Global Supply Chain Optimization

Minimizing Costs in a Complex Supply Network

Objectives

- Minimize total supply chain costs (fixed, variable, transportation).
- Ensure capacity meets demand across all regions.
- Analyze the impact of tariffs and exchange rates on operations.

Methodology

- **Model Components:**
  - Decision Variables: Plant operation, goods flow (HighCal, Relax).
  - Constraints: Capacity limits, demand fulfillment.
  - Objective: Cost minimization.
- **Data Inputs:**
  - Production capacities and demands for six regions.
  - Tariffs, duties, transportation costs.
  - Exchange rates (2019 baseline).
- **Optimization Tool:** Gurobi Solver.

Key Findings

1. **Cost Minimization:**
    - Achieved minimum cost: $1,163.7 (2024).
2. **Flow Patterns:**
    - Optimized HighCal and Relax production flows by region.
3. **Plant Strategies:**
    - Recommendations for operational plants and production lines.

Impact of Tariffs and Exchange Rates

- Tariff increases raise total costs significantly.
- Exchange rate fluctuations alter optimal flow and cost structures.
- Sensitivity analysis highlights regions with the most cost impact.

Recommendations

- Implement optimized production and distribution strategies.
- Regularly update the model to account for tariff and exchange rate changes.
- Conduct scenario planning for economic uncertainties.

Conclusion

- **Summary:** Optimization reduces costs and ensures operational efficiency.
- **Next Steps:** Utilize the model for ongoing strategic decisions.

Thank You!

Q&A