**Wrong Way Risk –**

This is a topic that is of special interest to derivatives exchanges and the players (both long and short) who trade derivative contracts. This is because “wrong-way risk” has implications for setting margin requirements and for both individual and systemic risks related to derivatives contracts. There is a substantial body of literature that explains (or tries to explain) wrong-way (and right-way) risk and their roles in both derivative markets and in contractual relationships not necessarily involving derivatives exchanges as well. In a recent session on derivatives markets a participant suggested that the explanations in the literature were too often unclear. This prompted this writer to read in detail on this topic, and I came away agreeing that explanations of wrong-way risk are sometimes confusing.

The following is my own explanation of wrong-way risk, first in a situation in which formal derivatives are not involved. **Wrong-way risk** is always defined as a case in which the probability of loss and the magnitude of loss are **positively correlated.** **Right-way risk** is defined as the case in which the probability of loss and the magnitude of loss are **negatively correlated.**

**A wrong-way risk example**: Assume that a corporate borrower (Corp B) pledges accounts receivable due to the corporation as collateral for a loan of $1 million made to the corporate borrower by Bank L. One scenario has the borrower declaring bankruptcy, in which case Bank L’s loss will be conditional on both the value of the accounts receivable and the financial recovery available from Corp B’s bankruptcy proceedings. It would often be the case that contributing factors to Corp B’s bankruptcy filing were a decrease in the volumes of sales and accounts receivable as well as the collectability of the accounts receivable. Because the value of Corp B’s accounts receivables normally decreases as the probability of default of Corp B increases, Bank L is increasingly more likely to suffer a “double whammy” when Corp B’s financial situation deteriorates. This is a case of wrong-way risk. Had Corp B pledged T-bills rather than its own accounts receivable as collateral, the loss to Bank L would have been a function of the general credit-worthiness of Corp B, which presumably declined before it declared bankruptcy. However, the value of the T-bill collateral would have been unlikely to be correlated with the probability of default of Corp B, hence no wrong-way risk when T-bills were posted as collateral.

For more detail and variations on the wrong-way and right-way risk themes see **Investopedia’s** five examples at the following link: <https://www.investopedia.com/articles/investing/102015/introduction-wrong-way-risk.asp>

Example 1 of Investopedia’s five examples provides a good explanation of wrong-way risk involving derivatives trading. Here is the example as presented by Investopedia.

 “*Cortana Inc. buys a* [*put option*](https://www.investopedia.com/terms/p/putoption.asp) *with Alfa Inc's stock as the underlying on day 12 from Alfa Inc.*

*Strike Price: $75, Expiry: Day 30, Type:* [*American Put Option*](https://www.investopedia.com/terms/a/americanoption.asp)*, Underlying: ALFA stock*

*On Day 24, Alfa stock has fallen to $60 due to a downgrade in its rating and the* [*option*](https://www.investopedia.com/terms/o/option.asp) *is* [*in the money*](https://www.investopedia.com/terms/i/inthemoney.asp)*. Here, the exposure of Cortana Inc. to Alfa Inc. has increased to $15 (strike price minus the current price) at the same time that Alfa Inc. is more likely to default on its payments. This is a case of specific wrong-way risk.”*

**Rlosey comment:** Create a variation of Example 1 (Call it 1A) by changing only one aspect of Example 1. More specifically, change the seller of the Alfa put option in the example above to another corporation in an industry where corporate returns are uncorrelated to Alfa earnings. In this new Example 1A, Cortana’s returns from the put option will be paid by a firm that is equally likely to show increased or decreased earnings when Alfa does poorly. Hence, there is no correlation between the risk exposure of Cortana associated with the put option and the probability of payment on the put option by the counterparty. This is neither wrong-way nor right-way risk, but the intermediate case that I’ll characterize as “neutral-way” or “no-way” risk.

**Implications for a Derivatives Exchange:** Logically, margin requirements should be set at higher levels for the seller of the option when wrong-way risk is applicable.

Read more: [An Introduction to Wrong Way Risk | Investopedia](https://www.investopedia.com/articles/investing/102015/introduction-wrong-way-risk.asp#ixzz53RFMWCWi) <https://www.investopedia.com/articles/investing/102015/introduction-wrong-way-risk.asp#ixzz53RFMWCWi>
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an archer agrees to a bet for which the payoff is proportional to the degree to which a stock market index deviates from its historical trend line (of approximately appreciating 7-8% per annum). The archer will receive a positive return (when [s]he hits the bulls eye with her arrow) equal to $1000 times the absolute value of the percentage difference based on his/her accuracy when launching one arrow into a target on the expiration date of the agreement. She will pay $1000 times the absolute value of the percentage difference when (s)he misses the bulls eye. Assume that the probability that (s)he hits the bulls is .5 (and the deviations around the trend line are normally distributed). In this case this game has an expected return of zero.

But what if the archer is a nervous type whose performance is better than average when there are modest or moderate sums at risk, but who gets shakier and shakier past a certain threshold of potential loss when there are large sums at risk and. In this case the archer will be more likely to miss the bulls eye when a large sum is at risk because the

On average the