Information Spillovers for Export Markets

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New Thinking in Industrial Policy:
Perspectives from Developed and Developing Countries

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Questions

Information frictions in international markets are large...

- ▶ Rauch, 1996; Allen, 2014; Atkin et al., 2017; Dickstein and Morales, 2018; Steinwender, 2018

...despite large gov't spending to reduce non-tariff barriers.

- ▶ Trade Council (Denmark): 400M DKK, USTDA: 100M USD, Export Development Canada: 200M CAD

Why? Is trade information:

- ▶ Private, excludable, highly-specific. If so, why subsidize?
- ▶ Public, non-excludable, non-specific. Evidence of a public good?

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- ▶ Public, non-excludable, non-specific. **Evidence of a public good?**

Q1: Does Danish Trade Council (TC) information spillover from supported to unsupported firms?

A1: Yes, unsupported peers of supported firms have more export market information.

- ▶ Export support programs create a policy-driven public good that spills over to unsupported firms.

Questions

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Why? Is trade information:

▶ Private, excludable, highly-specific. If so, why subsidize?
▶ Public, non-excludable, non-specific. **Evidence of a public good?**

Q2: Do TC information spillovers have a quantitatively large impact on Danish exports?

A2: Yes, spillovers alone increase aggregate machinery exports by 1-2% p.a.

▶ Justification for industrial policy in international markets.

Questions

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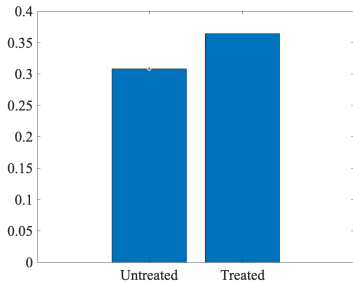
Why? Is trade information:

- ▶ Private, excludable, highly-specific. If so, why subsidize?
- ▶ Public, non-excludable, non-specific. **Evidence of a public good?**

Q3: Do TC information spillovers have a sufficient large impact on Danish exports to justify program expansion?
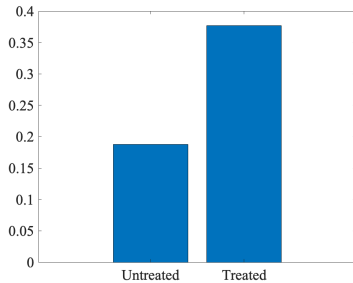
A3: Probably not.

- ▶ Doubling program size has modest public benefits.

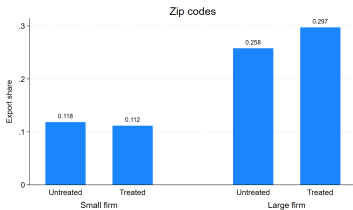# Firm Networks & Exporting

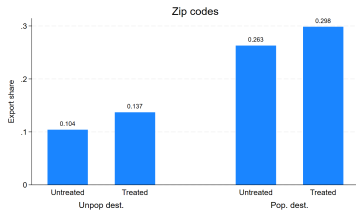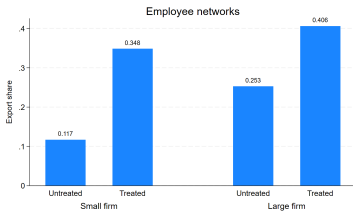(a) Export Sales (M USD) (b) Export Propensity
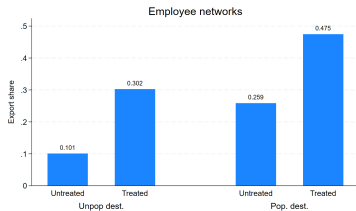
Firm Networks & Exporting

(a) Firm Size & Zipcode Network

(b) Dest. Popularity & Zipcode Network

(c) Firm Size & Emp. Network

(d) Dest. Popularity & Emp. Network

Related Literature

Information frictions are significant barriers to international trade

▶ Dickstein & Morales (2018), Rauch (1996, 1999, 2001), Rauch & Trindade (2002), Casella & Rauch (2003), Allen (2014), Atkin, Khandelwal, & Osman (2017), Steinwender (2018).

▶ This paper: Gov't policy mediates info frictions in export markets.

Trade-relevant, firm-network information spillovers

▶ Wei, Wei & Xu (2021), Fernandes & Tang (2014), Bisztray, Koren, & Szeidl (2018), Mion & Opromolla (2014), Kamal & Sundaram (2016), Cai & Szeidl (2017), Chaurey et al (2025).

▶ This paper: (i) Separate 'info' from network induced demand/cost premia.
(ii) Test public-good hypothesis of export support/promotion.
(iii) Quantify aggregate export gains from info spillovers alone.

