Mapping the interconnectedness of Swedish credit institutions – Domestic exposures

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Summary

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In this Economic Commentary, we visualise the interconnectedness of Swedish credit institutions using supervisory COREP (Common Reporting) data on large exposures. We map the bilateral linkages in the network of Swedish credit institutions, focusing on domestic exposures. This commentary is part of a broader research project on interconnectedness, and key issues such as foreign exposures and contagion will be examined in future work.

Our results suggest that the Swedish banking system forms a concentrated network, with the large Swedish banks playing a central role, functioning as critical intermediaries that channel exposures across the system. Interconnectedness is primarily driven by debt exposures, reflecting Swedish banks' holdings of each other's covered bonds. The combination of high network density and concentrated dependencies increases the risk that shocks propagate rapidly, thereby increasing the likelihood of spillovers and contagion. The identification of these risks and potential contagion within the network will be addressed in forthcoming analysis.

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1   Introduction

Interconnectedness among financial intermediaries has been referred to as a double-edged sword: it can enhance risk sharing and market efficiency, but it can also rapidly channel stress across the financial system. Over the past decades, the Swedish financial system has been characterised by increasing interconnectedness across institutions, markets and borders. Interlinkages have therefore become a key stability concern for policymakers and a crucial factor in the design of financial stability policies.

To better understand how institutions within the Swedish banking system are connected, we leverage supervisory COREP reporting data on large exposures to map the interconnectedness of Swedish credit institutions by means of bilateral exposures. The analysis is descriptive and aims to visualise and identify key properties of the network of Swedish credit institutions. In future companion studies, we will assess potential risks and analyse paths of contagion within the network.

In the paper at hand, we focus exclusively on domestic exposures. Foreign exposures of Swedish credit institutions, as well as exposures to other sectors such as non-financial firms, households and the public sector, will be covered in future analysis. By

mapping the interconnectedness among Swedish credit institutions, we construct a comprehensive, data-driven representation of the banking system that allows us to identify concentration, central institutions and vulnerabilities. This mapping is not merely illustrative; it forms the foundation for subsequent quantitative analysis for the purpose of risk assessment.

2   Data

COREP is a standardised regulatory reporting framework within the European Union designed to monitor the solvency, credit, market, and operational risks of banks and investment firms. The COREP Large Exposures (LE) reporting requires banks to disclose exposures exceeding a certain regulatory threshold. According to the Swedish Financial Supervisory Authority's regulatory definition, an exposure to a single counterparty qualifies as a large exposure if it exceeds 10 per cent of the institution's Tier 1 capital, exceeds 300 million euros, or ranks among the ten largest exposures in the institution's portfolio. The reporting is conducted on a quarterly basis and includes detailed information on connected clients, as well as the value and type of each exposure.

A key advantage of the COREP large exposure data is its high level of granularity. Covering the full population of Swedish credit institutions—both large and small—it provides a unique system-wide perspective on interbank dependencies. In this study, we focus on the domestic interconnectedness of Swedish credit institutions and restrict the exposure counterparties to domestic credit institutions only. The exposures in our sample are reported in gross terms and include both direct and indirect exposures to each other. The exposures can be broken down by type and include debt instruments (interbank loans and debt securities holdings), equity, derivatives[2], and off-balance sheet items. To enhance interpretability and reveal bilateral relationships that otherwise would be difficult to discern, we illustrate the network structure across bank groups organised by size. Specifically, we classify credit institutions as large, medium or small according to the criteria established by the Swedish Financial Supervisory Authority (2025).[3]

The sample covers 109 Swedish credit institutions over the period 2021Q2 to 2025Q3. The data comprise 3 large banks, 15 medium banks and 91 small banks. The total assets of the Swedish banking system amount to approximately 14.3 trillion Swedish kronor[4], corresponding to about 200 per cent of Swedish GDP. This is below the EU average of roughly 250 per cent, but significantly higher than in the United States, where banking system assets amount to about 80 per cent of GDP. Over the sample period, we identify 734 unique bilateral large exposures among Swedish credit institutions. In total, these exposures amount to 674 billion kronor (Table 1).

