's suppose we settle at one hundred, just as a number. And, the next day, the market goes down to 98 or up to 102, a two percent move. For the volatility calculation, I don't care. It's going to look like

an absolute-value function. All we're doing is measuring the move, not the direction of the move, so essentially it's a two percent move. Which way did it move? I don't care; it's two percent.

What happens if we move up two percent intraday? It's now midday, we're up two percent, and now I give you the same scenario. We can go down two percent or up two percent. If we go back down two percent, the volatility, or the change, is zero. So the volatility contribution to the month for that day is zero. But, if we go up two percent from there to the close, then it's a daily change of four percent, which is huge; it gets squared and it's enormous.

What I'm getting at is that there's an embedded directional component that's available within the day that's not available inter-day. As soon as the end of the day comes, we mark the contract and we say okay, that's where it settles. That goes into the formula and the calculations. And now which way should you hedge your volatility bet with futures? I don't know. You would need to know which way the underlying is going. But intraday after it moves, you have a very strong directional effect here. Let's take my

up-two-percent example. We buy a VolContract at up two percent and we sell futures on the underlying asset. If the market continues to go up, the VolContract explodes, and in futures, you start losing because you sold. And if the market goes back down to unchanged, then the VolContract loses and the futures contract gains, again because you've sold it. So there's an offset. If you were to plot this on a chart, it's a curve, but the futures market is a line. You're trying to mesh this line and this curve.

EM: That's interesting, because a swap would have that same curvature.

RK: Right. What I'm getting at is that a market-maker could tap into the liquidity of the futures market within the day that's not available inter-day. You couldn't say, let me buy or sell a VolContract and hedge it for a week. It just won't work. But he could buy or sell a VolContract, hedge it within the day, and as long as he gets out or transacts by the end of the day to neutralize himself, he could tap into the liquidity of the underlying to hedge his VolContract exposure. So, there's the potential of tapping into the futures, there's the obvious ability to tap into the options, and then if you can or you have accounts set up with investment banks, there's the liquidity of the vol swap market,



also. So there are some great ways to hedge, or lean on, or lay off, some of your risk if you're making markets in this product.

But also we're getting some interest from some general futures traders. Since it's a futures product, they're saying things similar to, "I'm used to making markets in futures so let me just do that naturally."

EM: *Do you have plans for rolling out additional products in the near term? I'm curious how it came to be that the FX contract was the first place to move. Was it just an area of interest, or was it the easiest to roll out for regulatory reasons?*

CB: We do have plans to roll out additional products. Those products will be partially determined by the next entity that we strategically partner with, its trading platform, and its natural customer base. To explain, one of the first things we did when we started working on this project, was to meet with exchanges and, later on, some of the major OTC firms that have their own trading platforms. One of our goals currently is to partner with major entities that have their own electronic trading facilities so that traders interested in trading our product can be connected right from the start. One of the keys to successfully

introduce new products to the marketplace is to have as broad a distribution network as possible upon launch. The easier it is for market participants to access your products from day one, the better.

Typically, a new exchange will set up its own trading platform and clearing facility. That can lead to a product development problem for them because right from the start, they have to overcome a customer access issue. That's because some traders naturally wait until new products develop a certain amount of liquidity before committing to the development work involved with writing to a new exchange API, or paying an ISV for new exchange access, or opening a new account to trade.

The way we are approaching the market, we won't have that connectivity problem. When VolContracts begin to roll out on Globex in February, everybody that has access to Globex will already have access to the product.

To come back to your original question, VolContracts on FX are being launched first because, early on, the CME approached us with that idea in mind. One of the interesting aspects of VolContracts is that they share similarities with the volatility swaps market, and it turns out that a

high percentage of the trade in volatility swaps takes place in FX.

We licensed our product to the CME for FX, though licensing is not our business model going forward. When you license something, you tend to lose control of product development and marketing. You can still work cooperatively, but it's not the same thing as controlling the growth, the branding, and the standardization of the product, which is our goal. To accomplish that requires a slightly different business model than what has typically been done before. Our current discussions with other potential partners are more along the lines of strategic partnerships, not licensing.

As far as developing new products, right from the start we set up meetings with potential market makers, particularly focusing on the options market-makers. They got the idea instantly and have been very excited about our product ever since. We actually have a number of market makers waiting to make markets in other products depending on what their expertise is, whether it's in equities, indexes, energy, rates, or other asset classes.

Earlier, you started to ask the question of whether there will be mostly buyers or sellers for this



product. The best that we can tell you is that we've had great feedback from all types of market participants, which points to broad market participation. For example, when we talk to the fund community, they tell us that they view volatility as an interesting asset class in its own right, that volatility is uncorrelated with other products in their portfolios, and that they would be interested in trading our product.

