ECON 180

Introduction to Principles of Microeconomics and Financial Project Evaluation

Lecture 17: When P isn't P*

October 15, 2021

Version 1

Required Reading

- Hutchinson, E. (n.d.). 4.5 Price Controls. In *Principles of Microeconomics*. Retrieved from https://pressbooks.bccampus.ca/uvicecon103/chapter/4-6-price-controls/

Recommended Reading and Viewing

- Hutchinson, E. (n.d.). 8.1 Monopoly. In *Principles of Microeconomics*. Retrieved from https://pressbooks.bccampus.ca/uvicecon103/chapter/8-1-monopoly/
- Khan Academy. (2019, March 15). Economic profit for a monopoly [Video File]. Retrieved from https://youtu.be/PEFEnss--mU
- King, S. (n.d.). 9b – the marginal cost curve is the supply curve! [Video File]. Retrieved from https://youtu.be/Bn-aK0b-Lus
- Marshall, R. C. & Marx, L. M. (2012). The Economics of Collusion: Cartels and Bidding Rings. https://ebookcentral-proquest-com.ezproxy.library.uvic.ca/lib/uvic/detail.action?docID=3339441

Optional Readings

- Davidson, A. (2013, July 23). The Perverse Effects of Rent Regulation. *The New York Times Magazine*. Retrieved from http://www.nytimes.com/2013/07/28/magazine/the-perverse-effects-of-rent-regulation.html?_r=0
  - **Rent control in NYC**
- King, R. L. (2016, June 3). How the government made ticket-scalping legal in Ontario. *thestar.com.* Retrieved from https://www.thestar.com/news/canada/2016/06/03/hip-fallout-or-how-the-government-made-ticket-scalping-legal-in-ontario.html
  - **Scalping**

Optional readings on Canada's dairy cartel

- Canadian Dairy Board. (2020). Milk quotas [Web site]. Retrieved from https://www.dairyinfo.gc.ca/eng/dairy-statistics-and-market-information/milk-quotas/?id=1503001558315
- B. C. Milk Marketing Board. (2020). Annual Reports [Web Page]. https://bcmilk.com/about/annual-reports/
  - **The two links above are official information on milk quotas and milk marketing in B.C.**
- Goldfinger, D. (2020, April 28). Ontario dairy farmers to ramp up milk donations to food banks amid novel coronavirus pandemic [Web Page]. Retrieved from https://globalnews.ca/news/6878661/coronavirus-ontario-dairy-farmers-donations-food-banks/
- Malmo, C. (2014, September 4). Blame Canada's Dairy Cartel for Our Expensive Milk and Cheese [Web page]. Retrieved from http://www.vice.com/en_ca/read/blame-canadas-dairy-cartel-for-our-expensive-milk-and-cheese-867
- Mills, S. (2020, April 6). Dairy farmers dumping milk as demand drops [Web Page]. Retrieved from https://www.cbc.ca/news/canada/ottawa/dairy-demand-covid19-ottawa-farmers-1.5521248
- Tasker, J. P. (2018, June 16). How Canada's supply management system works [Web page]. Retrieved from https://www.cbc.ca/news/politics/canada-supply-management-explainer-1.4708341
- Grubel, H. G. & Schwindt, R. W. (1977). *The Real Cost of the B. C. Milk Board*. Canada: The Fraser Institute. Retrieved from https://www.fraserinstitute.org/sites/default/files/real-cost-of-the-bc-milk-board.pdf
  - **The data is very outdated, but this is a reasonable overview of the basics of dairy marketing boards in terms of basic supply & demand.**
- Lippert, O. (2001). *The Perfect Food in a Perfect Mess: The Cost of Milk in Canada* [Public Policy Sources No. 52]. Canada: The Fraser Institute. Retrieved from https://www.fraserinstitute.org/sites/default/files/PerfectFoodinaPerfectMess.pdf
  - **An updated (2001) discussion from the same think-tank.**

Optional readings on Vienna & rent control

- Condon, P. (2018, June 6). How Vienna Cracked the Case of Housing Affordability [Web Page]. Retrieved from https://thetyee.ca/Solutions/2018/06/06/Vienna-Housing-Affordability-Case-Cracked/
  - **A good summary written by a U.B.C. professor.**
- Hayek, F. A. (1929). The Repercussions of Rent Control. In Verdict on Rent Control [IEA Readings No. 7]. London: The Institute of Economic Affairs. Retrieved from https://iea.org.uk/wp-content/uploads/2016/07/Verdict%20On%20Rent%20Control.pdf
  - **A classic paper by a famous economist. Outdated but insightful.**
- How Vienna ensures affordable housing for all with an extremely complicated housing system. (2017, July 10). Retrieved from http://milwaukeeclt.org/2017/07/10/how-vienna-ensures-affordable-housing-with-an-extremely-complicated-housing-system/
- Prager, A. (2018, November 2). Vienna battles rising housing costs – can a new policy fix it? [Web Page]. Retrieved from https://www.euronews.com/2018/10/30/vienna-battles-rising-housing-costs-can-a-new-policy-fix-it
- Jenkins, B. (2009). Rent Control: Do Economists Agree? *Econ Journal Watch*, *6*(1), 73-112. Retrieved from https://econjwatch.org/articles/rent-control-do-economists-agree
  - **A recent(-ish) survey of the academic literature.**

Learning Objectives

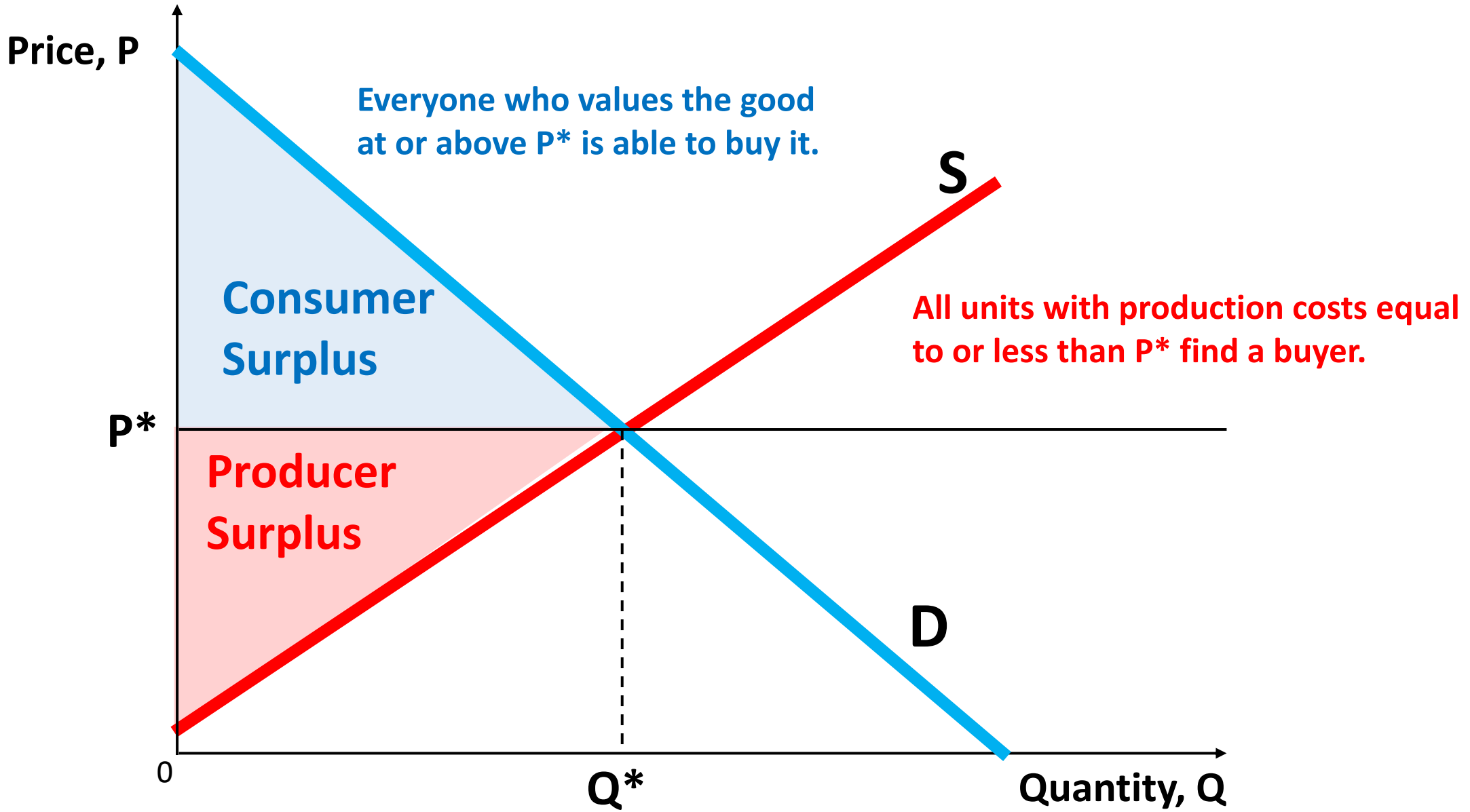
- Understand what happens if there is a price floor.
- Understand what happens if there is a price ceiling.
- Obtain a basic understanding of why a monopolist sets Price = Marginal revenue, and what the implications are regarding society's total surplus.

