



Law, Economics, and Organization: Recent Developments

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T P W I N S T I T U T O V G T X Y F
L I V Q L T R X P K C **O M G** B
S C Z W P Z G P Y A D A B M F A I

Law, Economics, and Organization: A Social Science



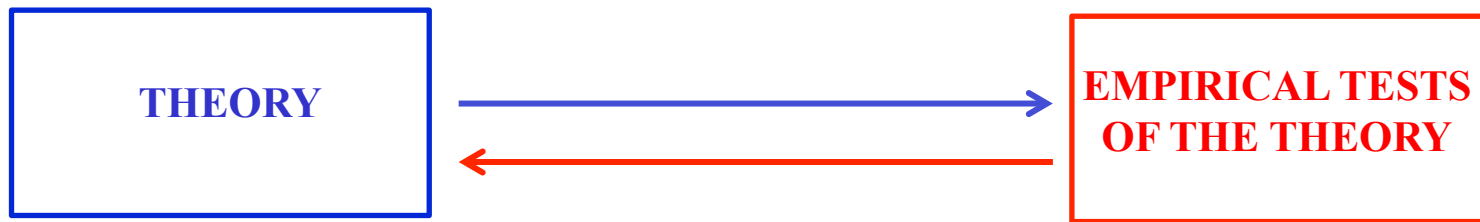
Models

- Set of **assumptions and predictions.**

Statistical tests using **data.**

- **Laboratory** and field **experiments.**
- Observational studies.
- Simulations.

Law, Economics, and Organization: A Social Science



Models

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Methodological Tools

- Legal Analysis.
- Game Theory.
- Experimental Economics.

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John Nash

Mathematician

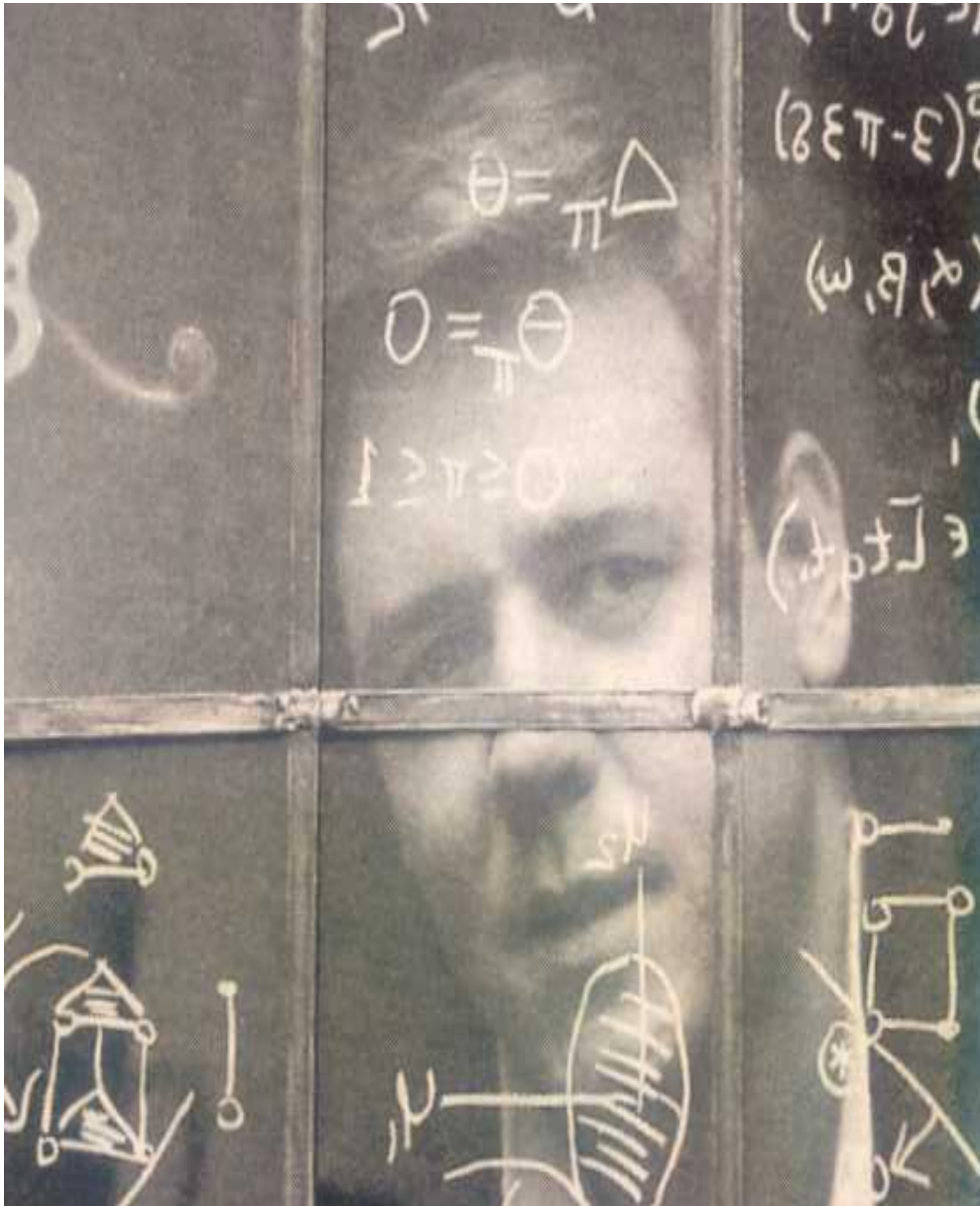
Nobel Prize in Economics, 1994

Prize Motivation: “For the pioneering **analysis of equilibria** in the theory of non-cooperative games.”

Contribution: “Introduced the distinction between cooperative games, in which binding agreements can be made, and non-cooperative games, where binding agreements are not feasible. **Developed an equilibrium concept for non-cooperative games** that now is called **Nash equilibrium**.”

