# A simple isochore model evidencing regulation risk

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Financial regulations have fundamentally changed since the Basel II Accords. Among other evolutions, Basel II and III explicitly impose that computations of capital requirements be model-based. This paradigm shift in risk management has been the source of strong debates among both practitioners and academics, who question whether such model-based regulations are indeed more efficient. A common feeling in the industry is that regulations will sometimes give a false impression of security: risk managers tend to think that a financial company that would fulfil all the criteria of, say, the Basel III Accords on capital adequacy, is not necessarily on the safe side. This is so mainly because many risks, and most significantly systemic or system-wide risks, are not properly modelled.

This work studies a simple instance of what we call r*egulation risk*: the idea is that, in certain situations, the very prudential rules (or, rather, some of them) imposed by the regulator in the frame of the Basel II/III Accords or Solvency II directive are themselves the source of a systemic risk. The instance of regulation risk that we bring to light in this article can be summarized as follows: wrongly assuming that prices evolve in a continuous fashion when they may in fact display large negative jumps, and trying to minimize Value at Risk (VaR) under a constraint of minimal volume of activity leads in effect to behaviours that will *maximize* VaR.

More precisely, we consider the following situation: we assume that N actors trade on the market. All actors are supposed to act in a statistically similar fashion, but are allowed to take correlated decisions. They try to solve the following optimisation problem in any given time period: minimize their VaR under two constraints: keep the volume of activity above a certain threshold as well as the number of trades below another threshold. All these requirements are natural: since SCR are indexed on VaR, minmizing it is certainly a desirable aim; meanwhile, some activity must be maintained, thus the volume constraint, and finally the bound on the number of trades simply means that there cannot be an arbitrarily large quantity of orders in a fixed duration.

We show that realizing this program under the belief that markets evolve according to a continuous diffusion, or, more generally, a process with finite activity (finite number of jumps) when the true dynamics is a non-Gaussian stable motion (or, more generally, when returns follow a distribution with fat left tail), will in fact *maximize* VaR: in a nutshell, this is because, in a Gaussian framework, VaR is controlled exclusively by volatility, while, in a stable one, another dimension of risk must be taken into account, namely the intensity of jumps (as measured by the index of the stable random variable). Wrongly ignoring this feature leads to making trading decisions that will minimize volatility but maximize jump intensity. This latter variable has a greater impact on VaR than volatility, resulting in an effect which is inverse to the one sought for.

Although much stylised, our analysis highlights some pitfalls of model-based regulation and may hint at some better alternatives .