

# Are Hotels in Destination Competitive or Cooperative?: An Empirical Application of Social Network Analysis

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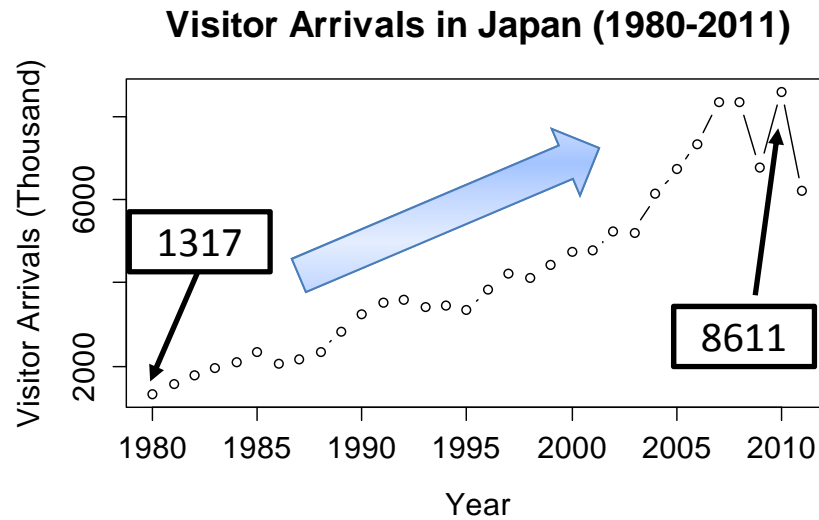
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The Fifth Joint Japan-North America Mathematical Sociology Conference  
August 16, 2012, Denver CO, USA

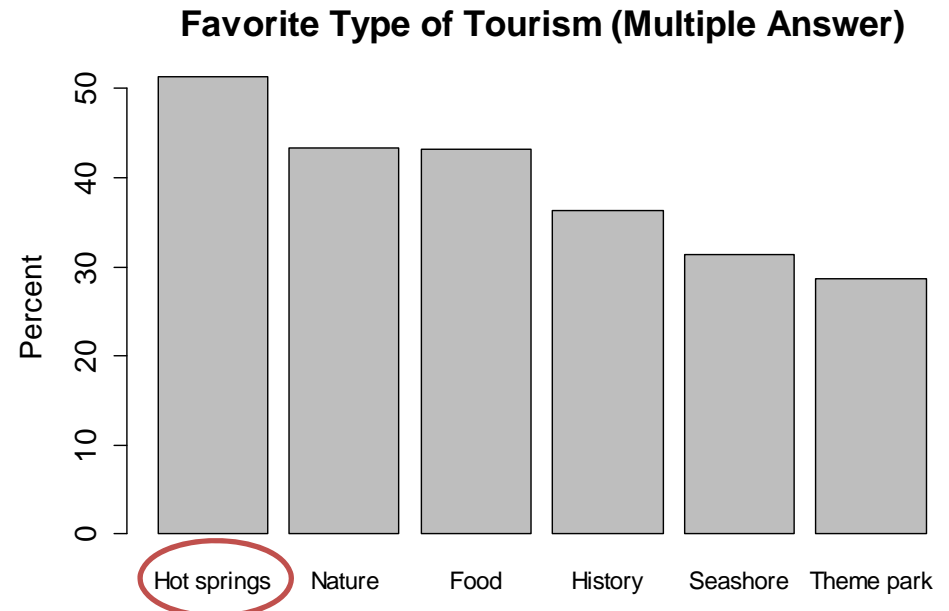
# Organization of the Presentation

- Puzzle: Competitive or cooperative?:  
Inter-firm relations in tourist destinations
- Theoretical argument: Centrality indices on inter-firm network
- Data and methods
- Findings: Cooperative rather than competitive
- Conclusions

