



Crypto Risk Assessment: Way to go

By Stéphane Reverre

A back-of-the-envelope comparison between risks on traditional and crypto markets.

Analysis Paper

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Last autumn I had the pleasure of giving an introductory course on financial risk management at the IAE Master in Bordeaux. The purpose was to provide students with a general understanding of what financial risk looks like, and what it means to “manage” risk.

Naturally, as part of the course, I had to offer a typology of financial risks i.e. a list as exhaustive as possible of all risks, their magnitude, likelihood, and to some extent the way to mitigate them.

The result is the table below: it is naturally a simplification, but not an excessive one. Listed are the risks by type, with the space of instruments they apply to, some simple ideas about possible mitigation, the first order of magnitude, and examples of things gone bad whenever possible:

Risk	Space	Mitigation?	Magnitude	Illustration
Market	cash/derivatives	delta hedging (when possible)	++	so many, we don't even know where to start
Model	derivatives		under normal market conditions : + volatile markets : ++	Black & Scholes notoriously inapplicable in real life
Custody	cash		virtually non-existent in properly regulated jurisdictions	
Credit	money markets	collateral posting (when possible)	+++	COVID crisis
Counterpart	derivatives	margin calls	small to non-existent for centrally cleared markets everywhere else: ++	
Settlement	cash	delivery vs. payment (DVP)	virtually non-existent when DVP is in place everywhere else: ++	
Operational (fraud)	all	internal controls	who knows? fat finger: ++	Kerviel, Leeson, many others Jcom
Operational (bug, "fat finger")	all	internal controls	bug: anywhere from + to +++	Knight Securities
Liquidity (short squeeze)	mostly cash	rigorous risk management	++	volkswagen, gamestop
Liquidity (trading volume)	mostly cash	rigorous risk management	++	H2O meltdown
Liquidity (gross funding)	money markets	conservative funding policy	+++	Lehman Bankruptcy
Liquidity (leverage)	money markets	margin calls & rigorous risk management	for funding provider: ++ for leveraged client: +++	Archegos/Nomura Long Term Capital Management
Rate transformation, assets/liabilities management	money markets	conservative funding policy	+ / ++	
Compliance, Legal	all	internal controls	who knows?	Virtually every bank at one point or another
Commercial	all	transparent commercial policy	who knows?	Subprime scandal
Fiscal	all	internal controls	who knows?	German cum/cum, cum/ex cases
Systemic	all		let's pray we never get there	

The magnitude scale is as follows (applied to capital at risk, whether it is a nominal amount for cash products or notional amounts for derivatives):

- + (very small to small): a fraction of a percent to a few percent
- ++ (medium to significant): a few percent to a few tens of percent
- +++ (high to very high): up to 100% and beyond. The vital prognostic of the

firm may be engaged

- *who knows?* this one is exactly what it reads, possible losses range from trivial to life-threatening

The individual links do not appear in the image, so here they are with underlying URLs:

- [Black & Scholes notoriously inapplicable in real life](#)
- [COVID crisis](#)
- [Kerviel, Leeson and many others](#)
- [JCom](#)
- [Knight Securities](#)
- [Volkswagen, gamestop](#)
- [H2O meltdown](#)
- [Lehman bankruptcy](#)
- [Archegos / Nomura](#)
- [Long Term Capital Management](#)
- [Virtually every bank at one point or another](#)
- [Subprime scandal](#)
- [German cum/cum, cum/ex scandal](#)

Now it is beyond the scope of this article to go deeply into each risk, but one remark is in order: the table above could be much redder, and was such in fact not too long ago. Indeed, many of the risks have turned out to be manageable because the industry has structured itself to address them. I have written before about the operational governance in capital markets, this governance is the result of a long slow evolution. A lot of money has been invested (and still is) into market infrastructure, to vent several types of risks out of the system.

A few examples to illustrate the point: independent clearinghouses, heavy regulation of depository institutions, SWIFT messaging infrastructure, standardized master agreements (notably from professional organizations such as ISDA, ISLA, ICMA, etc), delivery-vs-payment settlement to name but a few.

What's the situation in the realm of digital assets? Are we better or worse in an ecosystem that is much younger, and not yet dominated by highly-capitalized international financial institutions? Supposedly fintech are nimbler and consequently more adaptable.

The table below summarizes the main differences (well, at least as I see them):

Risk	Space	Magnitude	Magnitude (crypto)	Explanation/Illustration
Market	cash/derivatives	++	++	
Model	derivatives	under normal market conditions : + volatile markets : ++	under normal market conditions : + volatile markets : ++	
Custody	cash	virtually non-existent in properly regulated jurisdictions	+++	Mt Gox, etc
Credit	money markets	+++	+++	Frequent liquidations of leveraged positions
Counterpart	derivatives	small to non-existent for centrally cleared markets everywhere else: ++	+++	no independant central clearinghouse
Settlement	cash	virtually non-existent when DVP is in place everywhere else: ++	++/+++	custodial exchanges, no DVP
Operational (fraud)	all	who knows?	+++	well we know
Operational (bug, "fat finger")	all	fat finger: ++ bug: anywhere from + to +++	fat finger: ++ bug: anywhere from + to +++	
Liquidity (short squeeze)	mostly cash	++	++	
Liquidity (trading volume)	mostly cash	++	++	
Liquidity (gross funding)	money markets	+++	+++	
Liquidity (leverage)	money markets	for funding provider: ++ for leveraged client: +++	for funding provider: ++/+++ for leveraged client: +++	
Rate transformation, assets/liabilities management	money markets	+ / ++	not applicable so far	crypto firms still small and unregulated
Compliance, Legal	all	who knows?	+++	regulators still very vigilant and suspicious
Commercial	all	who knows?	who knows?	too few precedents
Fiscal	all	who knows?	who knows?	too few precedents
Systemic	all	let's pray we never get there	probably ok	
Governance failure, cryptographic hack, "51% attack"	all	n/a	+++ : game over	

Like before the links have disappeared in the picture, here they are:

- [Mt Gox, etc](#)
- [Frequent liquidations of leveraged positions](#)
- [Well, we know](#)

Naturally the above is subjective, and I am quite certain many bitcoin proponents would object. Regardless, there is little doubt that it is redder than the previous table, and for good reasons: most of the infrastructure in place in traditional markets doesn't exist in crypto. For example, exchanges are "custodial" i.e. you need to deposit both fiat and crypto before you can trade. There is no single (cash) exchange in traditional markets that accepts deposits from its members and/or participants.

The question of settlement and money flows is addressed somewhere else in the industry (that's exactly why clearinghouses have come to exist, and those do require deposits from the select firms they accept as members). Even when you settle a trade with a stable coin such as Tether, you still carry the specific risk of Tether. The same applies to derivatives: in the absence of a central clearinghouse, exchanges manage the entire process, and there can be no assurance for an investor that he will be able to recoup his funds should the exchange go under.

Reward doesn't go without risk and vice versa. The reason why crypto is such a gold rush right now is exactly this: risk is high, widespread, and probably very poorly understood. Investors who made a lot of money should probably ask themselves: what risk did I really take? Am I out of the woods now? Which one(s) do I want to take going forward?

To end on a positive note, one risk has disappeared, and that's for the better: the systemic one. If bitcoin went to 0, or if a large crypto participant went under, chances are the overall economy would not suffer much. This incidentally is why regulators worldwide still do not want to intervene. They are vigilant, suspicious because part of their mandate is to protect the "small" guy. But from a risk standpoint, they can still afford to let the crypto space mature and regulate itself.