Relevant Solved Problems

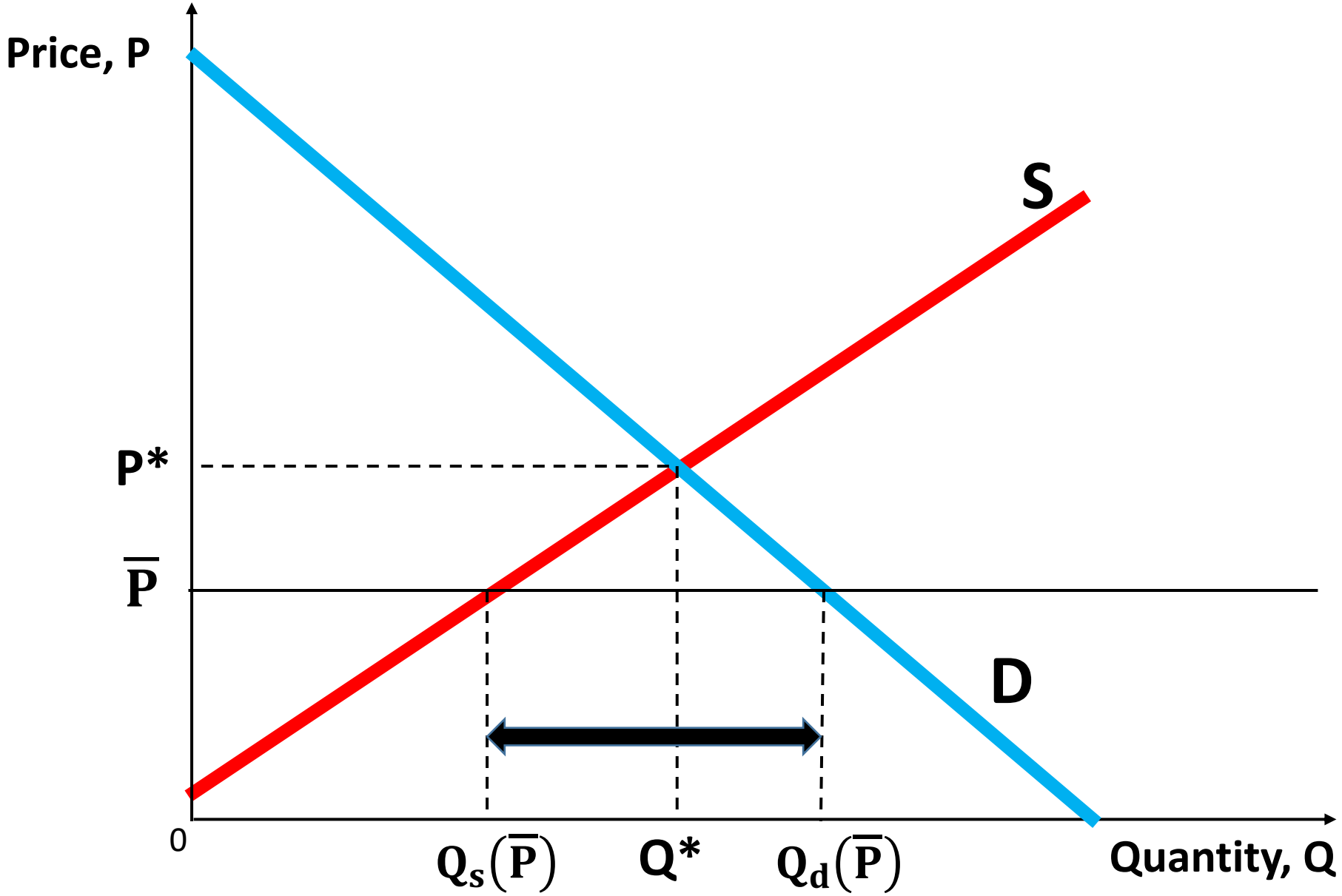
- Besanko/Brauetigam, Chapter 2: See Coursespaces for a large number of original solutions to relevant end-of-chapter problems in this text. They're found in the same folder as the publisher solutions for the main textbook.

ESSENTIALS (18 slides)