“A Beautiful Mind”

John Nash



Russell Crowe



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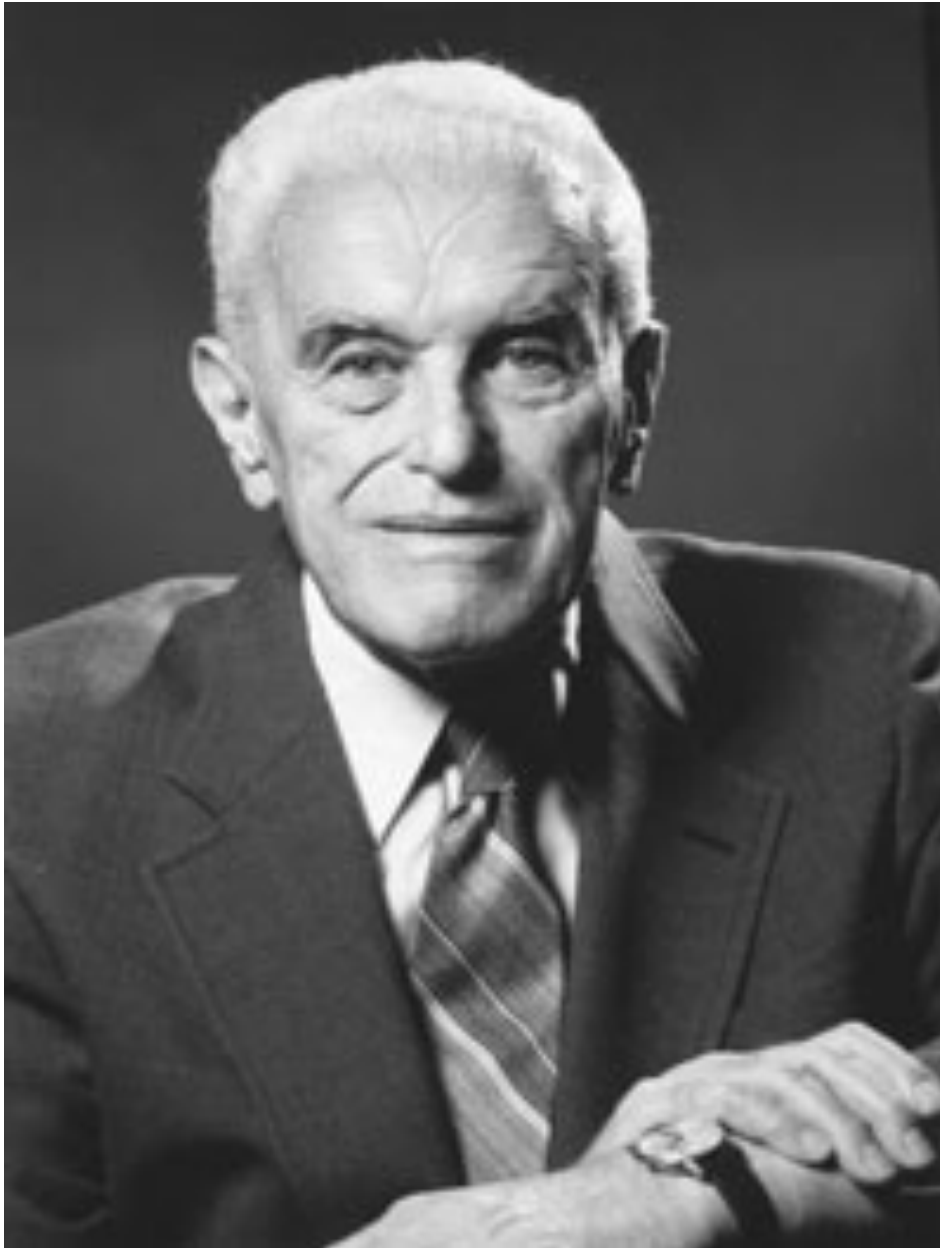
Reinhard Selten

Economist

Nobel Prize in Economics, 1994

Prize Motivation: “For the pioneer **analysis of equilibria** in the theory of non-cooperative games.”

Contribution: “**Refined the Nash equilibrium concept for analyzing dynamic strategic interaction** by getting rid of unlikely equilibria. He also applied the refined concept to analyses of oligopolistic competition.”



John C. Harsanyi

Economist

Nobel Prize in Economics, 1994

Prize Motivation: “For the pioneer **analysis of equilibria** in the theory of non-cooperative games.”

Contribution: “**Showed how games of incomplete information can be analyzed**, thereby providing a theoretical foundation for a lively field of research – the economics of information.”

Methodological Tools

- Legal Analysis.
- Game Theory.
- **Experimental Economics.**

Experimental Law and Economics

- Experimental law and economics refers to the **application of experimental economics methods** to the study of legal institutions.



Vernon L. Smith

Economist

Nobel Prize in Economics, 1992

Prize Motivation: “For having established **laboratory experiments as a tool in empirical economic analysis**, especially in the study of alternative market mechanisms.”

Contribution: “Developed **methods for laboratory experiments in economics**, which has helped our understanding of economic behavior.”



Alvin Roth

Economist

Nobel Prize in Economics, 2012

Prize Motivation: “For the theory of stable allocations and the **practice of market design.**”

Contribution: “Through **empirical studies and lab experiments**, Roth and his colleagues demonstrated that stability was critical to successful matching methods. Roth has also developed systems for matching doctors with hospitals, schools pupils with schools, and organ donors with patients.”

Experimental Law and Economics: Contributions

- Landeo (*The Research Handbook on Behavioral Law and Economics*, forthcoming) argues:
 - “Experimental law and economics **might strengthen the contributions of economic theories** [...] to the design and implementation of [legal institutions] and policies” (p. 2).

Experimental Law and Economics, cont.

- First, experimental law and economics studies might advance the knowledge of the **factors that influence the effects of laws and policies.**
 - Factors included in the theory.
 - Previously non-modeled factors.

Experimental Law and Economics, cont.

- Second, experimental law and economics studies **might facilitate [practitioners] understanding of economic theories.**
- Although experimental settings are aligned with theoretical environment, they represent **simplified (and hence, more understandable) versions of the theory.**

Experimental Law and Economics, cont.