# Visit Japan! Visit Hot Springs!



**Source:** Japan National Tourism Organization, the Ministry of Justice

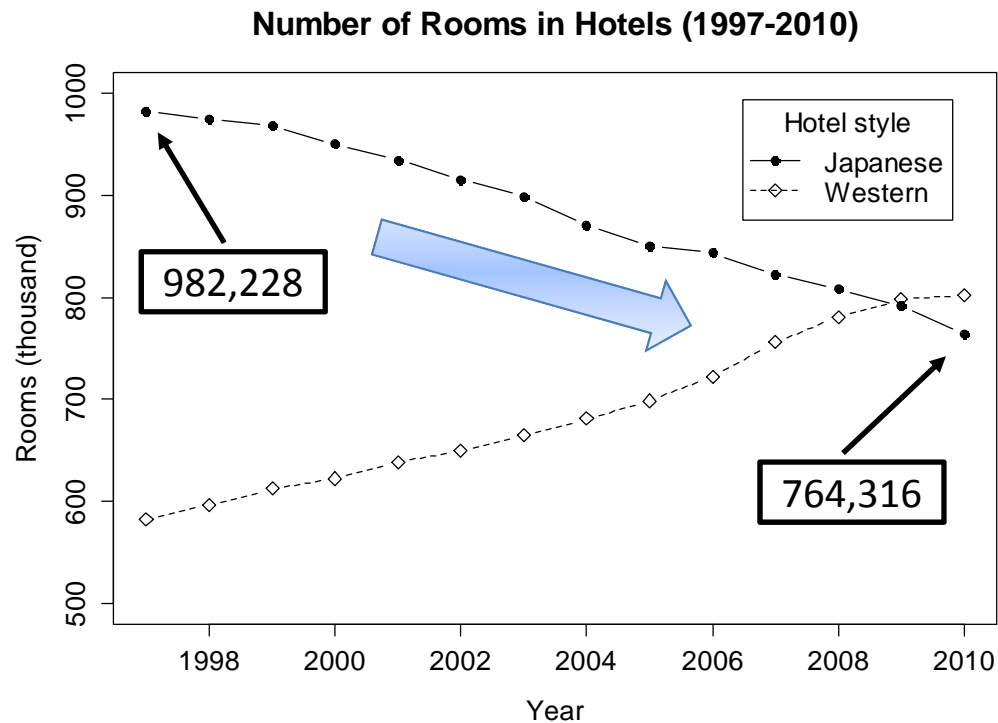


**Source:** Japan Travel Bureau Foundations (2007)

2007 The enactment of the Tourism Nation Promotion Basic Law  
2008 The establishment of Japan Tourism Agency

# Stay at *RYOKAN*?

Decline of Japanese style hotels in hot springs destinations



Source: the Ministry of Health, Labour and Welfare



A hotel in the style of traditional Japan  
(Ginzan hot springs, Yamagata)

# Inter-firm Relations in Destinations

- Competition
  - Share visitors to the destination
- Cooperation
  - Collaborative network to attract more tourists for the destination
  - To win the nation-wide or global competition among destinations

A Puzzle: Competition or Cooperation?

# Centrality on Inter-firm Network

If inter-firm networks are...

competitive

cooperative

**betweenness** centrality

**degree** centrality

... will bring more profits **to each hotel**.

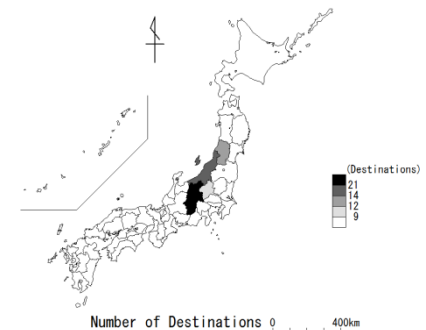
Because of...

power to control  
information flow within  
inter-firm network

deep involvement in  
collaborative network  
for promotion

# Data

- Questionnaire Survey for Hotels in Hot Springs Destinations
  - Population: Purposively selected 4 prefectures which have various types of hot springs destinations
  - Target: ALL Hotels in ALL hot springs destinations in the 4 prefectures
  - Reliable responses were 779 (51.4%).
  - Mail survey conducted in 2007.



# Variables and Methods

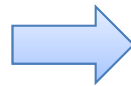
- Unit: Hotel ( $N=779$ )
- Dependent Variable:
  - Profit change compared to five years ago
- Independent Variables:
  - Betweenness centrality (normalized within destination)
  - Degree centrality (normalized within destination)
- Control Variables:
  - Room rate (high or low; dummy variable)
  - Management efforts
- Method
  - OLS regression



# Centrality Indices (1)

- Specify the whole inter-hotel network structure in each destination
- Derived from participations in the events for promotion held during the last year