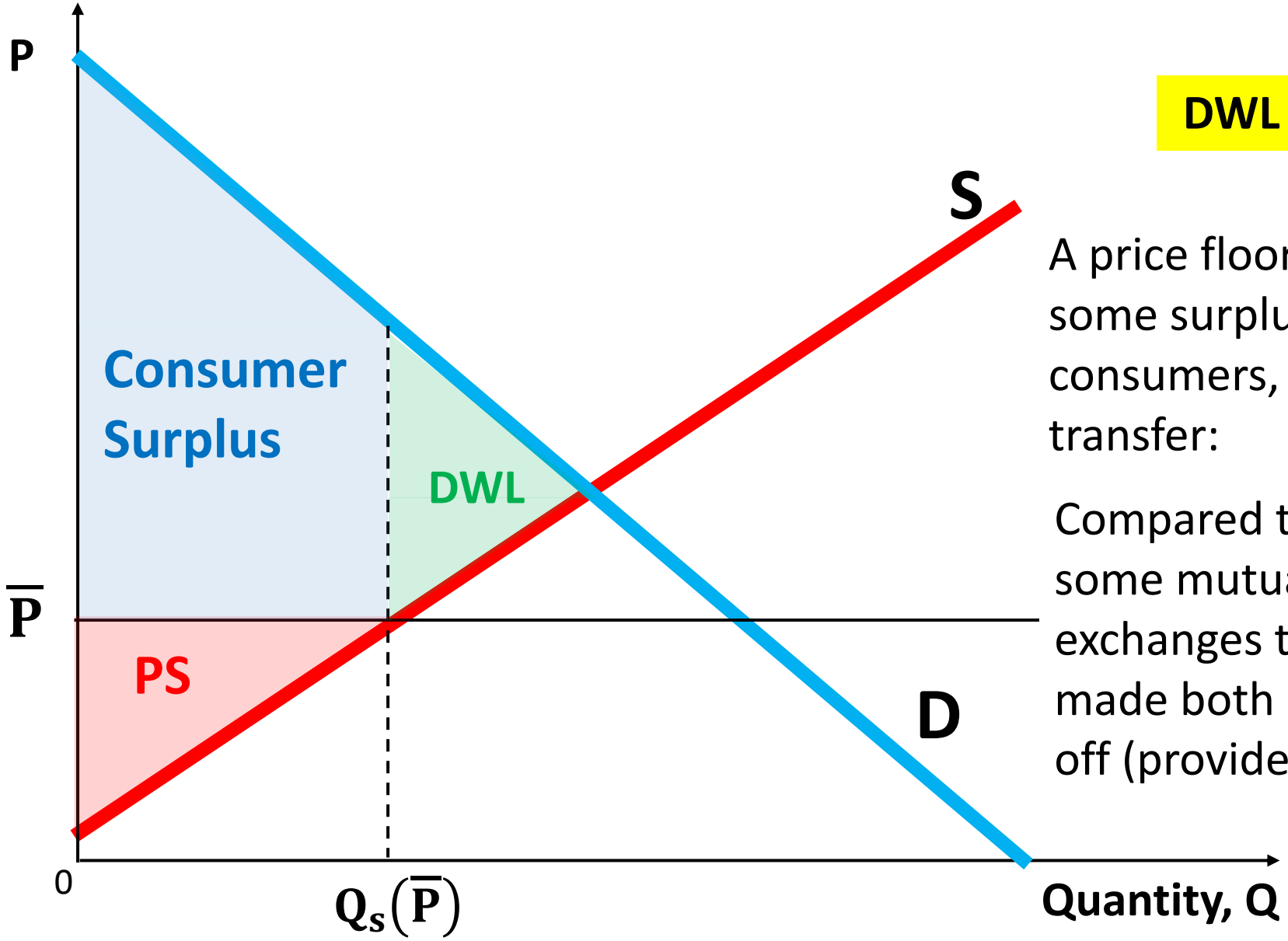
The competitive equilibrium



What happens with a price ceiling of P<P*?



Welfare (Society's well-being) implications



DWL = Dead Weight Loss

A price floor with P < P* transfers some surplus from producers to consumers, but it's a **LOSSY** transfer:

Compared to P=P*, we lose some mutually beneficial exchanges that would have made both buyer & seller better off (provided surplus)

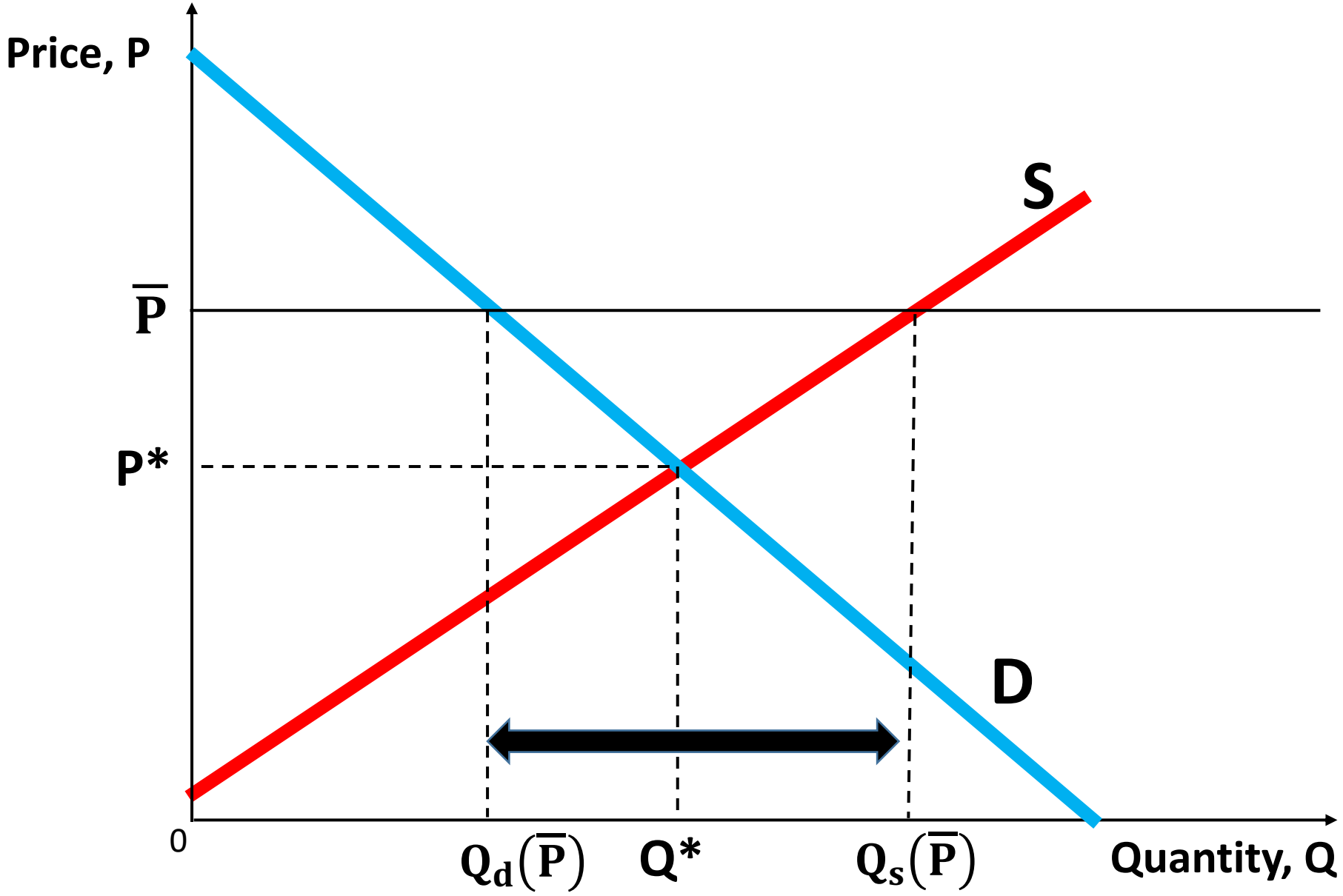
Ticket scalping and rent control

- A price ceiling above P* is possible, but unnecessary.
- For a price floor below P*, you need a way of dealing with excess demand.
- Two things pop up like mushrooms after a price floor rain: shortages via *official* channels, and fully-stocked black markets (or resale markets) with jacked-up prices.
- Example: concert tickets. They sell out almost instantly, and are offered by scalpers/resellers at much higher prices. LiveNation got in trouble with consumers over this. (It owns TicketMaster AND reseller StubHub.)
- **If scalping pays, then P < P***. (Your turn: why are tickets so 'cheap', then?)
- Another example: rent control. Nice deal, if you can get it… but it raises prices for everyone else (NYC) and diminishes incentives for folk to get into or stay in the rental business (Vienna).

