Arc Elasticity

η

"eta"

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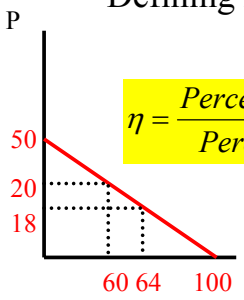
Lectures in Microeconomics-Charles W. Upton

Defining Arc Elasticity



$$\eta = \frac{PercentChangeinQuantity}{PercentChangein\,\mathrm{Pr}\,ice}$$

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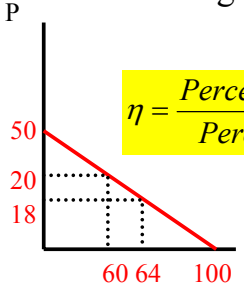

$$\eta = \frac{PercentChangeinQuantity}{PercentChangein\,\mathrm{Pr}\,ice}$$

Where:

Percent change is measured as percent of average value

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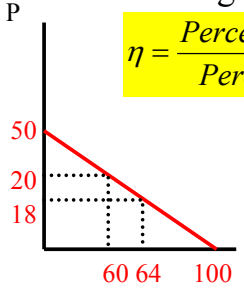

$$\eta = \frac{PercentChangeinQuantity}{PercentChangein\,\mathrm{Pr}\,ice}$$

When P changes from 20 to 18, $\Delta p = -2$

Average value of P = 19

The % change is thus -2/19

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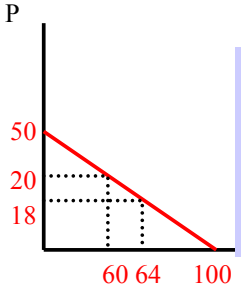
Arc Elasticity

The Formula



$$\eta = \frac{\dfrac{Q_1 - Q_o}{(\frac{1}{2})(Q_1 + Q_o)}}{\dfrac{P_1 - Po}{(\frac{1}{2})(P_1 + P_o)}}$$

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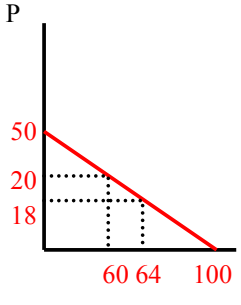
Arc Elasticity

The Formula



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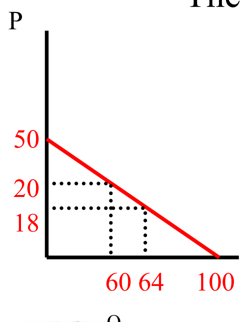
Arc Elasticity

The Formula



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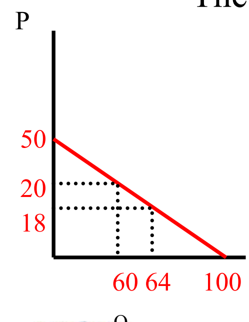
The Formula



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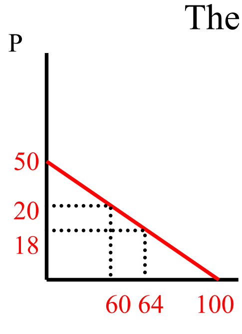
The Formula



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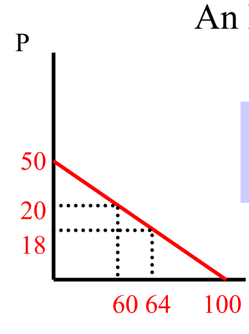
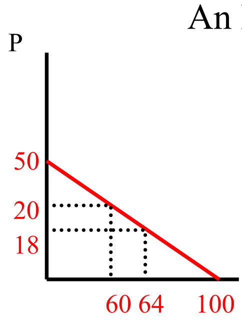
An Example



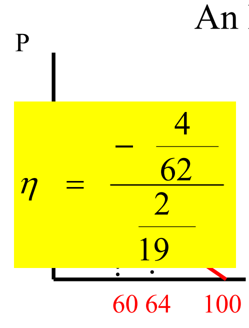
Compute the arc elasticity when P changes from 20 to 18

An Example



$$\eta = \frac{\dfrac{60 - 64}{(\frac{1}{2})(60 + 64)}}{\dfrac{20 - 18}{(\frac{1}{2})(20 + 18)}}$$

An Example



$$\eta = \frac{-\dfrac{4}{62}}{\dfrac{2}{19}}$$

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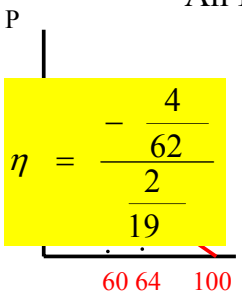
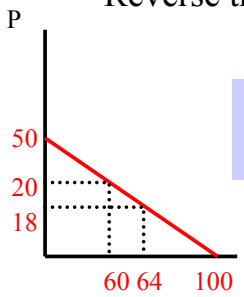
An Example



$$\eta = \frac{-\frac{4}{62}}{\frac{2}{19}} \qquad \eta = \frac{\frac{60-64}{(\frac{1}{2})(60+64)}}{\frac{20-18}{(\frac{1}{2})(20+18)}}$$

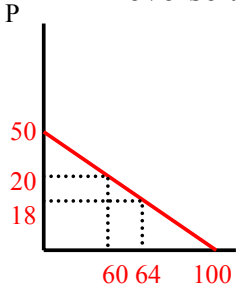
η = -0.6129

Reverse the Calculation



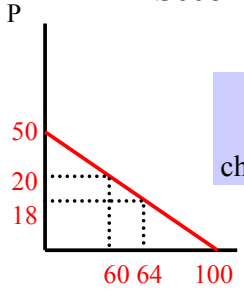
Compute the arc elasticity when P changes from 18 to 20

Reverse the Calculation



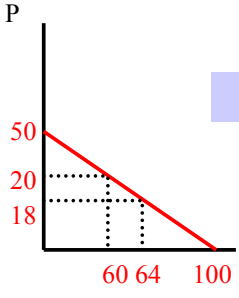
η = -0.6129

Second Example



Compute the arc elasticity when P changes from 10 to 20

Second Example



η = -4/7

Arc Elasticity and Tables

- 15,000 units were demanded when the price was $5.
- 12,000 units were demanded when the price was $7.
- Compute the elasticity

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Arc Elasticity and Tables

- **15,000** units were demanded when the price was **$5**.
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$$\eta = \frac{\frac{-3000}{13{,}500}}{\frac{2}{6}}$$

Arc Elasticity and Tables

- **15,000** units were demanded when the
- the
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Arc Elasticity and Tables

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Note that we never said which price came first.

Which method is best?

- The concept of elasticity is defined without reference to any one method of calculation.

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- The concept of elasticity is defined without reference to any one method of calculation.
- There are occasions when the point elasticity formula is best and there are occasions when the arc elasticity formula is best.

Which method is best?

- The concept of elasticity is defined without referenc ulation.
- There ar elasticit e occasion mula is best.

In general we tend to use point elasticities in class, because we have the luxury of examples with nice demand curves.

Extensions to other Elasticities

- Income elasticities (measuring the responsiveness of demand with respect to changes in income).

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- Income elasticities (measuring the responsiveness of demand with respect to changes in income).
- Own price elasticities measuring the responsiveness of demand with respect to changes in the price of the good itself.
- Cross price elasticities (measuring the responsiveness of demand with respect to the price of other goods).

End