Incidence Matrix						Adjacency Matrix								
Hotel	Event					Hotel	Hotel							
	E1	E2	E3	E4	E5		H1	H2	H3	H4	H5	H6	H7	H8
H1	1	0	1	0	1	H1	3	2	2	2	3	2	3	0
H2	1	1	1	0	0	H2	2	3	1	1	3	2	2	0
H3	1	0	0	0	1	H3	2	1	2	2	2	1	2	0
H4	1	0	0	0	1	H4	2	1	2	2	2	1	2	0
H5	1	1	1	1	1	H5	3	3	2	2	5	2	3	0
H6	1	0	1	0	0	H6	2	2	1	1	2	2	2	0
H7	1	0	1	0	1	H7	3	2	2	2	3	2	3	0
H8	0	0	0	0	0	H8	0	0	0	0	0	0	0	0



Note: 1 = participated in, 0 = not participated in

# Centrality Indices (2)

- Calculate betweenness and degree centrality for each hotel
- Normalize indices within each destination

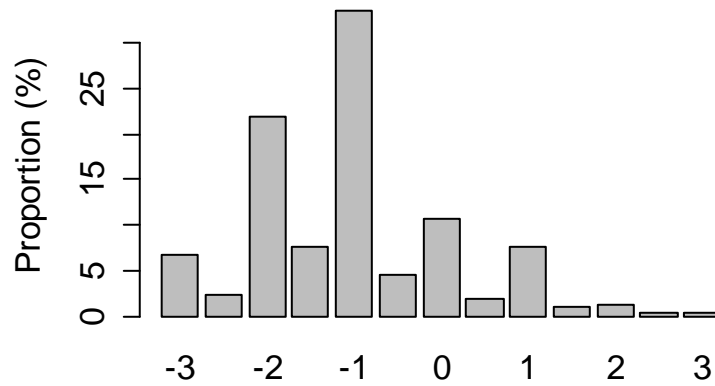
Before Normalization		
Hotel	Centrality	
	Betweenness	Degree
H1	1.33	6
H2	0	4
H3	0	4
H4	0	4
H5	1.33	6
H6	0	4
H7	1.33	6
H8	0	0



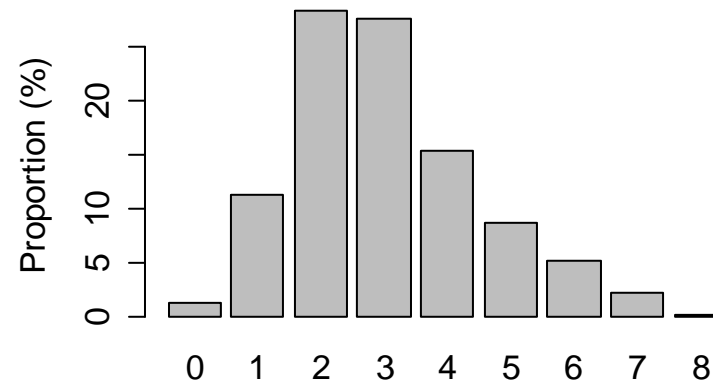
After Normalization		
Hotel	Centrality	
	Betweenness	Degree
H1	1.21	0.88
H2	-0.72	-0.13
H3	-0.72	-0.13
H4	-0.72	-0.13
H5	1.21	0.88
H6	-0.72	-0.13
H7	1.21	0.88
H8	-0.72	2.14