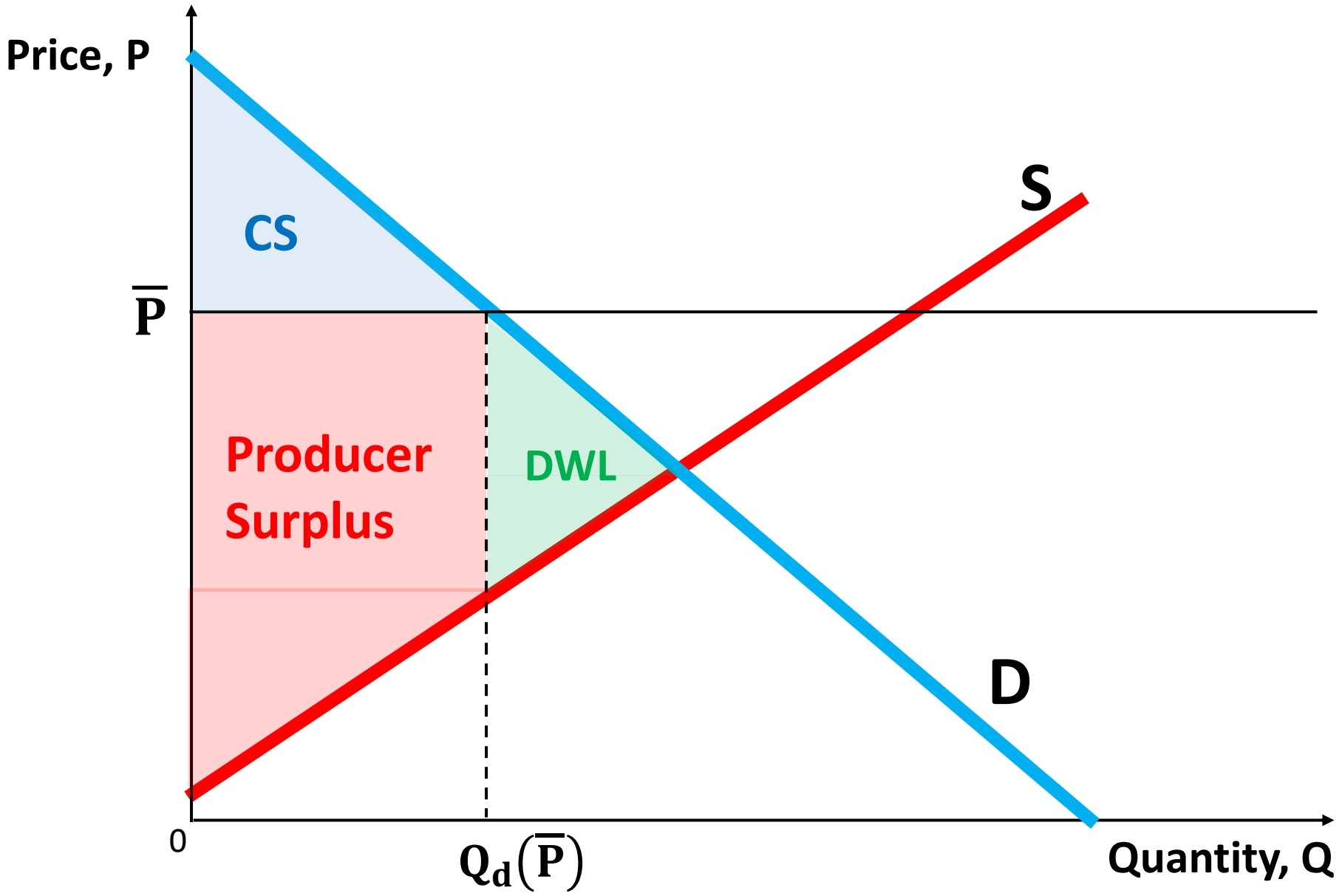
The case of Vienna, Austria

- Vienna is a rare example of rent control working roughly as intended.
- Just before WWI, Vienna had many homeless or nearly homeless, & renters were numerous & had few protections. WWI made things worse.
- 1917-1934: Viennese government prioritizes affordable housing, with strict rent control and strong renters' rights as main mechanisms.
- This has the expected effect: less new rental property, existing property is under-maintained or upgraded.
- BUT: Less developer/landlord demand for city land → cheaper land. Government took notice, bought it & built high-quality public housing (comparable to private sector housing).
- Public housing is NOT just for the poor (at the time, ~1/5 reserved for that), but the remainder is handled co-operatively and/or not-for-profit, with rents kept in line with income, & money re-invested into the housing.
- Not-for-profit developers compete for city projects, & stakeholders decide.
- When extra money was eventually needed, obtained via taxes on private housing & (especially high) on vacant land. This has led to big rises in private rents… 43% from 2008 to 20016, according to (Prager, 2018).

What happens if P > P*?



Welfare implications



AFTER HOURS

- Canada‘s dairy cartel acts like a monopoly (13 slides)
  - The trouble with total surplus (4 slides)

Canada's dairy cartel

- Want to set a price above above P*?
- →You need a way of dealing with excess supply.
- You either have sellers re-enacting The Hunger Games to be the ones to get a customer, or you limit supply.
- Canada does this for dairy. The price is set by provincial dairy boards ('table' milk) and Canadian Dairy Council (everything else).
- How? Import restrictions (such as import duties of over 200% for butter and cheese) and production quotas (these can be traded).
- In BC, in April of 2020, a 365-day quota cost $36,500 per kg of butterfat per day, and allowed the sale of 91.9 kg of butterfat per day. (Roughly the production of one cow.) The price and quantity limit varies by month. (Source: Monthly Milk Quota Exchange data at www.dairyinfo.gc.ca)

	Average Component Tests			Milk Component Prices		
Month	Butterfat (KG/HL)	Protein (KG/HL)	Other Solids (KG/HL)	Butterfat ($/KG)	Protein ($/KG)	Other Solids ($/KG)
Aug-18	3.9994	3.2395	5.7116	16.3339	2.3493	0.6794
Sep-18	4.2475	3.128	5.884	16.6899	2.5428	0.6911
Oct-18	4.3835	3.1752	5.8919	17.0865	2.6359	0.7252
Nov-18	4.4123	3.1904	5.887	16.6903	2.5576	0.7086
Dec-18	4.344	3.1475	5.9028	16.7337	2.5818	0.7102
Jan-19	4.132	3.1848	5.9738	16.8612	2.6123	0.7120
Feb-19	4.3123	3.2650	5.9929	16.5933	2.5721	0.7068
Mar-19	4.2248	3.2121	5.958	16.5936	2.5495	0.6997
Apr-19	4.0913	3.2039	5.9539	16.8008	2.5611	0.6942
May-19	3.9687	3.1446	5.937	16.9593	2.5565	0.6885
Jun-19	3.9422	3.1237	5.9357	16.9950	2.5527	0.6836
Jul-19	4.0885	3.1712	5.9315	16.5649	2.5030	0.6674

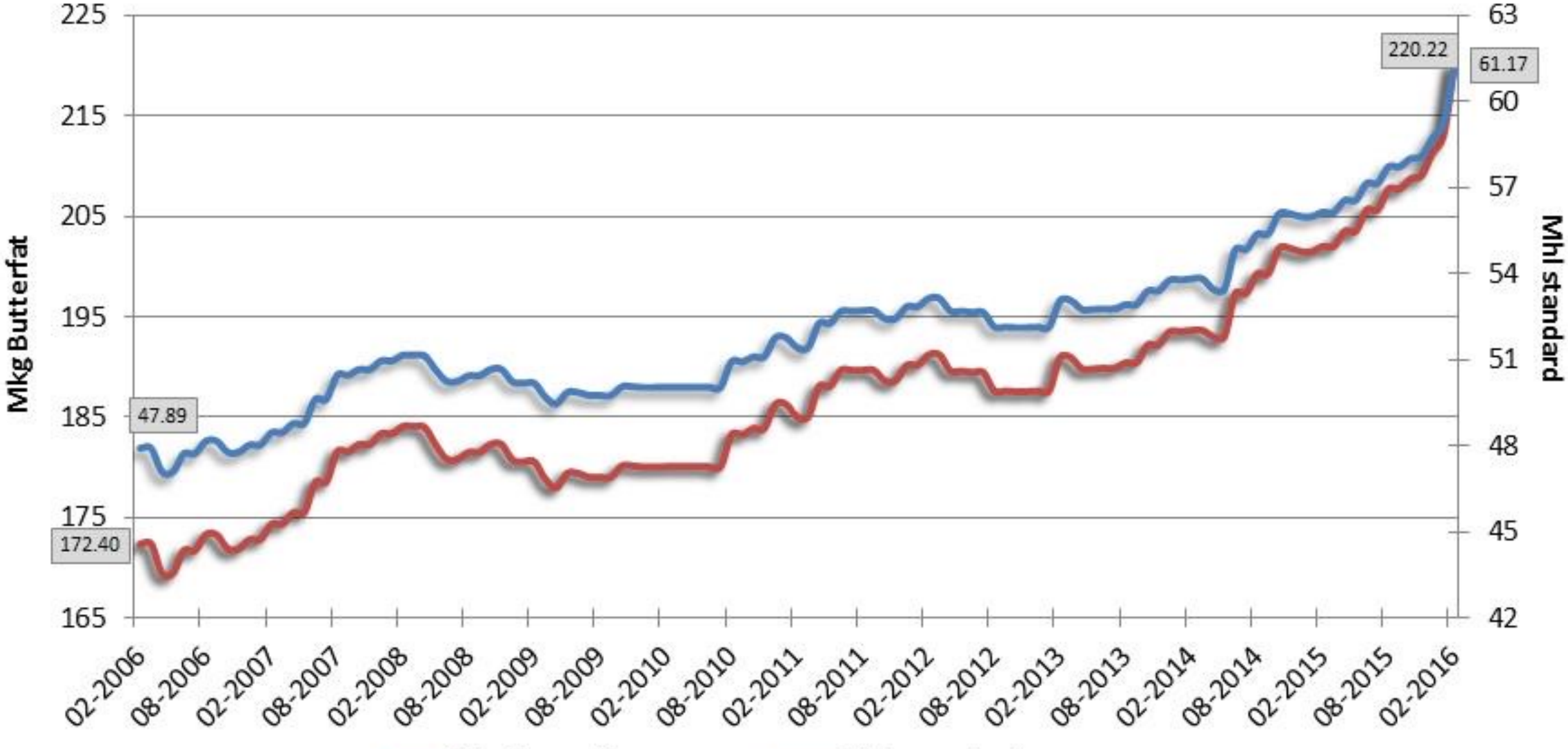
Notes: Effective October 1, 2017, the allocation of pool dollars was changed as follows; Butterfat: 85%; Protein: 10%; Other Solids: 5%

