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Rutgers Business School
Newark and New Brunswick

Games and Experiential Learning in Supply Chain Management

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Use Experiential Learning to Empower Students

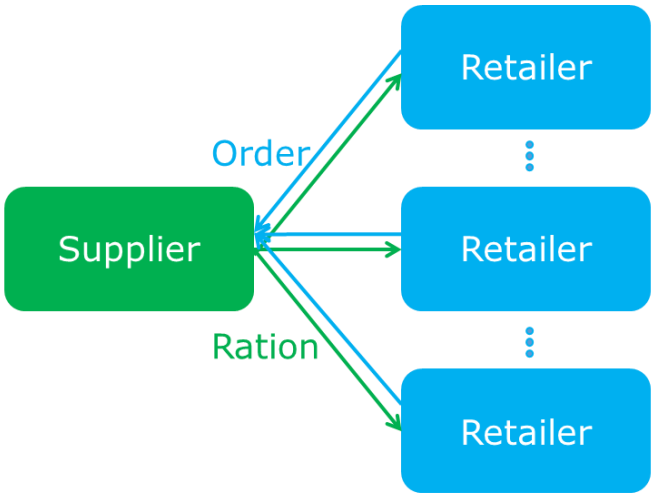
Team-based, computer-assisted, action-live simulations

Have fun & learn a lot!

Hunger Chain Simulation

A Newsvendor and Shortage Gaming Simulation

Mummy bird only has one worm, whom to give it to?



Supply is limited, how to allocate efficiently and fairly?

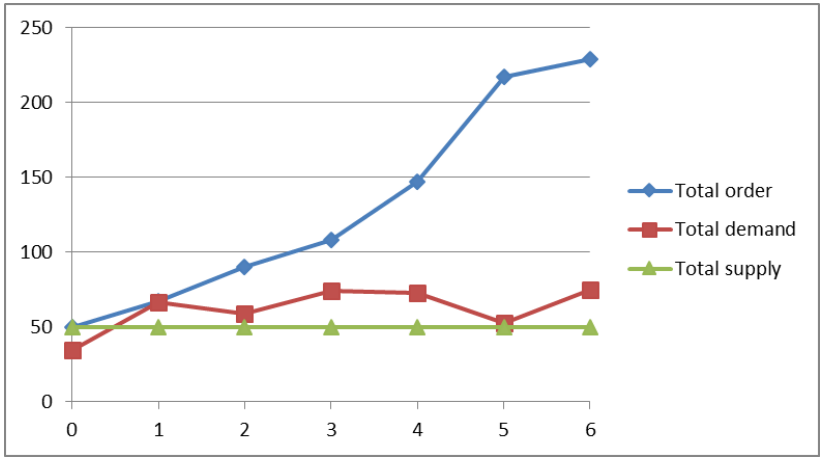
Supply Chain Problems Under Shortage

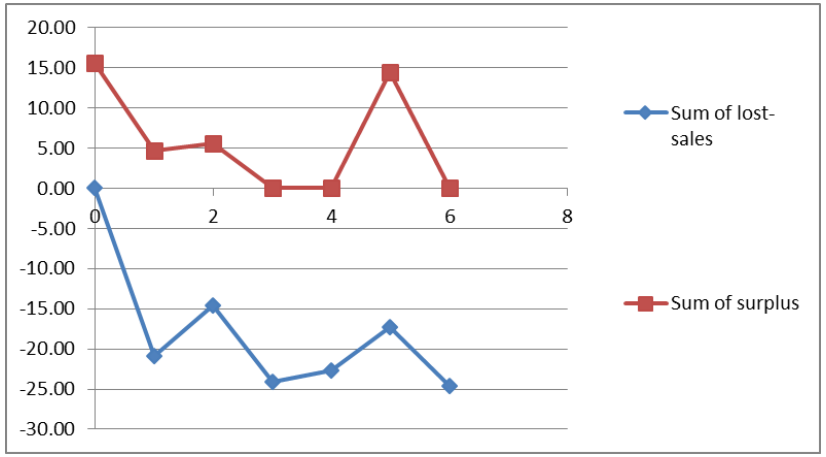
- Panic orders
- Hoarding
- Unfair allocation
- Supply chain melt down

Teaching Objectives

- The impact of demand uncertainty and power of the Newsvendor Model.
- Shortage gaming (panic orders, hoarding), the impact of information.
- Competition and equilibrium (Prisoners' Dilemma): how one team's action may affect other teams' profit? Why order inflation is inevitable?
- Inventory rationing for fairness and supply chain efficiency

Game Trajectory





Facing stable demand, why did total order increase significantly over time?!

