

Estimating tier-to-tier ties

1. This part of analysis is broken into two parts.
 - a) We look at network ties into future, i.e. network ties at quarter 't' and quarter 't+1'. We estimate the number of ties from tier-i to tier-j, for those get dropped and those that continue on.
 - b) We look at network ties into past, i.e. network ties at quarter 't' and quarter 't-1'. We estimate the number of ties from tier-i to tier-j, for those get newly formed and those that are old ties that continue on.
2. In our analysis we were cautionary to include only those tier-wise suppliers that exist in FactSet data from Quarter 't-1' to 't' while looking into the past and 't' to 't+1' while looking into future. The reason for this is to remove any bias due to inconsistencies in data collection of FactSet data. We also noticed that for some companies the tier-value changed going from one quarter to other. So, we only focused on companies for which the tier-value was constant from 't-1' to 't' and 't' to 't+1'.
3. Next, we found the suppliers and buyers of all tier-wise suppliers and recorded their tier-value as well. For these suppliers and buyers of tier-wise suppliers we recorded if,
 - a) The supply relation existed from Quarter 't-1' to 't', meaning they are old ties, or it formed exclusively in quarter 't', meaning new ties.
 - b) The supply relation existed from Quarter 't' to 't+1', meaning they are continued ties, or it formed exclusively in quarter 't', meaning dropped ties.
4. For each tier we counted the tier-to-tier ties formed by the suppliers in that tier to their suppliers and buyers. For each supplier, it's suppliers and buyers will themselves be located in different tiers, so we counted each pairs of such tier-to-tier ties. For example, if a supplier in tier-3 has 10 suppliers that are distributed as 4 in tier-4, 3 in tier-3 and 3 in tier-2, then we perform following updates;
 - a) Number of supply ties (tier-4 to tier-3): +4
 - b) Number of supply ties (tier-3 to tier-3): +3
 - c) Number of supply ties (tier-2 to tier-3): +3
5. Finally, we added all these tier-to-tier ties for each tier in four different categories, namely old ties (existing from quarter 't-1' to 't'); new ties (formed exclusively in quarter 't'); continued ties (existing from quarter 't' to 't+1') and dropped ties (existed not in quarter 't+1' but in 't').