- Third, experimental law and economics studies **might increase the likelihood of admissibility of the evidence provided by economic experts in court.**
- Economic testimony based solely on theoretical models (without providing empirical or experimental evidence) might fail the **scientific method** requirement for admissibility of evidence in court.

Law, Economics and Organization: Applications

- **Inter-Firm and Intra-Firm Contractual Agreements.**
 - Exclusive Contracts as a Market Foreclosure Mechanism.
 - Incentive Contracts for Teams.

Applications, cont.

- **Business Law.**
 - Partnership Agreements.
- **Civil Litigation.**
 - Tort Reform.
 - Legal Disputes and Third-Party Litigation Funding.
- **Criminal Law.**
 - White-Collar Crime and Law Enforcement.

Exclusive Contracts as a Market Foreclosure Mechanism

Landeo and Spier, *The American Economic Review*, 2009.

Landeo and Spier, *The Journal of Institutional and Theoretical Economics*, 2013.

Landeo, *The Research Handbook on Behavioral Law and Economics*, forthcoming. 22

Anheuser-Busch Companies, Inc.

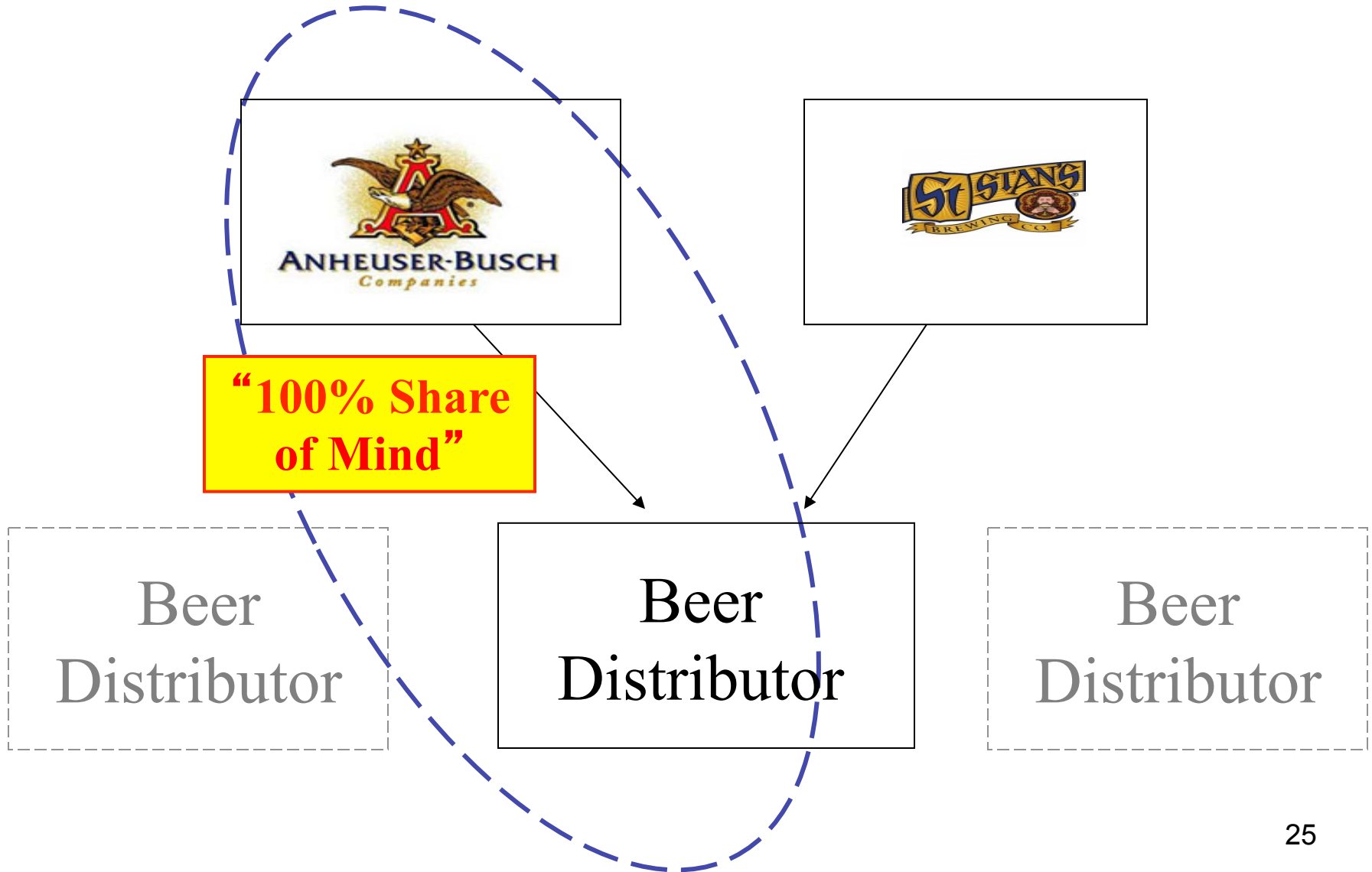
- In the mid-1990s, Anheuser-Busch accounted for almost 50% of all U.S. domestic beer shipments and 70% of industry profits.
- Its brands included:



Anheuser-Busch has also diversified into specialty beers



Anheuser-Busch Companies, Inc.



Anheuser-Busch Companies, Inc.



**“100% Share
of Mind”**

Beer
Distributor

Beer
Distributor

Beer
Distributor

“Amid Probe, Anheuser Conquers Turf,” *The Wall Street Journal*, March 9, 1998

“Many **Anheuser-Busch distributors are dropping independent brews** in favor of such smaller Anheuser Busch brands as Red Wolf and Black & Tan Porter and brands in which the company holds a stake, such as those made by Seattle’s Redhook Ale Brewery.”

“**Last year, growth for domestic microbrews – including brands such as Samuel Adams and Sierra Nevada – hit a brick wall.** The Segment experienced no growth, compared with 20% in 1996 ... One big reason is that **distributors are shedding brands.**”

“Analysts predict the **demise of many small brewers.**”

Exclusive Contracts, cont.

