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REGULATION AND COST-BENEFIT ANALYSIS

What If…?

- What if the Spanish government …
  - Raised taxes on wine by 30 euros *per bottle*?
  - Banned chocolate?
  - Warned that watching fútbol caused cancer?
- Would you be happy? No!
  - Consumption would fall
  - Utility (welfare, happiness) would be lower

Regulation of Smoking in Spain

- Taxes
  - Excise + Ad Valorem + VAT is 79% of final price
- Bans
  - 2006 smoking banned in public and work places, with some exceptions (e.g., restaurants)
  - 2011 smoking ban extended to restaurants, some outdoor areas
- Warning labels
  - "Fumar mata" or similar longer warning

Government Regulation

- Do these regulations make smokers unhappy?
- Do we care?
- Is smoking different than chocolate?

- What is economic framework to analyze any regulation?
  - Especially for addictive goods that are harmful to health

US Perspective

- In 2009 Food and Drug Administration granted power to regulate cigarettes
- In 2010 FDA proposed graphic warning labels
- Goal was to inform smokers of risks, reduce smoking
- Any major legislation in US requires analysis showing that benefits greater than costs

US Perspective

- Benefits of smoking reduction are clear
  - Better health, longevity, lower health care costs
- What are costs of smoking reduction?
  - What is welfare loss from graphic warning labels?
  - Some think the question is crazy to ask
  - Many have tried to answer it anyway
- Summary: anywhere from $0 to full benefit
- Several lawsuits, answer important but unsettled

Levy, Norton, Smith (2015)

- Much of today's talk taken from working paper by Helen Levy, Edward Norton, and Jeffrey Smith
- "Tobacco Regulation and Cost-Benefit Analysis: How Should We Value Foregone Consumer Surplus?"

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Overview

- Goal is to understand welfare analysis of government regulation
- In particular, for goods like cigarettes
  - Harmful to health
  - Information problems
  - Addiction

Questions

- Want to be able to answer questions like
  - What is welfare loss from taxation?
  - What is welfare loss from bans?
  - What is welfare loss from warning label?
- How does answer depend on information and addiction?

Role of Economics

- Here is an important policy problem
- Economists have important role
- Economists think about happiness, tradeoffs, taxation, models for changes in behavior

- Even so, this is a tricky problem
- Economists may disagree
  - In US, estimates of lost enjoyment ranged from nearly $0 to nearly all health benefits