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[2] Derivatives are in netted values.

[3] Large banks comprise the three largest Swedish banks. Medium banks refer to banks under supervision category 2 and 3. Small banks refer to banks under supervision category 4. All banks are treated as anonymised institutions in our analysis.

[4] The statistics are based on the legal entity level, so foreign subsidiaries of Swedish banks are not included.

Table 1 Summary statistics of large exposure data

	# institutions	Total assets	Tier 1 capital	# unique exposures	Total exposures
Large	3	9 449	518	23	156
Medium	15	3 849	182	87	407
Small	91	1 002	117	624	111
All	109	14 300	818	734	674

Notes. Total assets, Tier 1 capital and total exposures are in billion Swedish kronor.

3   Types of large exposures

When disaggregating by instrument type, debt instruments account for most large exposures across all bank groups and counterparties (Table 2). Debt instruments include loans, advances and debt securities holdings according to the COREP reporting standards, but the large exposure dataset only provides the total exposure amount for debt instruments and does not allow us to separate interbank loans from debt securities holdings. However, aggregate statistics on interbank lending and covered bond holdings (Figure 1) indicate that average interbank lending amounts to approximately 150 billion kronor, which is substantially less than the interbank holdings of covered bonds (around 400 billion kronor). This suggests that the interconnectedness of Swedish credit institutions in terms of debt exposures mainly reflects investment and funding linkages arising from cross-bank holdings of covered bonds rather than short-term liquidity management through interbank lending.

For equity exposures in Table 2, one number warrants attention. It is the exposure of 18.1 billion kronor from small banks to large banks. This figure is driven by small saving banks that were historically part of, and still hold shares in, Swedbank.

Derivates are the instrument type with the smallest amount of exposure. The total derivative exposure for all banks amounts to 20.3 billion kronor, only 3 per cent of the total large exposures for all instruments (674 billion kronor).

For off-balance sheet exposures, the largest amount is observed for medium-sized banks, at 52.7 billion kronor, and accounts for 77 per cent of the total off-balance sheet exposure amount of 68 billion kronor among all credit institutions. Large banks also have substantial exposures to different bank groups; however, the size of their exposures is not on the same scale as that of the medium bank group's.

Table 2 Large exposures among Swedish credit institutions by instrument type

SEK Million	Counterparties			
	All banks	Large banks	Medium banks	Small banks
The banking system exposures				
Total exposures	674 419	266 703	382 554	25 162
Debt instruments	564 081	234 106	314 041	15 934
Equity instruments	21 800	18 351	1 089	2 361
Derivatives	20 342	12 630	7 652	60
Off balance sheet items	68 196	1 616	59 773	6 807
Large bank exposures				
Total exposures	156 421	71 132	75 748	9 540
Debt instruments	132 110	64 079	63 493	4 538
Equity instruments	1 361	3	1 070	288
Derivatives	9 193	5 552	3 584	56
Off balance sheet items	13 757	1 498	7 600	4 659
Medium bank exposures				
Total exposures	407 462	117 433	285 453	4 576
Debt instruments	344 717	111 622	229 219	3 876
Equity instruments	355	205	0	150
Derivatives	9 665	5 598	4 067	0
Off balance sheet items	52 725	9	52 166	549
Small bank exposures				
Total exposures	110 537	78 137	21 353	11 046
Debt instruments	87 254	58 405	21 328	7 520
Equity instruments	20 084	18 142	18	1 923
Derivatives	1 485	1 481	0	4
Off balance sheet items	1 715	109	7	1 599

Notes. The exposure amount for all banks equals the sum of the exposure amounts for large, medium and small banks.

