Firm-to-firm Access in Production Networks

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Introduction

- Firms in developing countries often stay small and fail to upgrade.
- Possible reason: barriers to access in production networks.
 - Firm-to-firm markets decentralized and opaque
 - Search-and-matching frictions limit partnering and growth
- Prior work: distance and borders limit access via info frictions
 - Jensen and Miller (2018), Bernard et al (2019), Atkin et al (2017), Alfaro-Urena et al (2022)
- We lack evidence on
 - 1 Impacts between domestic firms, nature of non-info frictions
 - 2 Industry equilibrium: reallocating vs creating links and activity
- This paper: randomize access between suppliers and clients in the same city and industry in China

1 Experimental design and data.

- 2 Results.
- **3** Conclusion.

- We work with the industry producing the Chinese brush pen.
 - Leading location of production: one county, 2 urban and 9 rural areas.
- Supply chain has two main layers:
 - Input suppliers (406): produce brush head and handle.
 - Final good producers (276): assemble and sell.







Chinese writing brush





Context and data

Five survey waves

- 1 Baseline 1: 2018 summer and 2019 spring
- 2 Baseline 2: 2019 summer
- **3** Baseline 3 and referral intervention: 2021 summer
- 4 Follow up 1: 2022 summer
- **5** Follow up 2: 2023 summer
- Key data:
 - 1 Firm performance: sales, profit, price, products, quality
 - 2 Firm-to-firm transactions: partners, number of transactions, value, satisfaction

- We created potential supplier-client matches using baseline data
- Variation 1: screened vs unscreened
 - Screened: partner of competitor (network data)
 - Competitors ranked by similarity in location, product, and price
 - Referrals ranked by number of competitors transacting with partner
 - Algorithm to ensure no firm gets too few/too many referrals
 - Unscreened: product type match (firm data)

• Variation 2: information vs subsidy

- Info: only introduction
- Subsidy: info + subsidy for first transaction, valid for 2 months
 - 50% and up to 1500 RMB per transaction, valid for 2 months

Referral coupons





Structure of randomization



T1: Subsidy treatment T0: Control + Info treatment



A and B: screened, subsidy C: unscreened, subsidy

A and B: screened, info or unmade C: unscreened, unmade

Summary statistics

		Supplier	5		Clients		
	Untreated	Treated	Difference	Untreated	Treated	Difference	
Firm Characteristics							
Firm Age	26.483	26.567	0.084	22.212	20.468	-1.744	
	(13.947)	(12.697)	(1.324)	(11.907)	(11.799)	(1.427)	
Num Employees	2.371	2.667	0.296	5.635	5.518	-0.117	
	(1.627)	(2.658)	(0.218)	(5.662)	(5.499)	(0.672)	
Profit (10,000 RMB)	6.804	8.702	1.898	37.380	37.244	-0.136	
	(10.341)	(24.543)	(1.863)	(66.989)	(62.405)	(7.792)	
Sales (10,000 RMB)	14.833	16.799	1.966	85.007	86.003	0.996	
	(27.422)	(38.271)	(3.299)	(145.306)	(136.645)	(16.976)	
Num Regular Clients	5.595	6.647	1.052	15.745	14.561	-1.183	
	(9.706)	(13.583)	(1.170)	(21.447)	(19.461)	(2.464)	
Num Regular Suppliers	2.571	2.552	-0.018	6.102	5.619	-0.483	
	(3.218)	(2.598)	(0.291)	(7.347)	(6.208)	(0.818)	
Attrition and Shutdown (202.	3)						
Attrition	0.063	0.025	-0.039*	0.058	0.086	0.028	
	(0.244)	(0.156)	(0.020)	(0.235)	(0.282)	(0.031)	
Shutdown	0.029	0.015	-0.014	0.007	0.014	0.007	
	(0.169)	(0.122)	(0.015)	(0.085)	(0.120)	(0.013)	
Observations	205	201	406	137	139	276	

P-value of joint significance in both 2021 and 2023 samples >0.8.

Take-up of subsidy

Dep. var.: subsidy	Clients	Suppliers	Links	Links
used	(1)	(2)	(3)	(4)
Treatment	0.609*** (0.041)	0.631*** (0.034)	0.484*** (0.039)	
Screened				0.474***
Unscreened				(0.05)) 0.504^{***} (0.047)
Information				(0.017)
Strata FF	Ves	Ves		
Business type FE	105	105	Yes	Yes
Observations	276	406	856	856

- 1 Experimental design and data.
- 2 Results.
 - Effects on the network
 - Effects on firms
 - Return to capital
- **3** Conclusion.