Role for industrial policy in export markets

▶ Lawrence & Weinstein (1999), Lane (2020), Blonigen (2015), Hanlon (2019), Lashkaripour & Lugovskyy (2023), Juhász and Steinwender (2023), Reed (2024), Juhász et al. (2024), Ali et al (2025), Buus et al (2025), Depetris-Chauvin et al (2025).

▶ This paper: Externality identification & program evaluation exploiting quasi-random firm-level info variation.

Estimation assumptions matter for trade policy evaluation

▶ **Info & Estimation:** Manski (1993), Manski (2004), Cunha & Heckman (2007), Dickstein & Morales (2018).

▶ **Export Support:** Bernard & Jensen (2004), Gorg et al (2008), Volpe Martincus & Carballo (2008, 2010a,b,c, 2012), Munch & Schaur (2018).

▶ This paper: Estimation assumptions matter for trade policy evaluation.

Background: Danish Trade Council (TC) Support

Subsidized support services administered through Danish embassies or consulates.

- ▶ No coordination across embassies/consulates.
- ▶ Buus et al. (2025): TC support ≈ ↑ demand. No impact on costs, quality, markups, etc.

Most **common** services target *demand-side information* ▸ Example

- ▶ Partner search
- ▶ Foreign marketing ('Trade Fairs')
- ▶ Market intelligence

Buus et al. (2025): no evidence of **demand** spillovers across firms, products, locations. We confirm this feature across firm networks.

Unique feature of this program: Firms self-select into support or are **quasi-randomly called** by TC.

- ▶ Quasi-random: random conditional on past firm size.
- ▶ Allows identification of the arrival of policy-relevant information.

Model: Focus on (*U*)nsupported firms.

- Notation
  - *i*: firms;   *l*: network locations;   *j*: export destinations;   *t*: years;
  - $\mathcal{J}_{ijlt}$: *i*'s info set in (*jt*), can potentially vary with location *l*.

- Costs: All **known** to the firm
  - Constant marginal production costs, c_{it}
  - Iceberg trade costs, τ_{ijt}
  - Fixed entry costs, $f_{ijt}^U = \beta_0^U + \beta_1^U dist_j + \nu_{ijt}^U$

- Demand: **Potentially unknown/partially known**
  - CES structure ⇒ Constant markups
  - + Firm-specific demand shocks ⇒ Shifts quantity demanded
  - Impact of Trade Council through Firm Networks:
    - Increase demand?
    - Increase information?

- Timing:
  1. Firms choose to which countries they want to export.
  2. Conditional upon entry, firms set prices optimally.
  - Abstracts from selection into support concerns. Addressed in empirics.

Export Revenue and Profits

Export revenue among unsupported firms:

$$r_{ijt} = \alpha_{ijt}^U r_{iht} = \alpha_{jt}^U r_{iht} + e_{ijt}^U$$

where

- r_{iht} is firm i's domestic revenues in year t;
- α_{ijt}^U: Firm i's demand shifter in market j and year t;
- $\alpha_{jt}^U = \mathbb{E}_{jt}[\alpha_{ijt}]$: Common component to demand in jt;
- e_{ijlt}^U: Unexpected ijt- specific revenue shocks, $\mathbb{E}_{jt}[e_{ijt}^U | \mathcal{J}_{ijlt}, r_{iht}, f_{ijt}] = 0$

An unsupported firm will export to j in t if expected profits > 0,

$$D_{ijt} = \mathbb{1}\{\eta^{-1}\mathbb{E}[\alpha_{jt}^U r_{iht} | \mathcal{J}_{ijlt}] - \beta_0^U - \beta_1^U dist_j - \nu_{ijt}^U \geq 0\}$$

Probit model representation

$$\mathcal{P}(D_{ijt} = 1 | \mathcal{J}_{ijlt}, dist_j) = \Phi(\sigma_U^{-1}(\eta^{-1}\mathbb{E}[\alpha_{jt}^U r_{iht} | \mathcal{J}_{ijlt}] - \beta_0^T - \beta_1^T dist_j))$$

Moment Inequality Estimation

▶ Exporters face uncertainty in predicting export revenues;
  ▶ buyers? competition? market size?, etc.

▶ Researcher observes elements, Z_{ijt}, of firm information sets, $\mathcal{J}_{ijlt}$,
  $Z_{ijt} \subseteq \mathcal{J}_{ijlt}$.
  ▶ Distance to j ($dist_j$), past aggregate export sales to j ($R_{j,t-1}$), past firm-level
    domestic sales ($r_{ih,t-1}$) as in DM (2018).
  ▶ Also, support (s_{ijt}) instrumented by calls ($call_{ijt}$).

