



Building Collaborative Networks for Innovation

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MNCs Between the Local and the Global: Knowledge
Bases, Proximity and Distributed Knowledge Networks

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MNCs Between the Local and the Global: Knowledge Bases, Proximity and Distributed Knowledge Networks

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The Aim of the Paper

- Analyze how international collaboration patterns of the subsidiaries of MNCs are influenced by:
 1. The dominant knowledge base
 2. The co-location abroad with foreign collaboration partners

Why Multinational Enterprises?

- Operate across different territorial innovation systems
- Able to carry out global intelligence
 - Search for information, knowledge, partners
 - Transfer knowledge between subsidiaries in different contexts
 - Influence external collaboration of subsidiaries on an international scale

Knowledge Bases

- Characterises the nature of the critical knowledge which the innovation activity cannot do without
- Expected to influence international collaboration patterns
 - Geographical Scope (number of regions)
 - Diversity (types of partners)
 - Degree of territorial embeddedness (in specific regions)

	Analytical (science based)	Synthetic (engineering based)
Rationale for knowledge creation	Developing new knowledge about natural systems by applying scientific laws; <i>know why</i>	Applying or combining existing knowledge in new ways to solve problems; <i>know how</i>
Knowledge development and use	Scientific knowledge, models, deductive	Cross-disciplinary, experience-based, inductive
Interplay between actors	Collaboration within and between research units	Interactive learning with customers and suppliers
Knowledge content	Strong codified knowledge content, highly abstract, universal codes, available in professional epistemic communities.	Partially codified knowledge, strong tacit component, local codes, more context specific, communities of practice.
Sensitivity to geographical distance	Travels well. Meaning relatively constant between places	Sticky. Meaning may vary substantially between places
Examples	Drug development	Mechanical engineering

Data

- Norwegian Community Innovation Survey, Fourth Round (2005)
- Compulsory, limited non-response bias
- Study is based on 1506 innovation active enterprises

Operationalisation

- Analytical knowledge base (N=101)
 - Science system information sources rated as more important than information from customers & suppliers
- Synthetic knowledge base (N = 1405)
 - Customer & supplier information rated as more important than information from science system sources

Co-location with collaboration partners abroad

- The presence of a subsidiary in a foreign region enables the identification of possible partners
- Provides a platform for complex project collaboration

Operationalisation

- The Norwegian respondent enterprise maintain active collaboration with subsidiary of parent group in regions abroad

Dependent variables

1. International geographical scope of collaboration network
 - Number of world regions in which the respondent enterprise located in Norway maintain active collaboration
2. The diversity of collaboration partners in specific world regions
 - Used by respondent enterprises located in Norway
 - Measure of embeddedness in the same regions
 - Nordic, EU & US regions

