

Farm-Level Decision Analysis: Introduction

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Farm-Level Decisions

A Few Climate-Sensitive Examples

- P Farm resource acquisition and allocation
- P Enterprise portfolio / risk management
- P Interactions between enterprises
- P Farm vs. non-farm livelihood activities
- P Work vs. leisure
- P Household consumption

Farm-Level Decisions

Farm Resource Allocation

How do I allocate farm land among competing production enterprises? ...between production and fallow? ...between annual crops and tree crops or forest?

How much time should my family members spend on each enterprise? How do I manage the timing of activities to make best use of limited labor?

Farm-Level Decisions

Farm Resource Aquisition

When should I purchase or replace equipment?

Should I hire seasonal labor? ...permanent labor?

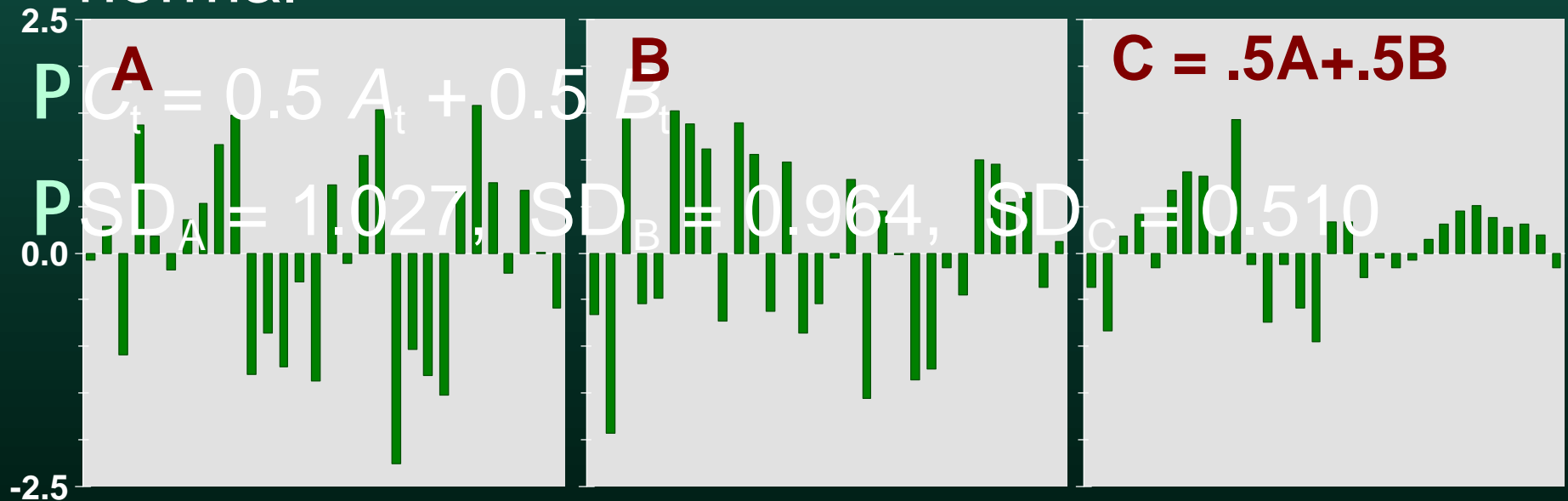
Should I purchase a draft animal or hire someone to do my plowing this year?

