TABLE 1: AN OVERVIEW OF THE SIMULATION SETTINGS AND MAJOR FINDINGS

Network Structure	Model Setting	Research Objective	Findings
GCN Network (Independent Paths) A generic conceptual model. Each path is modeled independently.	Independent Paths • Acceptance Only • Cost-Reduction Only • Switching Only • Rejection Only	Understand the unique effect of financial squeeze on network structure and firm performance if the supplier responds with acceptance only; cost-reduction only; switching only; or rejection only. .	1. Financial squeeze caused a large number of exits at both the top-tier and bottom tier levels. 2. The impact is higher on raw-material suppliers than on top-tier suppliers.
GCN (Comprehensive Model) A generic conceptual model. All paths are integrated into one model.	All options are combined	Understand the comprehensive effect of financial squeeze on network structure and firm performance if the supplier responds with a combination of actions	3. While each independent path model has pros and cons in impacting the supply network and firm performance, the comprehensive approach in general performs better than independent paths. 4. The impact of financial squeeze is most severe at the raw material supplier level. Rate of change increases as one goes further upstream.
NexusIn Supply Network The presence of a Nexus suppliers in supply networks	All options are combined; High in-degree centrality.	Investigate the effect on a Nexus supply network with a high in-degree centrality supplier.	5. Nexus supplier with high-in-degree centrality score exhibits significant operational risks when squeezed.
NexusOut Supply Network The presence of a Nexus suppliers in supply networks	All options are combined; High out-degree centrality	Investigate the effect on a Nexus supply network with a high out-degree centrality supplier.	6. When squeezed, the downstream suppliers connected to a Nexus supplier with high out-degree centrality score suffers from unfulfilled orders.

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TABLE 2: AGENT PRICE AND COST STRUCTURE FOR EACH NETWORK

Table 2A Generic Networks

Agent	Price (Mean)	Price (Std. Deviation)	Fixed cost	Variable cost
B	563.50	2.7	26,610	156.528
S1	152.928	1.45	7,222	42.48
S21	12.96	0.6	612	3.6
S22	25.92	1.06	1,224	7.2
RM1	3.6	0.3	170	1
RM2	3.6	0.3	170	1
RM3	3.6	0.3	170	1
RM4	3.6	0.3	170	1
RM5	3.6	0.3	170	1

TABLE 2B Nexus Network with High In-Degree Centrality

Agent	Price (Mean)	Price (Std. Deviation)	Fixed cost	Variable cost
B	1,679.616	6.08	79,315.20	466.560
S11	233.280	1.7	11,016.0	64.80
S12	233.280	1.7	11,016.0	64.80
S21_i	64.80	1.18	3,060	18.0
RM1	3.6	0.3	170	1
RM2	3.6	0.3	170	1
RM3	3.6	0.3	170	1
RM4	3.6	0.3	170	1
RM5	3.6	0.3	170	1

TABLE 2C Nexus Network with High Out-Degree Centrality

Agent	Price (Mean)	Price (Std. Deviation)	Fixed cost	Variable cost
B	1,679.62	6.2	79,315.20	466.56
S11	93.312	1.5	4,406.40	25.92
S12	93.312	1.5	4,406.40	25.92
S13	93.312	1.5	4,406.40	25.92
S14	93.312	1.5	4,406.40	25.92
S15	93.312	1.5	4,406.40	25.92
S21_o	25.92	0.6	1,224	7.2
RM1	3.6	0.3	170	1
RM2	3.6	0.3	170	1

TABLE 3: AGENTS AND THEIR AVAILABLE ACTIONS

Actions	Buyer	Raw Material Suppliers	Other (Non-Raw Material) Suppliers
Compute profit margin	X	X	X
Compare with target	X	X	X
Squeeze	X		X
Accept the squeeze		X	X
Reduce fixed cost		X	X
Switch the supplier	X		X
Reject the squeeze		X	X

TABLE 4 GENERIC STRUCTURE: THE IMPACT OF FINANCIAL SQUEEZE ON SUPPLY NETWORK STRUCTURE

Table 4A Generic Supply Network: The Number of Supplier Exits out of 100,000 Iterations