Additional Controls

- R&D intensity
- 10 sector dummies
- Size
- International market orientation

Method

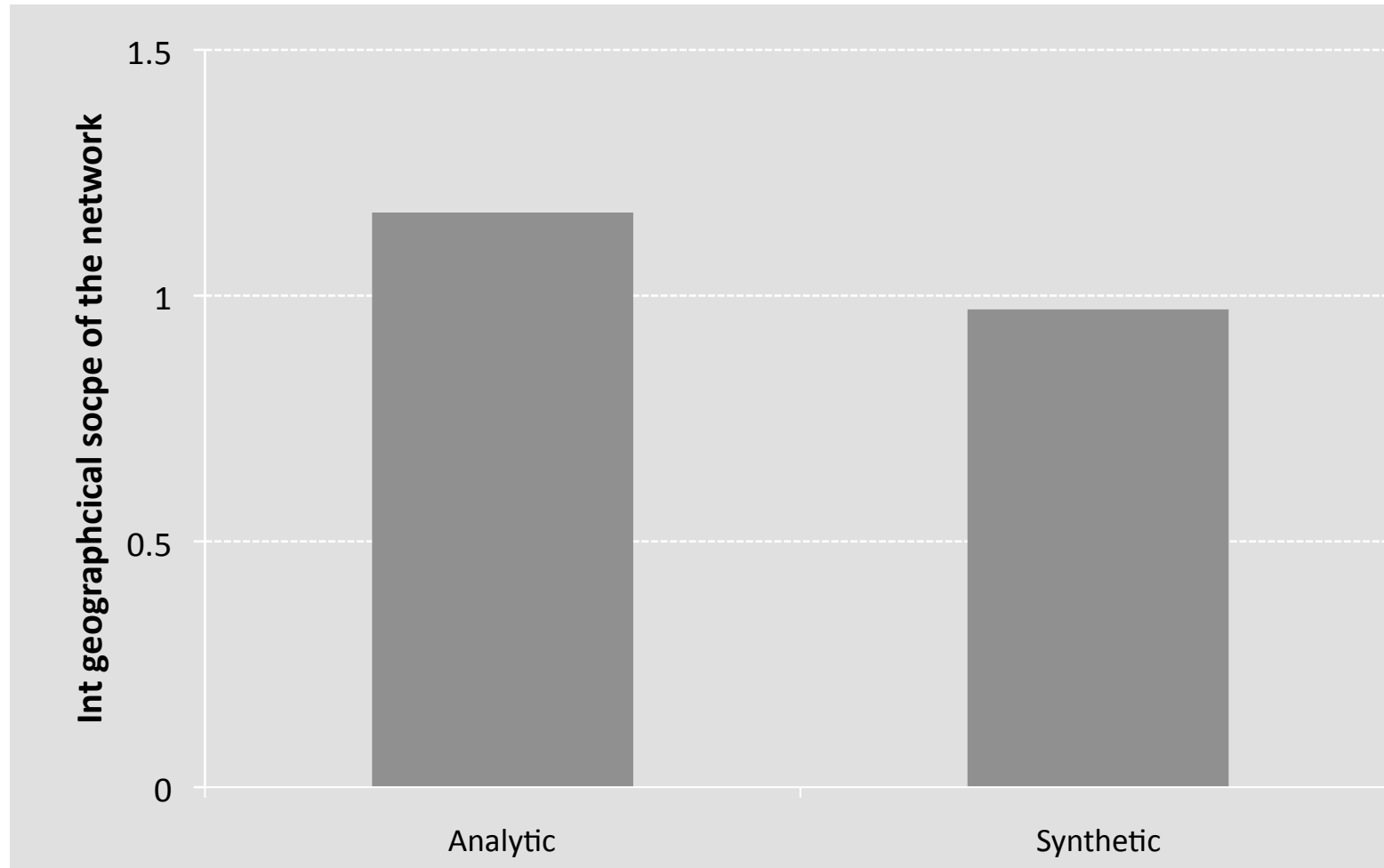
- Count data suggest negative binominal regressions
- But OLS regressions yield substantially the same results, and coefficients can be interpreted directly

Geographical diversity.

Dep. Var.:	DEGEO_VER		DEGEO_SCI	
	Coef.	Std. Err.	Coef.	Std. Err.
D_SYN	-0.186	0.159	-0.827	0.104 ***
LEMP	0.148	0.038 ***	0.197	0.025 ***
PROPAT	0.645	0.099 ***	0.348	0.065 ***
INTMARKT	0.400	0.088 ***	0.100	0.058 *
EXPSHR	-0.008	0.107	-0.024	0.070
APP	1.697	1.187	-1.367	0.775 *
HAMNO	-0.433	0.112 ***	-0.239	0.073 ***
ORG_DM	2.652	0.180 ***	0.998	0.117 ***
ORG_FO_ND	-0.010	0.183	-0.031	0.120
ORG_FO_EU	0.413	0.171 **	0.287	0.111 **
ORG_FO_US	0.585	0.220 ***	0.380	0.143 ***
ORG_FO_OT	1.310	0.540 **	0.708	0.353 **
NOBS	1506		1506	
F	30.04 ***		25.25 ***	
ADJ. R2	0.247		0.215	