Link creation

Dep. Var.:	Link	Num Transactions	Value (RMB)
	(1)	(2)	(3)
Screened Subsidy	0.455*** (0.041)	2.714*** (0.329)	7,863.811*** (1,166.094)
Unscreened Subsidy	0.288*** (0.033)	1.259*** (0.191)	3,362.326*** (651.598)
Information	-0.029 (0.046)	0.179 (0.361)	1,365.964 (1,196.802)
Referral type, business type, year FE	Yes	Yes	Yes
Observations	1,707	1,707	1,707

Estimated in sample of made and unmade referrals

 $y_{ijt} = \beta_{S} \cdot Screened_{ij} + \beta_{U} \cdot Unscreened_{ij} + \beta_{I} \cdot Info_{ij} + FE + \varepsilon_{ijt}.$

- Screened vs unscreened suggests search friction
- Screened vs info suggests matching friction

Crowding out

Dep. Var.:	Link	Num Transactions	Value (RMB)
	(1)	(2)	(3)
Client Treated * Supplier Treated	-0.208***	-1.420	-18,457.623**
	(0.050)	(1.083)	(8,256.183)
Client Untreated * Supplier Treated	-0.181***	0.185	-13,424.635*
	(0.044)	(2.042)	(7,065.487)
Client Treated * Supplier Untreated	-0.198***	-1.966**	-21,845.341***
	(0.053)	(0.931)	(6,922.504)
Business type, year FE	Yes	Yes	Yes
Observations	1,238	1,238	1,238

- Estimate in sample of baseline links.
- Business stealing from untreated firms. Table

Rewiring

Dep. Var.:	Degree	Baseline links active	Non-baseline links	Reactivated prior links
	(1)	(2)	(3)	(4)
Treated	0.917***	-0.540***	1.457***	0.103
	(0.231)	(0.118)	(0.178)	(0.123)
Exposure * Treated	-0.057	0.073	-0.130	-0.029
	(0.306)	(0.134)	(0.258)	(0.141)
Exposure * Untreated	-0.115	-0.345***	0.230*	0.273**
	(0.195)	(0.121)	(0.134)	(0.117)
No reg partners, treat* no reg, baseline partners, client, strata	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	
Observations	1,283	1,283	1,283	651

- Firm-level regression, exposure is share of baseline partners treated.
- Crowd-out partial, exposed firms rewire using prior network.

- Number of supplier-client links grew by 21%
- Referrals thickened production network

- 1 Experimental design and data.
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Firms: main outcomes

Dep. Var.:	Log Sales (1)	Profit (10,000 RMB) (2)	Log Operating Cost (3)	Log Employ- ment (4)	Total Hrs Worked / Day (5)	Num Reg Supplier (6)	Num Reg Client (7)	Satisfaction Clients / Suppliers (8)		
Panel A: Supp	Panel A: Suppliers									
Treatment	0.244***	1.501*	0.051	0.068*	2.693**	0.373*	1.876**	0.219***		
	(0.074)	(0.824)	(0.098)	(0.040)	(1.345)	(0.209)	(0.761)	(0.064)		
Control Mean	1.890	6.804	1.296	0.711	18.82	2.571	5.595	5.059		
Observations	761	763	652	763	763	763	763	761		
Panel B: Clien	its									
Treatment	0.042	0.152	0.023	0.050	-0.958	1.608**	0.889	0.241***		
	(0.113)	(3.916)	(0.123)	(0.067)	(3.861)	(0.672)	(1.835)	(0.071)		
Control Mean	3.340	37.38	2.740	1.349	39.78	6.102	15.74	5.308		
Observations	520	520	502	520	520	520	520	496		

Standard errors clustered by firm. *** p<0.01, ** p<0.05, * p<0.1.

- ANCOVA estimation with baseline control
- Coefficient may reflect both treatment effect and business stealing
 - Controlling for exposure does not change treatment effects.

Client log sales at baseline



• Two-sided Kolmogorov-Smirnov p = .41.

Client log sales at follow-up



• Two-sided Kolmogorov-Smirnov p = .08.