# Descriptive Statistics

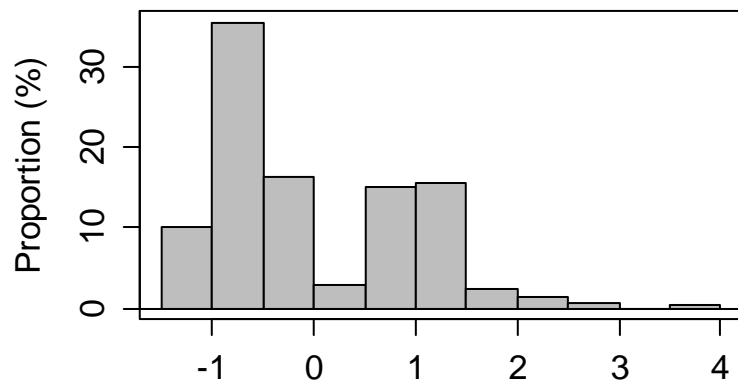
**Profit Change (N = 757)**



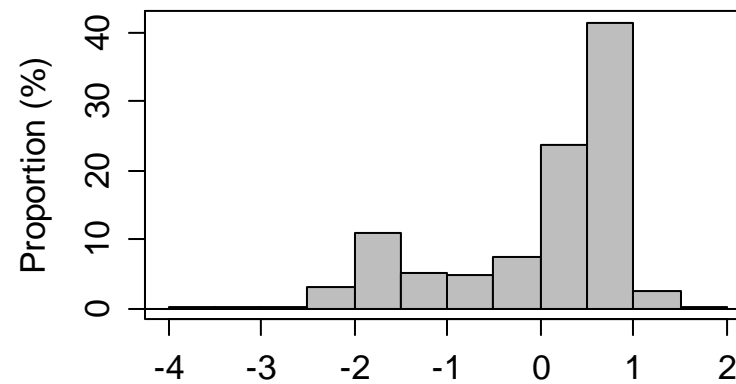
**Management Effort (N = 765)**



**Betweenness Centrality (N=575)**



**Degree Centrality (N=738)**



# Correlation Coefficient Matrix

	Profit	Betweenness	Degree	Efforts
Profit	1.000			
Betweenness	0.087*	1.000		
Degree	0.102**	0.647***	1.000	
Efforts	0.252***	0.162***	0.157***	1.000

Note: \* < .05, \*\* < .01, \*\*\* < .001.

- Significantly positive *simple* correlation
  - between Profit and Betweenness centrality
  - between Profit and Degree centrality
- High simple correlation between Betweenness and Degree centrality (-> multicollinearity)

# OLS Regression

	Hypothesis			
	Competition		Cooperation	
	Coef.	S.E.	Coef.	S.E.
Betweenness	.034	.051		
Degree			.079 +	.044
Rate	.502 ***	.102	.482 ***	.088
Efforts	.138 ***	.035	.127 ***	.030
Constant	-1.639 ***	.115	-1.670 ***	.097
adj. $R^2$	.095 *		.101 *	
$N$	538		690	

Note: Dependent variable is Profit Change. "Rate" means higher rate dummy.  
+ < .10, \*\*\* < .001.

- Betweenness centrality is NOT significant.
- Degree centrality is significant.

# Findings

- Score of betweenness centrality does not have a significant effect on profit change.
  - **Competition** hypothesis was **rejected**.
- Score of degree centrality has a significant effect on profit change
  - **Cooperation** hypothesis was **accepted**.

# Conclusions

- Inter-firm relations in tourist destinations are cooperative rather than competitive.
- Active involvement in the collaborative network for destination development is beneficial for the management performance of each hotel.
- An example of empirical application of social network analysis.

# Thanks!

## Your Comments are Welcomed!

This work was supported by MEXT/JSPS KAKENHI Grant Number 23614020.

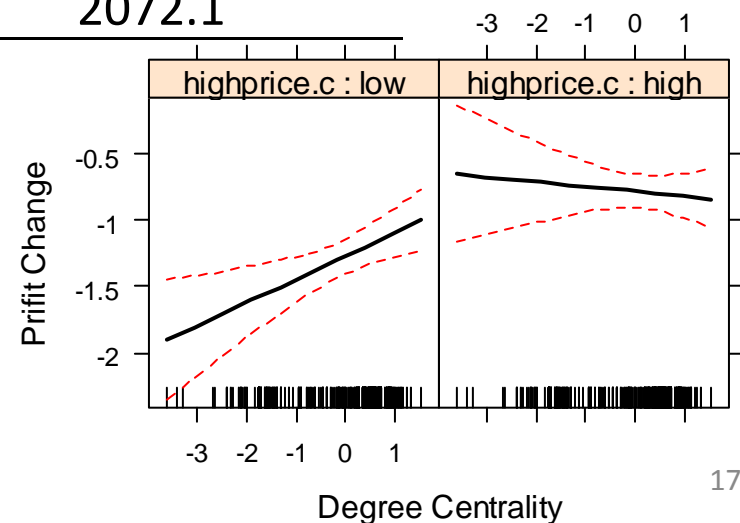


# Interaction between Degree Centrality and Price

	Model 1		Model 2		S.E.
	Coef.	S.E.	Coef.	S.E.	
Degree centrality	.079 +	.044	.175 **	.059	
Rate	.482 ***	.088	.486 ***	.088	
Degree x Rate			-.212 *	.088	
Efforts	.127 ***	.030	.132 ***	.030	
Constant	-1.670 ***	.098	-1.673 ***	.097	
adj. $R^2$	.101*		.108 *		
AIC	2075.6		2072.1		

Note: Dependent variable is Profit Change.