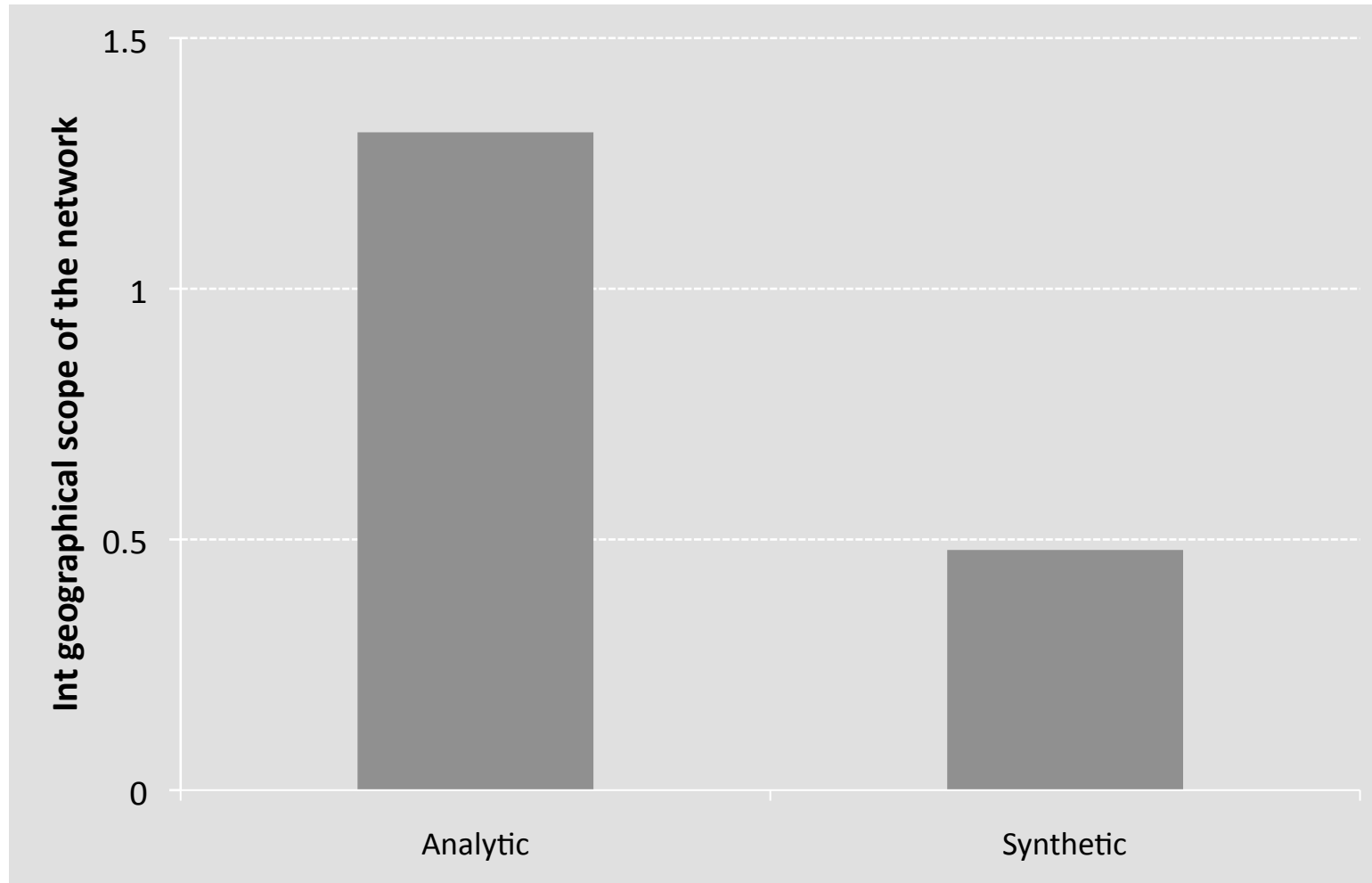
Note: *** (**, *) indicate significance at the 10% (5%, 1%) level. Regressions include 10 sector dummies, which are jointly significant.

Geographical scope of customer and supplier collaboration by enterprises located in Norway



Note: The diagram shows the geographical diversity of the vertical network of the average company in the sample. Analytic / synthetic refers to the knowledge base of the company, all other company characteristics being equal.