	S1	S21	S22	RM1	RM2	RM3	RM4	RM5
Independent Path Models								
Cost Reduction	4187	22001	21392	11111	22605	34754	34939	35024
Switching	2563	6522	6678	17775	28487	36593	37060	37135
Rejection	42818	38839	40306	31742	37406	38839	39475	39509
Acceptance	0	0	0	0	0	0	0	0
Comprehensive Models								
Size=fixed (base)	146	701	707	9058	7045	4564	4590	4584
Size=random	152	346	887	7211	6944	4393	4766	4753

Table 4B Generic Supply Network: The Number of Supplier Entrances out of 100,000 Iterations

	S1	S21	S22	RM1	RM2	RM3	RM4	RM5
Independent Path Models								
Cost Reduction	0	0	0	0	0	0	0	0
Switching	2563	6522	6678	17775	28487	36593	37060	37135
Rejection	0	0	0	0	0	0	0	0
Acceptance	0	0	0	0	0	0	0	0
Comprehensive Models								
Size=fixed (base)	4	127	119	5731	5612	4343	4345	4342
Size=random	4	146	135	5690	5696	4236	4378	4363

TABLE 5 COMPLEX NETWORK: THE QUADRATIC EFFECT OF TIER ON THE NUMBER OF EXITS

Regression Statistics	
Multiple R	0.87
R Square	0.77
Adjusted R Square	0.76
Standard Error	1491.10
Observations (n)	160.00

ANOVA

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	2.00	1138293190.61	569146595.31	255.98	<0.001
Residual	157.00	349069977.37	2223375.65		
Total	159.00	1487363167.98			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	4339.36	1234.10	3.52	<0.001	1901.78	6776.95
Tier	-6555.98	1278.35	-5.13	<0.001	-9080.97	-4031.00
Tier^2	2373.42	298.22	7.96	<0.001	1784.38	2962.46

TABLE 6 GENERIC NEWTORK STRUCTURE: THE IMPACT OF FINANCIAL SQUEEZE ON FIRM OPERATIONAL OUTCOMES

Table 6A Mean Percentage of Unfulfillment Orders out of 100,000 Iterations*

	S1	S21	S22	RM1	RM2	RM3	RM4	RM5
Independent Models								
Cost								
Reduction	4.04	2.14	20.78	10.85	22.00	33.93	34.11	34.19
Switching	0	0	0	0	0	0	0	0
Rejection	41.93	37.98	39.43	31.09	36.57	37.98	38.60	38.64
Acceptance**	-	-	-	-	-	-	-	-
Comprehensive Models*								
Size=Fixed								
(based)	0.14	0.56	0.58	3.26	1.41	0.22	0.24	0.24
Size=Random	0.14	0.20	0.74	1.49	1.23	0.16	0.38	0.39

Table 6B Mean Revenue Out of 100,000 Iterations

	B	S1	S21	S22	RM1	RM2	RM3	RM4	RM5
Independent Models									
Cost									
Reduction	56366.23	14578.25	1011.04	2033.83	322.86	280.03	236.69	236.02	236.10
Switching	56360.89	14784.81	1170.80	2338.12	301.51	261.09	230.80	229.58	229.18
Rejection	56360.62	8869.21	803.45	1566.92	251.74	229.26	222.61	220.99	220.74
Acceptance**	-	-	-	-	-	-	-	-	-
Comprehensive Models									
Size=Fixed	56342.24	15182.20	1273.99	2547.06	329.18	335.28	343.74	343.63	343.87
Size=Random	56348.70	15182.66	1278.01	2543.38	335.63	335.69	344.59	343.31	343.38

Table 6C Mean Profit Out of 100,000 Iterations

	B	S1	S21	S22	RM1	RM2	RM3	RM4	RM5
Independent Models									
Cost									
Reduction	14195.44	3405.10	131.41	269.93	66.46	35.76	4.89	4.88	4.61
Switching	14152.62	3514.61	239.79	474.41	48.85	18.83	-3.49	-4.25	-4.58
Rejection	14036.46	-813.83	-31.16	-92.71	12.79	-4.21	-9.45	-10.44	-10.66
Acceptance**	-	-	-	-	-	-	-	-	-
Comprehensive Models									
Size=Fixed	14166.15	3760.62	307.57	613.95	69.42	73.11	78.73	78.66	78.89
Size=Random	14171.35	3760.68	310.26	611.09	74.07	73.40	79.39	78.50	78.56

*The unfulfillment percentage is calculated by using the mean number of unfulfilled orders divided by 100,000, the resulting values are transformed into percentage values, which are reported in this table.