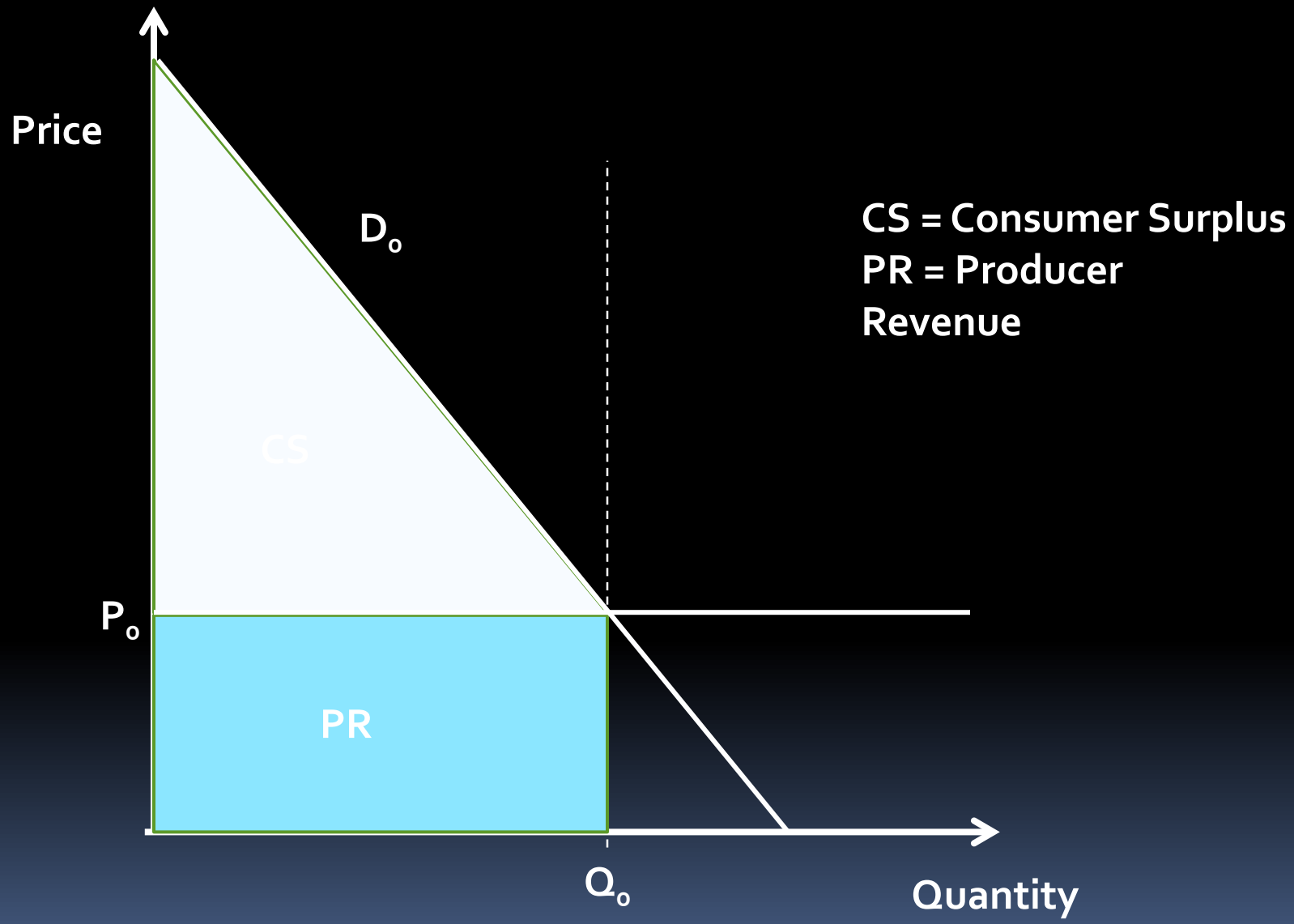
Start with Taxation

- Simplest possible model
  - Taxation
  - No information problems
  - No addiction
  - Linear demand curves
  - One period
- Later will relax each assumption

Demand for Bread

- People like bread
- Demand decreases with price
- Flat supply curve, lots of producers
- Utility (happiness) is difference between what you are willing to pay, and what you pay
- Consumption generates welfare (happiness)
- Consumer surplus = area between demand curve and price

Demand for Bread



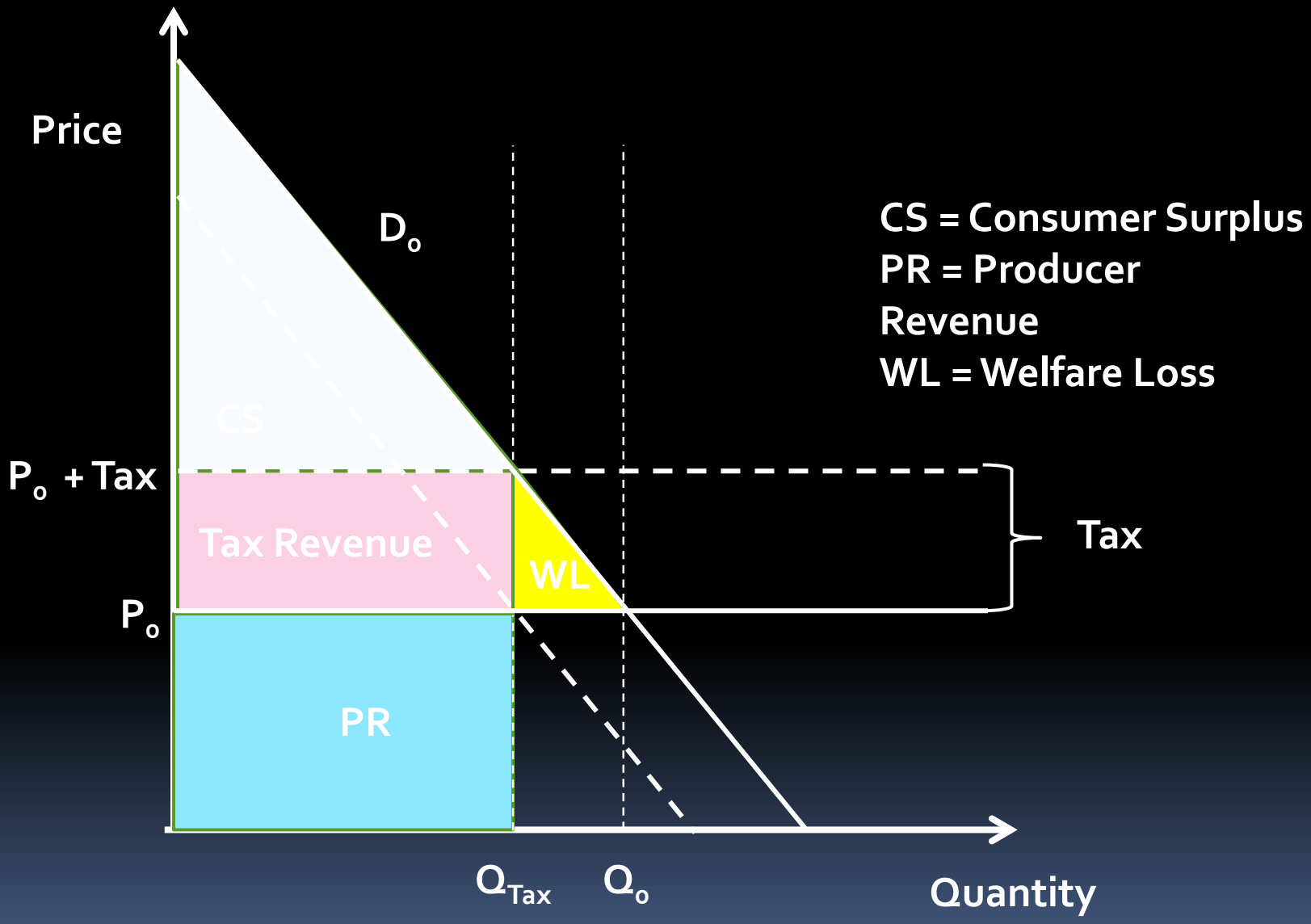
CS = Consumer Surplus
PR = Producer Revenue

