

# Can collusion promote sustainable consumption and production?

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Maarten Pieter Schinkel, Amsterdam School of Economics and ACLE

Yossi Spiegel, Tel Aviv University, ZEW, and CEPR

# Motivating examples

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- ❑ North Sea shrimp fishermen decided in early 2000's to restrict the amount of harvested shrimp to promote sustainable fishing methods that are less damaging to the seabed
- ❑ The Dutch Royal association 'The Friesian Horses Pedigree' imposed in mid 2000 stallions' breeding quota on members to prevent inbreeding and conserve the Friesian pedigree
- ❑ Dutch energy companies agreed in 2013 to close down five coal power plants which accounted for approximately 10% of the Dutch generating capacity, as part of a nation-wide effort led by the Dutch government to switch to green energy
- ❑ Dutch supermarkets, broiler farmers, and broiler meat processors made arrangements to only sell chicken meat produced under enhanced animal welfare-friendly conditions
- ❑ The Fair Wear Foundation (FWF), an independent non-profit organization, works with companies and factories to improve labour conditions for garment workers in developing countries
- ❑ Dutch and German tour operators decided to stop offering elephant back rides, which are deemed cruel to elephants, in holiday travel itineraries

# The main questions

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- ❑ Should antitrust authorities consider broad public interest objectives, like sustainability, or only focus on competitive considerations?
- ❑ Many governments already promote SCP (e.g., green energy, biological food, and fair trade products), using performance standards and mandatory labels, taxes and subsidies, and public campaigns and education (OECD, 2008)
- ❑ Recently it was argued that since competition may induce firms to offer unsustainable products, exempting horizontal agreements from cartel liability may promote SCP
- ❑ Can horizontal agreements enhance welfare, say by promoting investments in SCP?

# The model

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- Two firms produce differentiated products
- Two-stage game: investment → quantity competition
  - Quantity competition is a reasonable approximation for shrimps, Friesian horses, chickens, and electricity
  - The main results carry over to price competition
- The representative consumer has quadratic utility function; investment in sustainability raises WTP

- Profit functions:

$$\pi_i = \underbrace{(a + v_i - q_i - \gamma q_j)}_{p_i} q_i - k q_i - r \frac{v_i^2}{2}$$

$$= (A + v_i - q_i - \gamma q_j) q_i - r \frac{v_i^2}{2}$$

# Four scenarios

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- Competition in both stage
- Sustainability coordination (SC)
  - Competition in stage 2 but cooperation in the choice of SCP
- Production cartel (PC)
  - Cooperation in stage 2 but competition in the choice of SCP
- Full collusion
  - Cooperation in both stages

# Comparison

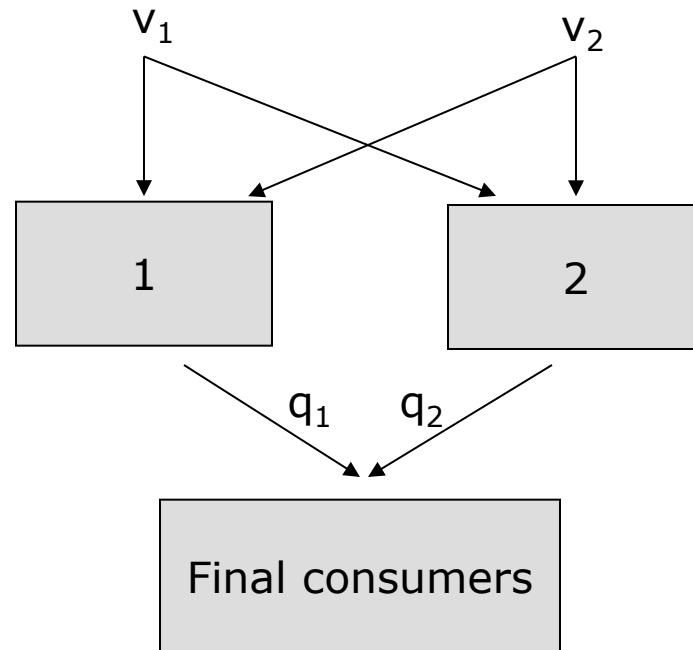
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- $v^{pc} > v^* > v^{fc} > v^{sc}$ : sustainability is highest under a production cartel and lowest under sustainability coordination
  
- Stark contrast to the emerging policy in the Netherlands, where the Dutch Authority for Consumers and Markets (ACM) is willing to allow sustainability coordination, but not coordination of output or prices
  - The North Sea shrimp fishermen were explicitly prohibited from restricting output, but were allowed to coordinate sustainability efforts
  - The ACM welcomed the Chicken of Tomorrow initiative but did not approve the agreement to remove regular chicken meat from supermarket shelves
  - The ACM did not object talks about moving to more sustainable energy production, but did not approve the joint agreement to close coal power plants