Geographical scope of science system collaboration by enterprises located in Norway



Note: The diagram shows the geographical diversity of the science network of the average company in the sample. Analytic / synthetic refers to the knowledge base of the company, all other company characteristics being equal.

Findings I

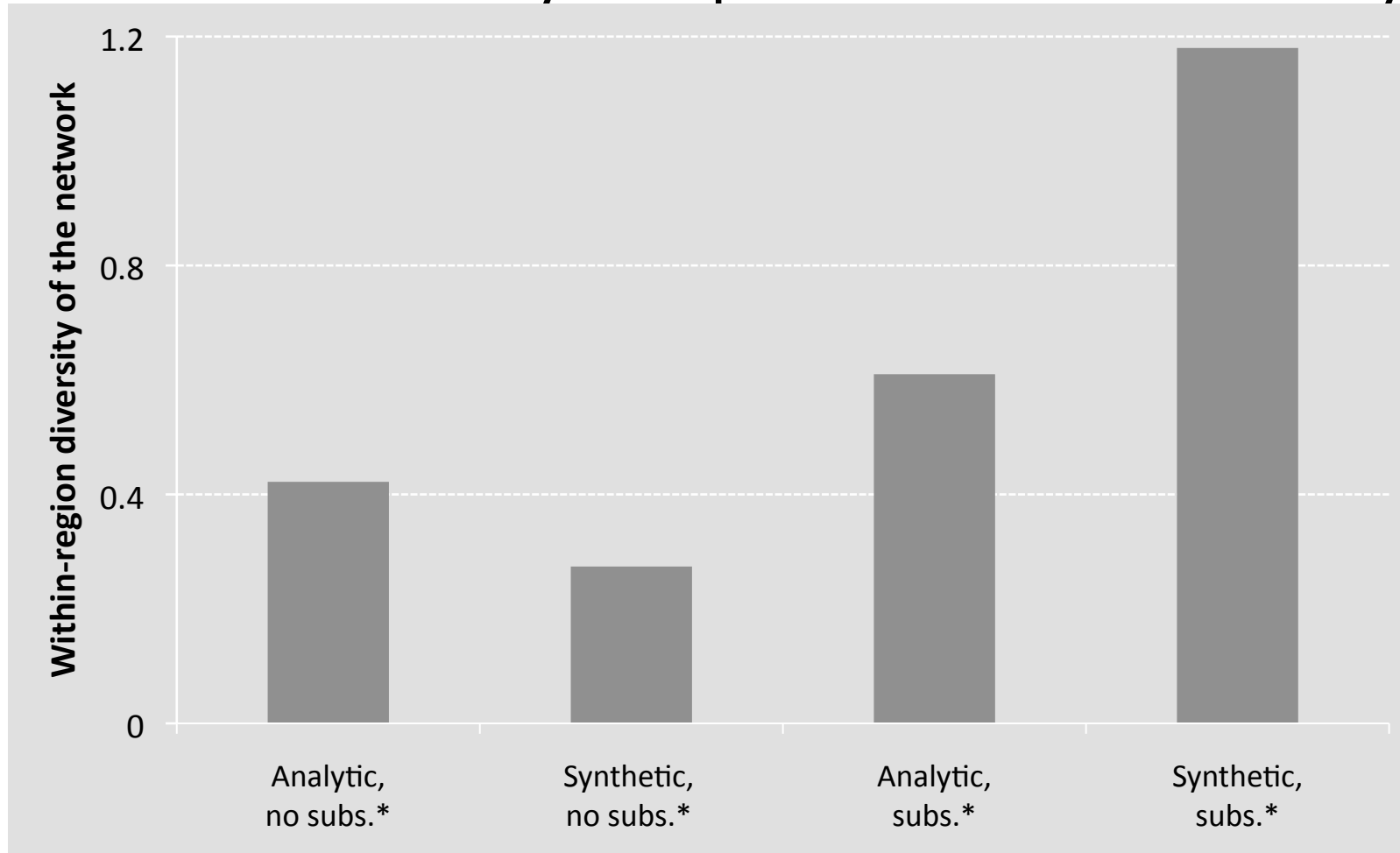
- Enterprises based on analytical knowledge maintain a wider geographical reach in their collaborative patterns than enterprises based on synthetic knowledge

Diversity of partners.