▶ Two steps
  1. Predict revenues based on a particular informational assumption. Measure
     firm-level expected revenues.
  2. Simultaneously apply
     ▶ **Odds-based** (Dickstein and Morales, 2018): $\frac{\Phi(\cdot)}{1-\Phi(\cdot)}$ and $\frac{1-\Phi(\cdot)}{\Phi(\cdot)}$ are convex in
       expected revenues.
     ▶ **Revealed preference** (Pakes, 2010; Pakes et al, 2015): $\frac{\phi(\cdot)}{1-\Phi(\cdot)}$ and $\frac{\phi(\cdot)}{\Phi(\cdot)}$ are convex
       in expected revenues.
     moment inequalities for additional fixed cost identifying power.

▶ Use specification test à la Bugni, Canay and Shi (2015) to test
  informational assumptions.

Data

Danish machinery industry, 2010-2015.

- ▶ Largest component of Danish manufacturing exports.
- ▶ Frequent user of export support services (though only 6% of firms)
- ▶ Abstract from Great Recession.

Firm-Level Data Sources

- ▶ Balance sheet data: Revenues & costs (by type).
- ▶ Customs records: Export revs & no. of buyers (by export destination).
- ▶ Trade council data:
    - ▶ Support purchases by firm-product-destination.
    - ▶ Records timing, product class, and firm identity associated with TC outreach.
- ▶ Network data
    - ▶ Detailed location data (zip codes, municipalities)
    - ▶ Linked employment records.

Restrict attention to most frequently supported export markets

- ▶ Benchmark: Non-EU. EU-inclusive sample, used for robustness.
- ▶ Major markets: Norway, USA, Japan, China, India.

TC Randomization

Firms' initial letter
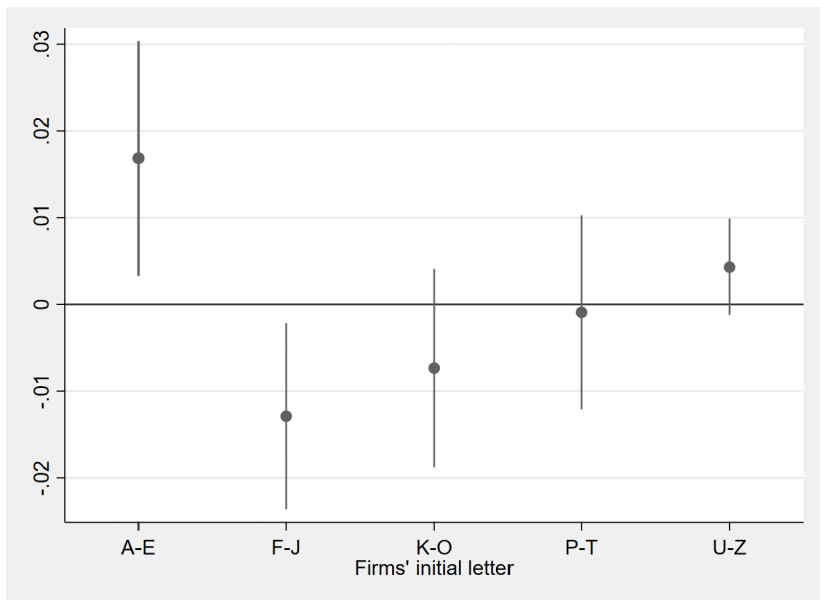
Balancing by Firm-Level Outreach
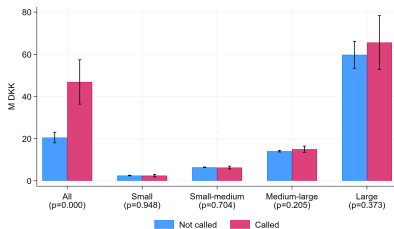
(a) Domestic Sales by Call Status
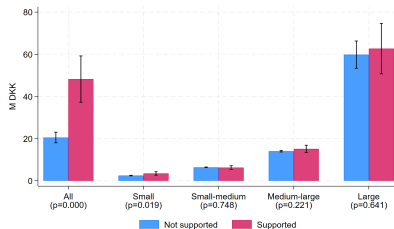
(b) Domestic Sales by Support Status