Panic orders

Why do we have both lost-sales and surplus inventory in the same time?!

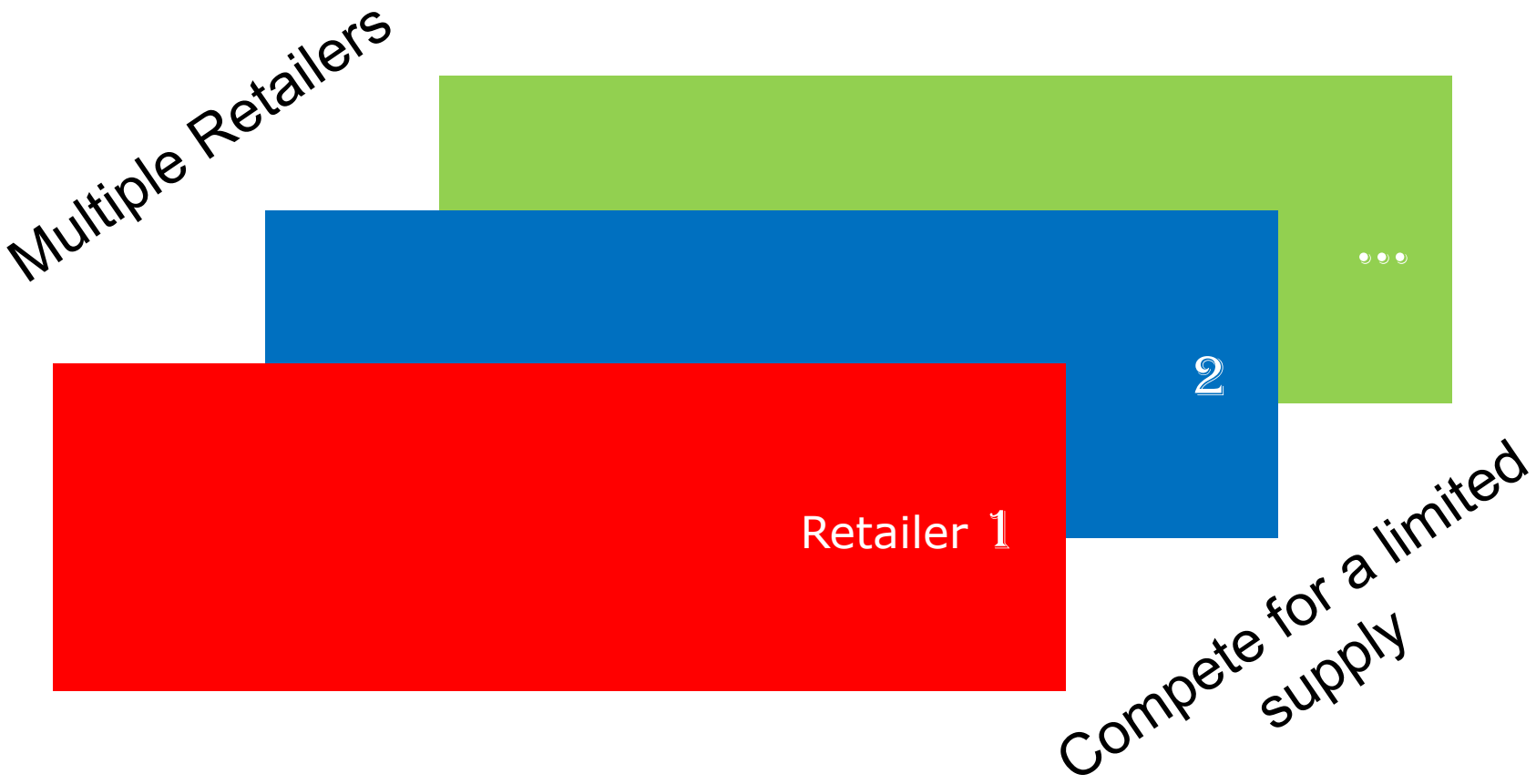
Hoarding

Positioning and Audience

- Game positioning
  - Few existing games are interactive and competitive in the sense that one team's action affects others' payoff.
  - Newsvendor model, shortage gaming and Prisoners' Dilemma are hard to teach but easy to play out.