Dep.Var.	DGEO_NO			DGEO_ND		DGEO_EU		DGEO_US	
	Coef.	Std. Err.		Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
S _{xx} *	1.140	0.405 ***		0.188	0.290	0.009	0.310	0.886	0.186 ***
D _{SYN}	-1.130	0.187 ***		-0.149	0.084 *	-0.339	0.099 ***	-0.032	0.059
D _{SYN} * S _{xx} *	0.885	0.429 **		0.719	0.300 **	1.359	0.321 ***	-0.005	0.198
LEMP	0.139	0.041 ***		0.068	0.019 ***	0.066	0.022 ***	0.010	0.013
PROPAT	0.336	0.105 ***		0.246	0.050 ***	0.407	0.059 ***	0.169	0.035 ***
INTMARKT	0.152	0.094		0.117	0.045 ***	0.197	0.052 ***	0.096	0.031 ***
EXPSHR	-0.295	0.114 **		-0.074	0.054	0.138	0.064 **	0.085	0.038 **
APP	-3.600	1.261 ***		0.513	0.602	1.072	0.706	0.971	0.418 **
HAMNO	-0.421	0.119 ***		-0.129	0.057 **	-0.092	0.066	-0.050	0.039
ORG_DM	1.372	0.196 ***		0.761	0.104 ***	0.735	0.121 ***	0.215	0.066 ***
ORG_FO_ND	-0.077	0.195		0.065	0.097	-0.018	0.109	-0.032	0.065
ORG_FO_EU	0.165	0.182		0.161	0.087 *	0.033	0.110	-0.052	0.061
ORG_FO_US	0.529	0.234 **		0.081	0.112	0.216	0.132	-0.019	0.087
ORG_FO_OT	1.148	0.574 **		0.245	0.274	0.079	0.322	-0.107	0.191
NOBS	1506			1506		1506		1506	
F	26.94 ***			19.54 ***		27.65 ***		15.44 ***	
ADJ. R2	0.259			0.213		0.280		0.174	

Note: *** (**, *) indicate significance at the 10% (5%, 1%) level. Regressions include 10 sector dummies, which are jointly significant. *xx = NO for regression of DGEO_NO, xx = ND for regression of DGEO_ND, xx = EU for regression of DGEO_EU, xx = US for regression of DGEO_US,