Domestic Sales Balancing by Network-Level Outreach
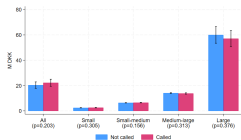
(a) By Call, Muni.
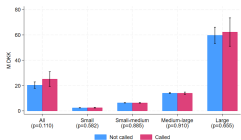
(b) By Call, Zip Codes
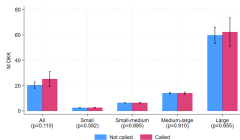
(c) By Call, Employment
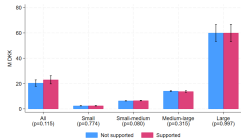
(d) By Support, Muni.
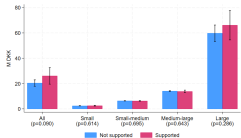
(e) By Support, Zip Codes
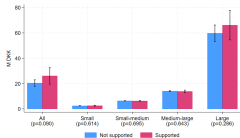
(f) By Support, Employment

Demand Shifters

OLS estimation: $r_{ijt} = \alpha_{jt}^U r_{iht} + e_{ijt}^U$

Country shifters (annual averages)

	AUS	CHN	IND	JAP	NOR	RUS	TUR	USA
Unsup.	0.021	0.062	0.019	0.016	0.036	0.056	0.013	0.072
Demand	(0.007)	(0.019)	(0.004)	(0.003)	(0.006)	(0.023)	(0.003)	(0.016)

▶ The *level* of export demand roughly follows gravity.

▶

▶

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	(0.007)	(0.019)	(0.004)	(0.003)	(0.006)	(0.023)	(0.003)	(0.016)
Support Premium	0.081	0.094	0.035	0.043	0.023	0.000	0.000	0.239
	(0.051)	(0.090)	(0.035)	(0.010)	(0.007)	(0.022)	(0.006)	(0.142)

▶ The *level* of export demand roughly follows gravity.

▶ Large support premium. Network spillovers?

▶ Caution: level of demand $\neq$ knowledge of demand.

Network Spillovers?

$$\text{OLS estimation: } r_{ijt} = (\alpha_{jt}^{U} + \underbrace{\alpha_{j}^{N} N_{ijt}}_{\text{Nwk Spillover}})r_{iht} + e_{ijt}^{U}$$

Country	Municipalities			Zip codes			Worker Transitions		
	Coef.	S.E.	P-val.	Coef.	S.E.	P-val.	Coef.	S.E.	P-val.
Australia	0.004	0.015	0.776	-0.018	0.020	0.356	0.014	0.013	0.281
China	0.070	0.044	0.110	0.040	0.020	0.050	0.062	0.041	0.131
India	-0.008	0.005	0.091	-0.009	0.005	0.060	-0.009	0.011	0.428
Japan	-0.012	0.007	0.091	—	—	—	-0.016	0.005	0.001
Norway	-0.014	0.020	0.471	0.017	0.042	0.686	0.042	0.088	0.633
Russia	-0.044	0.026	0.100	-0.026	0.021	0.209	0.008	0.021	0.719
Turkey	-0.015	0.010	0.148	-0.001	0.008	0.851	0.018	0.012	0.467
US	-0.005	0.026	0.839	-0.020	0.021	0.349	0.040	0.055	0.467

Fixed Costs

Parameter estimates

Estimator	Unsupported			Supported		
	σ	β_0	β_1	σ	β_0	β_1
Moment ineq.	[314; 471]	[326; 480]	[146; 243]	[122; 357]	[109; 322]	[48; 278]

Average fixed export costs, 1,000 DKK

Estimator	Unsupported			Supported		
	USA	China	Norway	USA	China	Norway
Moment ineq.	[450; 648]	[454; 655]	[336; 493]	[193; 433]	[194; 440]	[117; 327]

Notes: Distance is measured in 10,000 kilometers. The demand elasticity η is set to 5. For the three moment inequality estimates, extreme points of the 95% confidence set are reported in square brackets.

▶ Unsupported firm fixed costs: $56,000-74,000 USD

▶ Supported firm fixed costs: $19,500-50,000 USD

Information Tests

Assumption: All firms are rational.

Bugni, Canay and Shi (2015) model specification test $\Rightarrow$ Information set test.

We use the information tests to establish two facts:

1. Unsupported firms generally do not know much about export market conditions (with exceptions).

2. Unsupported firms in supported networks are more likely to know export market conditions.

Do (unsupported) Danish firms know export market conditions?

H_0 : Do unsupported Danish firms know

A. Minimal export info.
B. Perfect foresight
C. Minimal export info. + export demand shifter $(t-1)$

Firms	Markets	Unsupported Firms Ind. p-value
Panel A: Minimal information		
All	All	0.224
Panel B: Perfect foresight		
All	All	0.021
Panel C: Minimal information & country shifter		
All	**All**	**0.029**
No. of Obs.		21064

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Firms	Markets	Unsupported Firms Ind. p-value	Supported Firms Ind. p-value
Panel A: Minimal information			
All	All	0.224	0.429
Panel B: Perfect foresight			
All	All	0.021	0.001
Panel C: Minimal information & country shifter			
All	**All**	**0.029**	**0.557**
No. of Obs.		21064	216

Same qualitative results with (larger) EU-inclusive sample.