- Courses and audience
  - Courses: Operations management, supply chain management, procurement / sourcing, distribution and logistics.
  - Target audience: undergraduate, graduate (MS, MBA) and executive / continuing education students.

The Game Setup

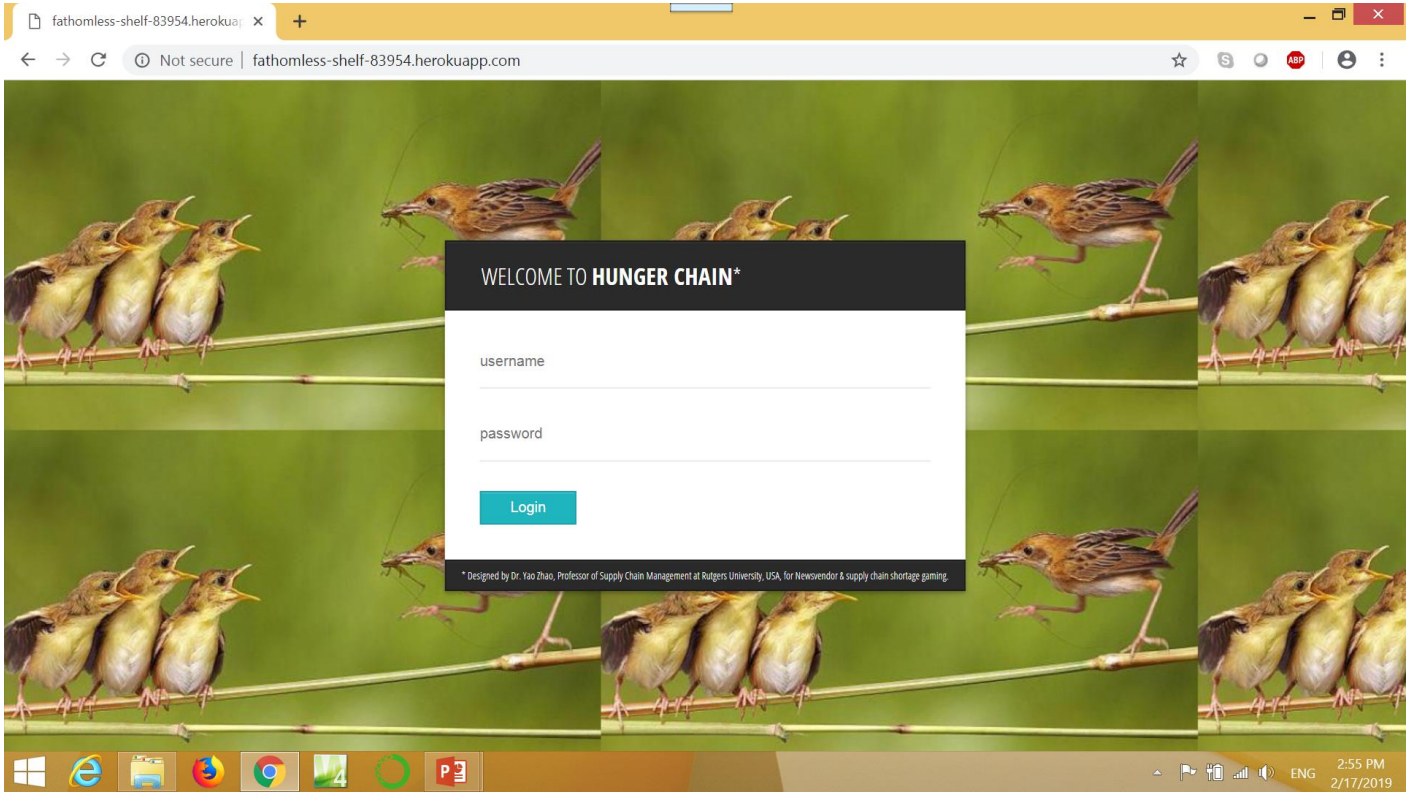


Screen Play (4-6 Hours)