# What's going on?

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- Overall  $v_1$  has 6 effects: 3 on  $\pi_1$  and 3 on  $\pi_2$ 
  - Direct effect on demand and on the cost of investment
  - Indirect effects through  $q_1$  and  $q_2$



# What's going on?

	Competition	Sustainability coordination	Production cartel	Collusion
Direct effect on $\pi_1$	+ , -			
Direct effect on $\pi_2$				
Effect on $\pi_1$ via $q_1$				
Effect on $\pi_1$ via $q_2$	+			
Effect on $\pi_2$ via $q_1$				
Effect on $\pi_2$ via $q_2$				

- The effects on  $\pi_2$  are ignored since firms compete
- The effect via  $q_1$  vanishes since  $q_1$  is chosen optimally in stage 2



# What's going on?

	Competition	Sustainability coordination	Production cartel	Collusion
Direct effect on $\pi_1$	+ , -	+ , -		
Direct effect on $\pi_2$		-		
Effect on $\pi_1$ via $q_1$				
Effect on $\pi_1$ via $q_2$	+			
Effect on $\pi_2$ via $q_1$		-		
Effect on $\pi_2$ via $q_2$				

- The negative effects on  $\pi_2$  is taken into account in stage 1
- ⇒ Less investment

# What's going on?

	Competition	Sustainability coordination	Production cartel	Collusion
Direct effect on $\pi_1$	+ , -	+ , -	+ , -	
Direct effect on $\pi_2$		-		
Effect on $\pi_1$ via $q_1$			+	
Effect on $\pi_1$ via $q_2$	+			
Effect on $\pi_2$ via $q_1$		-		
Effect on $\pi_2$ via $q_2$				

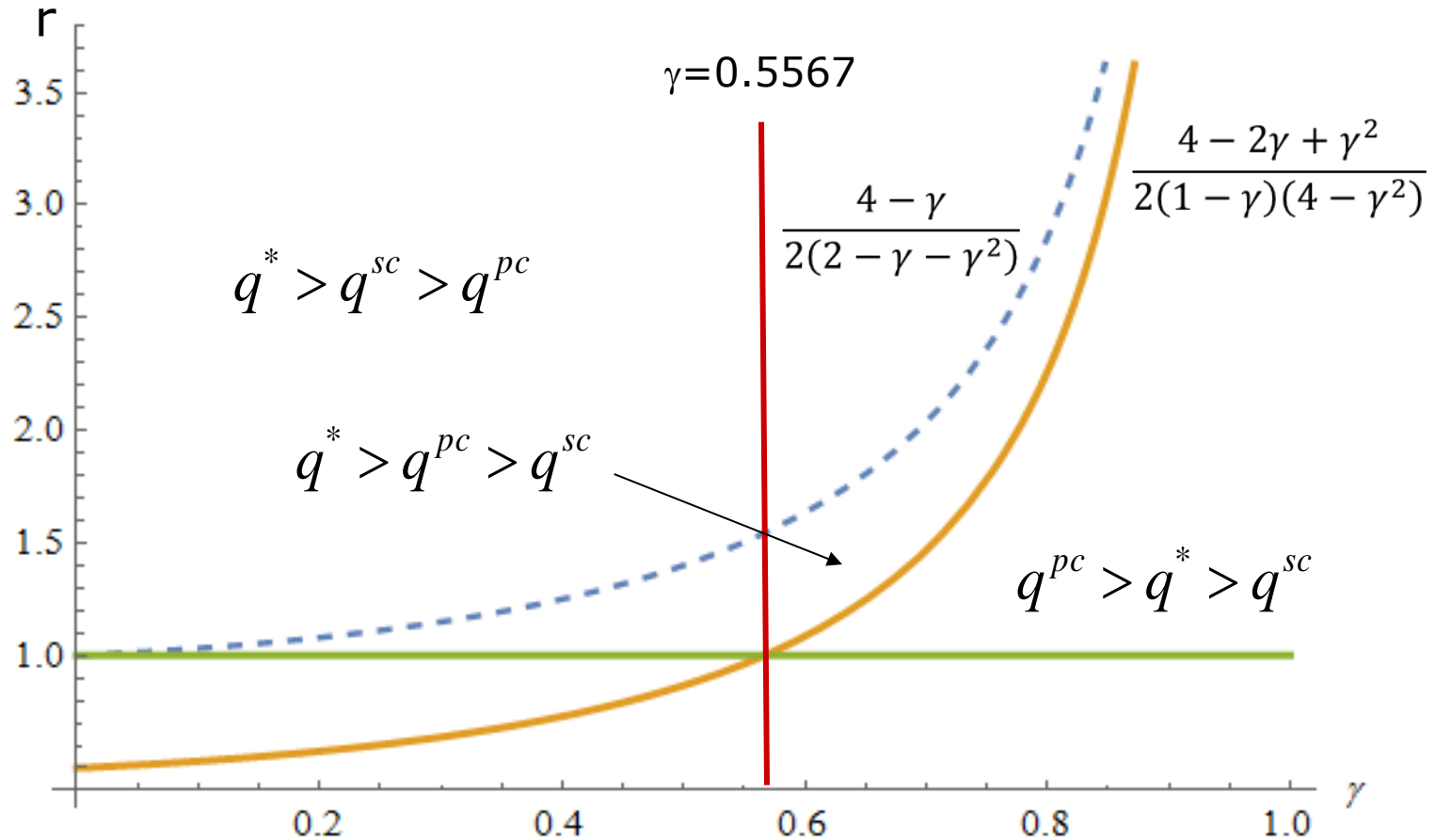
- The effect via  $q_1$  does vanishes as  $q_1$  maximizes  $\pi_1 + \pi_2$  in stage 2, not  $\pi_1$
- ⇒ More investment