- Exclusive dealing potential outcomes: Small brewers exit, and potential brewers never enter.
- The reason that the distributors agree is that it is in their **individual interest**. But it **may not be in their collective interest**.
- The Justice Department's investigation ended without any legal action.

Theoretical Framework

- Rasmusen, Ramseyer, and Wiley (*AER*, 1991) argue that exclusion may arise when the incumbent can deter entry through **exclusive contracts with just a subset of the buyers**.
 - Economies of scale.
 - Coordination failures among the buyers.
- Segal and Whinston (*AER*, 2000) refine RRW's argument.
 - Divide-and-conquer strategies.

Theoretical Framework (cont.)

- Suppose there are three players: an **incumbent** monopolist, and **two buyers**.
- First Stage: The Contracting Stage.
 - The seller simultaneously offers **transfer payments x_1 and x_2** to the buyers in exchange for exclusivity.
 - After observing both offers, the buyers simultaneously decide whether to accept or reject the offers.
- Second Stage: The Entry Stage.
 - Scale economies imply that entry will be deterred if **one (or both) buyers** accepted the offers in Stage 1.
- Third Stage: The Market Pricing Stage.

Numerical Examination

- Our experiment focuses on the **Contracting Stage**.
- The buyers' payoffs at the **acceptance subgame reflects the Second and Third Stages**:

Buyer 2 (Distributor 2)

Buyer 1 (Distributor 1)

	Accept	Reject
Accept	(x_1, x_2)	$(x_1, 0)$
Reject	$(0, x_2)$	$(1000, 1000)$

- The **incumbent seller's payoffs** (Anheuser-Busch's payoffs):
 - If both buyers reject the offers (**no-exclusion**), the seller receives **zero profits**.
 - If both buyers accept the offers (**exclusion**), the seller receives **$1950 - x_1 - x_2$** .
 - If only buyer i accepts the offer (**exclusion**), the seller receives **$1950 - x_i$** .
- To reduce the subjects' computational costs, we restrict the incumbent seller's offers to a small set: **$x_i \in \{100, 650, 800, 1100\}, i = 1, 2$** .

No Discrimination

		Buyer 2	
		Accept	Reject
Buyer 1	Accept	(800, 800)	(800, 0)
	Reject	(0, 800)	(1000, 1000)

- **PROPOSITION 1.** There are multiple subgame perfect Nash equilibria when the incumbent cannot discriminate ($x_1 = x_2 = x$):
 - **Exclusion equilibria:** The incumbent offers $x \in \{100, 650, 800\}$ and both buyers accept.
 - **Equilibria with entry:** the incumbent offers $x \in \{100, 650, 800\}$ and both buyers reject.

No Discrimination

		Buyer 2	
		Accept	Reject
Buyer 1	Accept	(100, 100)	(100, 0)
	Reject	(0, 100)	(1000, 1000)

- **PROPOSITION 1.** There are multiple subgame perfect Nash equilibria when the incumbent cannot discriminate ($x_1 = x_2 = x$):
 - **Exclusion equilibria:** The incumbent offers $x \in \{100, 650, 800\}$ and both buyers accept.
 - **Equilibria with entry:** the incumbent offers $x \in \{100, 650, 800\}$ and both buyers reject.

Discrimination

		Buyer 2	
		Accept	Reject
Buyer 1	Accept	(1100 , 100)	(1100 , 0)
	Reject	(0, 100)	(1000, 1000)

- **PROPOSITION 2.** There are multiple subgame perfect Nash equilibria, all of which involve exclusion. In these equilibria, $x_1 + x_2 \leq 1200$ and both buyers accept.
 - (100,1100) and (1100,100), the **divide-and-conquer offers**.
 - Other equilibria include (100,100), (100,650), (100,800).

Qualitative Predictions

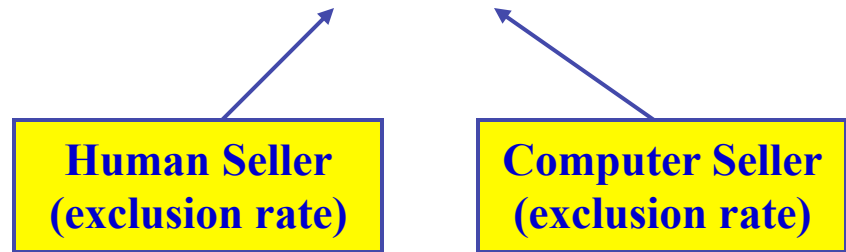
- **HYPOTHESIS 1:** *Discrimination* will increase the likelihood of exclusion.
- **HYPOTHESIS 2:** Under no-discrimination, *higher offers by the seller* will increase the likelihood of exclusion.
- **HYPOTHESIS 3:** Under no-discrimination, *communication between buyers* will reduce the likelihood of exclusion and will increase the amount of seller's offers.
- **HYPOTHESIS 4:** Under no-discrimination and offers greater than or equal to (650, 650), *endogeneity of buyers' payoffs* will increase the likelihood of exclusion.

Experimental Design

- Two **offer treatments**:
 - No-discrimination and discrimination → theoretical model
- Two **communication treatments**:
 - No-communication and two-way buyer-buyer communication → coordination games
- Two **buyers' payoff treatments**:
 - Computer seller (exogenous payoffs) and human seller (endogenous payoffs) → coordination games with endogenous payoffs (fairness and reciprocity)
- Eight-condition, between-subject design.
- Sixteen 70-minute to 90-minute sessions.
- 215 subjects in total (Northwestern University).