**We could not obtain a comparable and realizable number for this option.

TABLE 7 NEXUS SUPPLY NETWORK WITH HIGH IN-DEGREE CENTRALITY: THE IMPACT OF FINANCIAL SQUEEZE ON REVENUE, PROFIT AND PERCENTAGE OF UNFULFILLED ORDERS (OUT OF 100,000 ITERATIONS)*

	S11	S12	S21i	RM1	RM2	RM3	RM4	RM5
Revenue	23155.59	23143.47	6307.85	334.67	334.76	334.70	334.85	334.72
Profit	5733.588	5724.83	1487.953	72.53799	72.60359	72.58054	72.67178	72.58206
Unfulfilled Orders	0.23	0.26	1.19	0.57	0.57	0.58	0.59	0.58

*The unfulfillment percentage is calculated by using the number of unfulfilled orders divided by 100,000.

TABLE 8 NEXUS SUPPLY NETWORK WITH HIGH OUT-DEGREE CENTRALITY: THE IMPACT OF FINANCIAL SQUEEZE ON REVENUE, PROFIT AND PERCENTAGE OF UNFULFILLED ORDERS (OUT OF 100,000 ITERATIONS)*

	S11	S12	S13	S14	S15	S21o	RM1	RM2
Revenue	9157.07	9050.58	9054.02	9046.16	9046.29	2563.71	351.73	351.73
Profit	2217.08	2139.44	2141.54	2136.23	2136.13	626.79	84.30	84.30
Unfulfilled Orders	1.03	1.80	1.83	1.85	1.86	0.45	0.09	0.09

*The unfulfillment percentage is calculated by using the number of unfulfilled orders divided by 100,000.

TABLE 9 VALIDATION STUDY: ZERO SQUEEZE SCENARIO

	Num. of Exits	Number of Entrances	Unfulfilled Orders	Mean Revenue	Mean Profit
B			0.00	56342.17	14079.64
S1	0.00	0.00	0.00	15292.82	3823.45
S21	0.00	0.00	0.00	1295.78	323.68
S22	0.00	0.00	0.00	2591.87	647.94
RM1	0.00	0.00	0.00	359.94	89.95
RM2	0.00	0.00	0.00	360.12	90.13
RM3	0.00	0.00	0.00	360.10	90.10
RM4	0.00	0.00	0.00	359.95	89.95
RM5	0.00	0.00	0.00	359.98	89.98

TABLE 10 VALIDATION STUDY: REVENUE AND PROFIT ASSOCIATED WITH MEAN PRICE VARIATIONS

	Buyer Price=Low		**Buyer Price=High**		**S1 Price=Low**		**S1 Price=High**	
	Revenue	Profit	Revenue	Profit	Revenue	Profit	Revenue	Profit
B	**46353**	**6567**	**66346**	**24083**	56345	19375	56344	11684
S1	12846	1382	15293	3823	**10001**	**-1469**	**17677**	**6253**
S21	1295	323	1296	324	1296	324	1276	309
S22	2590	645	2592	648	2592	648	2549	615
RM1	240	7	360	90	360	90	187	-30
RM2	360	90	360	90	360	90	336	73
RM3	360	90	360	90	360	90	345	79
RM4	360	90	360	90	360	90	344	79
RM5	360	90	360	90	360	90	345	79

	S21 Price=Low		**S21 Price=High**		**S22 Price=Low**		**S22 Price=High**		**RM Price=Low**		**RM Price=High**	
	Revenue	Profit	Revenue	Profit	Revenue	Profit	Revenue	Profit	Revenue	Profit	Revenue	Profit
B	56373	14177	56356	14172	56349	14172	56393	14185	56343	14291	56358	14009
S1	15220	4252	15175	3130	15204	5326	15216	1541	15221	3936	15135	3531
S21	**799**	**-173**	**1949**	**977**	1296	324	1257	287	1288	476	1254	72
S22	2585	642	2513	589	**1001**	**-943**	**4848**	**2904**	2575	951	2506	141
RM1	331	71	330	70	329	69	335	73	**164**	**-86**	**594**	**324**
RM2	355	87	320	63	360	90	333	71	**187**	**-76**	**586**	**316**
RM3	359	90	359	90	360	90	356	87	**199**	**-71**	**553**	**292**
RM4	357	88	339	76	360	90	359	89	**199**	**-70**	**554**	**292**
RM5	357	88	339	76	360	90	359	89	**199**	**-71**	**553**	**292**