There is also a subset of the fund community that has emerged in the past few years that trades volatility exclusively. Some of that community has access to volatility swaps, which are similar to VolContracts. They tell us that while they will continue to trade volatility swaps, our products are attractive because they are exchange traded, and they reduce counterparty risk while increasing transparency. In addition, they are looking for more products to trade in the volatility space.

A bigger part of that group of funds that already trades volatility doesn't have access to the volatility swap market, perhaps because they lack the capital to access the market, or their mandate does not permit it, or some other reason. For these funds, the more products they can trade in

VolContracts don't require options to settle, which means that theoretically, there are a lot more underlying assets on which they can be listed.

the exchange-listed volatility space the better.

Prime brokers tell us the same thing, that they have a lot of fund clients who would be interested in our product for those reasons, and that they, the prime brokers, could have a natural interest in promoting our products.

We've also had great feedback from proprietary trading firms and retail firms. Today, if you want to trade volatility in gold, or crude, or Euribor, or any other asset other than S&P or EuroStoxx, you either have to be an options trader or you must have access to the volatility/variance swaps market. All of the other asset classes are, in a sense, closed to professional trading firms and retail traders that don't trade options, or don't have access to volatility/variance swaps.

And the volatility of our volatility products may prove to be very interesting to proprietary trading firms and retail traders. Our one month contract is very volatile, no matter

what the underlying is. Pick an asset; the volatility of volatility of our one-month contract is in the order of 80–100%. There's no seasonality to it, meaning that it is volatile nearly all the time. So traders looking for action and trading opportunities should be able to find them fairly easily in our one month product. The volatility of three-month contract on the other hand is in the range of thirty-five percent, just to put that in perspective.

RK: But that's interesting that we can create a totally different animal just by extending the calculation period. For a one-month version at ninety percent, some people may say, "That's just too much for me." But then the three-month at thirty-five, that's more like many commodities that vary at that rate. A lot of stocks vary at that rate. It's more "normal." If we extend it out to a year—by the way, we seem to have some demand for that—I'm not sure we're going to start there, but I think in time we could launch



a twelve-month product that really is calculating realized volatility from the moment it's launched or listed. So our twelve-month product is now calculating realized volatility during its entire listing period. The volatility of that instrument is somewhere around seven or eight percent, which is almost bond-like. Depending on whether you're a staid investment banker, or fund looking for opportunities, or somebody looking for lots of movement, we have the product to fit those needs.

Then, there's a very-near arbitrage between those contracts, so even if all of the speculators went for the one month and all of the hedge funds went for the three month, we can transfer that liquidity between them with some arbitrage traders.

CB: Another interesting thing about this product is, unlike VIX that requires a liquid options market to settle, ours does not. We don't require options to settle, which means that theoretically, there are a lot more underlying assets that we can list on.

EM: *I know, I've experienced a lot of that firsthand with products that don't have enough liquidity in the strikes you care about. You mentioned the VXX ETN and these other volatility products that give retail and individual investors more access. There's been a lot of self-education, I think it's fair to say, about the way that some of these VIX futures-based products trade and operate. Someone who said, "I'm going to take a ten percent stake in VXX as a portfolio hedge" has incurred some unexpected costs. So I think the reception among individual investors will be interesting to watch.*

I'm curious to see what the dynamic will be like comparing the period before a product starts to record daily volatility as part of the realized calculation to a period before that where it would be all implied and from that day, zero to expiration, obviously a mix of realized and the period remaining. What have you seen in terms of how that implied would work, if it would be roughly in line with VIX futures?

RK: It's expected to be. Anything that we're talking about is really speculative on our part because the only

thing the exchange is really doing is calculating the expiration price. Until then, it's up to the market participants to figure out what they want to do. If we take our cue from the volatility-swaps market, the volatility-swaps market prices forward realized volatility at, roughly, at-the-money implied. It doesn't matter that they expect realized volatility to be ten; if the current implied is twenty, then they're trading it at twenty. So we're expecting our VolContracts to trade similarly.

What that would imply is that a VolContract should probably decay into expiration. Implied volatility is, in general, a little higher—theoretically a little bit too high over long periods of time—to compensate for some tail event. But generally, and especially if it's a normal market, we would expect the short sellers to gain a little bit every day, almost like how an option would decay from theta. We see it that way, but again, the market could do different things and I've always been surprised at what the market can do.

EM: *Thanks for your time today.* **EM**