Taxation of Bread

- Per unit tax (per loaf)
- Demand falls (from provider perspective)
- Price rises (from consumer perspective)
- Some consumer surplus becomes tax transfer to government

- Some consumer surplus disappears
  - Triangular area in **YELLOW** is **welfare loss (WL)**

Demand for Bread with Tax



CS = Consumer Surplus
PR = Producer Revenue
WL = Welfare Loss

Taxation

- Lowers consumption
- Transfers some welfare (CS) from consumers to government (tax revenue)
- Some disappears, called welfare loss (WL)
- Taxes reduce total welfare (by WL triangle)
  - Welfare loss small if inelastic (vertical) demand
  - Argument to tax inelastic goods

Health Tax Motivation (1)

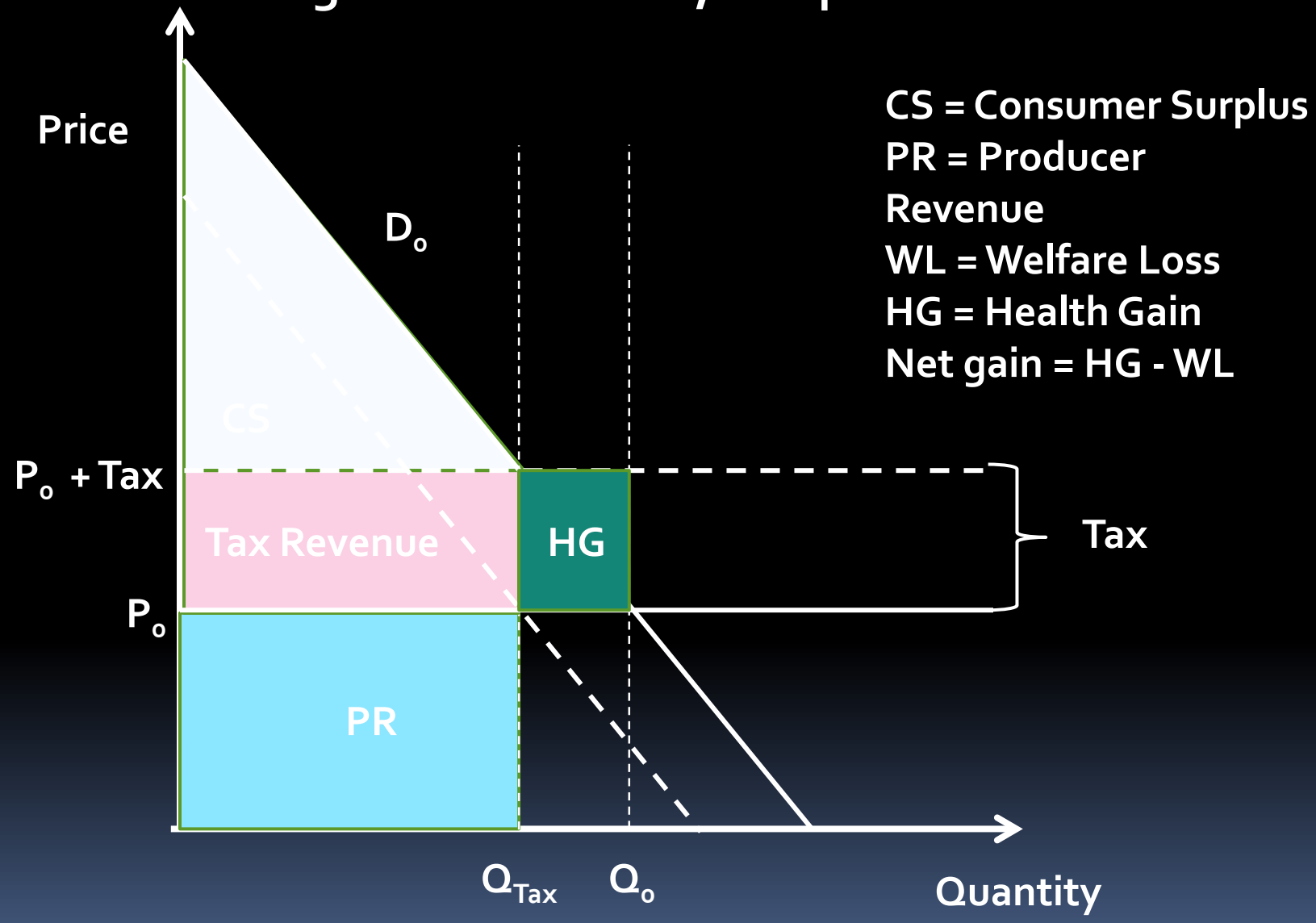
- One motivation for tax on cigarettes is to implicitly include health costs
- Uninformed person does not realize cigarettes harm health
- If (tax = per pack health cost), then internalize the cost through taxation
- Tax lowers demand to point where person would smoker if fully informed