Figure 1 Total interbank lending and interbank covered bond holdings in the Swedish banking system

a. Interbank loans, SEK billion

b. Covered bond holdings, SEK billion
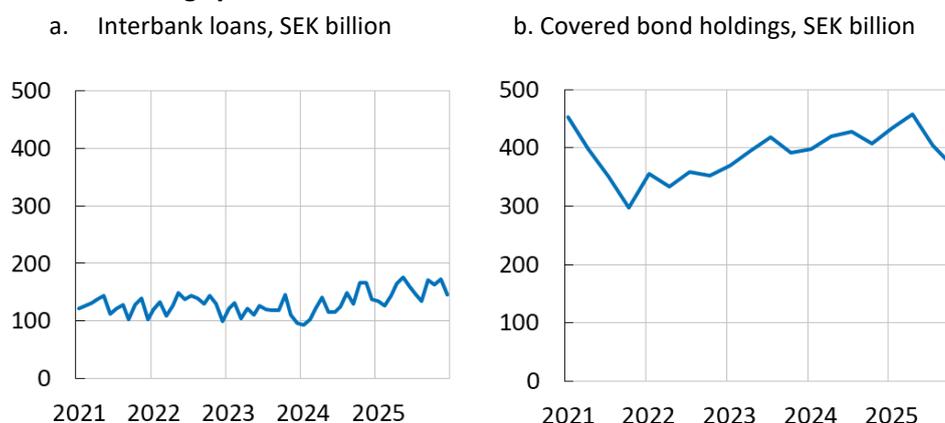
Sources: Statistics Sweden and the Riksbank

4 The network structure of Swedish credit institutions implied by large exposures

In this section, we illustrate the interconnectedness of Swedish credit institutions by presenting the network structure implied by bilateral exposures across different bank groups.

To obtain more analytically robust indicators of bank vulnerability, we normalize bilateral exposures by each institution's Tier 1 capital. While absolute levels of large exposures capture the degree of credit concentration, they provide limited insight into the bank's capacity to absorb potential losses. Scaling exposures by Tier 1 capital anchors them to the institution's underlying resilience, yielding a more informative measure of vulnerability that jointly reflects concentration and credit risks and the adequacy of the loss-absorbing capital base.

The most prominent empirical feature of the network is the presence of heterogeneity along two dimensions. First, *node heterogeneity* reflects differences in institutions' average Tier 1 capital, represented by node size (dots) in Figure 2. Second, *edge heterogeneity*, referring to the diversity of interconnecting edges (lines) in terms of the extent of bilateral exposures. Connecting lines represent directional dependencies and, as discussed above, they are scaled by the institution's Tier I capital to better reflect differences in risk-bearing capacity across institutions that may not be apparent from nominal exposures alone. Arrows point towards the counterparty institutions of exposures; for example, for debt instruments the arrow points towards the borrower. In other words, the node from which the arrow departs is the lender and hence bears the credit risk. The incoming and outgoing flows between the two connecting institutions are shown without netting. In this case, for each institution, we can distinguish both the inward exposures indicated by edges with arrows pointing towards the node