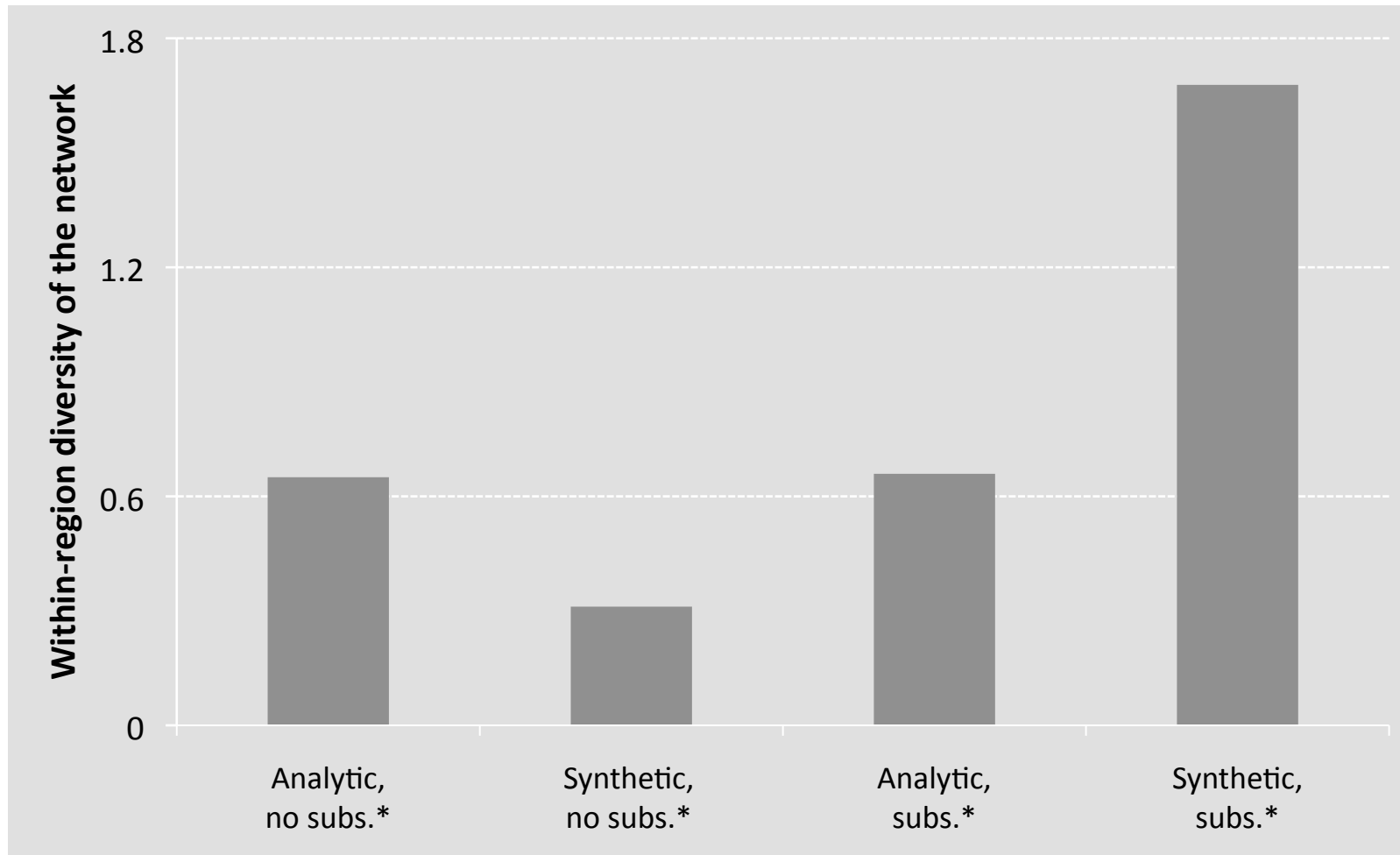
Diversity of collaboration with partners in other Nordic countries by enterprises located in Norway



Note: The diagram shows the diversity of the Nordic network of the average company in the sample.

* Analytic / synthetic refers to the knowledge base of the company. No subs. / subs. Indicates whether or not the company maintains an innovation collaboration with a subsidiary in the Nordic Countries. All other company characteristics being equal.