Do indirectly supported firms know export market conditions?

		Network			
Firms	Mkts	None	Muni.	Zips	Wkrs
Panel A: Minimal information & country shifter					
All	All	0.029	0.230	0.415	0.345
Panel B: Minimal info. & country shifter across call status					
Called	All				
Not called	All				
Panel C: Minimal info. & country shifter for Placebo firms					
All	All	—	—		
Panel D: Minimal info. & country shifter for Placebo dest.					
All	All	—	—		
No. of Uninfo. Obs.		0	19421	20432	20053
No. of Info. Obs.		21064	1643	632	463

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		Network			
Firms	Mkts	None	Muni.	Zips	Wkrs
Panel A: Minimal information & country shifter					
All	All	0.029	0.230	0.415	0.345
Panel B: Minimal info. & country shifter across call status					
Called	All	0.481			
Not called	All	0.039			
Panel C: Minimal info. & country shifter for Placebo firms					
All	All	—	—		
Panel D: Minimal info. & country shifter for Placebo dest.					
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Called	All	0.481	0.541	0.412	0.545
Not called	All	0.039	0.224	0.416	0.373
Panel C: Minimal info. & country shifter for Placebo firms					
All	All	—	—		
Panel D: Minimal info. & country shifter for Placebo dest.					
All	All	—	—		
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Not called	All	0.039	0.224	0.416	0.373
Panel C: Minimal info. & country shifter for Placebo firms					
All	All	—	—	0.039	0.043
Panel D: Minimal info. & country shifter for Placebo dest.					
All	All	—	—		
No. of Uninfo. Obs.		0	19421	20432	20053
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Panel C: Minimal info. & country shifter for Placebo firms					
All	All	—	—	0.039	0.043
Panel D: Minimal info. & country shifter for Placebo dest.					
All	All	—	—	0.005	0.017
No. of Uninfo. Obs.		0	19421	20432	20053
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Do indirectly supported firms know exp. mkt conditions? Disaggregated Findings

By firm/market:

- ▶ Large firms informed of export conditions in popular markets (Norway, USA, Japan), even if unconnected to TC.
- ▶ Large and small firms informed of export conditions in unpopular markets (India, China, Turkey, Russia) if a network peer is supported by the TC.

By information type:

- ▶ All network connections supply information re the number of buyers.
- ▶ Close network connections supply information re buyer quality.

Are TC initiated spillovers economically large?

Counterfactual experiment 1: How would Danish exporting change among unsupported firms if there were no TC initiated information spillovers?

Network	No. of exporters (%)	Mean exp. profits (%)	Agg. exports (%)
Employment	[0; 0]	[0.2; 0.3]	[0.2; 0.6]
Zip codes	[0.2; 0.3]	[0.1; 0.2]	[0.6; 1.3]
Municipalities	[0.2; 0.5]	[0.3; 0.5]	[1; 2.1]
Zip codes (full) + Municipalities (partial)	[0.1; 0.3]	[0.4; 0.6]	[0.8; 1.8]

▶ Total cost of TC subsidization $\approx$ 0.32 million DKK

▶ Additional profits from TC generated info. spillovers $>$ 1.6 million DKK

▶ Additional tax revenues from TC info. spillovers $>$ 0.35 million DKK

Broad vs. Targeted Outreach Policy, Employment Networks

Counterfactual experiment 2: How would Danish exporting change if the TC had contacted twice as many firms?

Outreach	No. of exporters (%)	Mean exp. profits (1000s DKK)	Agg. exports (%)
Panel A: No spillovers			
Random	[-1.4; 0.7]	[2700; 5500]	[0; 0.1]
Actual	[-2.2; -0.1]	[2600; 6400]	[0; 0.2]
Largest firms	[-8.6; -4.8]	[2000; 19400]	[-0.6; 0.2]
Most connected	[-5.7; -3.2]	[8600; 15000]	[-0.1; 0.3]
Panel B: Full spillovers			
Random	[-6.5; -2.6]	[8100; 9800]	[0.1; 0.3]
Actual	[-7.1; -3.1]	[10600; 12700]	[0; 0.6]
Largest firms	[-11; -8.8]	[13300; 18700]	[-1.4; -0.2]
Most connected	**[-6.7; -1.8]**	**[9900; 11700]**	**[0.5; 2.4]**

▶ Only outreach to most connected firms with full spillovers generates sufficient public gains to cover subsidy.