Main outcomes: clients by baseline degree

Dep. Var.:	Log Sales	Profit (10,000 RMB)	Log Operating Cost	Log Employ- ment	Total Hrs Worked / Day	Num Reg Supplier	Num Reg Client	Satisfaction Suppliers			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)			
Panel A: Baseline partners <=1											
Treatment	0.321**	9.297***	0.290*	0.064	0.294	2.500***	2.820	0.376***			
	(0.148)	(3.377)	(0.165)	(0.084)	(3.854)	(0.702)	(1.976)	(0.086)			
Control Mean	2.739	25.91	2.128	1.143	30.933	4.506	10.61	4.609			
Observations	304	304	288	304	304	304	304	284			
Panel B: Baseline pa	rtners >1										
Treatment	-0.181	-7.586	-0.174	0.043	-2.071	0.218	-2.957	0.045			
	(0.186)	(8.460)	(0.209)	(0.117)	(7.858)	(1.292)	(3.741)	(0.132)			
Control Mean	4.125	52.10	3.484	1.614	50.927	8.150	22.33	6.845			
Observations	216	216	213	216	216	216	216	211			

- Divide client sample at median baseline degree of 1.
 - Expect larger treatment effect for small-degree firms.

- Concern 1: Business stealing Table
 - Exposure has mild positive effects
 - Does not impact main coefficients
- Concern 2: Sample selection for clients Observation growth-oriented
 - In 2024 phone survey firms reported growth on 5-point-scale
 - Significant impacts on revenue and profit among all clients
- Concern 3: Experimenter demand Table
 - Similar impacts on enumerator's assessment of firm performance.

Indirect effects

Dep. Var.:	Log Sales (1)	Profit (10,000 RMB) (2)	Log Operating Cost (3)	Log Employ- ment (4)	Total Hrs Worked / Day (5)	Num Reg Supplier (6)	Num Reg Client (7)	Satisfaction Partner (8)
Exposure	0.083	4.861*	-0.009	0.125**	6.708***	0.855	2.821**	-0.018
Treatment	(0.119) 0.169*** (0.063)	(2.582) 1.185 (1.686)	(0.152) 0.063 (0.076)	(0.062) 0.064* (0.036)	(2.533) 1.266 (1.734)	(0.529) 0.850*** (0.295)	(1.434) 1.362 (0.853)	(0.082) 0.240*** (0.047)
No reg partner, client, baseline control, strata	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	2.468	19.05	1.921	0.966	27.347	3.985	9.661	5.159
Observations	1281	1283	1154	1283	1283	1283	1283	1257

- Pool suppliers and clients for power
- Exposure has some *positive* effects.
 - Having treated partners may benefit firms.

Mechanism: Product upgrading

Don Vari	Quality so	ore main pr	oduct	Quality	If 2nd	Share 2nd	Avg Log
Dep. var.:	Craftsmanship	Durability	Total	check hrs/wk	product	product	Price
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Suppl	liers						
Treatment	0.264***	0.258***	0.265***	4.329***	0.029	2.889*	0.095
	(0.087)	(0.090)	(0.087)	(0.794)	(0.035)	(1.541)	(0.080)
Control Mean	-0.198	-0.191	-0.198	1.759	0.449	14.05	0.558
Observations	408	408	408	763	763	763	624
Panel B: Client	ts						
Treatment	0.217*	-0.023	0.067	2.446**	0.091**	5.777***	0.187*
	(0.121)	(0.132)	(0.124)	(0.959)	(0.036)	(1.586)	(0.113)
Control Mean	-0.351	-0.382	-0.382	6.033	0.715	19.33	1.388
Observations	292	292	292	520	520	518	496

- Suppliers increase quality, clients expand higher quality 2nd product
- New links enable the creation of business ideas
 - Upgrading may help explain positive indirect effects

Friction: Pessimistic beliefs about partnering

Dep. Var.:	Perceived profit growth if new client %	Search new clients hrs/month	Perceived profit growth if new supplier %	Search new suppliers hrs/month	Personal initiative	Num non- referred partners
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Sup	pliers					
Treatment	11.051***	8.645***	0.957	1.038	0.307***	1.362*
	(1.453)	(1.358)	(0.712)	(0.633)	(0.070)	(0.762)
Control Mean	4.99	4.53	1.14	1.24	3.75	5.595
Observations	374	374	374	374	373	763
Panel B: Clie	nts					
Treatment	-0.933	0.732	2.302***	2.713**	0.074	1.159
	(1.346)	(2.030)	(0.799)	(1.365)	(0.083)	(1.416)
Control Mean	6.74	8.05	2.41	3.09	3.92	6.248
Observations	251	251	251	251	251	520

