

Post Graduate Program in Management

# Bullwhip Effect

Vinay Kumar Kalakbandi  
Area Chairperson and Assistant Professor  
Operations Management

Friday, February 18, 2022



27

## Bullwhip Effect in Supply Chains



Vishal Gaur, Core Reading: Supply Chain Management, HBP No. 8031 (Boston: Harvard Business School Publishing, 2014).  
Copying or posting is an infringement of copyright. Call 1-800-545-7685 or go to [custserv@hbsp.harvard.edu](mailto:custserv@hbsp.harvard.edu).

chnology

for Businesses

28

## Bullwhip effect

$$\text{Variance (Retail Demand)} \leq \text{Variance (Retail Orders)} \leq \text{Variance (Wholesale Orders)} \\ \leq \dots \leq \text{Variance (Production)}$$

$$\text{Amplification Factor} = \frac{\text{Variance of orders placed by a location}}{\text{Variance of demand received by that location}}$$

Friday, February 18, 2022

29

## Causes of the Bullwhip effect

- Demand forecast Updating
- Order Batching
- Price fluctuation
- Rationing and Shortage gaming



Friday, February 18, 2022

30


LTL

VS

FTL

Friday, February 18, 2022



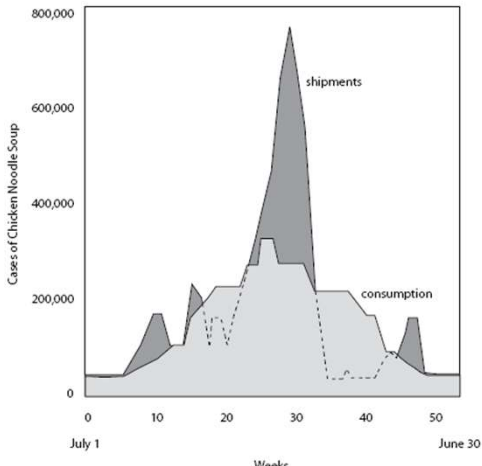
**Institute of Management Technology**  
Hyderabad

...Harnessing Knowledge for Businesses

31


## Price fluctuations

**How Campbell's Price Promotions Disrupted Its Supply System**



Weeks	Consumption (Cases)	Shipments (Cases)
0 (July 1)	~50,000	~50,000
10	~100,000	~100,000
20	~150,000	~150,000
30	~200,000	~750,000
40	~150,000	~150,000
50 (June 30)	~50,000	~50,000

Friday, February 18, 2022



**Institute of Management Technology**  
Hyderabad

...Harnessing Knowledge for Businesses

32



Friday, February 18, 2022

33

NEWS

• LIVE TV

**INDIA TODAY**

APP

[HOME](#) [MY FEED](#) [CORONA](#) [INDIA](#) [WORLD](#) [BUSINESS](#) [TECH](#) [MOVIES](#) [SPORTS](#) [HAPPINESS QUEST](#)

News / Coronavirus Outbreak / Delhi govt sought 4 times more oxygen than it needed during 2nd wave, says SC a

## Delhi govt sought 4 times more oxygen than it needed during 2nd wave, says SC audit panel

*The Supreme Court-appointed oxygen audit committee has said Delhi government asked for four times more oxygen than what was required during the second wave.*



Sanjay Sharma [@Aneesha Mathur](#)

New Delhi

June 25, 2021 UPDATED: June 25, 2021 12:45 IST



Friday, February 18, 2022

34

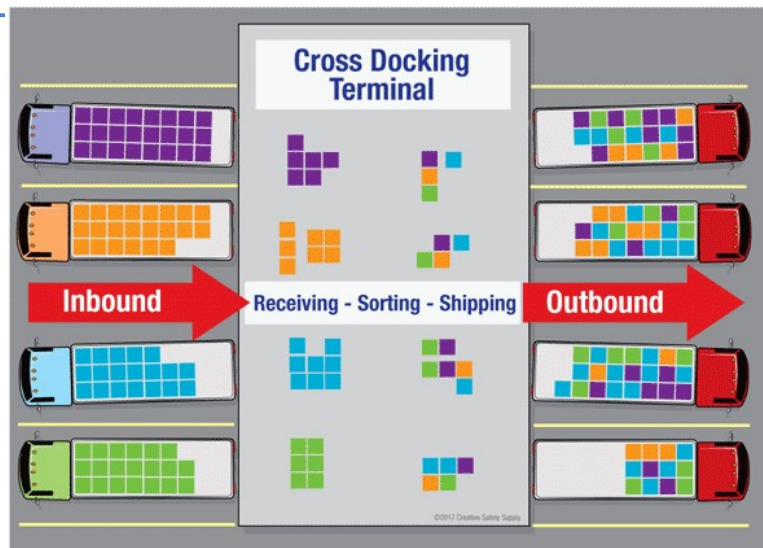
# Preventing the Bullwhip effect

**Table 3** Preventing Avoidable Fluctuations

	Information Sharing	Channel Alignment	Operational Efficiency
<b>Demand Forecast Updating</b>	Use electronic data interchange (EDI) Use point-of-sale data Understand system dynamics Avoid multiple demand forecasts	Make centralized ordering decisions Vendor-managed inventory (VMI) Discount for information sharing Consumer direct	Lead-time reduction Echelon-based inventory control
<b>Order Batching</b>	EDI Internet ordering	Mixed pallet shipments Cross-docking Logistics outsourcing	Reduction in fixed cost of ordering by EDI
<b>Price Fluctuations</b>		Continuous replenishment program Everyday low cost	Everyday low price Activity based costing
<b>Rationing and Shortage Gaming</b>	Sharing sales, inventory, and capacity data	Allocation based on past sales	

Friday, February 18, 2022

35



Friday, February 18, 2022

36

## Efficient Consumer Response

- Vendor Management Inventory/Continues Replenishment Program
- Collaborative Planning Forecasting Replenishment

Friday, February 18, 2022