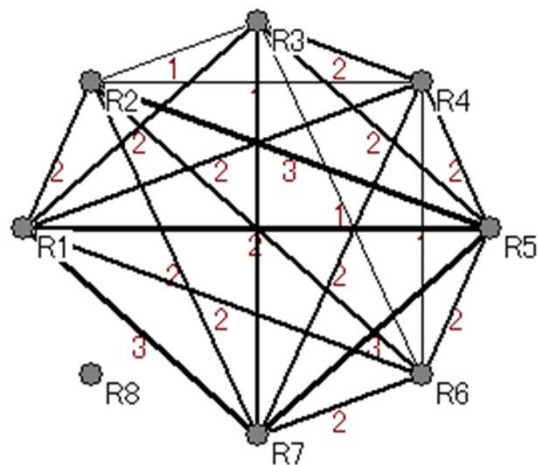
$N = 690$ . + < .10, \* < .05, \*\* < .01, \*\*\* < .001.



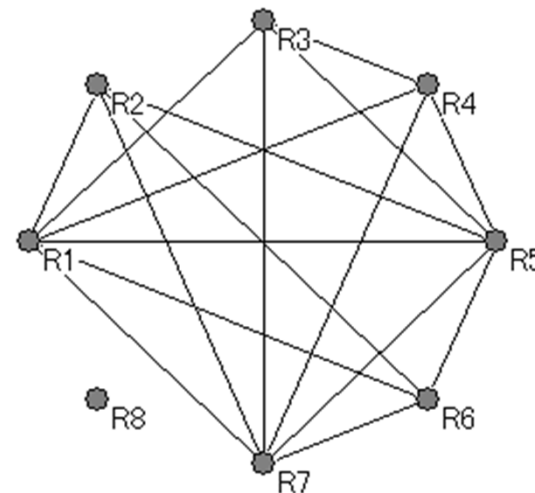
# Centrality Indices: Weight Transformation of Ties

- In each adjacency matrix of destination,
- Ties with weights greater than median were remained but with weight value 1,
- Ties with weights less than median were deleted.