Farm-Level Decisions

Enterprise Portfolios

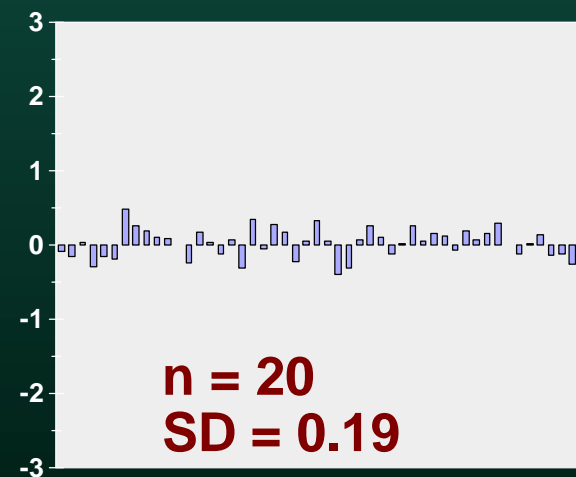
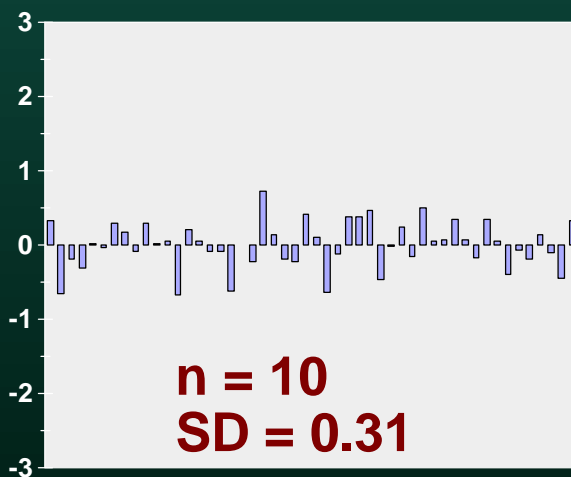
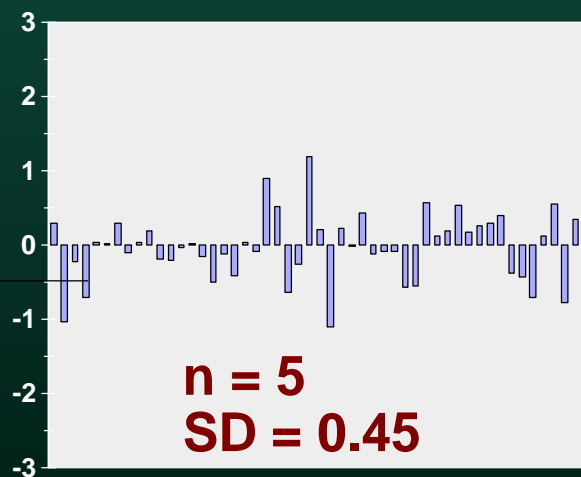
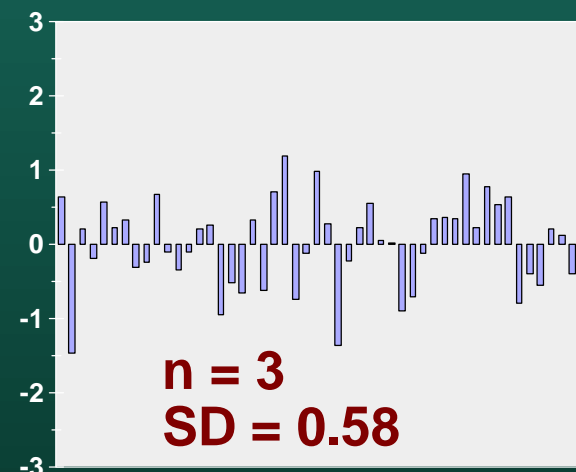
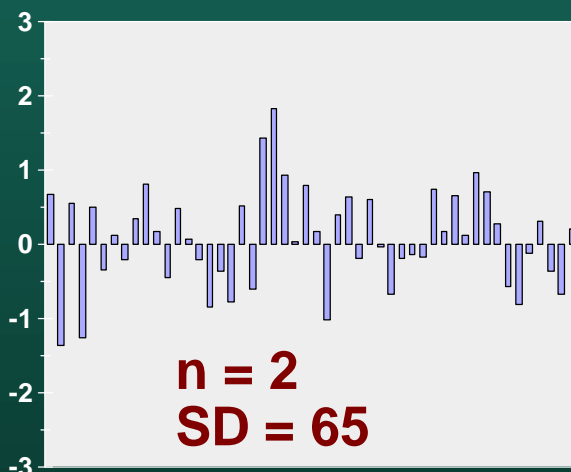
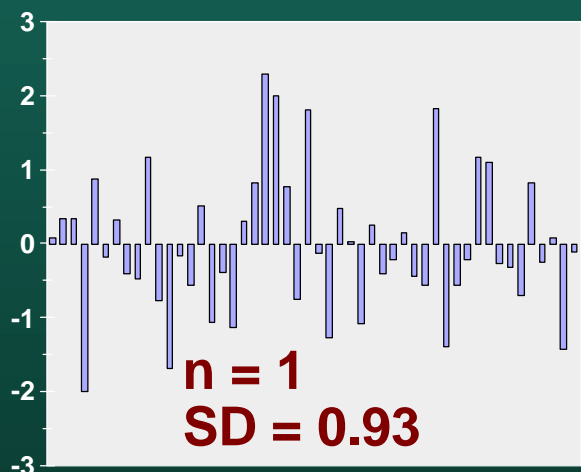
P *Low Correlation + Diversification = Reduced Risk*

