

# Industry Aware Firm Level Network Reconstruction

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Reconstructing firm-level production networks is essential for studying economic interdependencies and systemic risk, yet such data are rarely available. We develop an industry-aware reconstruction framework that combines firm-level strength data with aggregate input–output (IO) information. First, we extend the density-corrected gravity model by introducing an IO-based bias term that increases the likelihood of links between firms in industries with strong observed inter-sectoral flows. Second, we assign edge weights using iterative proportional fitting to jointly preserve firm-level in/out strengths and IO sectoral totals. We compare the resulting ensemble to the CReM-B model from Parisi et al. [2020] and find that our approach better preserves both firm-level and input–output constraints under realistic sparsity levels. The framework is tested on the 2021 Hungarian VAT-based production network to evaluate structural properties, consistency with IO aggregates, and implications for downstream systemic-risk analyses such as Diem et al. [2022].

## References

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