and the outward exposures indicated by edges with arrows originating from the node. The names of institutions are represented by letter combinations, with large institutions assigned one-letter aliases, medium institutions two-letter aliases and small institutions three-letter aliases.
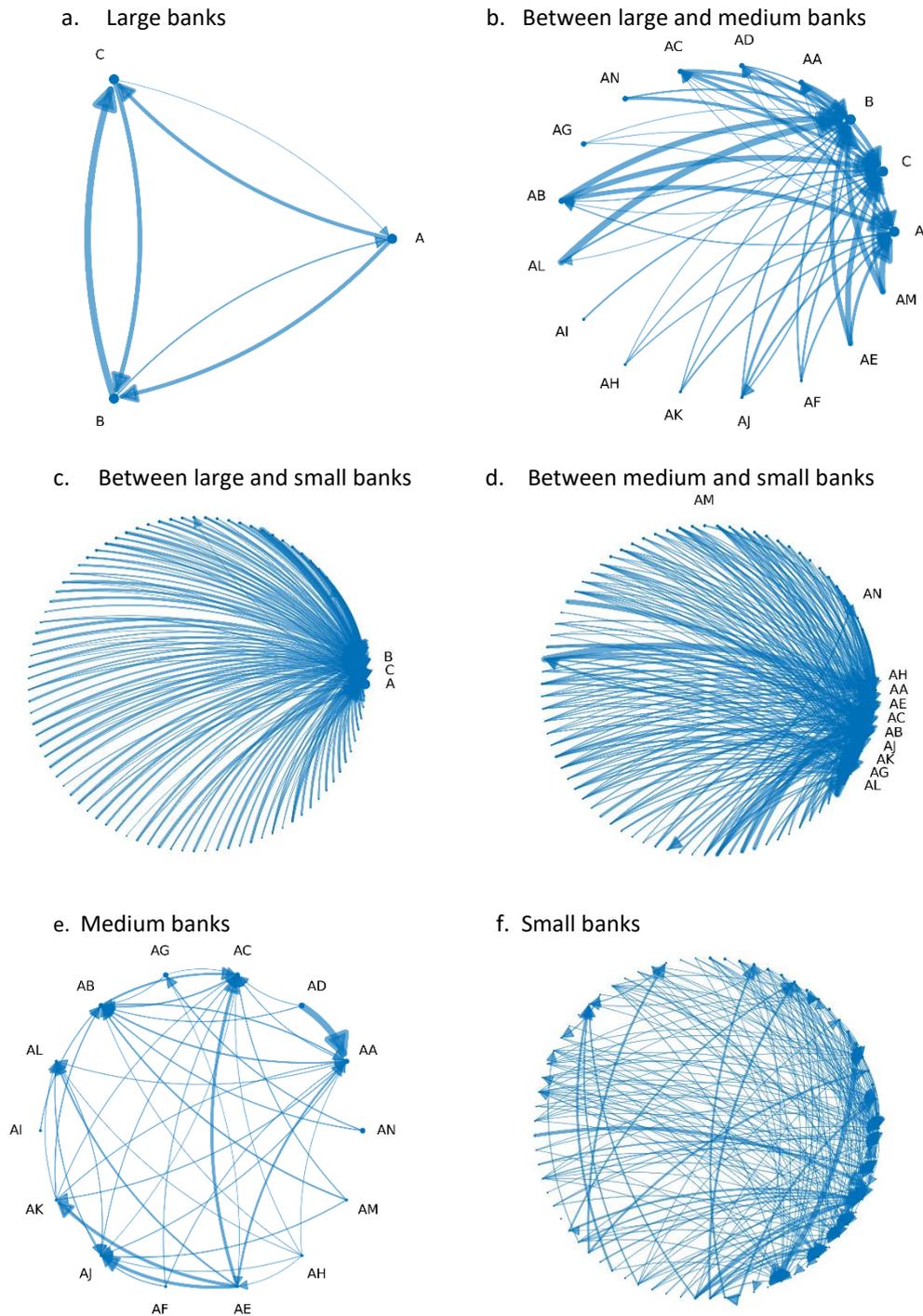
The large exposures among Swedish credit institutions form a network characterized by a core-periphery structure. This feature also results in a relatively sparse network, with 6.4% of all possible bilateral connections being realized. This is comparable to the euro area banking network (see Covi et al. 2022).

A common feature of networks linking different groups of credit institutions is a concentration of exposures toward larger institutions. For example, the network between large and medium-sized institutions (Figure 2b) shows that most exposures originate from medium-sized credit institutions and are directed toward large credit institutions. A similar pattern holds in the network connecting large banks and small banks (Figure 2c) as well as medium-sized and small institutions (Figure 2d). By contrast, networks within the same bank group display a more dispersed and less concentrated structure. Although some institutions have more inward or outward exposures than others within the same group, dependencies are generally more evenly distributed.

As debt instruments account for the majority of large exposures across all bank groups and counterparties, we also illustrate the networks between different bank groups, focusing exclusively on these exposures. As shown in Figure A1 in the Appendix, the networks based on debt instrument exposures mirror the networks of total exposures (Figure 2), reflecting the key role of debt in shaping interbank linkages.

For other instrument types, the networks generally display a structure similar to those for total exposures for the respective bank groups, but with a lower level of density, with two exceptions — the derivatives and off-balance sheet exposures among medium banks. As shown in Figure A2a in the Appendix, the network among medium banks for derivative exposures consists of a single connection between two banks, with the exposure amounting to 4 billion kronor according to Table 2. Similarly, the network structure among medium banks for off-balance sheet exposure (Figure A2b in the Appendix) is also extremely simple, comprising only three connections. These two networks indicate a high degree of concentration among medium banks for derivatives and off-balance sheet exposures.