P *A & B independent (not correlated) random normal*



Farm-Level Decisions

Enterprise Portfolios



Farm-Level Decisions

Farm vs. Non-Farm Livelihood

Should my son help me cultivate all of my land, or should we grow less, and send him to look for temporary employment in the city?

Suggested Strategy

P Start with the farmers (maybe their advisors).
Involve them throughout.

P Understand farmer goals

P Inventory important decisions:

- < Which are most sensitive to climate forecasts?
- < Which of these are inherently farm level?
- < What influences constrain each?

Suggested Strategy

- P Simulate, analyze, perhaps optimize individual enterprises first
- P Structure decisions & determinants in LP tableau. Adapt “textbook” examples.
- P Generalize to nonlinear
 - < Start with simplest (e.g., only land constraints)
 - < Add activities and constraints incrementally
- P Let farmers validate and refine

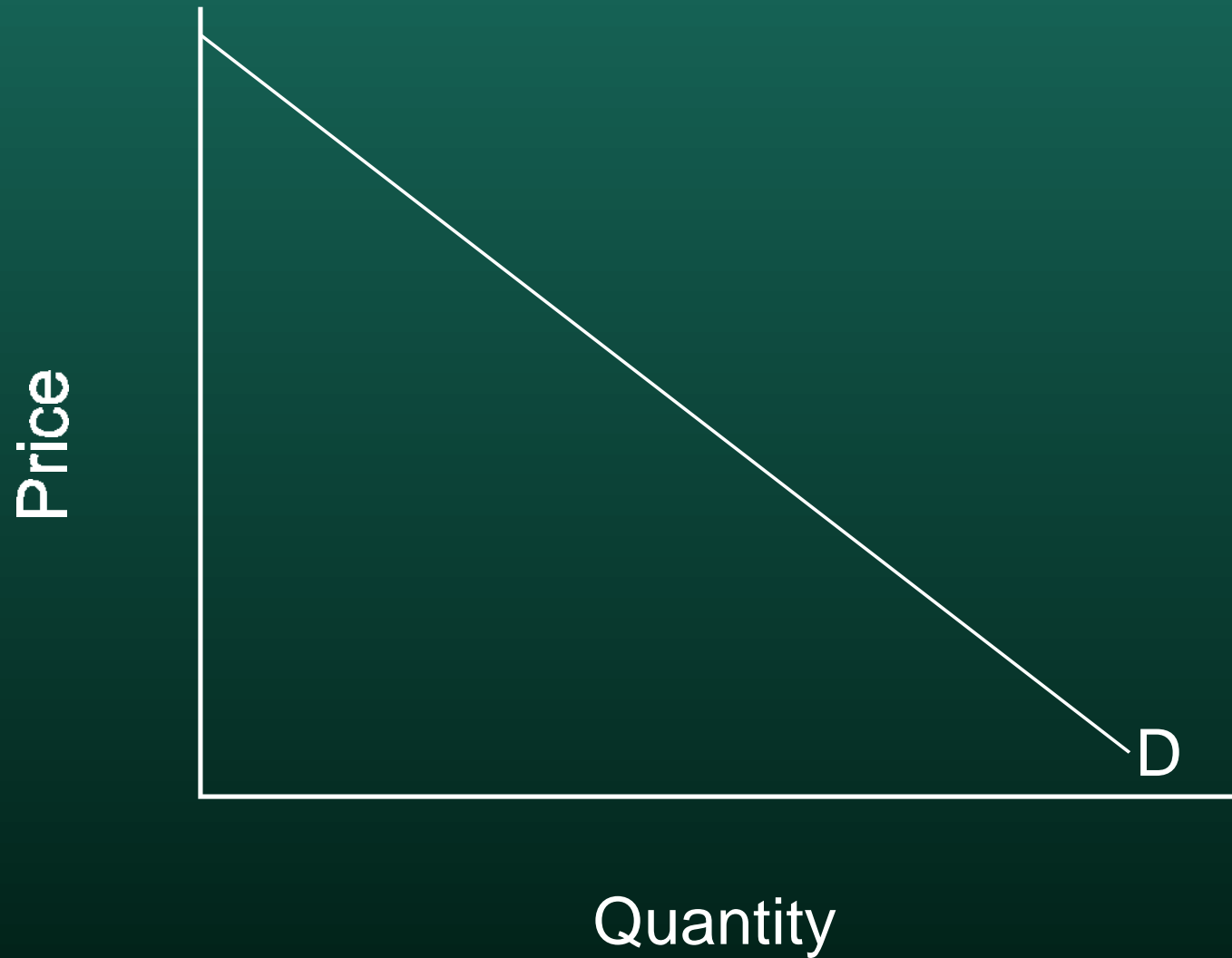
Market Impacts

What happens if many farmers try it?

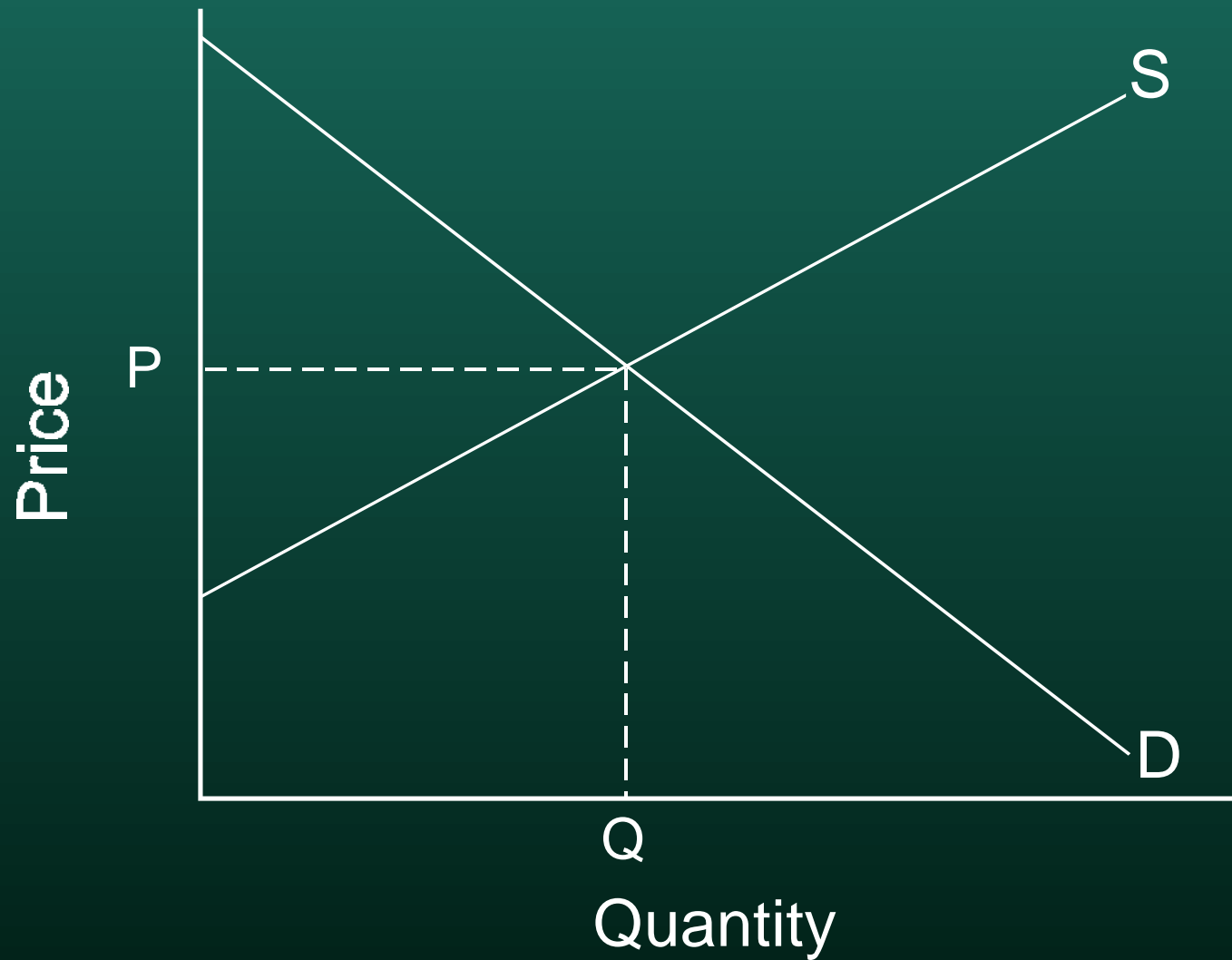
If wise use of climate forecasts would benefit a typical Argentine sunflower farmer an average of $\$5000 \text{ y}^{-1}$, what would the benefit be if 20,000 similar Argentine farmers used forecasts similarly?

