

Dynamic Conditional Beta

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Abstract:

In empirical finance and in time series applied economics in general, the least squares model is the workhorse. In class there is much discussion of the assumptions of exogeneity, homoskedasticity and serial correlation. However in practice it may be unstable regression coefficients that are most troubling. Rarely is there a credible economic rationale for the assumption that the slope coefficients are time invariant.

Econometricians have developed a variety of statistical methodologies for dealing with time series regression models with time varying parameters. The three most common are rolling window estimates, interaction with trends, splines or economic variables, and state space models where the parameters are treated as a state variable to be estimated by some version of the Kalman Filter. Each approach makes very specific assumptions on the path of the unknown coefficients. The first approach specifies how fast the parameters can evolve, and by using least squares on each moving window, employs an inconsistent set of assumptions. The second specifies a family of deterministic paths for the coefficients that may have undesirable or inconsistent implications particularly when extrapolated. The third requires specifying a stochastic process for the latent vector of parameters which may include unit roots and stochastic trends that are generally unmotivated and rarely based on any economic analysis.

There is no standardized approach that has become widely accepted. This paper will propose such an approach for a wide class of data generating processes. In addition, it will allow a test of the constancy of the parameter vector.