Figure 2. Network illustration of total bilateral exposures among Swedish credit institutions

a. Large banks

b. Between large and medium banks

c. Between large and small banks

d. Between medium and small banks

e. Medium banks

f. Small banks

Notes. Each node represents a Swedish credit institution. The size of the node represents the average Tier 1 capital for the corresponding institution during the sample period of 2021Q2-2025Q3. The arrowed line from institution A to institution B represents the average of the ratio between the total gross exposures from institution A to institution B and the Tier 1 capital during the sample period of 2021Q2-2025Q3.

5   Identifying key banks in the Swedish banking network

Beyond visualising the network structure, we identify key banks in the Swedish banking network through quantitative measures of so-called *node centrality*, which measures the importance of each node in the network. In this analysis, the banks remain anonymized.

We follow Marmulla and Brandes (2026)'s approach and use three different measures of centrality: Betweenness, Eigenvector, and PageRank. Betweenness centrality identifies nodes that function as bridges in the network and connect other nodes by being located on the shortest paths (geodesics) between them. Eigenvector centrality identifies a node as central if it points to other central nodes. This means that what matters in a network is not only the number of a node's connections, but also the importance of neighbouring nodes. PageRank is a modified version of the Eigenvector measure commonly used in less strongly connected networks.[5] As with the Eigenvector measure, a node is central if it is connected to other central nodes according to the PageRank measure.

Table 3 shows the five banks identified as the most important in the Swedish banking system based on the centrality measures discussed above. The analysis suggests that large banks play the most important role in channelling capital flows the Swedish banking network. Except for the small bank ADW being ranked very highly according to the Betweenness measure, the three large Swedish banks rank as the most important institutions under different centrality measures. ADW is top-ranked under the betweenness measure because it is exposed to many small banks, albeit by very small amounts (less than 100,000 kronor),[6] so it serves as a bridge between a large bank and other small banks. Economically, however, ADW is not likely to be systemically important given the size of its exposures.

Table 3: Key banks identified under centrality measures

Centrality measure	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5
Betweenness	ADW	C	B	A	ADE
Eigenvector	C	B	A	AC	AB
PageRank	B	C	A	AC	AB

Notes. Betweenness centrality: a node is central if it lies on the shortest paths between other nodes. Eigenvector centrality: a node is central if it points to other central nodes. PageRank centrality: in non-strongly connected networks a node is central if it is connected to other central nodes. The institutions have the same aliases as labels in Figure 2.

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[5] In a strongly connected network, each node is connected to every other node in the network.

[6] ADW bank is a financing arm for a large company and relies on leasing revenues.

6 Conclusion

The Swedish banking system, when visualised in terms of large exposures across institutions, displays substantial complexity and heterogeneity. Our analysis reveals that the large banks play a central role and act as critical intermediaries, potentially channelling exposures within the system. With respect to exposure types, interconnectedness among Swedish credit institutions is primarily driven by debt instruments, mainly cross-bank holdings of covered bonds.

This Economic Commentary is a first attempt at illustrating and quantifying the network of Swedish credit institutions using data on large exposures. It provides a background to future quantitative analysis of systemic risk and potential contagion in the Swedish banking sector.

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APPENDIX

Figure A1 Network illustration of bilateral debt instrument exposures among Swedish credit institutions