$$20,000 * \$5000 \text{ y}^{-1} = \$100,000,000 \text{ y}^{-1}?$$

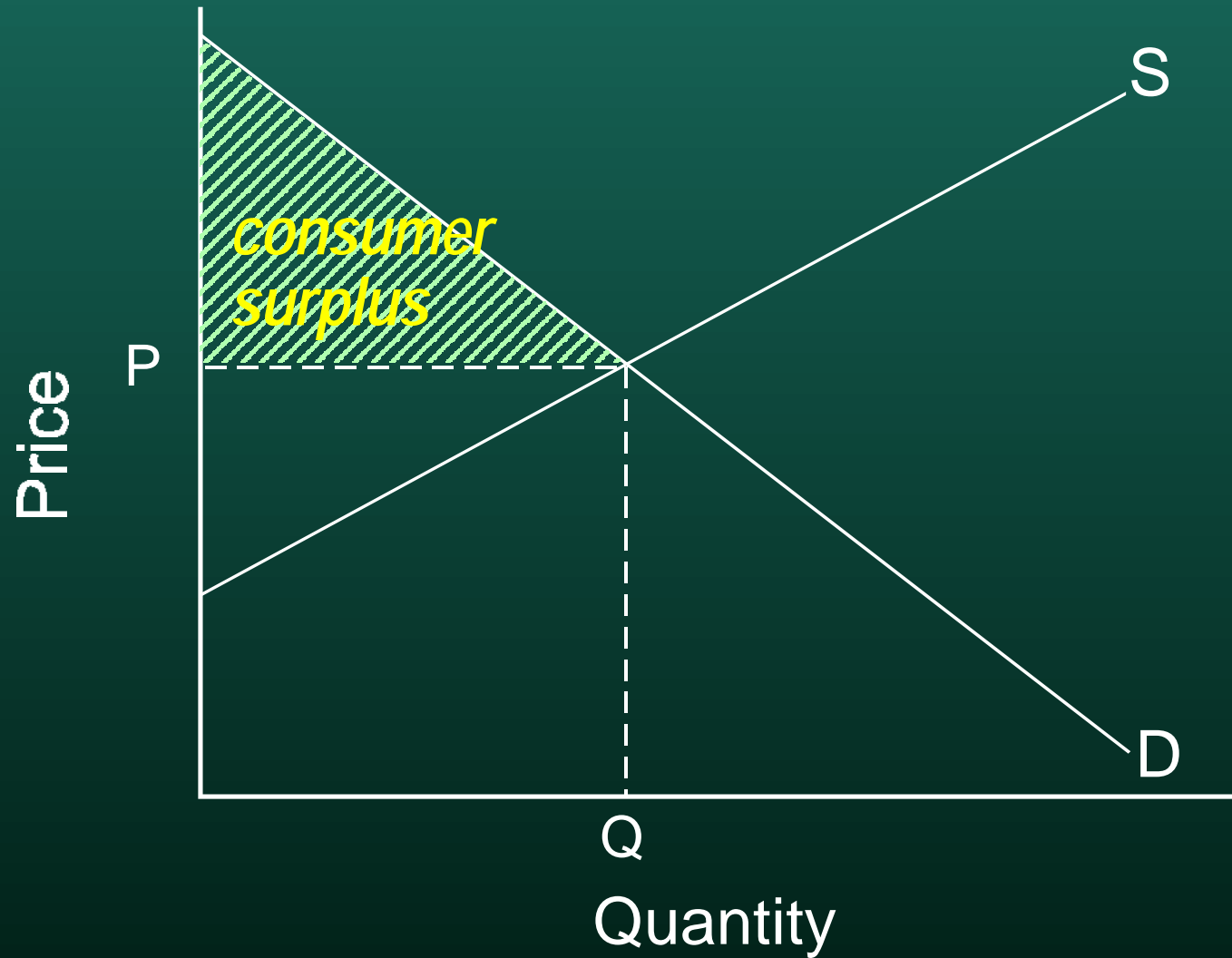
Market Impacts



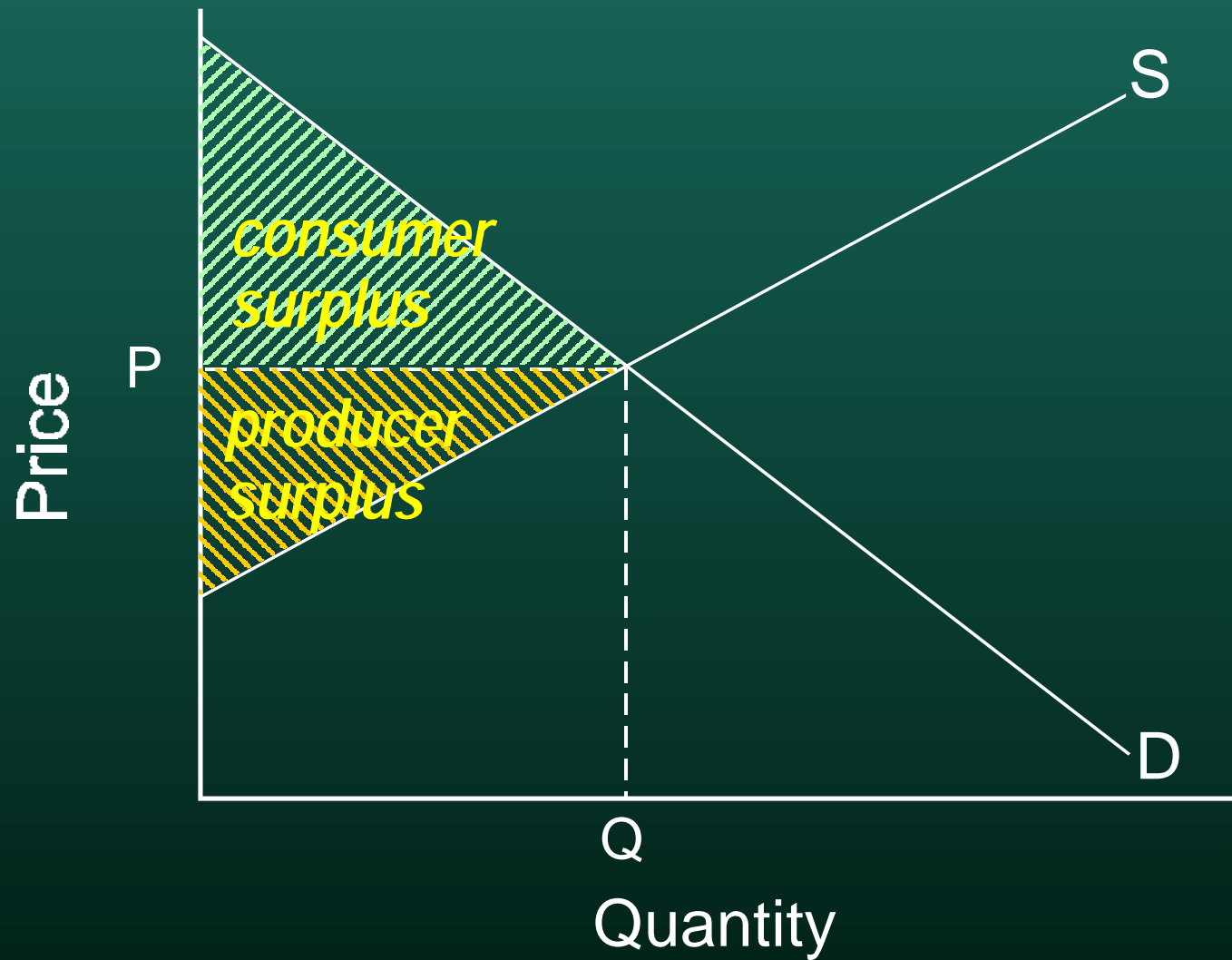
Market Impacts



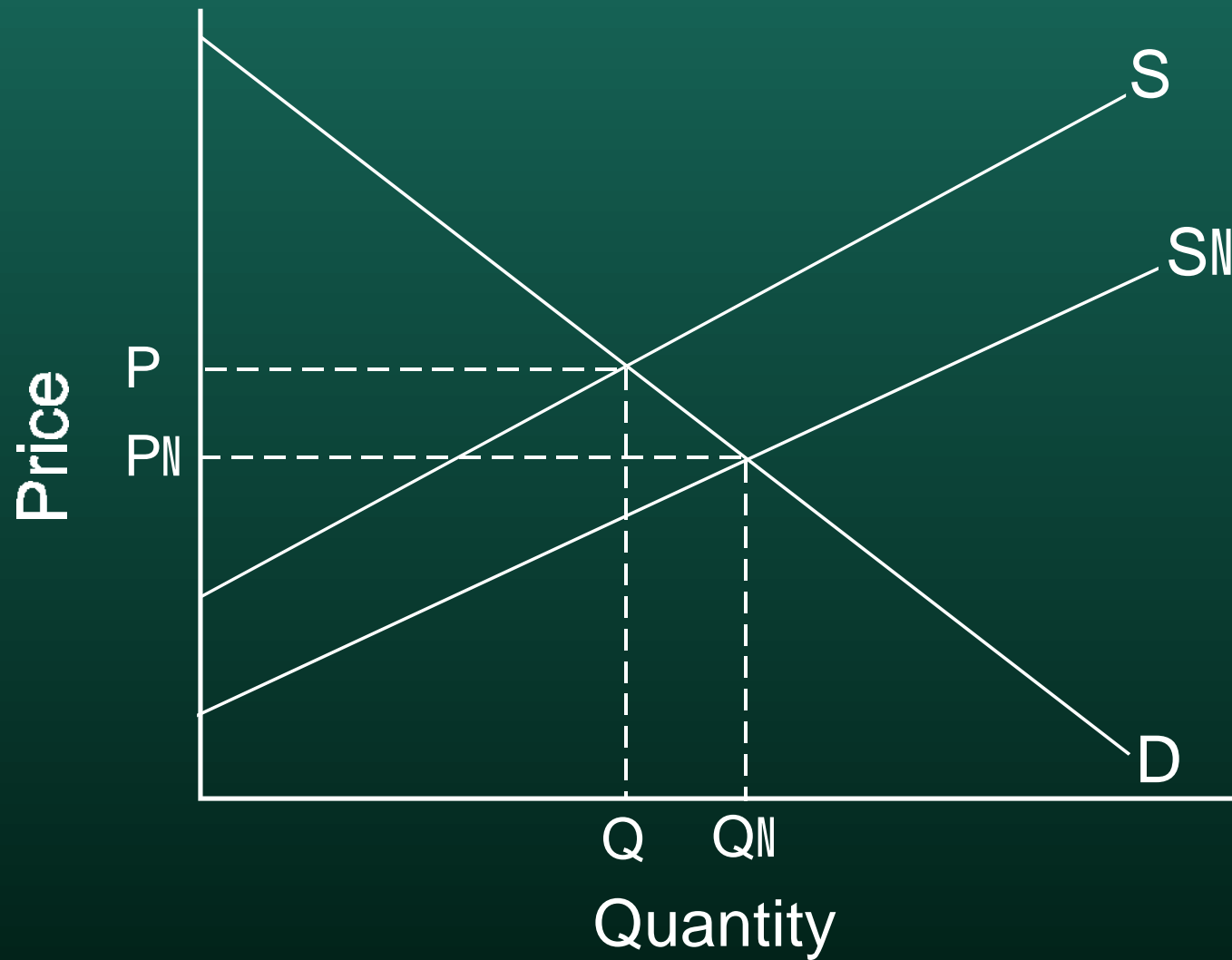
