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A Network Model for the Maltese Banking System

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   - direct impact on capital (and possible bank failure)
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Today we will focus on Phase 1: understanding the network structure

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Leveraging the power of network analysis

Research objectives

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Key findings:

- We detect 4 bank communities and provide a business model classification

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Key findings:

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! We do not aim to replace the Bank's Core/Non-Core/International bank categorisation with our own

- Our clustering is a **complimentary** categorisation based entirely on credit risk

Outline

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Data: the Maltese banking system

- Confidential supervisory data on 17 banks (Source: COREP)
- Exposures from 251 geographies
- Aggregated into 6 regions and 7 counterparties ('to whom'); yielding 42 distinct exposures (eg: Domestic-Sovereign, Domestic-Financial Institutions, etc)
- Reference period: 2024Q3

Geography	Counterparty
Domestic	Sovereign
Material Third Countries (M3C)	Financial institutions
Rest of the World	Non-financial corporations (SMEs)
Main SSM (DE, NL, FR)	Non-financial corporations (large)
Other SSM	Retail
Other EU	RRE
	Other

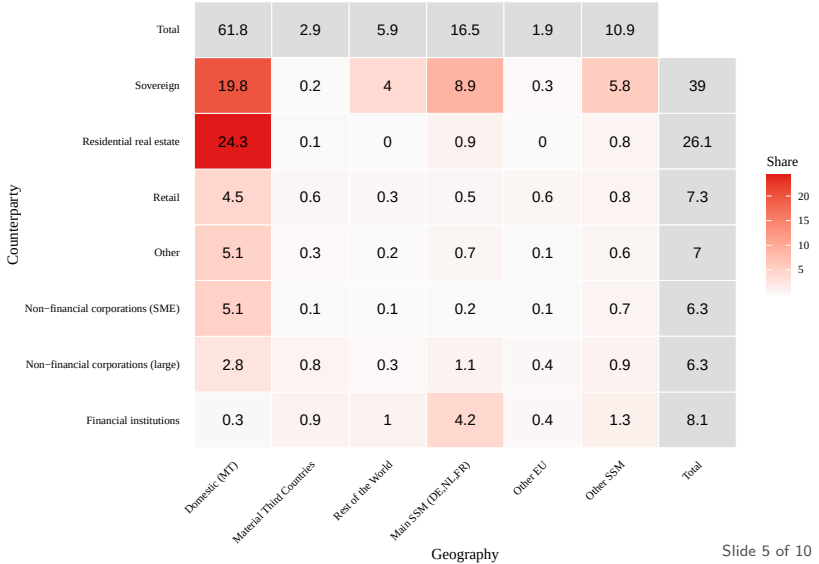
Outline

Results

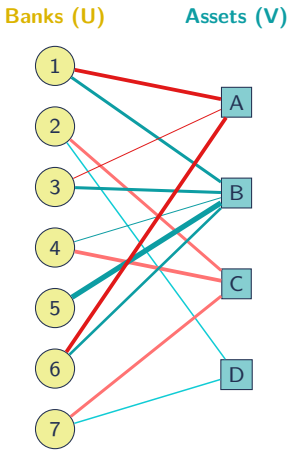
Materiality assessment (% of total exposures)

Significant concentration in Domestic Mortgages and Sovereign holdings

With some material Sovereign exposures in SSM countries



Bipartite graphs and community detection



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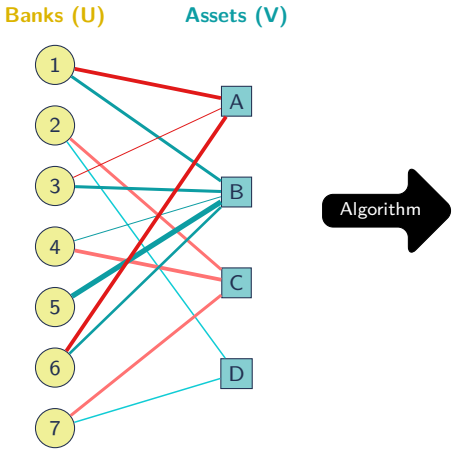