Findings: Effects of Communication (under no-discrimination)

Condition	(100, 100)	(650, 650)	(800, 800)	Total Offers
No-Communication	5 [.00, .00]	112 [.96, .84]	3 [1.00, 1.00]	120
Communication	9 [.00, .00]	74 [.39, .07]	37 [.59, .24]	120



[From Table 5 on page 31]

Findings: Effects of Communication (under discrimination)

Condition	(100, 800)/ (800, 100)	(100, 1100)/ (1100,100)	(650, 650)	Total Offers
No-Communication	20 [.25, .50]	83 [1.00, .99]	31 [.84, .71]	144
Communication	6 [.00, .17]	113 [.88, .69]	7 [.43, .00]	132

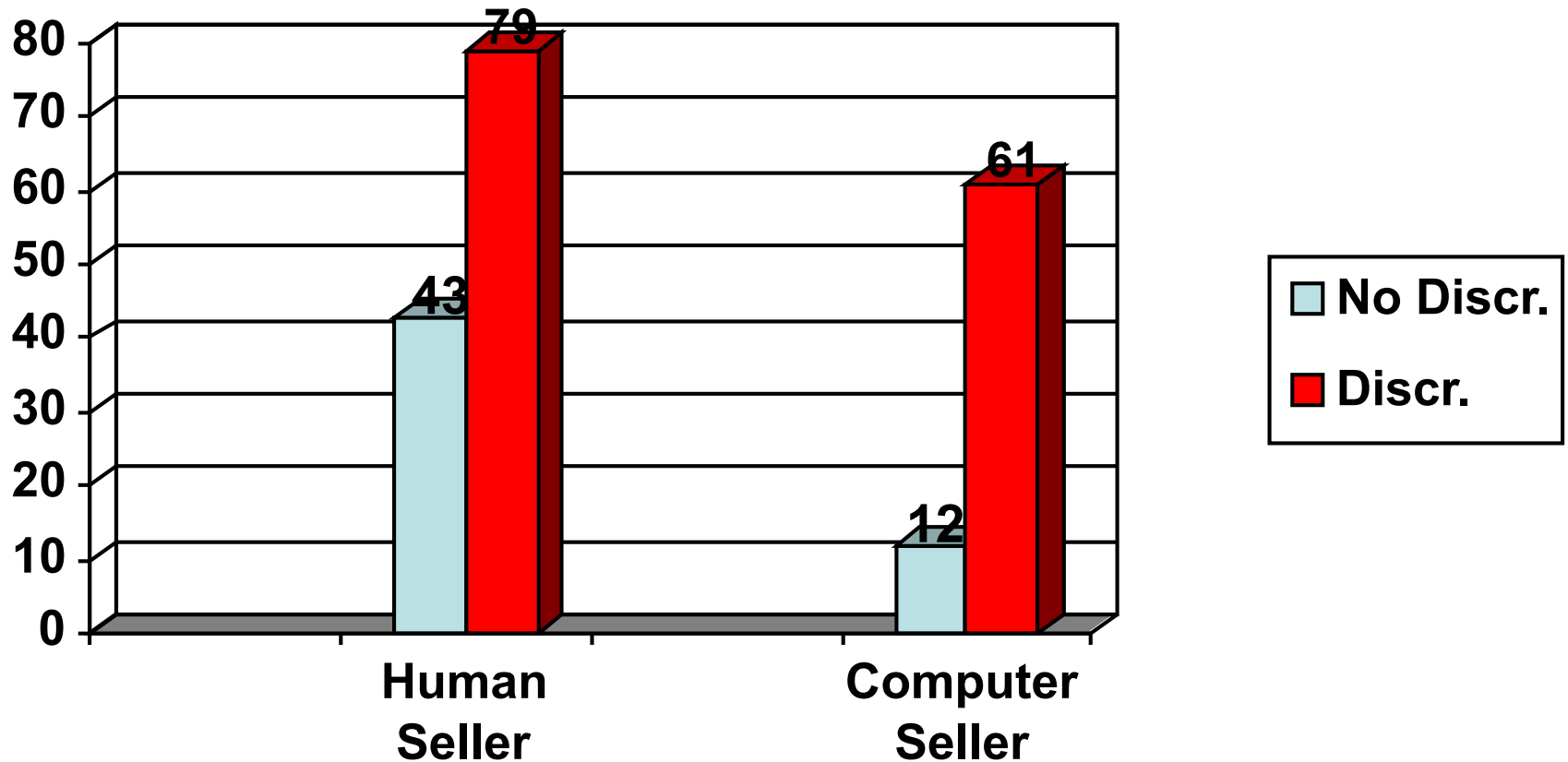
**Human Seller
(exclusion rate)**

**Exogenous
(exclusion rate)**

(From Table 5 on page 31)

Findings: Effects of Discrimination (under communication)

Exclusion Rate



[From Table 4]

Findings: Determinants of Buyer's Acceptance

	Marginal Effects
Own Offer	.33*** (.0001)
Partner's Offer	.11** (.0002)
Partner's Reject Intention	-.67*** (.0539)
<i>Divide-and-Conquer</i> Offers	.45*** (.0421)
Endogeneity	.29*** (.0522)
Observations	1008

Note:***and ** denote significance at the 1% and 5%, respectively.

[Table 8 on page 33]

Implications for Organizations

- Our findings suggest that Naked Exclusion may be surprisingly **easy for incumbent firms** to achieve.
 - Even in the absence of discrimination, when adequate **communication channels were not available**, our subjects **failed to coordinate** on their preferred equilibria and entry was deterred.
 - Coordination was particularly elusive when the incumbent seller had a human identity. The human face of a sales representative (an agent for the seller) might elicit **fairness and reciprocity** from the agents representing the buyers, and facilitate the exclusion of faceless rivals (in the event of contracts perceived as “kind”).

Implications for Policy Makers

- **Communication among non-competing buyers** might serve the public interest by facilitating entry.

Implications for Academic Scholars

- Naked Exclusion literature.
 - Our findings provide support for Segal and Whinston's predictions about **divide-and-conquer strategies** under communication.
 - We show that **communication** between the buyers influences not only the exclusion rate but also the offers made by the incumbent seller.
 - Our results suggest that **fairness and reciprocity** may lead to higher exclusion rates than previously anticipated.
- Experimental Economics literature
 - We provide the first empirical test of **coordination games with endogenous payoffs**.

Concluding Thoughts

- **Academic work** in Law, Economics, and Organization provides important **contributions to legal practitioners, managers, and policy makers.**
 - Game theoretic tools allow to capture empirically-relevant environments and hence, provide useful predictions regarding the effects of business policies and legal institutions.
 - Experimental economics tools allow to test these theories and incorporate behavioral factors previously ignored by the theoretical frameworks.