TABLE 11 VALIDATION STUDY: UNIFORM DISTRIBUTION

	Exits	New Entrants	Unfulfilled Orders (%)	Revenue	Profit
B			0.00	56341.97	14168.47
S1	106.00	2.00	0.10	15186.98	3766.60
S21	554.00	71.00	0.47	1274.95	308.34
S22	530.00	70.00	0.45	2550.78	617.04
RM1	6911.00	3001.00	3.82	336.51	75.20
RM2	6083.00	4064.00	1.98	338.30	75.61
RM3	4429.00	4011.00	0.41	344.22	79.36
RM4	4423.00	4000.00	0.42	344.40	79.53
RM5	4417.00	3999.00	0.41	344.38	79.52

Figure 1 Generic Network: Number of Exits (New Entrances) in Base Comprehensive Model

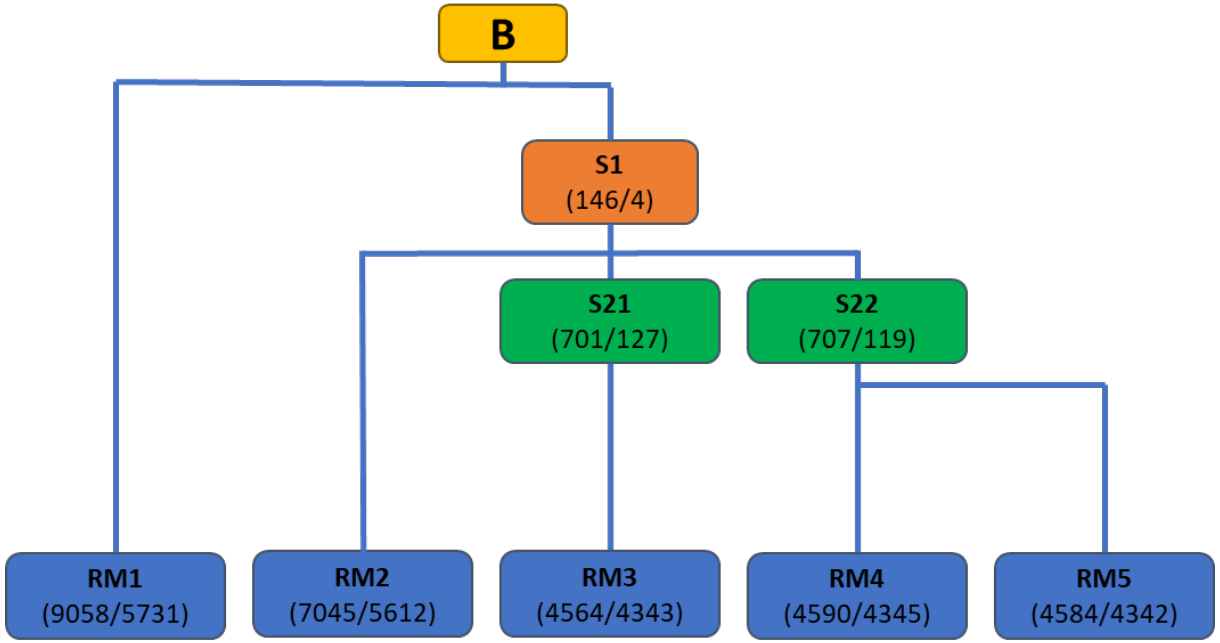

Figure 2 Nexus Supply Network with High In-Degree Centrality: Number of Exits/New Entrances in Comprehensive Model