- Treatment increases valuation and amount of search.
- Effects stronger for low-degree clients. Low degree

1 Complementary upgrading by suppliers and clients

- Suppliers improve quality
- Clients expand into higher-quality 2nd product
- 2 Beliefs increase about value of partners
 - Firms search more and find new partners

- 1 Experimental design and data.
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Return to capital

- Private return: Profit gain relative to cost of subsidies
 - To suppliers: 8 times.
 - To low-degree clients: 19 times.
- Firms could earn 2,700% return by self-subsidizing info referrals.
- Social return: includes business stealing, consumer surplus, survey.
- Producer surplus 14 times, consumer surplus 3.8 times cost of intervention.
- Social return 1,780% per year.

- 1 Experimental design and data.
- 2 Results.
- **3** Conclusion.

1 Large effects of access between spatially close domestic firms.

- Key friction: pessimistic beliefs about partnering.
- 2 Industry effects driven by thicker production network
 - Enable creation of business ideas, weak crowd-out effects.
- **3** Large gains to firms and consumers.
- **4** Improving access may be broadly important for firm growth.

- **1** Using VAT firm-to-firm transaction level data to predict product-match in manufacturing industry in Zhengzhou.
 - The government has established 106 "financial hubs" in the city
- We organize many mini trade fairs about 10 matched suppliers and 10 matched clients in a meeting
- **3** A key policy objective in this city is to improve the performance of supply chains.

Thanks for your feedback!

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Dep. Var.:	Log Sales (1)	Profit (10,000 RMB) (2)	Log Operating Cost (3)	Log Employ- ment (4)	Total Hrs Worked / Day (5)	Num Reg Supplier (6)	Num Reg Client (7)	Satisfaction Partner (8)
Exposure	0.083	4.861*	-0.009	0.125**	6.708***	0.855	2.821**	-0.018
Treatment	(0.119) 0.169*** (0.063)	(2.582) 1.185 (1.686)	(0.152) 0.063 (0.076)	(0.062) 0.064* (0.036)	(2.533) 1.266 (1.734)	(0.529) 0.850*** (0.295)	(1.434) 1.362 (0.853)	(0.082) 0.240*** (0.047)
No reg partner, client, baseline control, strata	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	2.468	19.05	1.921	0.966	27.347	3.985	9.661	5.159
Observations	1281	1283	1154	1283	1283	1283	1283	1257

• Define exposure as share of partners treated. Back

Concern: Business stealing in client-consumer market

Dep. Var.:	Log Sales (1)	Profit (10,000 RMB) (2)	Log Operating Cost (3)	Log Employ- ment (4)	Total Hrs Worked / Day (5)	Num Reg Supplier (6)	Num Reg Client (7)	Satisfaction Clients / Suppliers (8)
Panel A: Suppliers								
Treatment	0.246***	1.655*	0.042	0.078*	2.907*	0.397*	2.040**	0.203***
	(0.078)	(0.929)	(0.103)	(0.041)	(1.480)	(0.211)	(0.847)	(0.066)
Share of Treated	-0.055	2.187	-0.244	0.202	4.105	0.529	3.233	-0.317
among Close Competitor	(0.272)	(2.935)	(0.377)	(0.142)	(4.149)	(0.739)	(2.617)	(0.236)
Baseline Control	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Strata, Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	1.890	6.804	1.296	0.711	18.82	2.571	5.595	5.059
Observations	755	757	646	757	757	757	757	755
Panel B: Clients								
Treatment	0.024	-0.378	-0.006	0.049	-0.843	1.593**	0.683	0.234***
	(0.113)	(3.911)	(0.122)	(0.068)	(3.894)	(0.685)	(1.863)	(0.071)
Share of Treated	0.007	13.735	0.050	0.074	7.619	2.468	0.182	0.195
among Close Competitor	(0.309)	(10.476)	(0.419)	(0.190)	(9.994)	(2.439)	(5.391)	(0.222)
Baseline Control	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Strata, Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Mean	3.340	37.38	2.740	1.349	39.78	6.102	15.74	5.308
Observations	514	514	496	514	514	514	514	491