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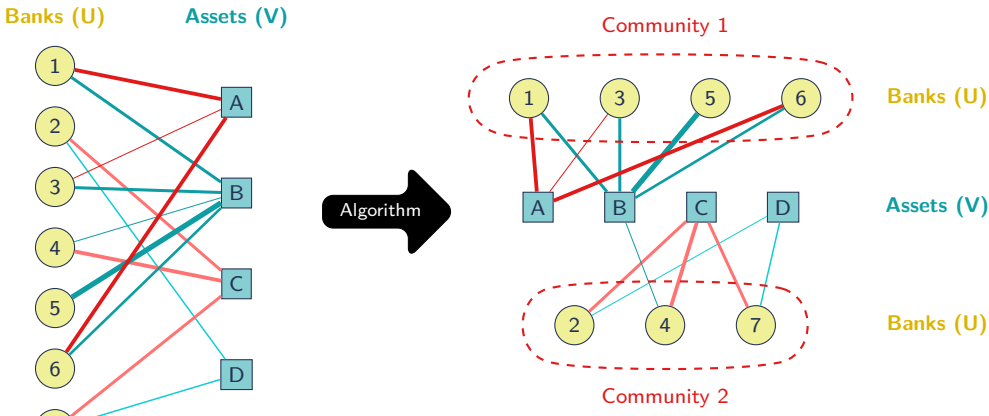

Results

Community nestedness matrix

- Communities:
  1 and 2 largest (6 banks each)
  3 and 4 smaller (3 and 2 banks)

- First glimpse at which bank/s would be **directly affected by a shock**...
  as well as the potential **contagion channel to other banks!**

Results

Bank-level network metrics

	Comm. 1						Comm. 2						Comm. 3			Comm. 4	
HHI (normalised)	0.13	0.31	0.16	0.27	0.28	0.18	0.16	0.35	0.27	0.35	0.33	0.36	0.16	0.29	0.29	0.17	0.08
Nestedness Rank	0.00	0.06	0.13	0.31	0.38	0.44	0.75	0.50	0.69	0.81	0.88	1.00	0.56	0.63	0.94	0.25	0.19
Normalised Degree	0.86	0.81	0.79	0.64	0.64	0.50	0.36	0.50	0.38	0.36	0.33	0.14	0.43	0.38	0.26	0.69	0.76
Weighted Betweenness	0.03	0.05	0.03	0.05	0.03	0.08	0.05	0.25	0.00	0.33	0.00	0.03	0.00	0.00	0.03	0.00	0.08

Results

Business model identification (based on credit risk)

Comm.	Business model	Target market
1	Local Generalist	Domestic: **RRE**, **Sovereign**, Retail, Other, Large & SME NFC SSM, RoW: Sovereign
2	Global Specialist	Domestic: **Sovereign**, Large NFC, Financial SSM, Other EU, M3C, RoW: **Large & SME NFC**, Financial, Sovereign
3	European Specialist	Domestic: Sovereign, Large NFC SSM, Other EU: **Retail**, Large NFC
4	Global Generalist	Domestic: **Sovereign**, Other SSM, M3C, RoW: **Sovereign**, Financial, RRE Retail, Other

See Alexandre et al. (2024) for a discussion of nestedness and specialisation

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- Our results are stable over time and robust to a series of robustness checks, see Andreani and Gatt (2025) for further details

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- Today we presented the first phase of the documentation and application of the M2MN model, focusing on **M1** and its main functionalities
  1. Materiality assessment
  2. Network metrics and community detection
- First attempt at bank business model identification
- Our results are stable over time and robust to a series of robustness checks, see Andreani and Gatt (2025) for further details
- Next steps: study the capital impact of shocks to exposures using **M2/M3**
  - direct impact
  - contagion via overlapping portfolios

Thank you!

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