We explore statistical commonalities among granular measures of market liquidity with the goal of illuminating systemwide patterns in aggregate liquidity. We calculate daily invariant price impacts described by Kyle and Obizhaeva (2014) to assemble a granular panel of liquidity measures for equity, corporate bond, and futures markets. We estimate Bayesian models of hidden Markov chains and use Markov chain Monte Carlo analysis to measure the latent structure governing liquidity at the systemwide level. Three latent liquidity regimes — high, medium, and low price-impact — are adequate to describe each of the markets. Focusing on the equities subpanel, we test whether a collection of systemwide market summary time series can recover the estimated liquidity dynamics. This allows an economically meaningful attribution of the latent liquidity states and yields meaningful predictions of liquidity disruptions as far as 15 trading days in advance of the 2008 financial crisis.