Concluding Thoughts, cont.

- **Better communication** between **practitioners and academic scholars** will strengthen the contributions of academic work to the design of business and legal strategies.
- **CIEL** represents one example of the mechanisms that can be used to facilitate this interaction!

ADDITIONAL SLIDES

Landeo and Spier, *The Journal of Economic Behavior and Organization*, 2015.

Incentive Contracts for Teams

Landeo and Spier, *The Journal of Economic Behavior and Organization*, 2015.

Motivation

- **Group-based incentives contracts** are used in economic environments.
 - **Rewards:** Work teams, professional service organizations.
- Incentive schemes that rely on collective rewards are **susceptible to free-riding**.
 - The moral-hazard-in-teams problem is particularly acute in static settings.
 - Long-term interaction among the team members can create implicit incentives, as the threat of peer monitoring may render shirking unprofitable.
- In their theoretical model, Che and Yoo (*American Economic Review*, 2001) argue that **group incentive contracts**, coupled **with long-term team interaction**, can allow the principal to successfully induce team cooperation at the minimum cost.



Paper's Goal

- To experimentally study incentive contracts for teams and provide evidence of the factors that affect:
 - **Team's cooperation** (hard work).
 - **Principal's cost** of achieving team cooperation.

Theoretical Framework

- Suppose there are three players: **A principal** and **two identical agents** who work together and are rewarded for their group performance.
- The game has two stages:
 - **Stage 1**: The principal chooses the **sharing rule**, $x \in [0, 1]$, the percentage of future revenues allocated to each agent. The principal retains $1 - 2x$.
 - **Stage 2**: The agents play an “Effort Stage-Game” where they choose to **work hard (cooperate)** or **shirk**.
- When an agent works hard, he bears a private cost of effort $e > 0$.
- The **firm’s revenues** depend on the efforts of the agents:

$$R_{11} > R_{01} = R_{10} > R_{00}$$

Model Parameterization

- Three players: **A principal** and **two identical agents** who work together and are rewarded for their group performance.
- The game has two stages:
 - **Stage 1**: The principal chooses the **sharing rule**, $x \in \{.20, .25, .30, .35\}$, the percentage of future revenues allocated to each agent. The principal retains **$1 - 2x$** .
 - **Stage 2**: The agents play an “Effort Stage-Game” where they choose to **work hard (cooperate)** or **shirk**.
- When an agent works hard, he bears a private cost of effort **$e = 38$** .
- The **firm’s revenues** depend on the efforts of the agents:

$$R_{11} = 344; \quad R_{01} = R_{10} = 200; \quad R_{00} = 100$$

Stage 2: Effort Stage-Game

- Agents' payoffs and Principal's payoff (in brackets) at the Effort Stage-Game:

		Agent 2	
		Work Hard	Shirk
Agent 1	Work Hard	$344x - 38, 344x - 38$ $[344(1 - 2x)]$	$200x - 38, 200x$ $[200(1 - 2x)]$
	Shirk	$200x, 200x - 38$ $[200(1 - 2x)]$	$100x, 100x$ $[100(1 - 2x)]$

- To reduce the subjects' computational costs, we restrict the possible **sharing rules** chosen by the principal to the set:

$$x \in \{.20, .25, .30, .35\}$$

Sharing Rule: $x = .20$

Agent 2

Agent 1

	Work Hard	Shirk
Work Hard	31, 31 [206]	2, 40 [120]
Shirk	40, 2 [120]	20, 20 [60]

Sharing Rule: $x = .25$

Agent 2

Agent 1

	Work Hard	Shirk
Work Hard	48, 48 [172]	12, 50 [100]
Shirk	50, 12 [100]	25, 25 [50]

Sharing Rule: $x = .30$

Agent 2

Agent 1

	Work Hard	Shirk
Work Hard	65, 65 [138]	22, 60 [80]
Shirk	60, 22 [80]	30, 30 [40]

Sharing Rule: $x = .35$

Agent 2

Agent 1

	Work Hard	Shirk
Work Hard	82, 82 [104]	32, 70 [60]
Shirk	70, 32 [60]	35, 35 [30]

Theoretical Framework, cont.

- We consider both short-term and long-term group settings for **Stage 2**.
- In the **short-term group settings**, Stage 2 involves a one-shot interaction between the agents, i.e., the Effort Stage-Game is played once.
- In the **long-term group settings**, Stage 2 involves an ongoing interaction between the agents, i.e., the Effort Stage-Game is played repeatedly.
 - At the end of each round, each agent observes the effort chosen by the other. Hence, the agents mutually monitor each other over time.
 - The game continues with probability $\delta = .75$ in each round.
- In both short-term and long-term settings, the sharing rule x chosen by the principal in Stage 1 **applies to all rounds** of the Effort Stage-Game in Stage 2.
 - This assumption makes the settings comparable, and allows us to isolate the effect of long-term groups on agents' cooperation.

Equilibrium Predictions

- **PROPOSITION 1.** In *short-term team settings* (one-shot team interaction), there are multiple SPNE:
 - **Cooperation equilibria (Hard Work):** The principal chooses a sharing rule equal to .30 or .35 and both agents decide to work hard.
 - **Shirking Equilibria:** The principal chooses a sharing rule equal to .20 and both agents decide to shirk.
- **PROPOSITION 2.** In *long-term team settings* (ongoing team interaction), there are multiple SPNE:
 - **Cooperation equilibria (Hard Work):** The principal chooses a sharing rule equal to .20, .25, .30 or .35 and both agents decide to work hard.
 - **Shirking Equilibria:** The principal chooses a sharing rule equal to .20 and both agents decide to shirk.

Qualitative Hypotheses

- **HYPOTHESIS 1:** *Long-term team settings* will increase the likelihood of team cooperation (hard work) and will reduce the principal's cost of achieving team cooperation.
- **HYPOTHESIS 2:** *Two-sided non-binding communication between the agents* will increase the likelihood team cooperation (hard work) and will reduce the principal's cost of achieving team cooperation.
- **HYPOTHESIS 3:** *In long-term team settings with prisoner's dilemma games generated by the lowest sharing rule, endogeneity* will decrease the likelihood of team cooperation (hard work).

