Abstract for the NZSA 2011

This paper presents an extension to the widely used volatility model GARCH to account for the empirical heavy tails.

The ARCH model was first developed by Engle in 1982 and then further generalised to GARCH by Bollerslev in 1986. It is often critisied for the inadequacy to capture the natural heavy tail of the typical financial time series. In the past, improvements have been achieved through the adoption of heavy tailed distributions such as *t* and Generalised Error distributions, or via the use of simulation based methods.

We extend the previous work of Yong (2007, 2009) and Chang (2010) by relaxing the assumption of the error distribution to a finite mixture of scale normal distributions.

There are several advantages associated with this method. Firstly, the mixture distribution is much more flexible than the other heavy tail distributions mentioned above. Secondly, this approach has an implicit interpretation; the risk can be decomposed into time dependent market risk results from market turbulence and also time independent risk such as financial crisis and the risk of default. Moreover, if the time independent risk consists of multiple component densities then it is possible to further correspond each risk driver to a specific source, thus gaining an increased understanding of the risk structure confronted.