Health Tax Motivation (2)

- Is there still a welfare loss?
- If properly account for health gain, now net gain
- Health gain = tax*(change in demand)
- Net gain = Health gain – Welfare triangle loss

- Net welfare gain!

Demand for Cigarettes with Tax, Perspective of Uninformed



CS = Consumer Surplus
PR = Producer Revenue
WL = Welfare Loss
HG = Health Gain
Net gain = HG - WL

Information

- Welfare analysis requires keeping track of two versions of each person
- Initial, uninformed person
  - ("Smoking harms my health, really?")
  - Use this demand curve to determine behavior
- Final, fully-informed person
  - ("I already knew that")
  - Use this demand curve for welfare analysis

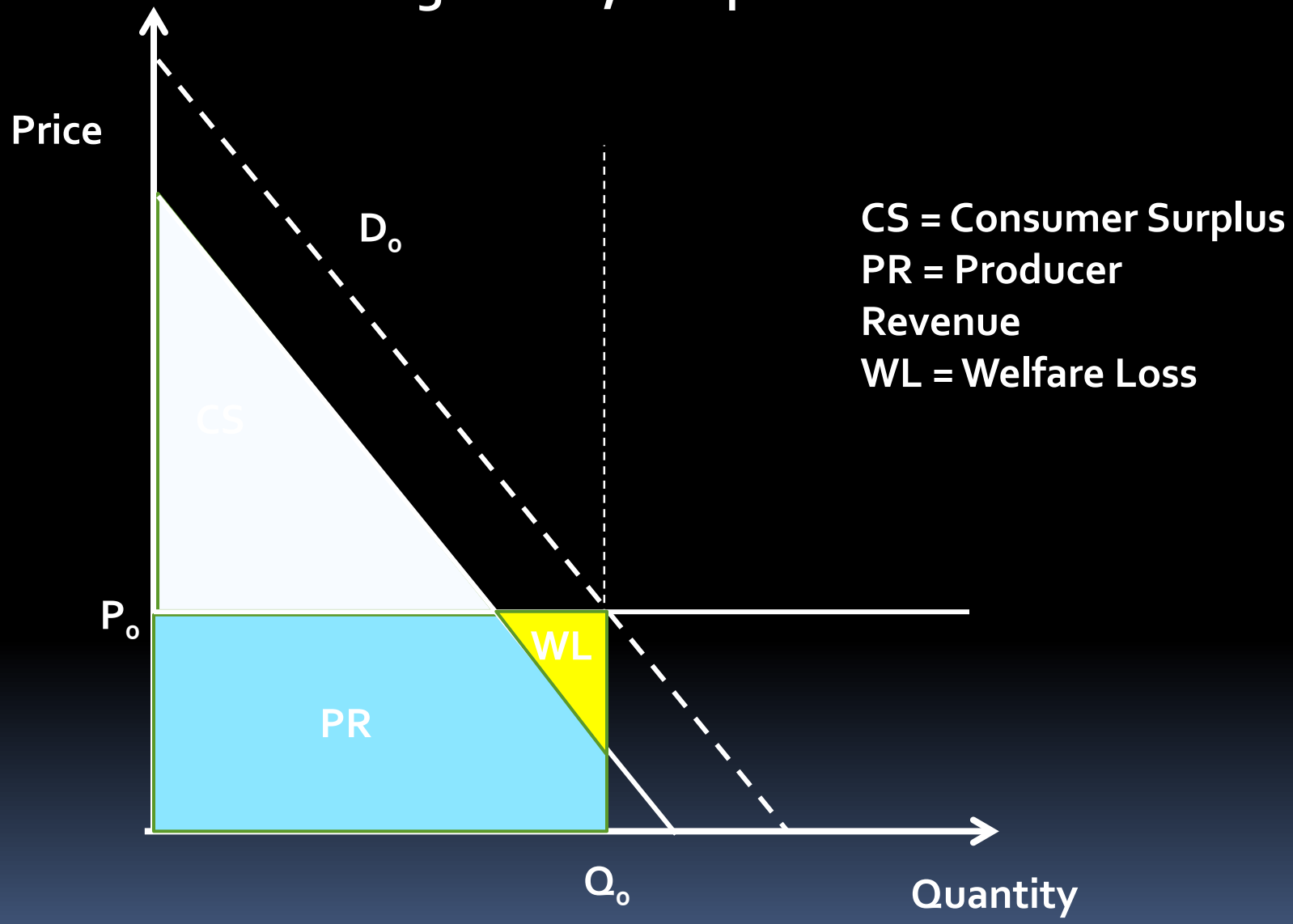
Environmental Economics