Conclusions

Q1: Do unsupported firms enjoy TC information spillovers through firm networks?

A1: Yes.

- ▶ Unsupported firms geographically close to supported firms appear to have better export market information.
- ▶ **To Do:** Incorporating cost dynamics.

Q2: Are info. spillovers to unsupported firms economically meaningful?
A2: Yes.

- ▶ Roughly 1-2 percent of aggregate exports.

Q3: Do TC information spillovers have a sufficient large impact on Danish exports to justify program expansion?
A3: Probably not.

- ▶ Doubling program size has modest public benefits.

Summary Statistics (2010-2015 annual averages)

	Export	Support	Support cond. on export	Call	Call cond. on export
Australia	75.5	0.83	-	1.67	0.83
China	89.5	6.33	4.00	4.50	3.00
India	53.5	3.67	2.83	4.00	2.50
Japan	61.5	1.00	1.00	1.33	1.33
Norway	262	1.33	-	0.83	-
Russia	60.1	5.67	3.67	8.00	3.83
Turkey	51.2	1.83	0.83	0.83	-
US	137	5.50	4.33	7.83	5.50

	Exp. rev. cond. on export	Dom. rev. cond. on export	Dom. rev. cond. on support	Dom. rev. cond. on call
Australia	1.18	33.6	60.3	42.4
China	3.07	38.8	62.9	58.5
India	1.35	40.2	83.7	76.0
Japan	1.15	41.0	68.7	64.5
Norway	2.02	27.0	22.3	33.4
Russia	2.45	37.9	54.7	78.0
Turkey	0.96	39.6	66.8	60.9
US	3.71	34.8	44.9	41.3

Notes: Columns (1) and (2) report the average number of exporters and number of supported firms in each country, while column (3) reports the fraction of exporters who receive TC support. Columns (4)-(5) report average export and domestic revenue conditional on exporting to a particular destination, while column (6) documents average domestic revenue conditional on TC support to a particular destination. All values in million DKK. Average domestic revenues across all firms is 21.2 million DKK across all firms in the estimation sample. "-" indicates that the cell value is based on too few firms to comply with Statistics Denmark's rules on data confidentiality.

Fixed Costs

Parameter estimates across support status

Estimator		Unsupported			Supported	
	σ	β_0	β_1	σ	β_0	β_1
Perfect foresight (MLE)	1,339	1,033	566	8,078	1,977	-6,998
Min. information (MLE)	911	738	423	3,499	961	-2,767
Moment inequality	[314; 471]	[326; 480]	[146; 243]	[122; 357]	[109; 322]	[48; 278]
Moment inequality, IV	[320; 471]	[330; 471]	[155; 249]	[106; 417]	[105; 346]	[42; 238]

Notes: Distance is measured in 10,000 kilometers. The demand elasticity η is set to 5. For the three moment inequality estimates, extreme points of the 95% confidence set are reported in square brackets.

Average fixed export costs, 1,000 DKK, across support status

Estimator		Unsupported			Supported	
	USA	China	Norway	USA	China	Norway
Perfect foresight (MLE)	7,262	7,336	5,322	-16,047	-16,966	7,926
Min. information (MLE)	5,256	5,311	3,808	-5,447	-5,811	4,029
Moment inequality	[450; 648]	[454; 655]	[336; 493]	[193; 433]	[194; 440]	[117; 327]
Moment inequality, IV	[459; 648]	[463; 655]	[340; 484]	[187; 438]	[188; 442]	[113; 353]

Notes: Distance is measured in 10,000 kilometers. The demand elasticity η is set to 5. For the three moment inequality estimates, extreme points of the 95% confidence set are reported in square brackets.

Dynamic Entry Costs

Parameter estimates, 1,000 DKK; unsupported firms

	σ	β_0	β_1	γ_0	γ_1
Static model	[308; 410]	[326; 431]	[141; 204]		
Dynamic model	[81; 550]	[20; 350]	[29; 377]	[-250; 250]	[441; 6,000]

Average fixed & sunk export costs, 1,000 DKK; unsupported firms

Estimator	United States	China	Norway
Panel A: Static model			
Fixed costs	[442; 570]	[446; 575]	[336; 441]
Panel B: Dynamic model			
Fixed costs	[199; 387]	[203; 388]	[35; 353]
Sunk costs	[290; 4,196]	[302; 4,354]	[-15; 502]
Fixed+sunk costs	[522; 4,583]	[538; 4,742]	[94; 571]

Are TC initiated spillovers economically large? Muni. Details

Counterfactual experiment:

- ► How would Danish exporting change among unsupported firms if there were no TC initiated information spillovers?
- ► Panel A: No change to support/outreach. Panel B: All locations become supported.