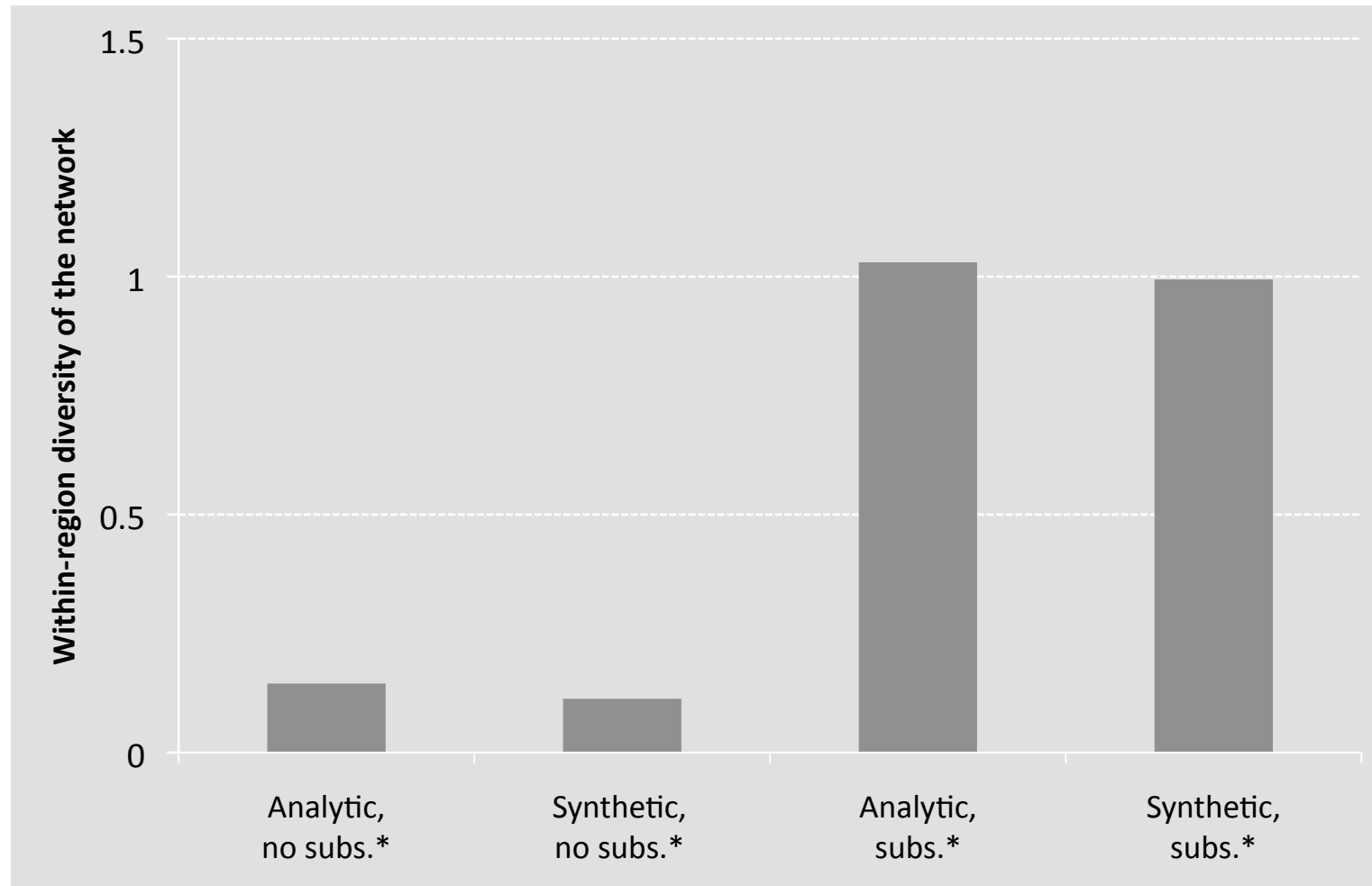
Diversity of collaboration with partners in other European countries by enterprises located in Norway



Note: The diagram shows the diversity of the European network of the average company in the sample.

* Analytic / synthetic refers to the knowledge base of the company. No subs. / subs. Indicates whether or not the company maintains an innovation collaboration with a subsidiary in European Countries. all other company characteristics being equal.

Diversity of collaboration with partners in the US by enterprises located in Norway



Note: The diagram shows the diversity of the US network of the average company in the sample.
* Analytic / synthetic refers to the knowledge base of the company. No subs. / subs. Indicates whether or not the company maintains an innovation collaboration with a subsidiary in the United States.

Findings II

- Enterprises based on synthetic knowledge maintain less diverse collaboration patterns in regions abroad than do enterprises based on analytic knowledge
- However, when they are present in the form of a **subsidiary** they establish **more diverse** collaboration patterns than do enterprises based on analytic knowledge

The exception

- Knowledge base characteristics do not influence collaboration patterns in the US.
- Only subsidiary presence matters for the diversity of the collaboration network.

Summing up

- Analytical knowledge and MNC affiliation increases the geographical scope of collaboration
- However, the diversity of collaboration within regions is increased by
 - Being part of a Norwegian MNC
 - Innovating on the basis of synthetic knowledge & having a parent group subsidiary present in the same region

Conclusions

- Enterprises depending on a synthetic knowledge base are found to be more sensitive to spatial proximity
 - Narrower geographical scope of collaboration
 - Stronger impact of subsidiary presence
- The form of MNC affiliation is important
 - Headquarter effects may stem from organisational and institutional proximity between enterprise and group HQ
 - Information spillovers from HQ of Norwegian MNCs to their subsidiaries in Norway promote more diverse collaboration patterns abroad by the subsidiaries



Thank You

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