- Long literature in environmental economics
- Difference between two demand curves can be explained by inconsistencies
  - Present bias (little concern for future)
  - Imperfect information
- For example: light bulbs
- Taxing or subsidizing fluorescent bulbs can overcome information problems early

Health Tax Motivation (3)

- Whose perspective should we take?
  - Uninformed person?
  - Informed person (taxed uninformed person)?
- If take perspective of informed person
  - Smaller consumer surplus
  - Welfare loss of taxation (tax inefficient)

Demand for Cigarettes, Perspective of Informed



CS = Consumer Surplus
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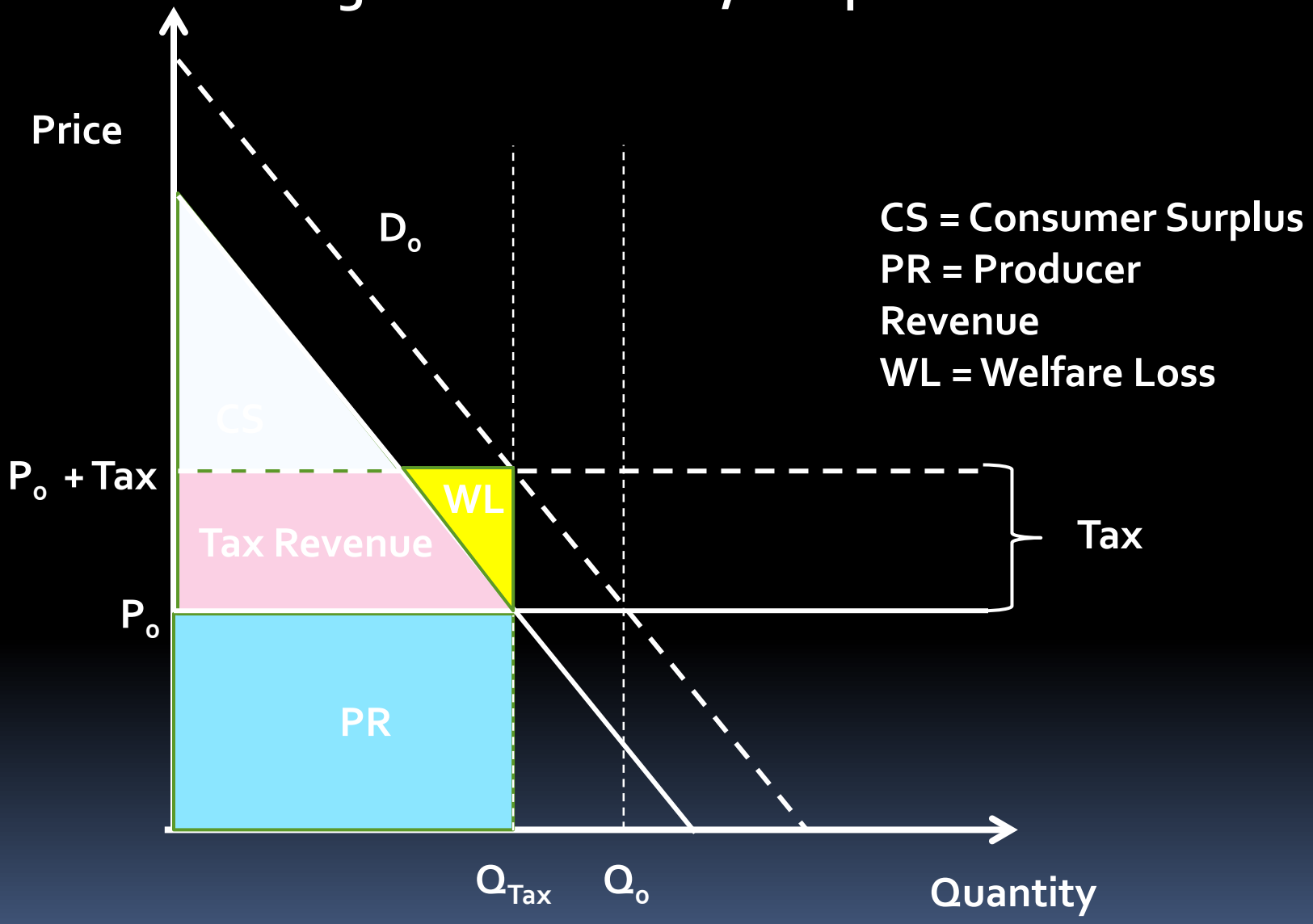
Demand for Cigarettes with Tax, Perspective of Informed