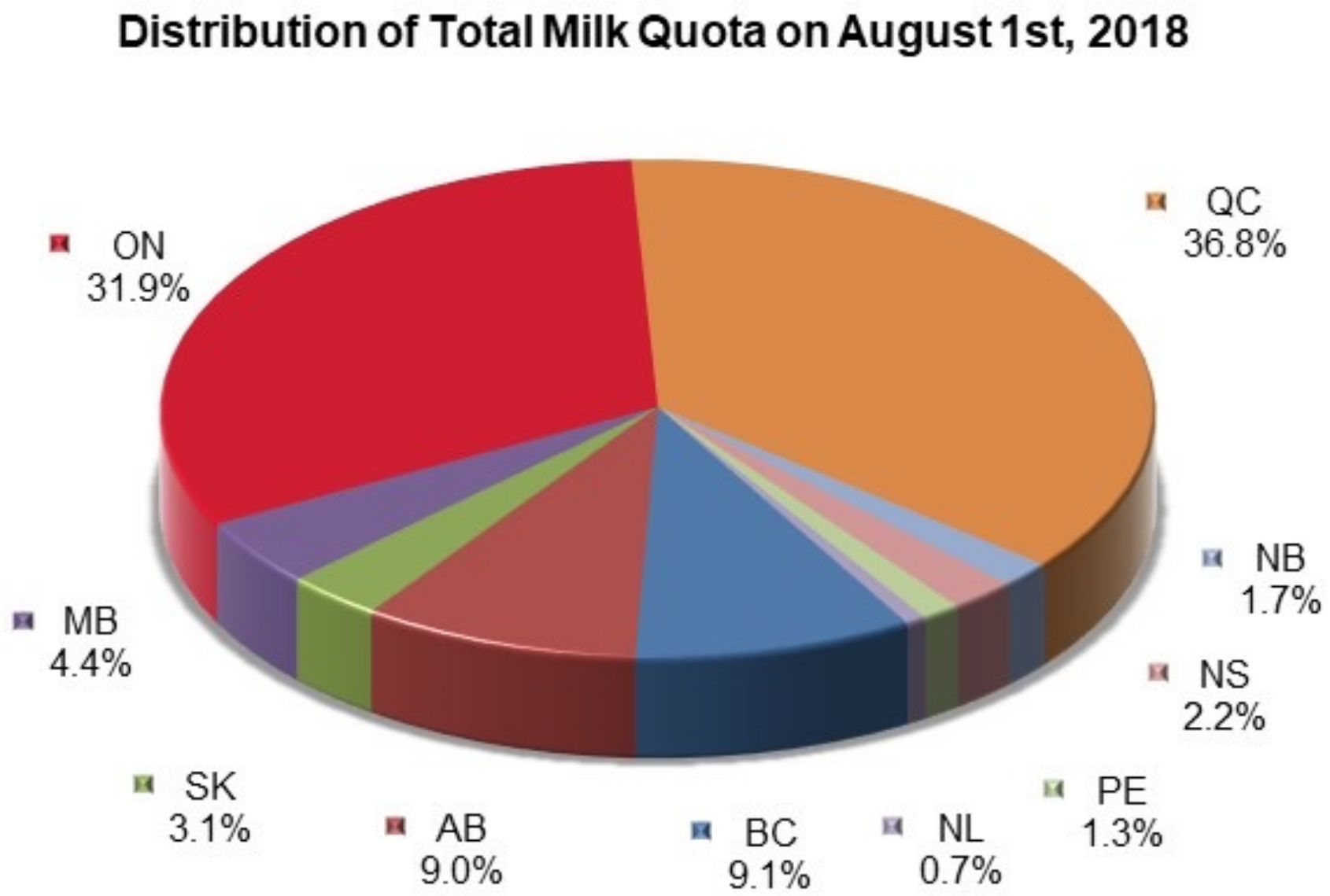
Source: B.C. Milk Marketing Board Annual Report, 2018/2019 Dairy Year

Evolution of the Market Sharing Quota (MSQ)

Industrial Milk

CANADA





Source: Canadian Dairy Information Centre

How the price is chosen

- Recall *why* high prices tend to fall to P*: sellers compete for scarce customers: “Buy from me, instead! I’ll take five cents off the price!”
- What if there’s only ONE seller?
- The dairy cartel is essentially the *whole market.* and knows it.
- They KNOW that the demand curve slopes downward: if they can only charge one price for milk, then raising that price means less milk sold.
- They balance the tradeoff between price & quantity.
- Punch line: they set a quantity *lower* than a collection of small firms without much bargaining or market power would provide.

A quick look at one tiny firm among many

- Suppose we have 1,000 identical dairy farmers in the milk market.
- Assume the milk from each is indistinguishable from the others.
- Each has an output q_i, and the sum of their outputs is total quantity supplied, Q: $Q = \sum_1^{1000} q_i$.
- They also have costs that vary in some way with their output:
- Costs = $c(q_i)$.
- They want to maximize revenue (price x quantity) – costs.
- Consider the maximization problem facing the producer with index 1.