Experimental Design

- Two **team treatments**

Short-term and long-term teams → theoretical model.

- Two **communication treatments**

No-communication and two-way agent-agent communication → coordination on the cooperation equilibrium.

- Two **strategic environment treatments**

Computer –administered sharing rules (exogenous strategic environments) and human principal (endogenous strategic environments) → endogenous Prisoner's dilemma and Stag-Hunt games (negative reciprocity).

- Eight-condition, between-subject design.
- Twenty-two 70-minute to 120-minute sessions.
- 230 subjects in total (Harvard University).

Team Cooperation Rates: Effect of Long-Term Teams (No-Communication)

Condition	.20	.25	.30	.35	Total Offers
Short-Term Teams	.16 [.00, .00]	.16 [.11, .00]	.60 [.39, .36]	.07 [1.00, .75]	55

**Human Principal
(cooperation rate)**

**Computer-Administered
Sharing Rules
(cooperation rate)**

[From Table 6]

Team Cooperation Rates: Effect of Long-Term Teams (No-Communication)

Condition	.20	.25	.30	.35	Total Offers
Short-Term Teams	.16 [.00, .00]	.16 [.11, .00]	.60 [.39, .36]	.07 [1.00, .75]	55
Long-Term Teams	.10 [.00, .76]	.30 [.91, .78]	.47 [.86, .72]	.13 [.90, .83]	60

**Human Principal
(cooperation rate)**

**Computer-Administered
Sharing Rules
(cooperation rate)**

[From Table 6]

Team Cooperation Rates: Effect of Communication (Short-Term Teams)

Condition	.20	.25	.30	.35	Total Offers
No-Comm.	.16	.16	.60	.07	55
	[.00, .00]	[.11, .00]	[.39, .36]	[1.00, .75]	

**Human Principal
(cooperation rate)**

**Computer-Administered
Sharing Rules
(cooperation rate)**

Team Cooperation Rates: Effect of Communication (Short-Term Teams)

Condition	.20	.25	.30	.35	Total Offers
No-Comm.	.16 [.00, .00]	.16 [.11, .00]	.60 [.39, .36]	.07 [1.00, .75]	55
Comm.	.18 [.10, .00]	.20 [.27, .09]	.53 [.72, .79]	.09 [1.00, 1.00]	55

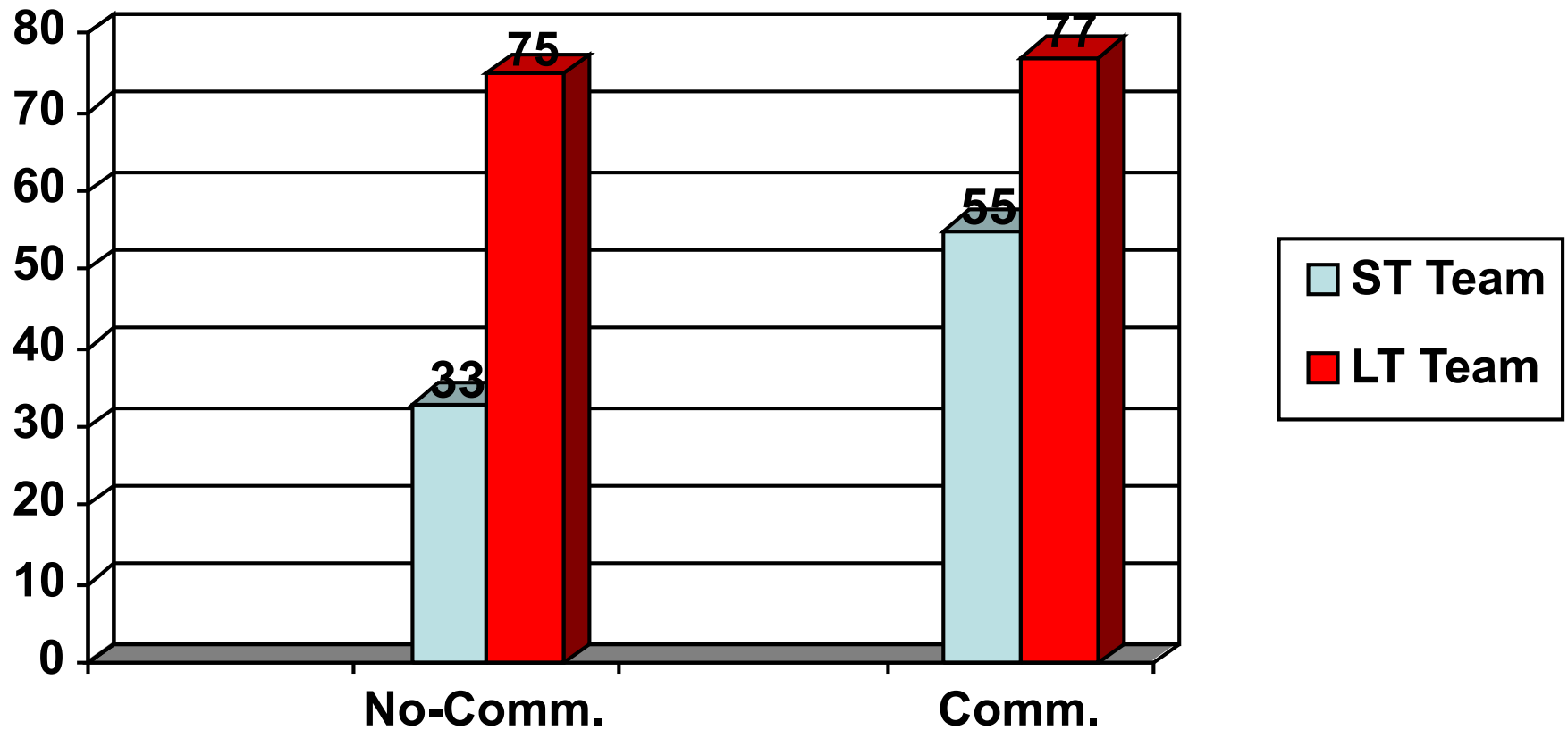
**Human Principal
(cooperation rate)**

**Computer-Administered
Sharing Rules
(cooperation rate)**

[From Table 6]