Market Impacts



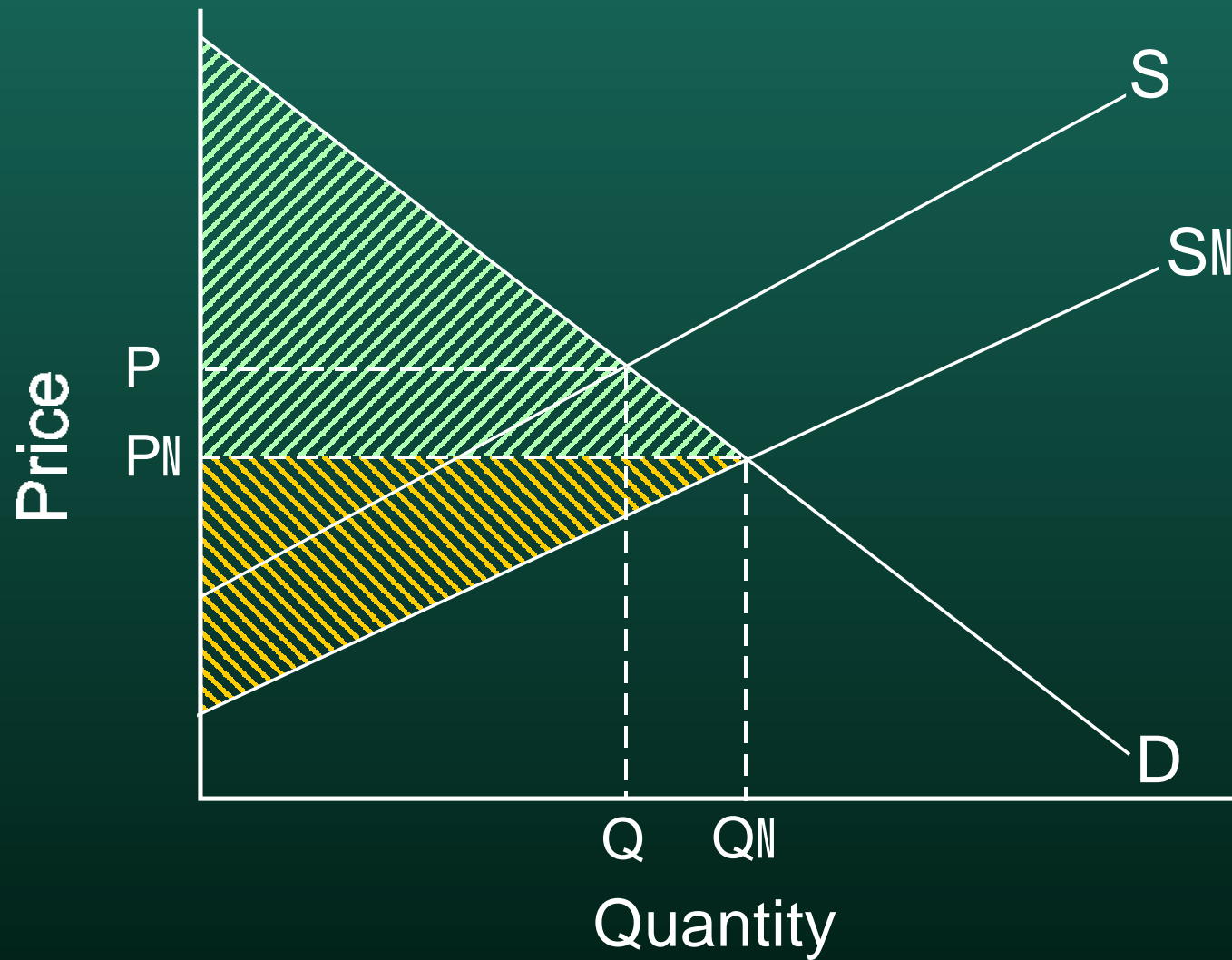
Market Impacts



Market Impacts



Market Impacts



Market Impacts

What factors disadvantage producers?

P Steep (inelastic) demand

< Small portion of family expenditure

< Necessity

< Few substitutes

Market Impacts

What factors disadvantage producers?

P Small market relative to production effects of forecast use

- < Homogeneous response to forecasts by large-scale producers and/or large number of producers
- < Local or specialty commodity
- < Perishable or otherwise difficult to transport
- < Constrained by processing or transportation system