Before Transformation

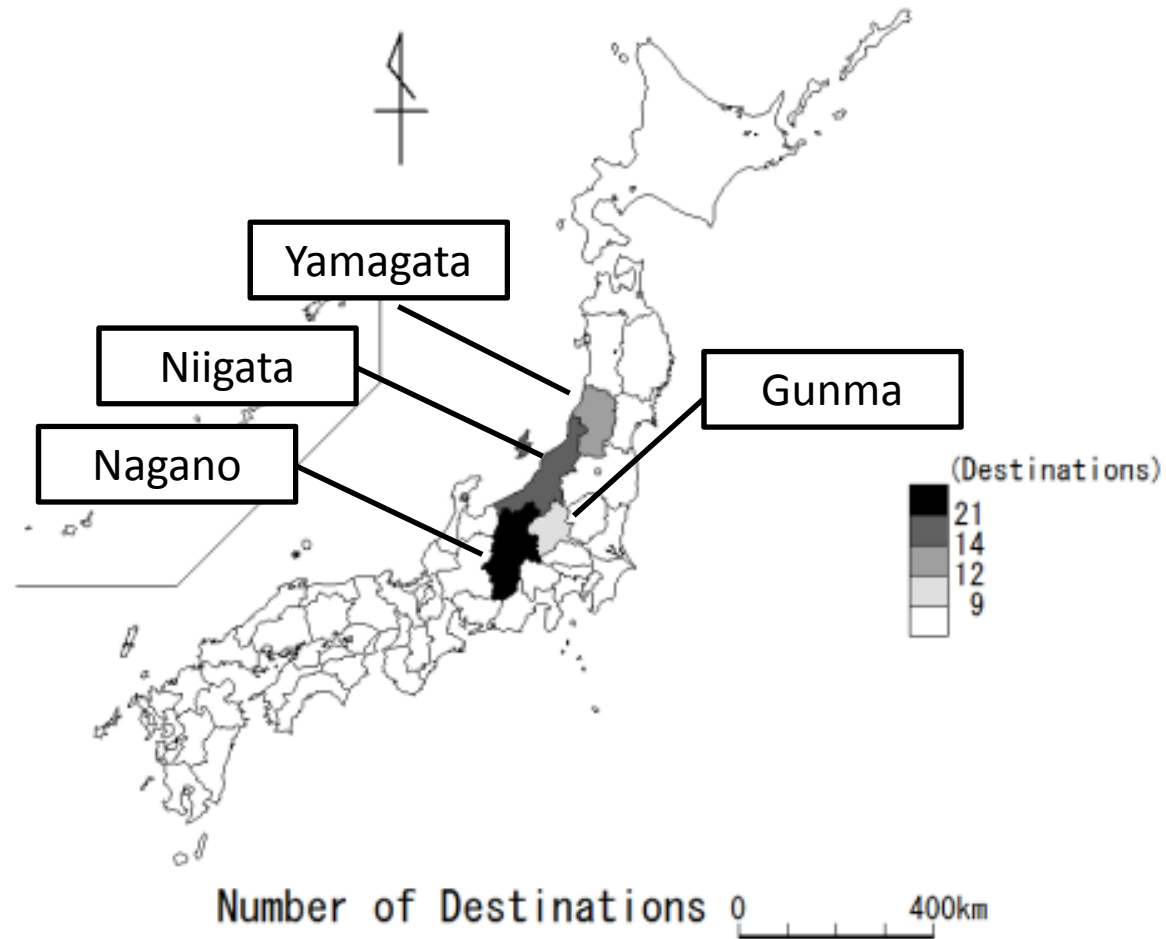


After Transformation



Note: Median of weight in this network is 2.

# Population Prefectures



# Sampling Design

Prefecture	Number of Destinations	Number of Hotels	Reliable Responses	Response Rate
Nagano	21	597	312	52.3%
Yamagata	12	224	117	52.2%
Gunma	9	329	169	51.4%
Niigata	14	365	181	49.6%
Total	56	1,515	779	51.4%

Note: Mail Survey conducted on January to February 2007.

