



# Applied Game Theory: up- and downstream sustainability

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By how much do drug and vaccine net prices usually differ across countries of comparable GDP per capita?

**1** Up to 50%

**2** 50% - 200%

**3** >200%

Alright, very interesting, dear game theory buddy.  
But what does this have to do with sustainability?



# Make it your game.

## TWS PARTNERS

- Leading **economic strategy consultancy**, applying **game theory and economic sciences** to business strategy
- More than **100 experts** in 5 offices across Europe
- Experts in **markets and their design, competition, and quantitative modelling**
- High impact in **disrupted and complex situations**, e.g. in face of innovation, competition, regulation

## OUR PHARMA PRACTICE

- Provides clients with strategic clarity in the areas of **market access / commercialization** and **procurement**



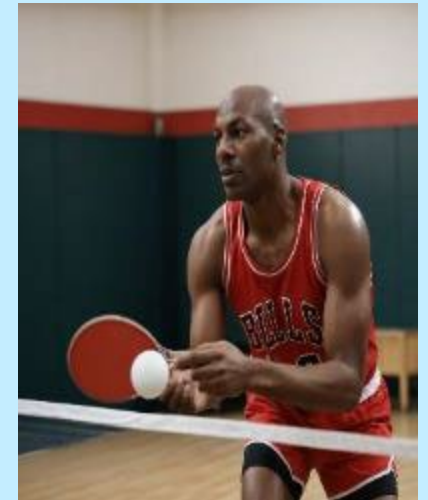
# Game theory studies optimal strategies in environments where players interact

## Game theory is a useful framework for:

(1) **PLAYING COMPLEX GAMES** better than other parties to win more often...



(2) ...and even more powerful, **CHANGING THE GAME** you are playing.



**FOCUS FOR TODAY**



# CHANGE THE GAME via **mechanism design**, the 'engineering arm' of Game Theory

**Mechanism design optimizes the rules of the game.**

It define the rules governing market **transactions** so ...

... agents with their **own objectives** ...

... find it **optimal** to behave in a **desirable** way.



***Award-winning methodology:***  
*Hurwicz, Maskin, and Myerson won  
the 2007 Economics Nobel Price for  
having laid the foundations of  
mechanism design theory.*



**Across many industries, mechanism design is successfully leveraged in commercial settings. But perhaps not enough in Pharma.**

# Mechanism design can be leveraged to optimise up- and downstream markets

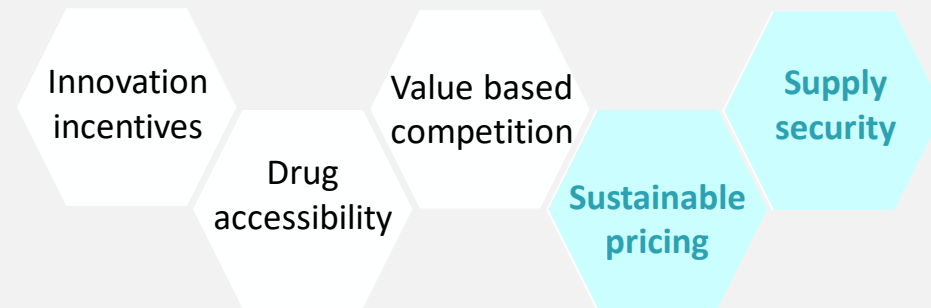


Mechanism design can help us achieve various objectives along the supply chain



**Learn more:**  
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...as well as various objectives in pharma sales markets