Concern 1: Sample selection for clients

	Perceived #	Perceived	Perceived	Perceived	Perceived	Perceived
Dep. Var.:	Products	Quantity	Avg Quality	Avg Price	Sales	Profits
	(1-5)	(1-5)	(1-5)	(1-5)	(1-5)	(1-5)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Supp	oliers					
Treatment	0.194*	0.202*	0.280***	0.179*	0.240**	0.348***
	(0.108)	(0.108)	(0.086)	(0.092)	(0.110)	(0.120)
Control Mean	2.261	2.254	2.944	2.761	2.254	2.190
Observations	288	288	288	288	288	288
Panel B: Clier	nts					
Treatment	0.242	0.203	0.192**	0.154*	0.323*	0.286*
	(0.165)	(0.162)	(0.085)	(0.091)	(0.166)	(0.162)
Control Mean	2.375	2.362	3.038	2.813	2.350	2.337
Observations	160	160	160	160	160	160

• In a 2024 phone survey we asked firms to rate their performance since 2020 on 5-point scale. Back

	Owner's	Phone Use	Enumerator Observation in the Field					
Dep. Var.:	Monthly Bill (RMB)	Num Calls & Wechat / Month	Num Visitors	Num Calls	Busy (1-5)	Num Employees	Assessment of operations (1-5)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Panel A: Sup	pliers							
Treatment	10.263**	3.495**	0.031	0.094**	0.302**	0.351	0.310***	
	(5.073)	(1.454)	(0.041)	(0.041)	(0.120)	(0.225)	(0.103)	
Control Mean	74.19	14.04	0.06	0.10	2.36	0.60	2.38	
Observations	373	373	363	363	369	363	371	
Panel B: Clie	nts							
Treatment	11.320	2.427	-0.023	0.068	0.232	0.212	0.166	
	(7.840)	(2.478)	(0.068)	(0.060)	(0.146)	(0.161)	(0.125)	
Control Mean	102.35	21.13	0.15	0.10	2.78	0.65	2.98	
Observations	251	251	246	247	250	246	251	

Upgrading: clients by degree

Don Vor	Quality s	core main pi	roduct	Quality check	If 2nd	Share 2nd	Avg Log	
Dep. Val	Craftsmanship	Durability	Total	hrs/wk	product	product	Price	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Panel A: Baseline partners <=1								
Treatment	0.120	-0.276	-0.135	1.718	0.129**	6.684***	0.382**	
	(0.178)	(0.177)	(0.172)	(1.052)	(0.053)	(2.216)	(0.169)	
Control Mean	-0.410	-0.435	-0.436	4.922	0.636	18.51	1.028	
Observations	138	138	138	304	304	303	282	
Panel B: Baseline pa	rtners >1							
Treatment	0.260	0.145	0.198	3.703**	0.044	3.908*	0.015	
	(0.176)	(0.192)	(0.178)	(1.798)	(0.048)	(2.319)	(0.151)	
Control Mean	-0.264	-0.306	-0.305	7.458	0.817	20.43	1.837	
Observations	153	153	153	216	216	215	213	



Search: clients by degree

Dep. Var.:	Perceived profit growth if new client %	Search new clients hrs/month	Perceived profit growth if new supplier %	Search new suppliers hrs/month	Personal initiative	Num non- referred partners
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Baseline p	artners <=1					
Treatment	0.758	1.877	3.279***	4.301**	0.004	2.673***
	(1.931)	(2.705)	(1.015)	(1.777)	(0.111)	(0.773)
Control Mean	5.750	6.569	2.125	1.764	3.837	4.506
Observations	143	143	143	143	143	304
Panel B: Baseline p	artners >1					
Treatment	-2.892	-1.222	1.717	1.013	0.236*	-1.705
	(1.836)	(3.310)	(1.259)	(2.552)	(0.140)	(3.691)
Control Mean	8.018	9.973	2.786	4.357	4.028	8.483
Observations	100	100	100	100	100	216