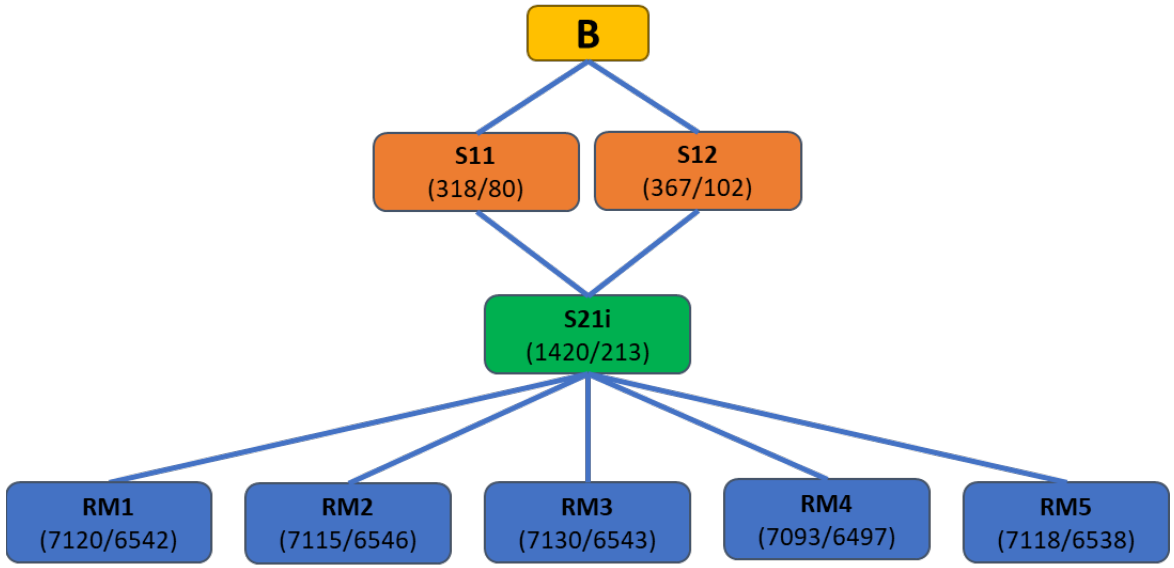

Figure 3 Nexus Supply Network with High Out-Degree Centrality: Number of Exits/New Entrances in Comprehensive Model

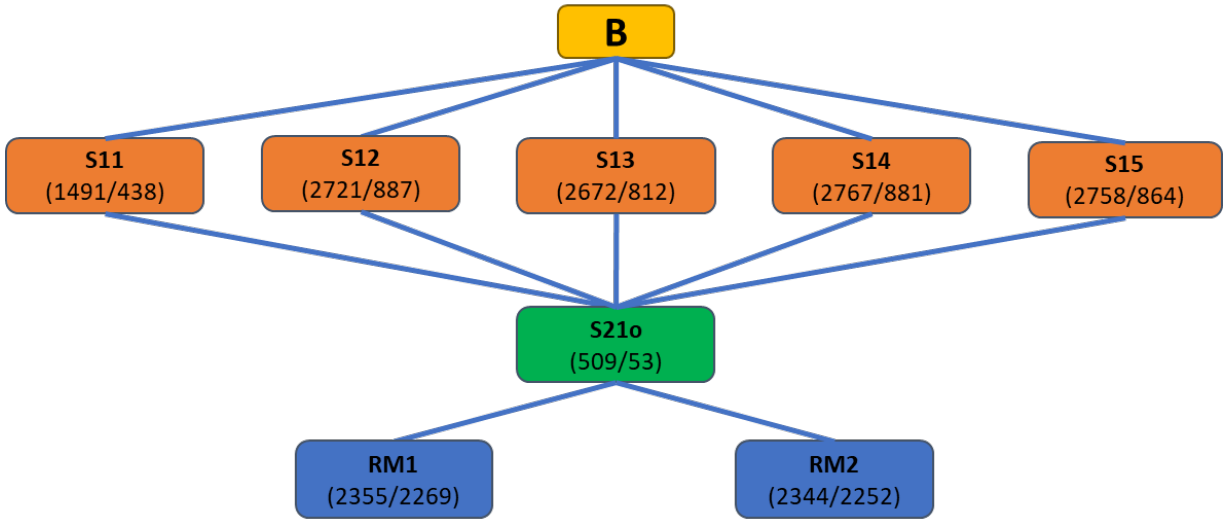

Figure 4 Emergent Archetypes