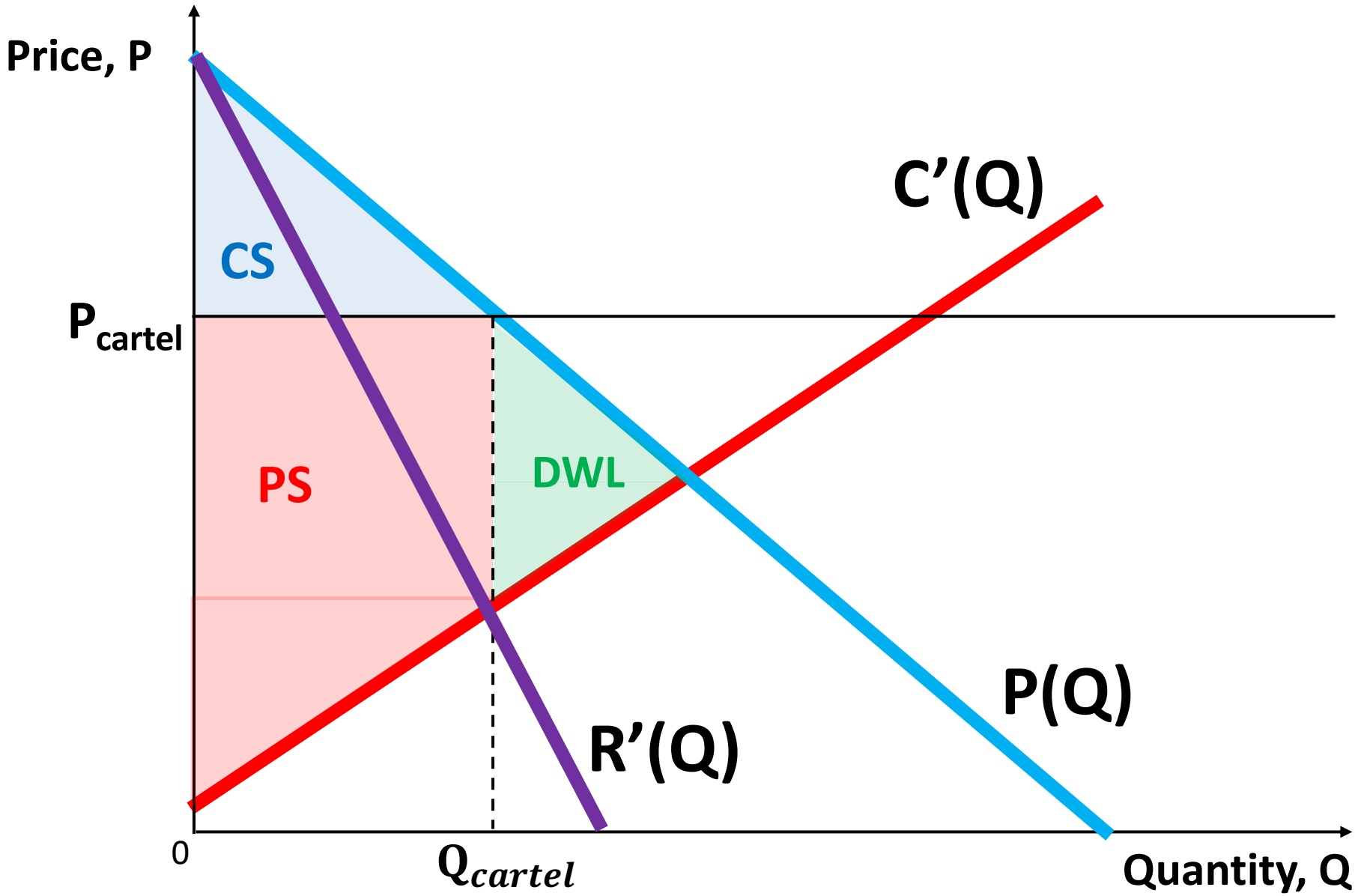
One of a thousand

- Profits for Farmer 1: Revenue - Costs = Price x Quantity – Costs
- Price is given by (inverse) demand: P = P(Q) = P(q_1+$\sum_2^{1000} q_i$)
- If farmers flood the market with milk, the price will need to be very low for all of it to sell. If they produce little milk, the price will be high.
- As far as that ONE farmer is concerned, yes, their production affects the price of milk a little bit…
- BUT their impact, alone, is likely to affect price by a tiny fraction of a cent → the individual farmer takes the price of milk as *given*.
- Profits = $Pq_1 – c(q_1)$ → The farmer will choose q_1 so $P = c'(q_1)$.
- Economists say the firm will set *price equals marginal cost*. (Marginal = of the next). When all firms think this way, we get our competitive equilibrium.
- The supply curve is the industry marginal cost curve, and Price is given by the demand curve, so Price = Marginal Cost means the supply & demand curves intersect.

What about the dairy cartel?

- The dairy cartel *is* the market, and knows it.
- The cartel's output is Q.
- Profits = P(Q) x Q – C(Q)
- Let Revenue = R(Q) = P(Q) x Q , so Profit = R(Q) – C(Q)
- The cartel maximizes profit by setting R'(Q) = C'(Q).
- →It sets *marginal revenue* = marginal cost.
- This leads to a *lower output* than perfect competition.
- Easily seen in the case of linear demand. If P = a - bQ, $R(Q) = aQ - bQ^2$
- R'(Q) = a – 2bQ
- This is a straight line with the same vertical intercept & twice as steep as the demand curve, and setting it equal to Marginal Cost means getting it to intersect with the supply curve.

Welfare implications

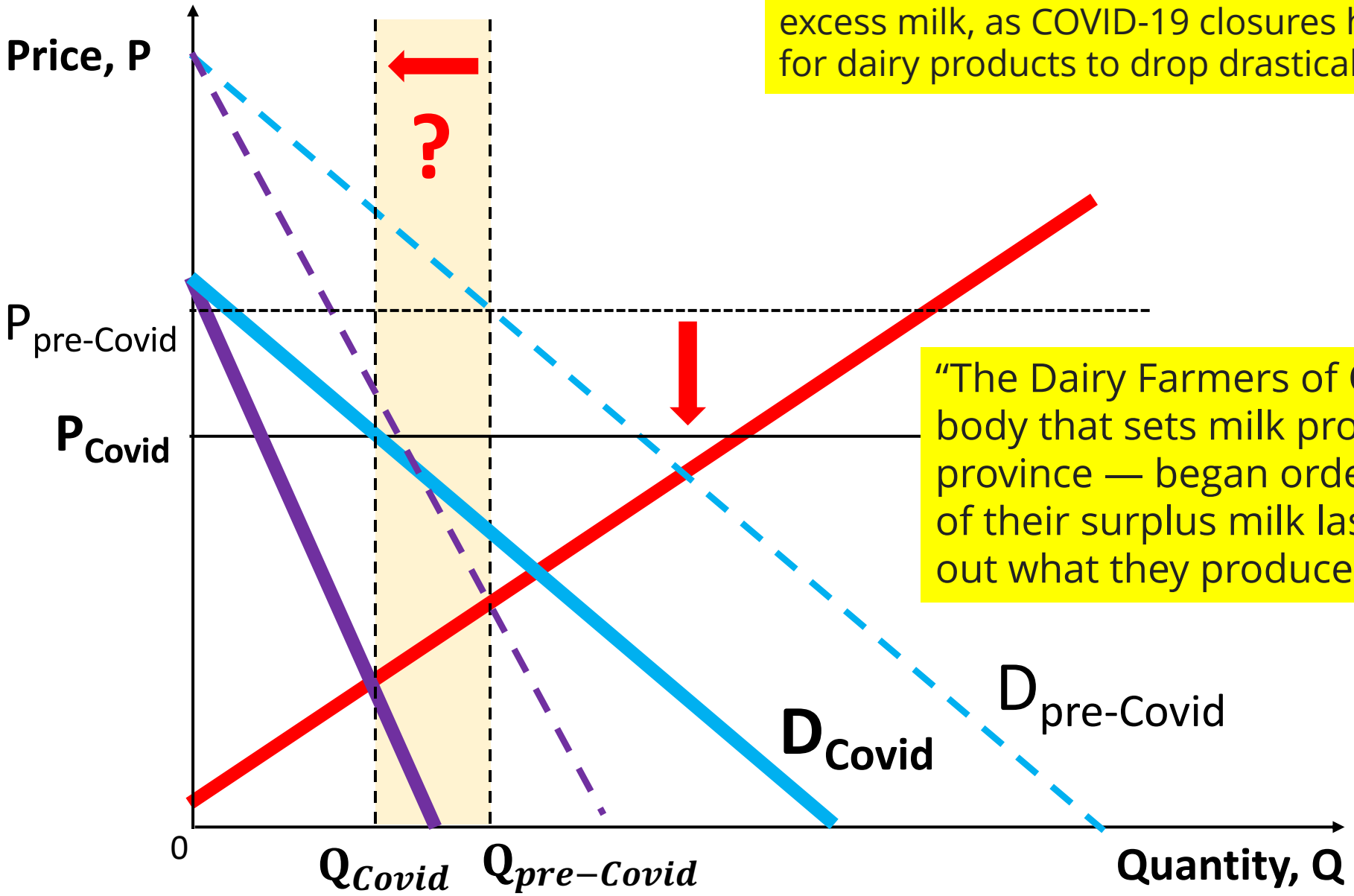


This is actually the *monopoly* price & quantity

- We just treated the cartel like a single firm that IS the market supplier:
- That's the definition of monopoly.
- Problem: the cartel is NOT one firm – it's an alliance of many small firms.
- *Given* the high price set by the cartel, each individual firm has an incentive to cheat and overproduce (remember that Quantity Supplied is greater than Quantity Demanded when P > P*).
- The dairy cartel assigns production *quotas* (limits) to each farmer, and enforces those limits.
- The dairy boards are the sole marketers of the milk, and they'll just refuse to take milk, etc. beyond the farmer's quota.
- Interesting question: what if demand drops, due to, say, a global pandemic?

