Correlation and contagion – a short discussion

Before we start discussing correlation and the contagion phenomenon, we need to define these concepts. Contagion as might be used in every day jargon usually relates to diseases, and how these propagate between individuals to affect whole societies. This kind of mechanism can also be seen in financial markets, where an incident or event in one market propagates and leads to consequences affecting other markets as well, creating a global crisis.

Contagion as defined in this article relates to correlation between markets which is due to a sudden and unanticipated chock, which markedly increases correlation between these markets. This article will not address heightened market and cross-correlation during stable market regimes which are due to normal circumstances (ex. increased trade).

A definition of correlation is now in order, as this concept is widely used yet rarely questioned.

Correlation is built on the assumption of a *linear* relationship between two variables and the strength of that relationship, and is a value between –1 and 1 (where zero entails no relationship at all). It is important to note that besides the linear relationship assumption, correlation does not tell you how that relationship was brought about (i.e. the causality, the cause). Correlation can also be computed in different ways, and most practitioners tend to not report which method was used; we will leave the computational aspect, as it is not the main subject of this article. To assume a linear relationship between variables representing returns is so problematic that the space for this article would not even cover parts of the introduction to a thesis on the subject; we shall thus also eave that discussion for now.

Correlation as a concept should be viewed and translated with care, and the reader is advised to be aware of the fact that a correlation value only gives a point in time and approximated value, based on assumptions that should be questioned, as discussed above. A certain correlation value can fluctuate heavily right after an unanticipated event in the market.

To assign correlation values during stable circumstances is, as we have noted, misleading. One may point to the fact that we can use scenario analysis on different correlation values based on historical or simulated values (ex. a "base", "growth" or "crisis" scenario). The problem with such a methodology is that simulations and assumptions based on past or simulated values are of little help when assumptions relating to future chock events are to be made.

A choice one may make is to not use correlation at all as a risk measure, and implement more suitable measures to capture the mechanism behind linkages in the market which lead to the sudden increase in correlation values and prepare oneself on how future contagions will affect one's portfolio. There are many clusters (ex. the interest rate market) that are affected when a chock hits the market. Depending on which post-crisis effects which impact one's portfolio the most, one allocates more attention to the most important variables.

The process behind contagion does follow patterns similar to that seen in diseases propagation, and also that of psychological emotional contagion. A friend's feelings of unease are transmitted over to the receiver. What the receiver can do to avoid such a situation is to know about this phenomenon, and react accordingly (ex. trying to calm the friend in question). The same applies to financial markets; it is not correlation itself that we should focus on. We should try to identify the linkages in the market which have direct influence on our portfolios and prepare oneself for the effects of such linkages.

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