The recent financial crisis drew the attention of both regulators and investors, as it exposed the financial system's fragility and the potential risks arising from bank defaults. Banking network links are determinant factors when measuring systemic risk. For this purpose, we present a new approach to measuring the bank’s systemic risk using a multivariate hierarchical tree structure, a Vine-Copula. The hierarchical copula modelling considers bank interconnectedness, conditional systemic dependence, and specific peer-to-peer tail dependence. Using this model, we calculate the effects from the vulnerability of one bank to another measuring the Value-at-Risk of the recipient institution, and disentangling direct and indirect effects. I will present models, and an application in the Brazilian banking sector.