Health Tax Motivation (4)

- Sounds good, but really difficult in practice
  - Health costs vary across people
  - Information problem does too, all taxed the same
- Logically, anyone who fully understands health consequences of smoking should not pay tax
- Using tax to correct an information problem, ***when tax is uniform but information is not***, is not efficient solution

Government Regulations

- Taxation
  - Affects everyone who buys by same price per pack
- Bans
  - Forces consumption to zero or change location
  - Heavy smokers affected more than light smokers
- Information labels
  - Depends on information
  - Well-informed person not affected at all

From Bread to Smoking

- Consider warning labels instead of taxes
- Key issues are information and addiction

- Assume already know benefits of smoking reduction, want to know cost (utility loss)
- Only consider internality (not externalities from second-hand smoke)

Warning Label (1)

- Assume warning label provides information
- Information is accurate
- Information about health risks, costs, mortality, and difficulty of quitting
- Assume people actually read labels, understand them, trust them, and act upon that information

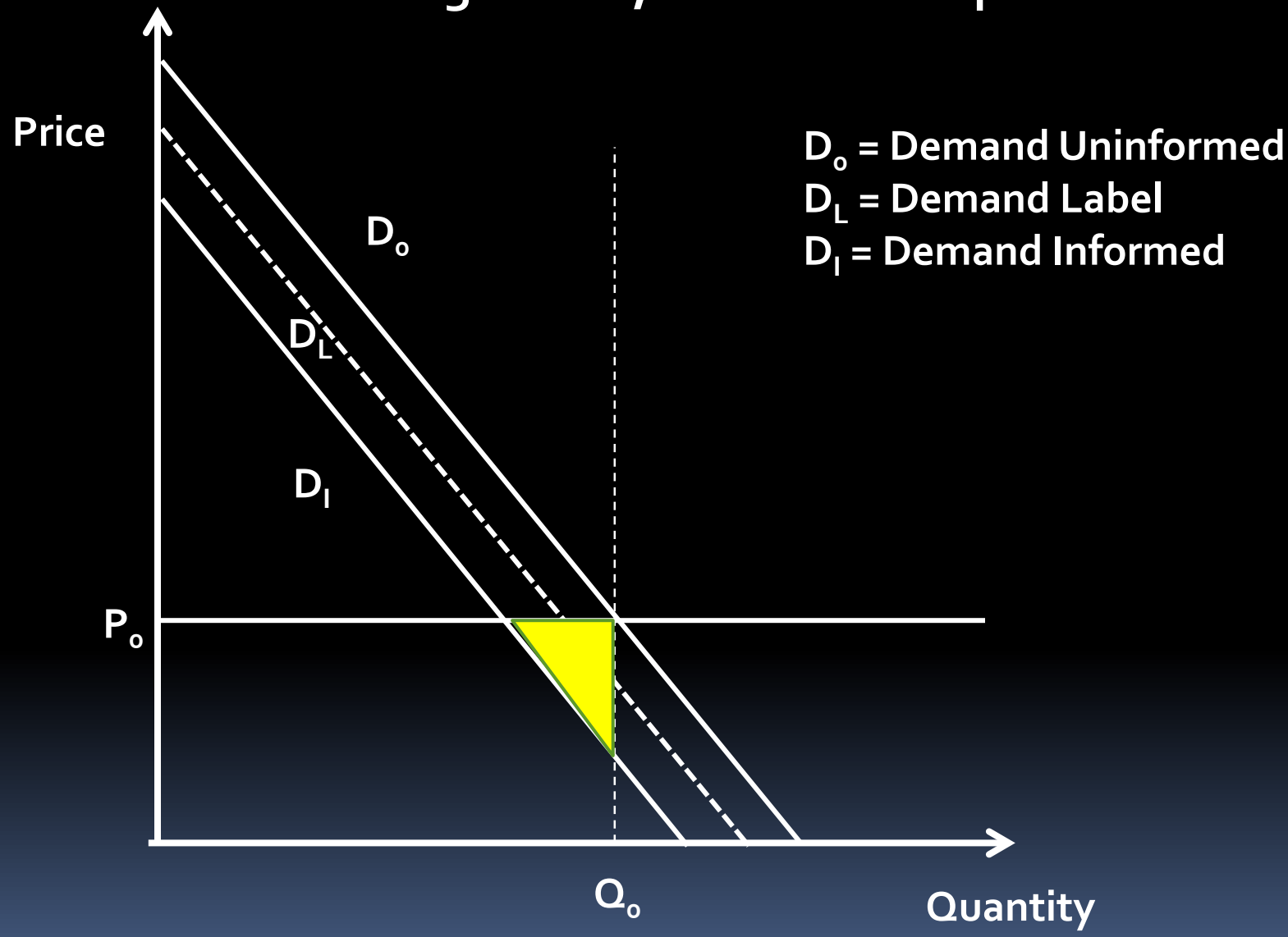
Warning Label (2)