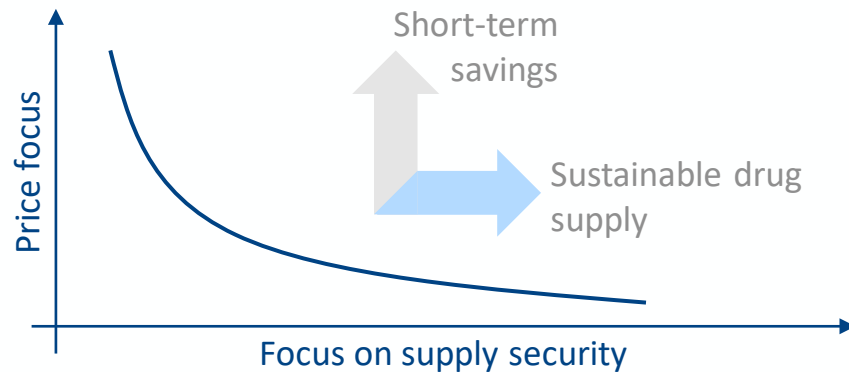


# Current Pharma procurement can trigger unsustainable pricing and supply risks



## CONTESTED TREATMENT AREAS OFTEN SUFFER FROM SUPPLY DISRUPTIONS

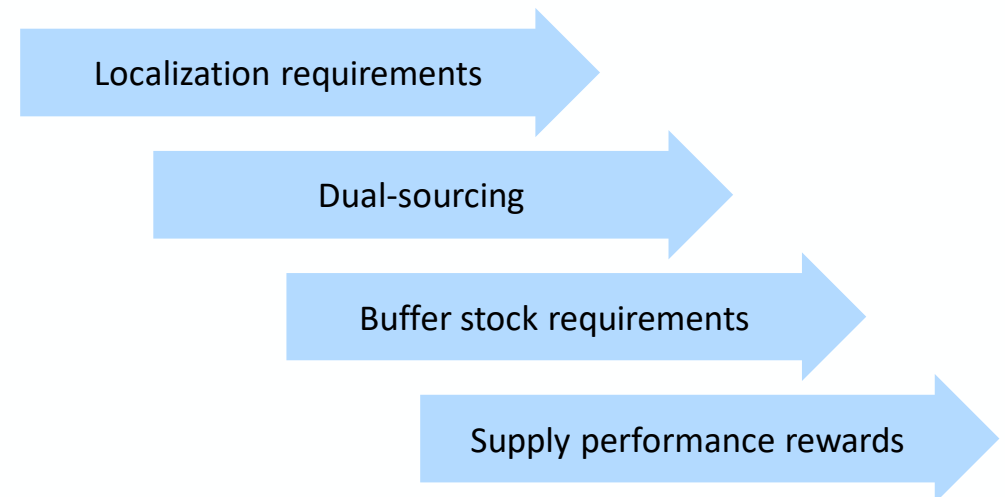
- **Price-only tenders** lead to **short-term savings** for the buyer through competition ...
- ... but **incentivize excessive risk taking** on the supplier side ...
- ... and **jeopardize sustainable drug supply**



## 'SUSTAINABLE' PROCUREMENT DESIGN

Pharma firms and customers/regulators have a **joint interest in resilient supply**. This preference can be realized by **optimizing the procurement mechanism**.

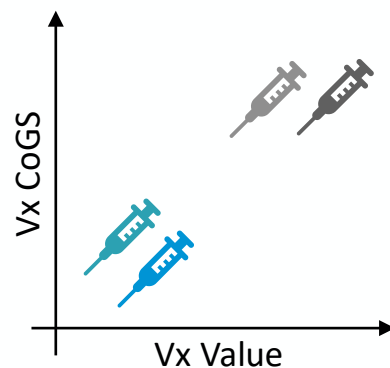
Potential **mechanisms** include:



# Mechanism design helped a vaccine manufacturer to shape a sustainable market

## SITUATION

- Vaccine market with multiple, differentiated players using different technologies
- High value products with substantially higher CoGs
- Vulnerable cohorts requiring high value products
- Buy side had to balance (i) strength of immunization (ii) budget containment (iii) supply risks



## SOLUTION

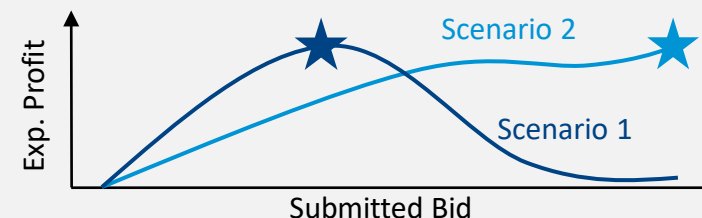
- 1) Map out scenarios – What could happen?

Price-based tender  
with all technologies  
in 1 lot



Decentralized,  
physician-choice  
procurement

- 2) Understand our preferences – What would we like to happen?



- 3) Shape your market – How to make this happen?  
→ Narrative, stakeholder engagement plan, fallbacks



# Summary

**Game theory** is a useful framework for two things:

**(1) PLAYING COMPLEX GAMES** better than other parties to win more often ...

**(2) ...and even more powerful, CHANGING THE GAME** you are playing.



**But now, let's answer  
your questions!**