Cooperation Rate: Effects of Long-Term Teams (Human Principal)

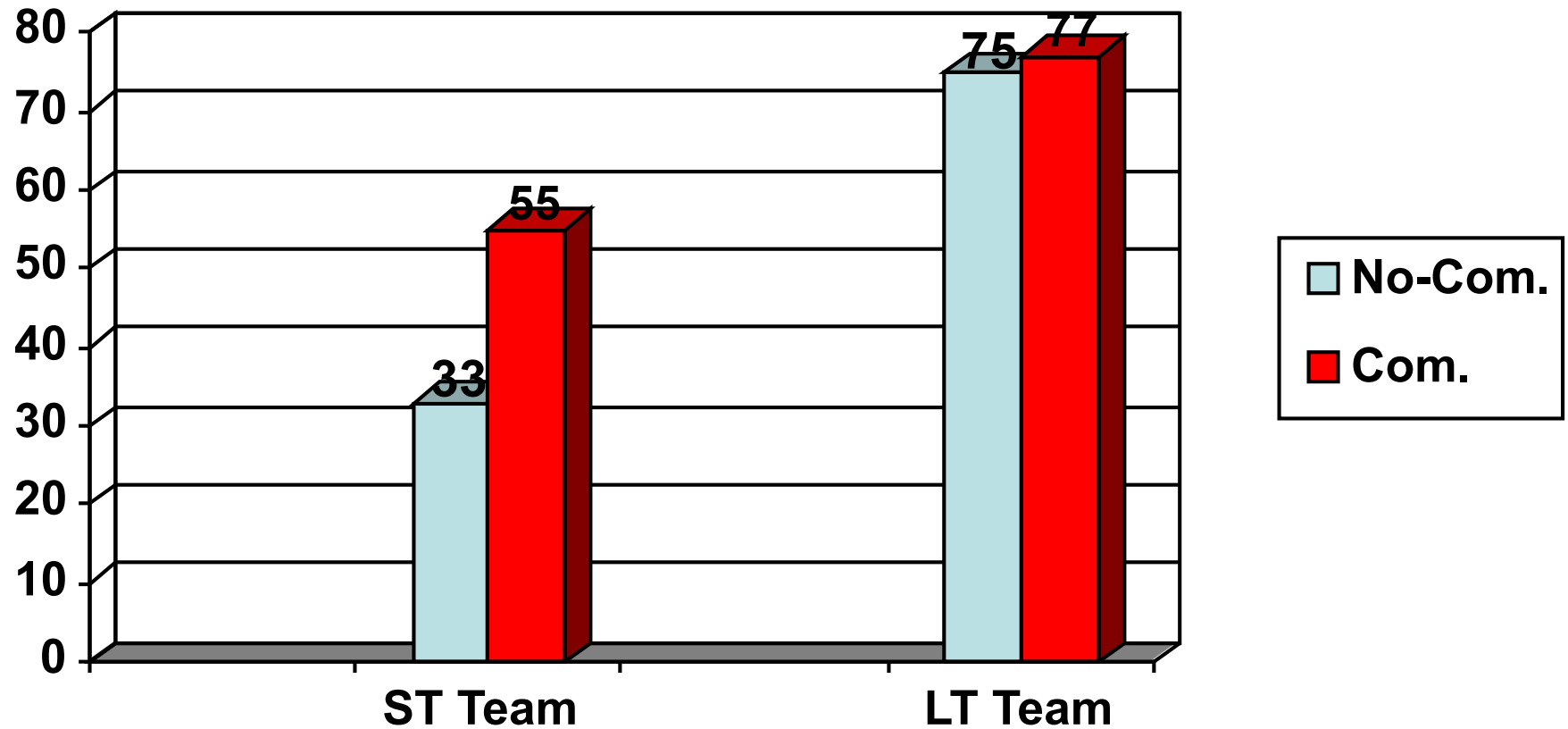
Cooperation Rate



[From Table 5]

Cooperation Rate: Effects of Communication (Human Principal)

Cooperation Rate



[From Table 5]

Effects of Long-Term Teams on the Likelihood of High Payoff for the Principal

Marginal Effects	
EN/ST/NC	.24**
EN/LT/NC	(.10)
Obs.	247
EN/ST/C	.32*
EN/LT/C	(.19)
Obs.	247

Note: High-payoff for the principal defined as a payoff > 138 (achieved under (W, W) and sharing rules equal to .20 or .25); ** and * denote significance at the 5% and 10%, respectively.

Implications for Organizations

- **Group-Incentive Mechanisms.**
 - Our findings provide support to the theoretical predictions regarding the effects of **long-term teams**.
 - Long-term teams increase team cooperation.
 - Long-term teams lower the cost of achieving team cooperation.
 - We show that **communication** between the agents positively influences team cooperation under short-term teams.
 - Our results suggest that **negative reciprocity** may lead to lower team cooperation rates than theoretically-anticipated: Long-term teams with prisoner's dilemma generated by the lowest sharing rule.

Implications for Academic Scholars

- Experimental Economics Literature.
 - We provide the first experimental test of the effects of the **endogeneity of the strategic environments** on players' **cooperation**.
 - We provide the first experimental test of the effects of **communication** on players' cooperation.
 - In infinitely-repeated **Stag-Hunt** games.
 - In infinitely-repeated **Prisoner's Dilemma** games.

Concluding Thoughts

- **Academic work** in Law, Economics, and Organization provides important **contributions to legal practitioners, managers, and policy makers.**
 - Game theoretic tools allow to capture empirically-relevant environments and hence, provide useful predictions regarding the effects of business policies and legal institutions.
 - Experimental economics tools allow to test these theories and incorporate behavioral factors previously ignored by the theoretical frameworks.

Concluding Thoughts, cont.

- **Better communication** between **practitioners and academic scholars** will strengthen the contributions of academic work to the design of business and legal strategies.
- **CIEL** represents one example of the mechanisms that can be used to facilitate this interaction!