Seems like a waste…

"Some Ontario dairy farmers have been told to dump their excess milk, as COVID-19 closures have caused the demand for dairy products to drop drastically." (Mills, 2020)

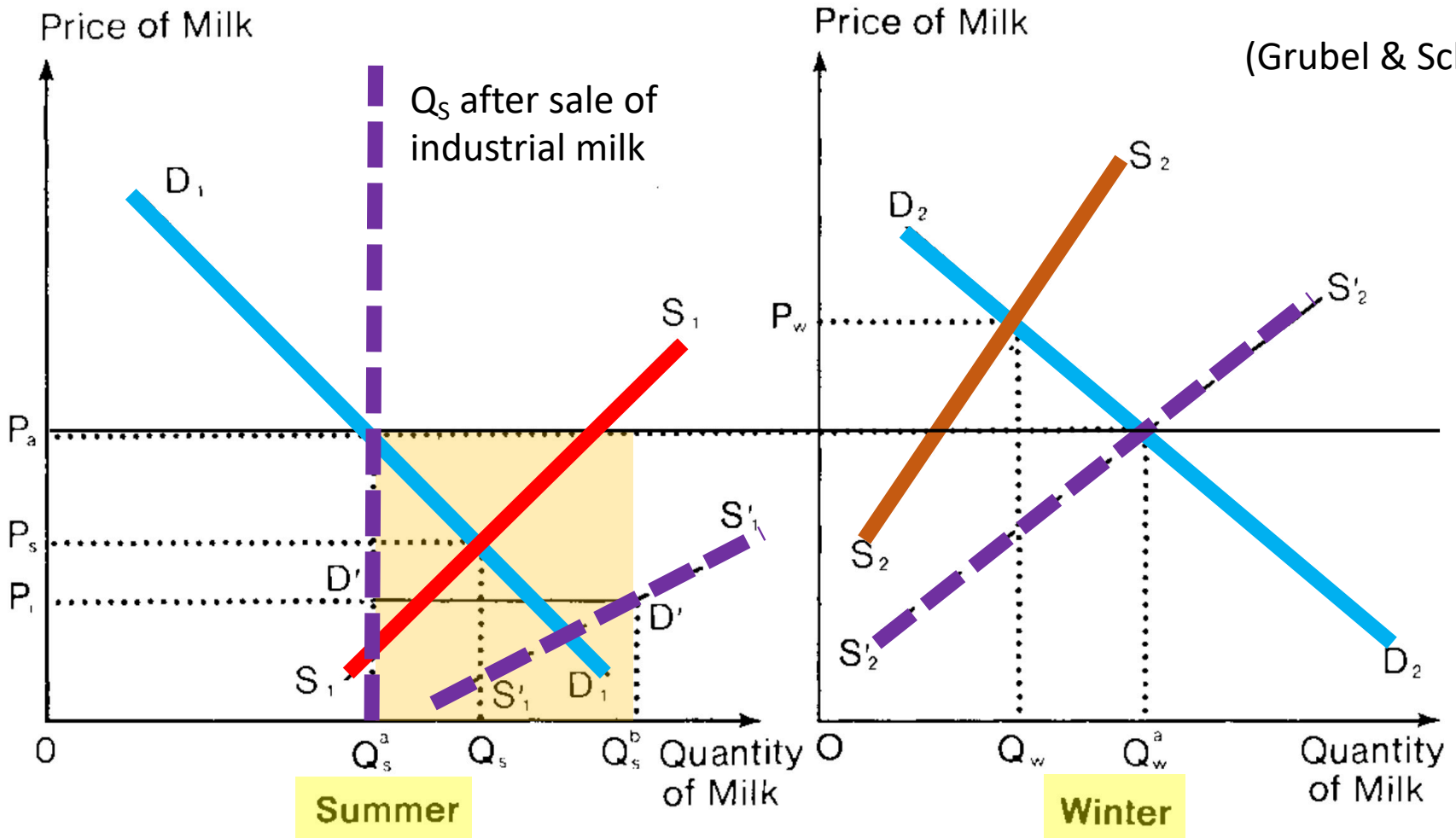


"The Dairy Farmers of Ontario (DFO) — the body that sets milk production quotas in the province — began ordering farmers to get rid of their surplus milk last week. […] [T]o throw out what they produce." (Mills, 2020)

There are also predictable seasonal changes to deal with…

Figure 1—Seasonal Fluctuations in Milk Supply

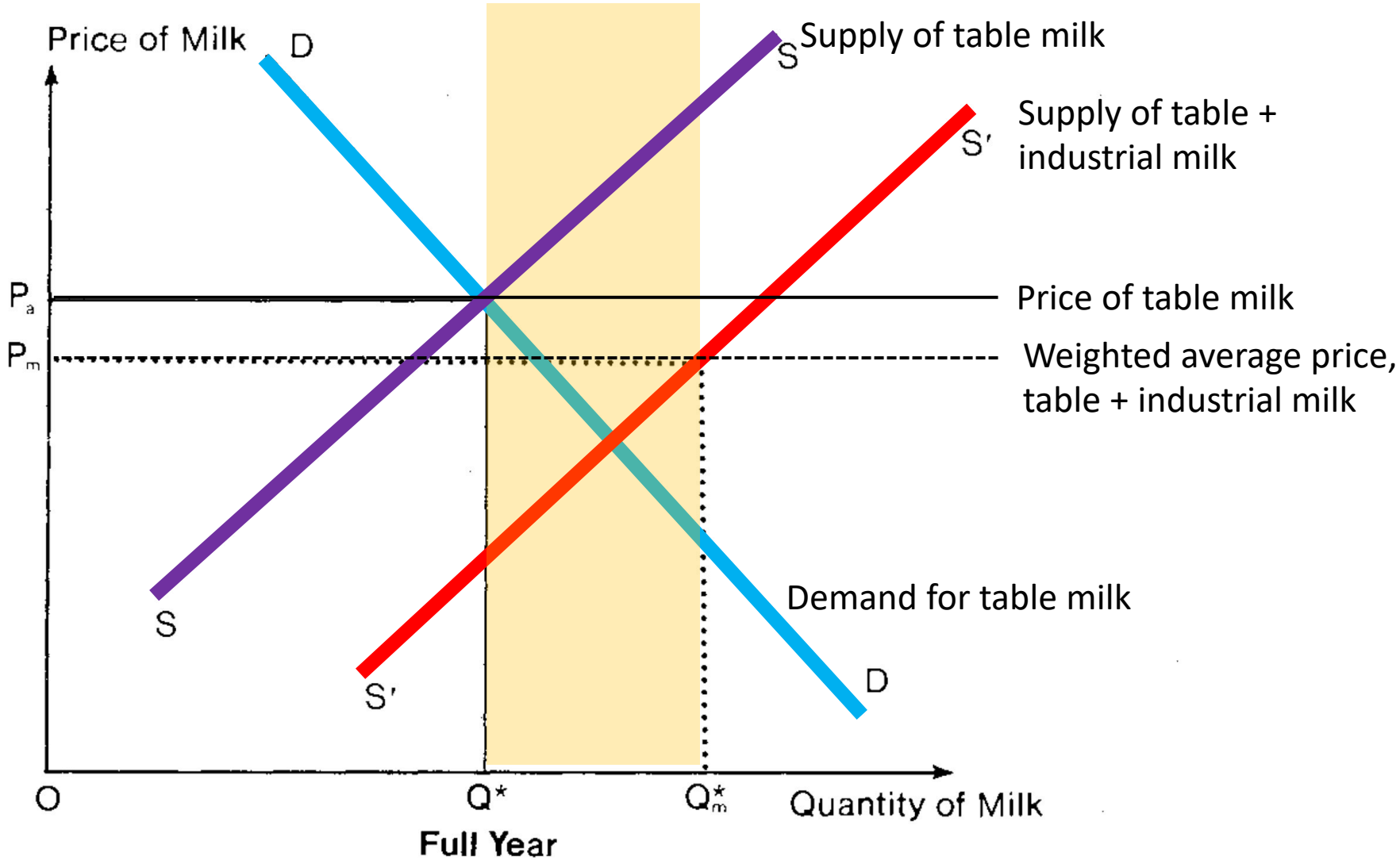
(Grubel & Schwindt, 1977)



The demand for milk is the same in summer (D_1D_1) as in winter (D_2D_2) but without marketing boards, large supply in summer (S_1S_1) leads to sales of OQ_s and price OP_s while small supply in winter (S_2S_2) leads to sales of OQ_w and price OP_w. With a marketing board, the price is OP_a throughout the year. The winter sales at that price require more cows, which results in supply curve $S'_2S'_2$ in winter and $S'_1S'_1$ in summer, with $Q_s^aQ_s^b$ sold as industrial milk and the weighted price of fresh and industrial milk OP_i.