- Big difference from taxes
- Everyone (informed, uninformed) pays tax
- Only some affected by information
  - Some already know health risks
  - Some cannot understand
  - Some do not believe
- Point is, ideally this shifts demand curve, so everyone now informed

Warning Label (3)

- From perspective of informed person, there is no welfare loss or gain
- We argue that informed person (alter ego) has the correct perspective

Demand for Cigarettes, Different Perspectives



Addiction

- Smoking different from many other goods
- Nicotine is addictive
- How does this affect welfare analysis?

- What is **addiction**?

Rational Addiction

- Becker and Murphy (1988)
- Adjacent complementarities
  - Smoking now affects pleasure of future smoking
  - Smoking now increases smoking in future
  - Future anticipated price increases lower smoking
- No information problems
- No irrational decisions: people enjoy smoking

Rational Addiction

- Welfare analysis
  - Nothing new
  - As before, correct information improves welfare
  - Analyze from point of view of informed person

Other Models

- Becker and Murphy inspired others to modify their model, think about what causes apparently inconsistent behavior

1. Addictive types
2. Quitting costs
3. Hyperbolic discounting
4. Cue triggers

Addictive Types

- Some people more likely to become addicted
- Through experience, learn type
  - No perfect foresight
  - Some realize too late they are likely to be addicted
  - This explains why some become addicted
- Welfare: government information always welfare enhancing, but not that helpful
- Government can only reveal distribution of types, not individual-level information
- Orphanides and Zervos (1995)

Quitting Costs

- Add quitting costs in model of repeated one-period game
- After starting to smoke, some remain smokers
- Would prefer to be non-smoker, but quitting costs too high (for some)
  - Continue smoking unhappily
- Welfare
  - Govt. regulations would be approved by alter ego
- Suranovic, Goldfarb, and Leonard (1999)

Hyperbolic Discounting (1)

- People value the future less than present
- But not in smooth way
- Hyperbolic discounting: discount tomorrow a lot, each future day a little more
- “I will quit smoking … tomorrow”

Hyperbolic Discounting (2)

- Time-inconsistent people smoke more now because future costs discounted
- Tension between current and future selves
- Regulations that reduce smoking are desired
- Gruber and Koszegi (2001, 2004)

Cue Triggers

- Mistakes triggered by environmental cues
- People try to control exposure to cues
- Person makes rational decisions in cold mode, irrational decisions in hot mode
- Bernheim and Rangel (2004)