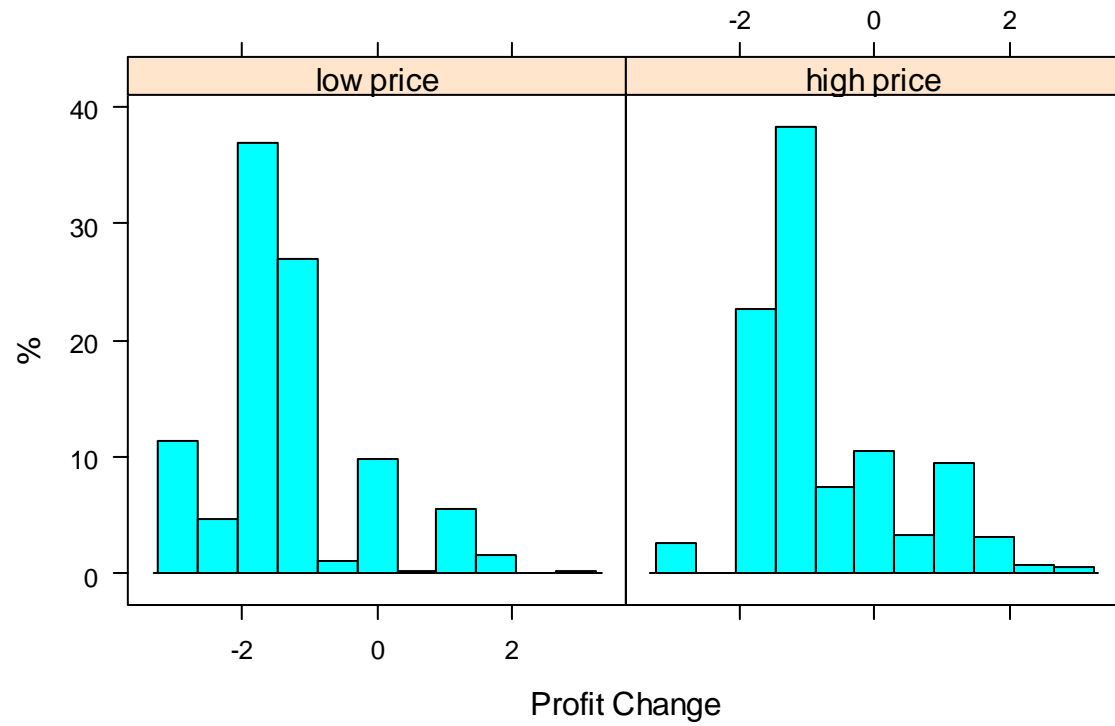
# Descriptive Statistics

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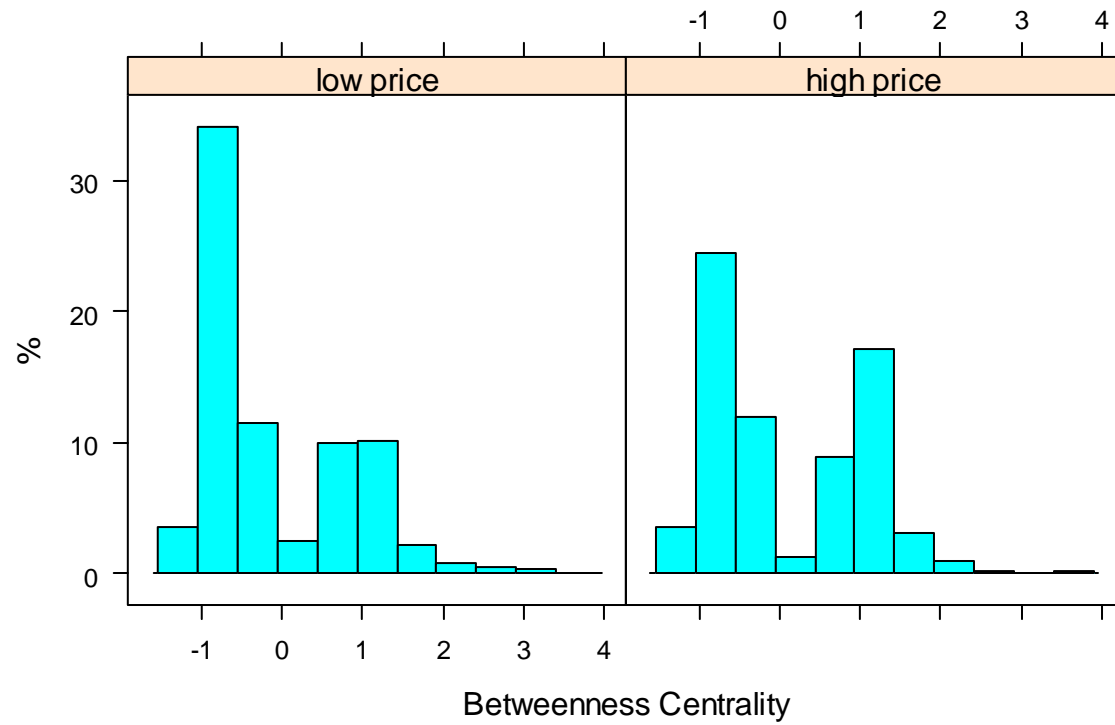
Variables	Values	Mean	Standard Deviation	<i>N</i>
Profit change compared to 5 year ago	-3 ~ 3	-1.017	1.151	757
Betweenness centrality	-1.339 ~ 3.693	0.000	0.970	575
Degree centrality	-3.615 ~ 1.529	0.000	0.966	738
Room rate	0(low), 1(high)	0.519	0.500	756
Efforts	0 ~ 8	3.030	1.487	765