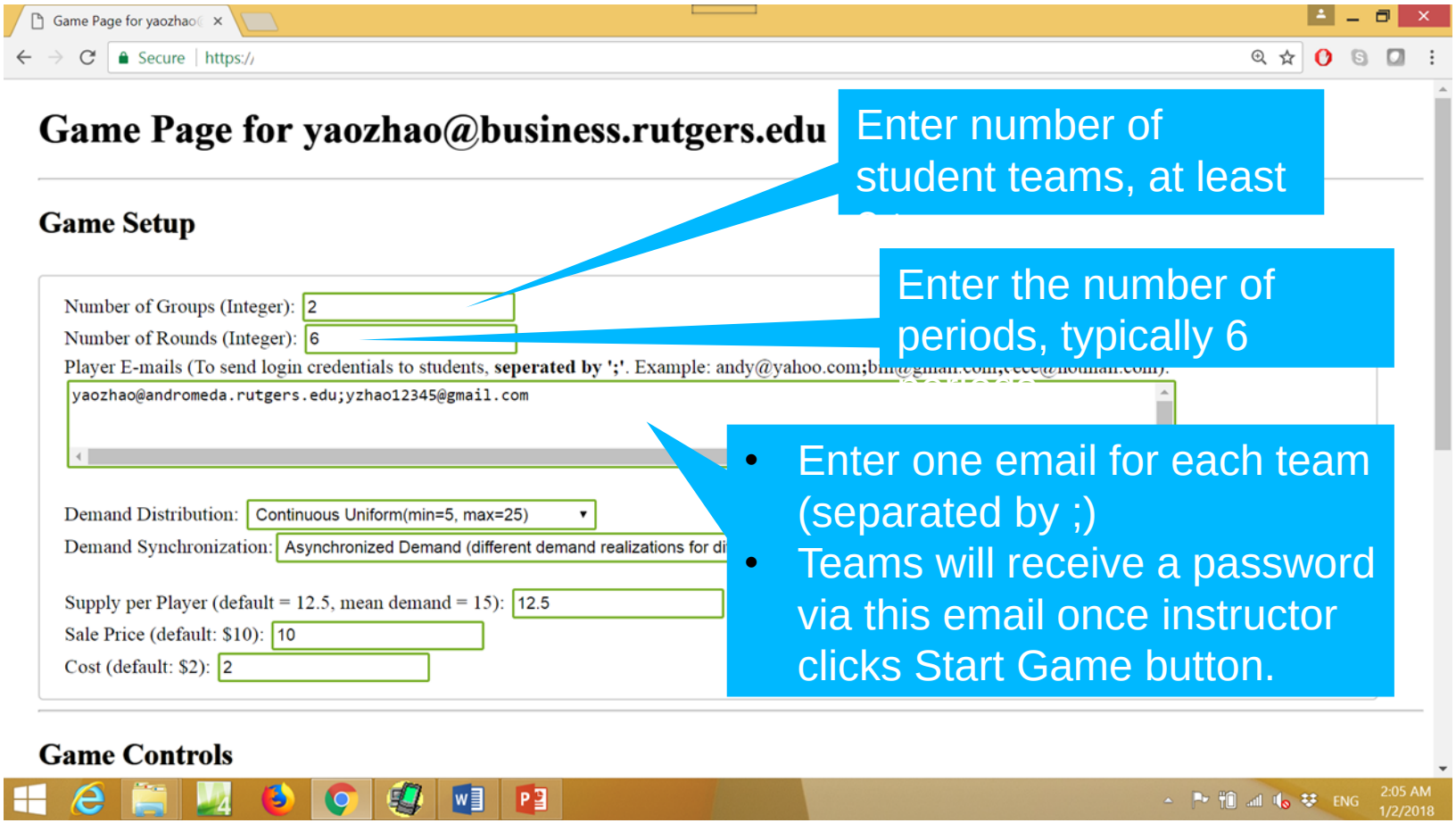
1. The Newsvendor Game (abundant supply)
   - Students experience random demand, and must make decision under uncertainty
   - After the game, they will be after you for the solution
2. Newsvendor model lecture
   - Calculate the optimal order quantity for the game
   - Comment on winning / losing teams' performance
3. The Shortage Game (short supply, the proportional rule)
   - Panic orders, hoarding, Prisoners' Dilemma, supply chain melt down
   - Link game to real life events
   - Supply rationing: the fair sharing rule

Instructor: Account & Login

Email yaozhao@business.rutgers.edu for instructor access



Instructors Setup Games



Play a Sample Game

- Setup your game: rounds, # of players, students login
- Game parameters
- Game actions: start, restart, reset, save, end, …
- Saved games: view, reload, delete.