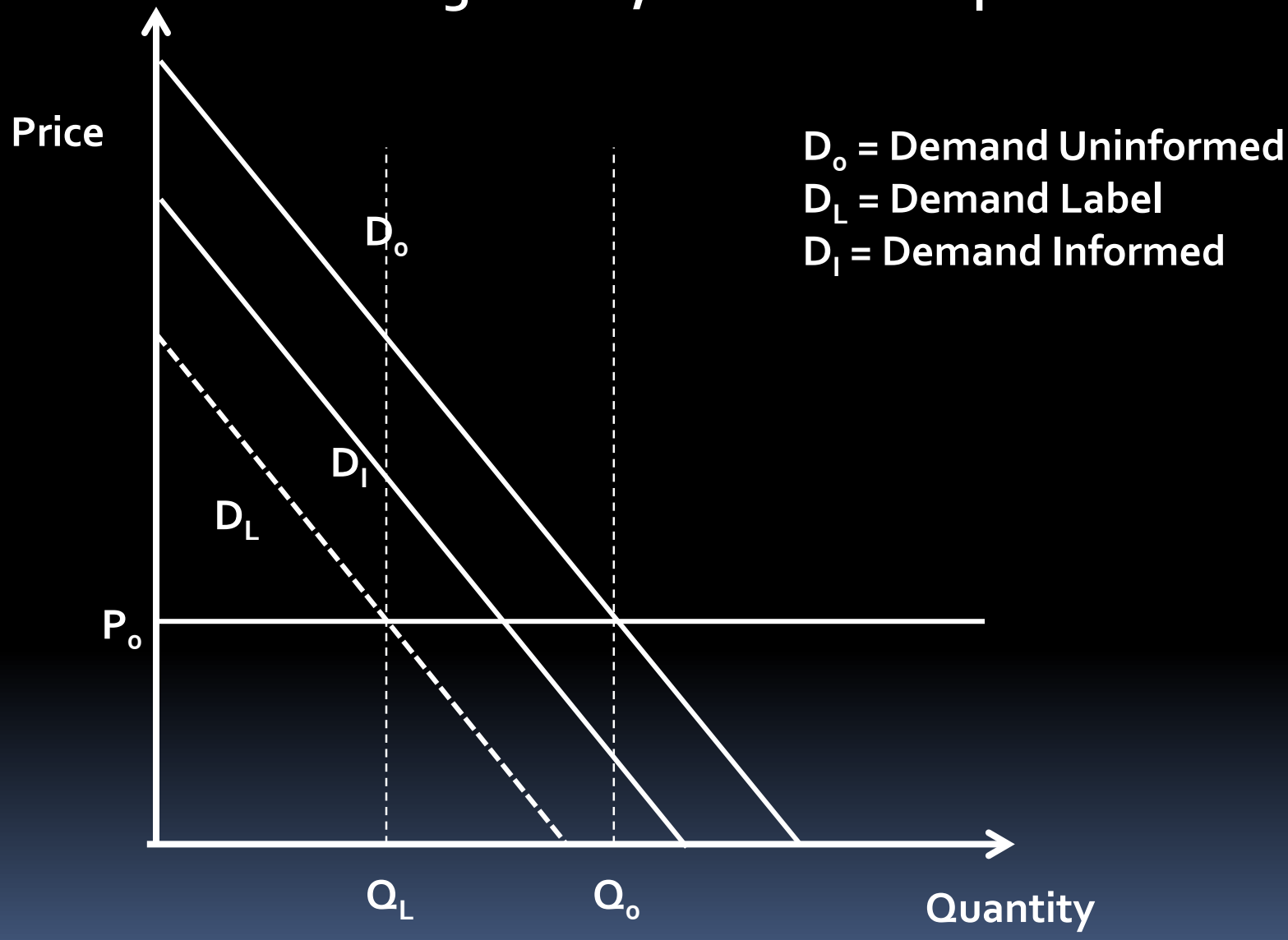
Welfare Summary

- In all these papers, welfare analysis should be done for fully informed person, or long-run person, or cold (rational) mode person
- Correct information is welfare enhancing

Too Much Information

- What if information is wrong?
- What if information is weak, ignored?
  - Then no effect, no behavior change
- What if information is too strong?
  - "Smoking will kill you and all your loved ones instantly!"
  - If people believed this, reduce smoking too much
  - If people ignore, then future credibility problems

Demand for Cigarettes, Different Perspectives



Non-linear Demand

- Subtle point
- Most graphs show linear demand
- Easy to draw
- Most empirical work assumes constant elasticity (non-linear demand)
- For smoking (elasticity = –0.2) welfare loss is about one-third lower than if linear demand

Over Time, Discounting

- Graphs are for simple static model
- But smoking happens for years, typically
- Discount future costs and benefits
- Lifetime model same as repeated static
  - If constant discount (no hyperbolic discounting)
  - If current consumption does not depend on past or future, meaning no addiction

Conclusions

- We see no reason to dismiss the idea that foregone consumer surplus should be counted
- Welfare analysis from perspective of informed, long-run, rational person
- If warning label is true, informative, believed, acted upon, then label is welfare enhancing
- If false, then could be worse, if ignored then irrelevant
- This welfare analysis essential for policy