a.   Large banks

b.   Between large and medium banks

c.   Between large and small banks

d.   Between medium and small banks
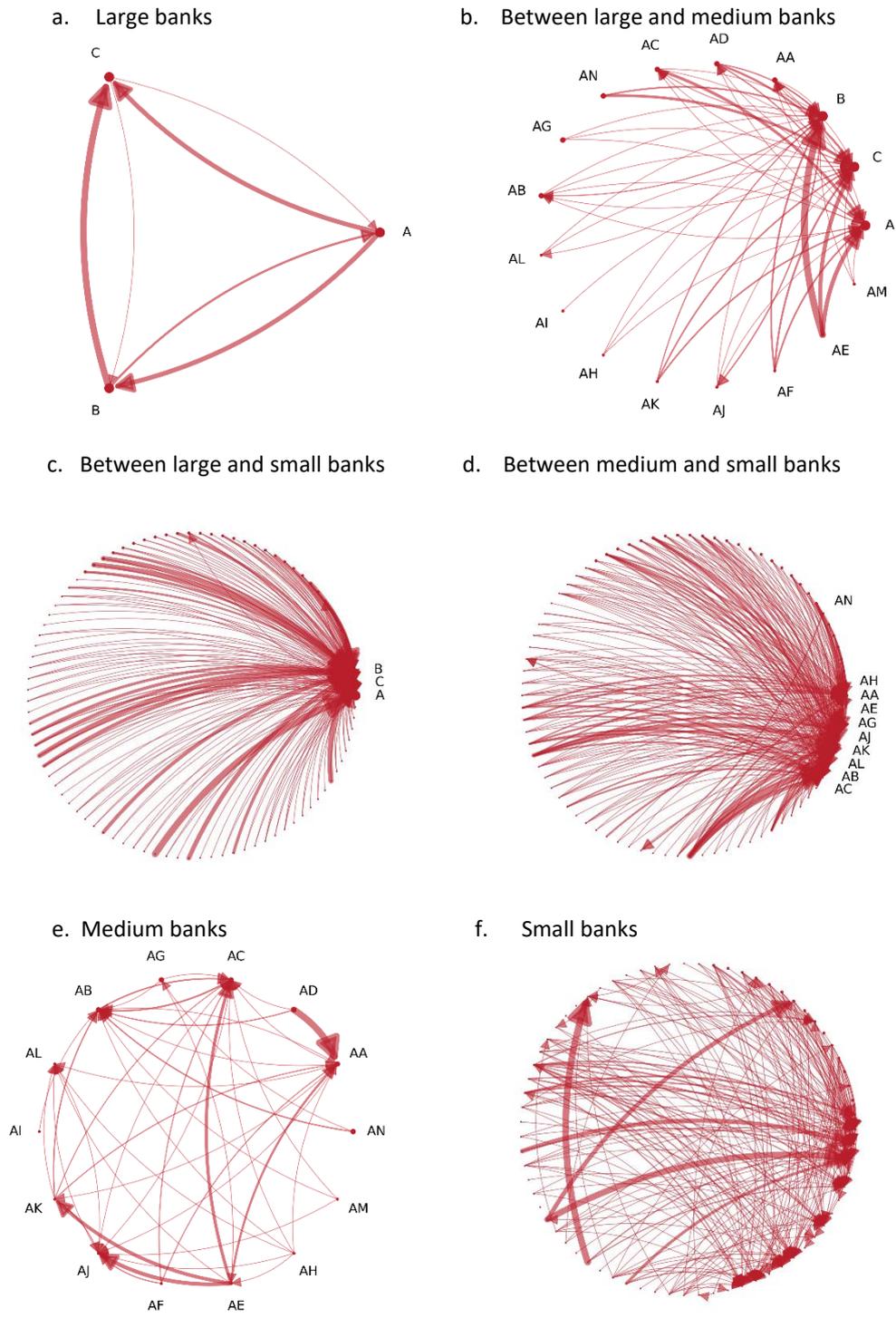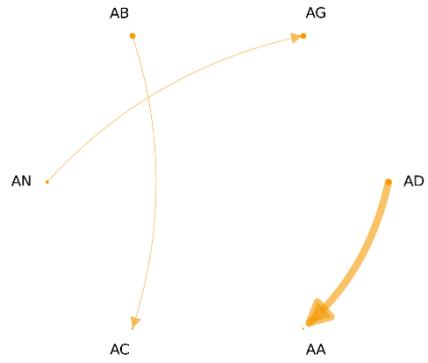
e. Medium banks

f.   Small banks

Figure A2 Network illustration of bilateral derivatives and off-balance sheet exposures among medium banks

a. Derivatives, Medium banks

b. off-balance sheet, Medium banks