Impact of adding information on country shifters to minimal information

Firms	Markets	No. of exporters	Mean exp. profits	Agg. exports
Panel A: Effect of info. spillovers to unsupp. firms in supported municipalities (%).				
All	**All**	**[0.2; 0.5]**	**[0.3; 0.5]**	**[1; 2.1]**
Large	All	[0.1; 0.6]	[0.3; 0.5]	[0.6; 1.8]
Small	All	[0.1; 0.2]	[-0.2; -0.1]	[0.3; 0.6]
All	Large	[0.2; 0.2]	[0; 0]	[0.3; 0.5]
All	Small	[0; 0]	[0; 0.1]	[0.1; 0.3]
Panel B: Effect of info. spillovers to unsupported firms in all municipalities (%).				
All	**All**	**[-4.0; -1.0]**	**[7.0; 8.5]**	**[3.8; 10.9]**
Large	All	[-4.0; -1.3]	[9.9; 11.1]	[1.1; 8.1]
Small	All	[0.0; 0.1]	[0.0; 0.0]	[0.1; 0.2]
All	Large	[-0.4; 0.0]	[2.3; 2.6]	[1.5; 2.7]
All	Small	[0.0; 0.0]	[0.0; 0.0]	[0.1; 0.2]

Odense: Home of *Inrotech* Robotic Welders

In 2019 TC support lands *Inrotech* a record order in US

SERVICES **INSIGHTS** MARKETS SECTORS

THE UNITED STATES

DANISH INROTECH OCCUPIES US WITH RECORD ORDER

Lack of welders in the U.S. market has in recent years caused problems for several shipyards. Inrotech's fully automatic welding robots have become part of the solution.

With The Trade Council's help, Danish Inrotech has just landed their first order on the American market – and even the largest order in the company's history.

Trade Council Support for *Inrotech...*

When Inrotech looks back, it is clear that there are several significant factors that play into their successful breakthroughs in the U.S. market. First, it was quickly identified where there was a gap in the market that they could fill with their unique product. Secondly, Ralf Kjærgaard Nielsen had to learn all that was to know about Inrotech's product, and therefore he was sent to a seminar in Denmark.

With new knowledge in his backpack, Ralf Kjærgaard Nielsen could now help Inrotech find precisely the companies that could benefit from Inrotech's innovative products. Through his local network in the southern United States, he knew, among other things, that Halter Marine had been given a large order for icebreakers that they could not deliver with their then production set-up. Therefore, he quickly established contact between Inrotech and the shipyard.

Specifically, the door was opened via Vice President of Sales, who appointed the right engineer, who had just been tasked with evaluating and determining which technology the shipyard should go with. This proved crucial to Inrotech and their further dialogue with the shipyard.

In the United States, it is absolutely essential to get hold of the higher management layers from the beginning – but it can be difficult for companies if they are in the establishment phase and have not yet built a network and know which threads to draw in, explains Ralf Kjærgaard Nielsen. He elaborates:

"In the United States, you don't get through if you send the classic sales email, because then you just end up in the paper pile in the shopping department. It's about getting in touch with the right person from the start."

Does Support Spillover?
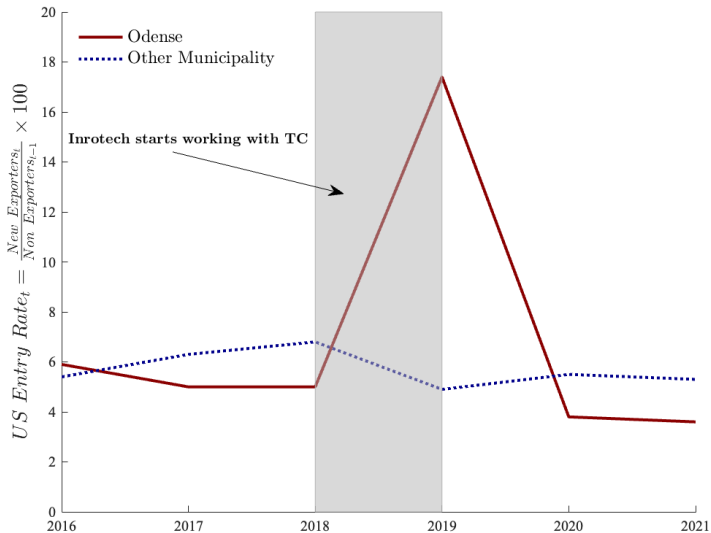
Identification Intuition

Consider upper bound odds-based moment inequality.