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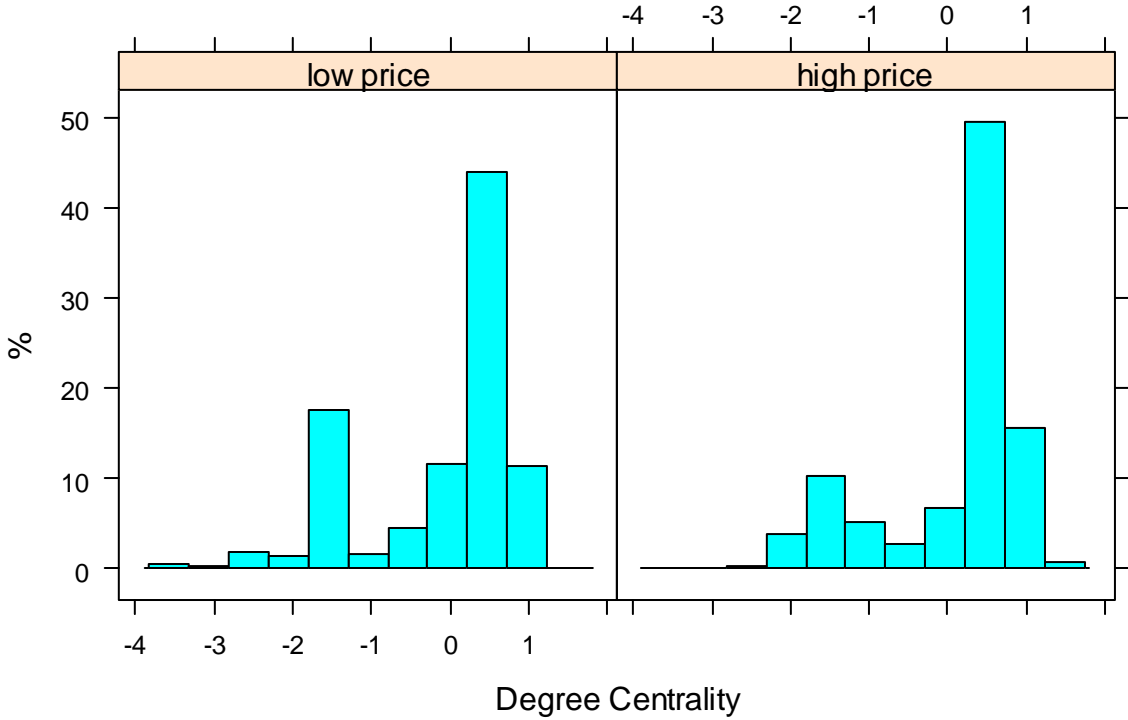
# Profit Change



# Betweenness Centrality

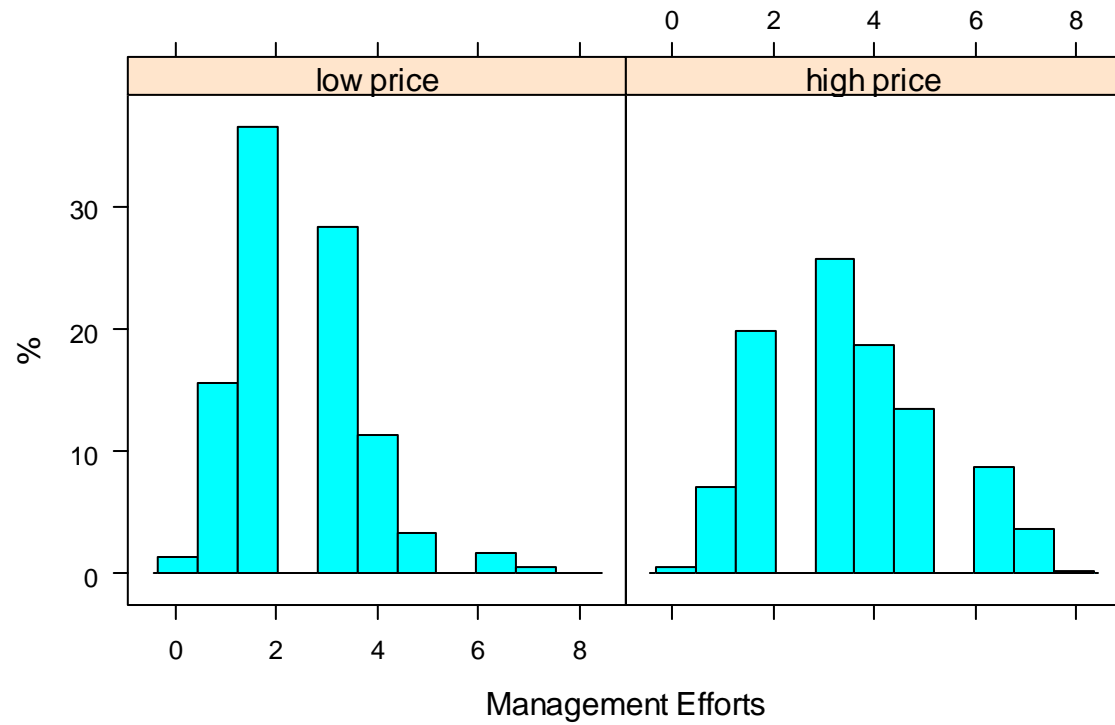


# Degree Centrality





# Management Efforts



# Scatterplot Matrix