Main outcomes: clients by growth orientation

Dep. Var.:	Log Sales (1)	Profit (10,000 RMB) (2)	Log Operating Cost (3)	Log Employ- ment (4)	Total Hrs Worked / Day (5)	Num Reg Supplier (6)	Num Reg Client (7)	Satisfaction Suppliers (8)
Panel A: Grow	th-oriente	d brush n	en produce	ers				
Treatment	0.425** (0.180)	8.387* (4.325)	0.505*** (0.185)	0.232** (0.106)	8.547** (4.206)	2.641*** (0.797)	2.822 (1.901)	0.241** (0.106)
Control Mean Observations	2.735 202	22.48 202	2.075 191	1.091 202	28.24 202	5.020 202	12.49 202	4.889 187
Panel B: Not gr Treatment	rowth-orie -0.045	ented brus -1.459	sh pen prod -0.146	lucers 0.000	1.652	1.482	-0.630	0.204*
	(0.179)	(7.779)	(0.189)	(0.113)	(7.213)	(1.393)	(4.010)	(0.106)
Control Mean Observations	3.877 214	50.91 214	3.282 211	1.483 214	49.32 214	7.754 214	21.28 214	5.766 209

- Remove make-up pen producers from clients (20%)
- Divide remaining brush pen producers by baseline growth orientation
 - Non-growth-oriented reflects limited capacity Back

Den Var·	Quality sco	re first pro	duct	Quality check	If 2nd	Share 2nd	Avg Log	
Dep. Val	Craftsmanship	Durability	Total	hrs/wk	product	product	Price	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Panel A: Growth-oriented brush pen producers								
Treatment	0.335*	0.111	0.195	3.282**	0.125*	6.045**	0.285*	
	(0.177)	(0.215)	(0.196)	(1.431)	(0.064)	(2.597)	(0.170)	
Control Mean	-0.529	-0.549	-0.555	5.873	0.804	22.94	1.727	
Observations	133	133	133	202	202	201	188	
Panel B: Not gro	owth-oriented	brush pe	n prod	ucers				
Treatment	-0.131	-0.284	-0.230	3.574*	-0.006	4.592*	-0.042	
	(0.177)	(0.197)	(0.185)	(1.822)	(0.046)	(2.483)	(0.185)	
Control Mean	-0.181	-0.241	-0.229	5.921	0.842	22.27	1.897	
Observations	156	156	156	214	214	213	209	



Dep. Var.:	Perceived profit	Search new	Perceived profit	Search new	Personal	Num non-
	growth if new	clients	growth if new	suppliers	initiative	referred
	client %	hrs/month	supplier %	hrs/month	miniative	partners
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Gro	wth-oriented br	ush pen pro	oducers			
Treatment	0.709	-1.493	3.390**	4.420*	0.264*	2.755***
	(2.348)	(2.510)	(1.403)	(2.540)	(0.153)	(0.842)
Control Mean	5.55	7.16	1.85	2.62	3.83	5.020
Observations	95	95	95	95	95	202
Panel B: Not	growth-oriented	l brush pen	producers			
Treatment	-0.754	3.616	2.575*	2.116	0.039	0.349
	(2.125)	(3.762)	(1.417)	(1.972)	(0.152)	(3.286)
Control Mean	7.62	10.11	2.92	3.15	4.00	8.105
Observations	101	101	101	101	101	214

• Effects driven by growth-oriented clients.

Networks: heterogeneity in link destruction

Dep. Var.:	Link	Num Transactions	Value (RMB)	IHS Num Transactions	IHS Value
	(1)	(2)	(3)	(4)	(5)
Panel A					
Exposure * Supplier satisfactory	0.019	4.562*	49,164.144*	0.465*	0.919
	(0.102)	(2.343)	(25,066.885)	(0.269)	(1.157)
Exposure * Client satisfactory	0.255**	-1.208	-13,724.691	0.351	2.529**
	(0.106)	(3.199)	(16,368.142)	(0.367)	(1.169)
Observations	646	646	646	646	646
Panel B					
Exposure * Supplier log sales	0.177^{***}	2.489**	1,095.596	0.477***	1.841***
	(0.033)	(1.201)	(8,840.932)	(0.099)	(0.366)
Exposure * Client log sales	0.001	-0.677	-1,658.855	-0.062	-0.080
	(0.029)	(0.794)	(4,518.495)	(0.087)	(0.311)
Observations	1,234	1,234	1,234	1,234	1,234
Panel C					
Exposure * Kin	0.407***	2.666	-12,459.261	0.881**	3.904***
	(0.112)	(2.719)	(25,818.091)	(0.348)	(1.288)
Observations	1,238	1,238	1,238	1,238	1,238

• Suggests improving link allocations. Back