Figure 2—Stabilized Milk Supplies During Full Year

(Grubel & Schwindt, 1977)



The fresh milk price is OP_a and sales are OQ^* during the full year with the supply curve for fresh milk shown as SS. The supply curve for fresh and industrial milk combined is S'S' and the weighted average price for the two types is OP_m, at which OQ^*_m is sold as industrial milk.

Ontario dairy farmers to ramp up milk donations to food banks amid novel coronavirus pandemic

By **Daina Goldfinger** · **Global News**
Posted April 28, 2020 2:46 pm · Updated April 28, 2020 2:48 pm

A good thing, right?

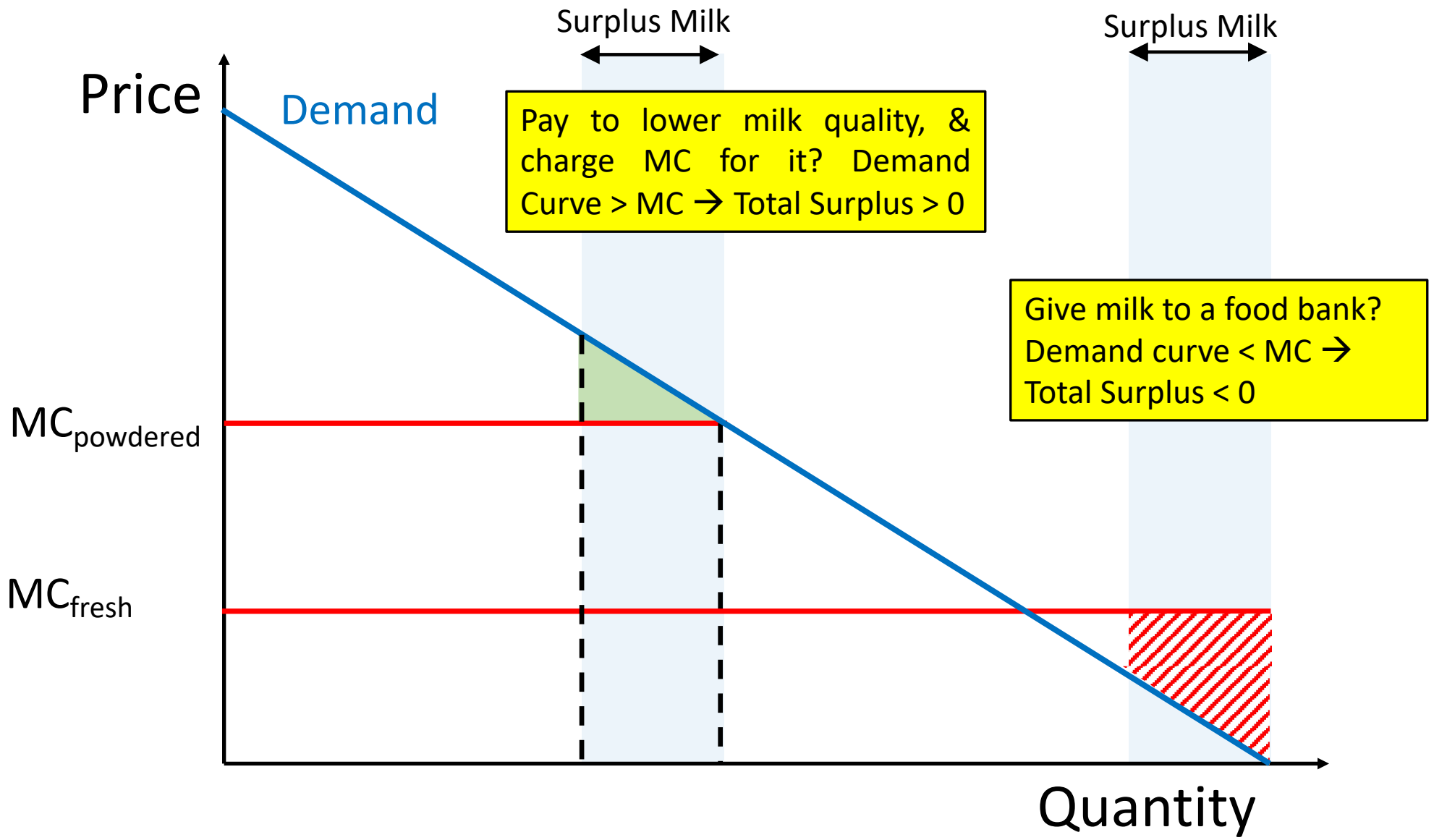
Dairy Farmers of Ontario (DFO) will donate $100,000, plus up to 200,000 litres of milk in increments, which will accompany the more than one million litres that it already donates to food banks every year with the Ontario Dairy Council and the Ontario Milk Transport Association. **File / Global News**

The trouble with total surplus (Consumer + Producer)

- Total surplus (consumer surplus + producer surplus) is sometimes used as the measure of the benefit to society from a particular firm or industry.
- Suppose that a dairy cartel accidentally over-produces milk.
- They have an extra 100 litres of milk, which cost $1/litre to make.
- The cartel sells fresh milk for $2/litre.
- The cartel do *not* want this extra milk lowering the price of milk.
- How to get rid of it?
- They have two options:
- Option 1: Donate the milk to a food bank that serves the poorest people in the province. The donation is free.
- Option 2: Pay an extra $0.50 to turn the milk into powdered milk, and sell the powdered milk made from 1 litre of milk for $1.50 (marginal cost).
- The powdered milk is so low quality that no one who can afford fresh milk will buy powdered milk: it does not compete with fresh milk.

The food bank… is bad?

- Suppose that the people in the food bank are so poor that they can't afford to pay more than $0.25/litre for milk.
- They have a very high marginal utility from milk (benefit from the next unit of milk consumed), because they have trouble affording food – BUT they can't pay much for it.
- →When we draw our demand curve, these are the people at the very right of the demand curve.
- Their maximum willingness to pay for milk is $0.25, and the milk cost $1.00/l to produce, so total surplus from giving them the milk is $0.25 - $1.00 = -$0.75. Total surplus from this exchange is NEGATIVE.
- What about the powdered milk? It's SOLD for $1.50, which is how much it costs to produce. If someone pays $1.50 for it, then they must value it at least at $1.50 → consumer surplus from this exchange is non-negative.
- MARGINAL UTILITY is different from ABILITY TO PAY which can be different from WILLINGNESS TO PAY. Using a total surplus criterion for 'societal well-being' mixes all these up.
- …and it's the way a lot of Canadian competition law works.


Surplus Milk
Surplus Milk
Price
Demand
Pay to lower milk quality, & charge MC for it? Demand Curve > MC → Total Surplus > 0
Give milk to a food bank? Demand curve < MC → Total Surplus < 0
MCpowdered
MCfresh
Quantity