Expectations, conditional on $(D_{ijt}, \mathcal{J}_{ijt}, dist_j, s_{ijt})$, yields

$$\mathbb{E}\left[(1 - D_{ijt})\frac{\Phi(\sigma_T^{-1}(\eta^{-1}\mathbb{E}[r_{ijt}|\mathcal{J}_{ijt}] - \beta_0^T - \beta_1^T dist_j))}{1 - \Phi(\sigma_T^{-1}(\eta^{-1}\mathbb{E}[r_{ijt}|\mathcal{J}_{ijt}] - \beta_0^T - \beta_1^T dist_{ijt}))} - D_{ijt}\Big|\mathcal{J}_{ijt}\right] \geq 0.$$

▶ Holds at $\theta = \theta^*$ for information set $\mathcal{J}_{ijt}$.
▶ Cannot be used for identification since we do not observe $\mathcal{J}_{ijt}$.

Identification Intuition

Consider upper bound odds-based moment inequality.

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▶ Holds at $\theta = \theta^*$ for information set $\mathcal{J}_{ijt}$.
▶ Cannot be used for identification since we do not observe $\mathcal{J}_{ijt}$.

Dickstein & Morales (2018): rational expectations + Jensen's inequality $\Rightarrow$

$$\mathbb{E}\left[(1 - D_{ijt})\frac{\Phi(\sigma_T^{-1}(\eta^{-1}\mathbb{E}[r_{ijt}|Z_{ijt}] - \beta_0^T - \beta_1^T dist_j))}{1 - \Phi(\sigma_T^{-1}(\eta^{-1}\mathbb{E}[r_{ijt}|Z_{ijt}] - \beta_0^T - \beta_1^T dist_{ijt}))} - D_{ijt}\Big|Z_{ijt}\right] \geq 0$$

hold at $\theta = \theta^*$ for $Z_{ijt} \subseteq \mathcal{J}_{ijt}$.

▶ Partial id. feasible for exogenous $Z_{ijt} \subseteq \mathcal{J}_{ijt}$
▶ Support endogenous; use (conditional) TC calls.

Do indirectly supported firms know exp. mkt conditions? By firm/mkt

Firms	Mkts	Network			
		None	Muni.	Zips	Wkrs
Minimal information & country shifter					
Large	Popular	0.318	0.425	0.423	0.492
Large	**Unpopular**	**0.002**	**0.027**	0.438	0.422
Small	Popular	**0**	0.147	**0.003**	**0.008**
Small	**Unpopular**	**0**	**0**	**0.001**	0.503

Do indirectly supp.firms know exp. mkt conditions? By destination

		Network			
		None	Muni.	Zips	Wkrs
Firms	Mkts				

Minimal information & country shifter

Firms	Mkts	None	Muni.	Zips	Wkrs
All	**India**	**0.012**	0.235	0.136	0.364
All	**China**	**0.004**	0.420	0.424	0.444
All	**Turkey**	**0**	**0.001**	0.341	0.526
All	**Russia**	**0**	**0**	**0.004**	0.381
All	Japan	0.342	0.435	0.290	0.164
All	Norway	0.368	0.288	0.354	0.302
All	U.S.	0.272	0.418	0.453	0.483

Do indirectly supp. firms know the no. or buyers or buyer quality?

		Network			
		None	Muni.	Zips	Wkrs
Firms	Mkts				
Panel A: Minimal information & no of buyers					
All	All	**0**	0.366	0.381	0.345
Panel B: Minimal information & buyer quality					
All	All	**0.040**	**0.016**	0.346	0.492
No. of Uninfo. Obs.		0	19421	20432	20053
No. of Info. Obs.		21064	1643	632	463

Are TC support initiated spillovers economically large?

Effect of info. spillovers to unsupp. firms in supported municipalities:

- ▶ Total cost of TC subsidization ≈ 0.32 million DKK
- ▶ Profits from TC generated info. spillovers by network type:
    - ▶ Municipalities: 8.1-8.7 million DKK
    - ▶ Zip codes: 4.8-10.5 million DKK
    - ▶ Employment: 1.6-4.8 million DKK

Effect of info. spillovers to all unsupported firms:

- ▶ Profits from TC generated info. spillovers up to 10X larger.
- ▶ How to cost-efficiently spread export information?

Do (unsupported) Danish firms know export market conditions?

| | | **EU Sample** | |
Firms	Markets	Unsupported Firms Ind. p-value	Supported Firms Ind. p-value
Panel A: Minimal information			
All	All	0.485	0.612
Panel B: Perfect foresight			
All	All	0.030	0.031
Panel C: Minimal information & country shifter			
All	**All**	**0.038**	**0.491**
No. of Obs.		42218	342