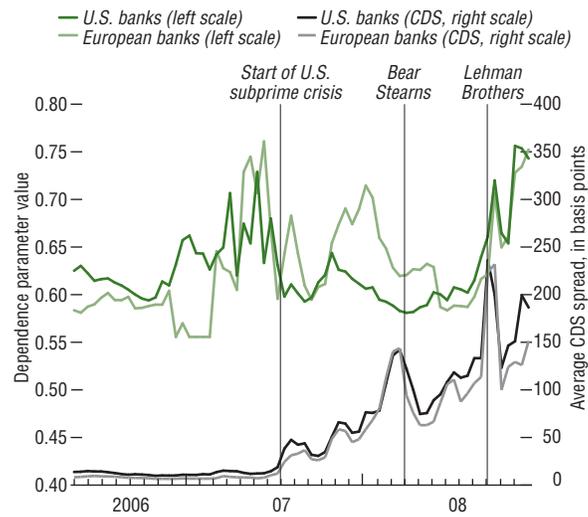


Figure 3.5. U.S. and European Banks: Joint Tail Risk of Implied Volatilities



Sources: Bloomberg, L.P.; and IMF staff estimates.

Note: Sample period: 5/18/2005–12/31/2008 (946 obs.) of implied volatility derived from at-the-money equity put options of three banks in each the United States and Europe. Rolling window (one year) estimation with bi-monthly updating. The line shows the estimated joint tail dependence ("asymptotic tail behavior") based on a nonparametric specification of a trivariate extreme value distribution (logistic model) with a convex dependence function whose upper/lower limits are derived under complete dependence/independence. U.S. banks = Bank of America, Citibank, and JPMorgan Chase & Co. European banks = Deutsche Bank, Royal Bank of Scotland, and UBS. CDS = credit default swap.