# What's going on?

	Competition	Sustainability coordination	Production cartel	Collusion
Direct effect on $\pi_1$	+ , -	+ , -	+ , -	+ , -
Direct effect on $\pi_2$		-		-
Effect on $\pi_1$ via $q_1$			+	
Effect on $\pi_1$ via $q_2$	+			
Effect on $\pi_2$ via $q_1$		-		
Effect on $\pi_2$ via $q_2$				

- The effects via  $q_1$  and  $q_2$  vanish due to collusion in in stage 2
- ⇒ Less investment than production cartel and competition, more than SC

# Consumer surplus - illustrating



# The ranking of CS

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- Two effects on  $q^{PC}$ 
  - Positive effect: PC boosts investments  $\Rightarrow$  demand  $\uparrow \Rightarrow q \uparrow$
  - Negative effect: Holding investments fixed, PC  $\Rightarrow q \downarrow$
  
- The positive effect is particularly large when  $r$  is small
  - when  $r \uparrow$ , firms invest less regardless of collusion
  
- The positive effect is also large when  $\gamma$  is large
  - Absent collusion, competition is intense  $\Rightarrow$  firms compete away the marginal benefit from investment  $\Rightarrow$  little investment
  
- Our analysis does not account for the utility of nonconsumers (e.g., vegetarians in the case of the Chicken of Tomorrow initiative, or future generations in the case of North Sea Shrimps)
  - Taking the utility of nonconsumers into account will only strengthen the case for production cartel (which leads to the highest investment in sustainability)

# The principle of compensation

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- The Dutch Ministry of Economic Affairs issued in 2014 a policy that states that: "... the ACM considers in its assessment of the conditions whether [...] in agreements that restrict competition made in order to enhance sustainability, a fair share of the improvements benefits "users" in the long run."
  
- ⇒ The ACM established in its 2014 vision document on competition and sustainability the principle of compensation that states that one criterion for exempting sustainability initiatives from cartel prohibition is that "consumers on the relevant markets cannot be worse off."
  
- In reality, it may be hard to compare consumer welfare with the competitive counterfactual; we'll ignore this difficulty and examine how the principle of compensation affects consumers

# The principle of compensation

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- Sustainability coordination
  - Firms jointly invest less than under competition but given investment they produce as under competition  $\Rightarrow$  the principle of compensation ensures investments of  $v^*$
  
- Production cartel
  - When  $r$  is sufficiently low, consumers are better off under PC so the principle has no bite
  
  - When  $r$  is high, consumers are worse off under PC  $\Rightarrow$  firms must expand output levels in Stage 2 to the competitive levels
  
  - $\Rightarrow$  Output expansion diminished the incentive to invest:  $v^E < v^* < v^{PC}$
  
  - $\Rightarrow$  When the principle has a bite, it leads to lower investment in sustainability under a PC

# Conclusion

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- Allowing firms to coordinate investment levels leads to lower investment in SCP and a lower consumer surplus
- Allowing firms to coordinate output levels leads to higher investments in SCP (when consumers care about SCP) and may even benefit consumers
- Making the exemption from cartel prohibition conditional on consumers being at least as well off as they are absent collusion does not help



# Conclusion

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- Our findings stand in stark contrast to the emerging policy in the Netherlands
  - Sustainability coordination may be even worse than we show since in reality it may be very hard for a competition authority to determine whether CS is the same as it would be under competition
  
- An obvious alternative: let government agencies set quality standards:
  - ban fishing methods that damage the seabed
  - imposing minimum quality standards on broiler farmers
  - ban trade with firms that do not pay minimum wages
  
- Effective regulation though is complex and the government may lack the needed information to set effective standards
  
- The paper is a first step; we abstracted from
  - how collusion comes about and how can it be sustained
  - antitrust enforcement