

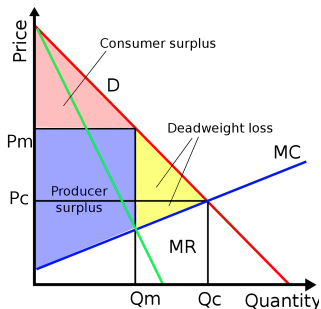


Cannabis Data Science

Saturday Morning Statistics

December 11th, 2021

Who bears the cost of quantity restrictions?



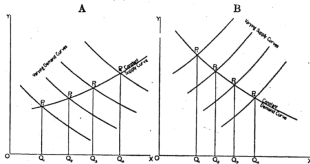
Effects of a quantity restrictions
on a market

Source: SilverStar at en.wikipedia

It depends...!

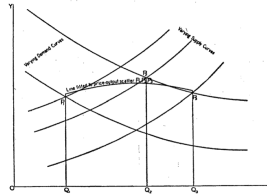
The identification problem

FIGURE 3. PRICE-OUTPUT DATA REVEAL—
(A) SUPPLY CURVE
(B) DEMAND CURVE



The Tariff on Animal and Vegetable Oils by
Phillip G. Wright (1928)
Retrieved from: <https://scholar.harvard.edu>

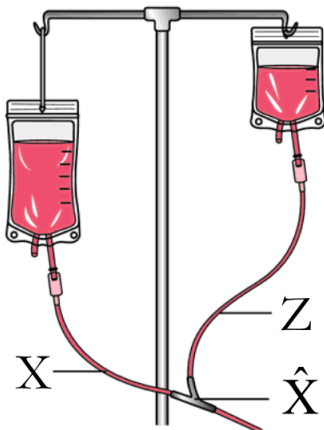
FIGURE 4. PRICE-OUTPUT DATA FAIL TO REVEAL EITHER SUPPLY
OR DEMAND CURVE.



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The change in price and quantity depends...!

We need a cannabis supply IV, STAT!



Why do we need an IV?

- **Reverse causation** – changes in the dependent variable change the value of at least one of the independent variables.
- **Omitted variables** – there are variables that affect both the dependent and independent variables that are not included in the model.
- **Measurement error** – the independent variables are subject to non-random measurement error.

What happens if we don't use an IV?

- Our explanatory (independent) variables may be endogenous.
- If our explanatory variables are endogenous, then any OLS estimates are biased and inconsistent.

What makes a good IV?

- 1 The instrument must be correlated with the endogenous explanatory variable(s). The more correlated the better.
- 2 The instrument cannot be correlated with the error term in the explanatory equation. This is the **exclusion restriction**.

What variables can we use as an IV?

- 1 Energy prices?
- 2 Changes in labor supply?
- 3 Building material prices?
- 4 Real estate prices?

Future work: Start preparing forecasts for 2022!

- ① Supply chain factors.
- ② Inflation.
- ③ Domestic spending.
- ④ Employment



Thank you for coming.

Take some time and discuss any conclusions drawn.