- Newsvendor or shortage? Your choice!

- Impact of information (3rd round), game trajectory.
- Show a past game for order inflation – a live example of the Prisoners' Dilemma

Melt-Down 2001: Solectron*

- In 2000, the telecom market was growing fast; the contract manufacturer, Solectron, has a short supply (capacity).
- Adding up orders from Cisco, Lucent & Ericsson, etc. exceeded the rosiest forecast – Solectron worried, but the telecom giants assured that they will pay.
- Meltdown happened in April 2001, it is too late to halt production from some 4000 suppliers, now Solectron sit on $4.7 billion inventory.
- In the meeting to resolve inventory

"Everyone says it's yours."

*"Why the Supply Chain Broke Down" Businessweek, March 18, 2001.

Supply Rationing: Fair Sharing

- Fair sharing: uses past shipment to allocate supply
  - Allocates limited supply among customers by their %s of the last 13-week of shipments
  - Ex: if CVS accounts for 10% of the last 13-week of shipments, reserve 10% of the supply to CVS

Pros:

- No order → no game playing
- Provides a clear incentive for retailers to sell the products rapidly
- Assures that units are sent to markets where they are most needed.

Efficient

Cons:

- Tend to lock in market shares – not really fair
- Eliminate retailers' forecast and business plans
- Still significant mis-match between demand and supply, …

Not fair

Student/Instructor Feedback

- "The Hunger Game was very interactive and brought critical thinking to the activity. I really enjoyed it as we got to work in groups while being inclusive enough to work together as a class. The competition aspect of the activity pushes each group to become more proactive with critical thinking which broadens everyone's perspective and reflection of real world competition."

- "The game worked really well. My teaching evaluation in this semester finally reached 4.38 [out of 5] – I am SO happy!"

Summary

- "Hunger Chain simulation" can teach the following topics **effectively** and **effortlessly**
  - Decision under demand uncertainty: the Newsvendor model
  - Supply chain competition: one retailer's profit depends on others' actions.
  - Shortage gaming: panic orders, hoarding, supply chain melt-down via Prisoners' Dilemma
  - Supply rationing can improve efficiency but may not be fair.

YouTube Videos

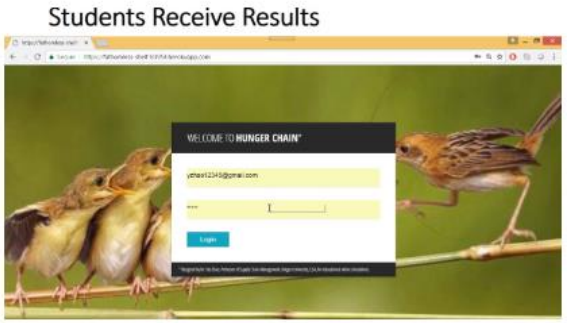
- **Hunger Chain Simulation Introduction**: https://youtu.be/tHCXs51Ba-E

Hunger Chain Simulation - Introduction

youtu.be

An introduction to Hunger Chain - A Competitive Supply Chain Simulation

- **Hunger Chain Simulation How to play**: https://youtu.be/Blolth_6duk

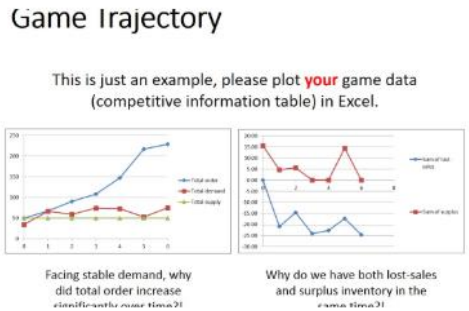


Hunger Chain Simulation - How to play

youtu.be

Use an example to show how to play the Hunger Chain Simulation

- **Hunger Chain Simulation Teaching Note**: https://youtu.be/WPqK5JwXEy8



Hunger Chain Simulation - Gaming and Discussion

youtu.be

Teaching note for the Hunger Chain Simulation