[MUSIC]

Hi, Professor Navarro here again.

At this point in the course, we are done with

the basics of supply and demand, and consumer and producer theory.

And it's time to move on to how industries and markets are organized.

This is some of my favorite stuff in economics, and our goal

over the next three lectures is to understand how industries are structured.

And why different industries exhibit different

kinds of market conduct and performance.

Industry structure refers to how many firms are in an industry, whether

the firms are big or small, what the firms cost structure looks like.

And how market share is divided among the firms.

The four major types of industry structure include, perfect

competition as well as three forms of imperfect competition.

Monopoly, monopolistic competition, and oligopoly.

In this lecture, we will focus solely on perfect competition.

It is the market structure by which economists measure all other market structures.

And one of the goals of this lecture will be to

understanding the implications of each of the major assumptions of perfect competition.

These assumptions range from numerous buyers and sellers, and

free entry and exit, to perfect information and homogeneous products.

By learning about these assumptions, we will come

to learn not only why the perfectly competitive market is

efficient, but also how markets in the real world can fail.

When one or more of the restrictive assumptions of perfect competition fail.

This concept of market failure is key to understanding

why government may sometimes intervene in the free market.

[SOUND]

The next three lectures are where the rubber meets the roads.

It's where we put together

everything we've learned about consumers, and producers, and supply and demand.

The goal is to understand how american industries are structured and

why different industries exhibit different kinds of market conduct and performance.

Industry Structure refers to how many firms are in an industry.

Whether the firms are big or small, what the firms cost

structure looks like, and how market share is divided amongst the firms.

The major types of industry structure include, perfect competition as well

as three forms of imperfect competition; monopoly, monopolistic competition and oligopoly.

In this

lecture we'll study perfect competition then in the

next two lectures we will turn to imperfect competition.

As we study perfect and imperfect competition, it will be useful to

keep in mind one of the key conceptual tools of traditional micro economics.

The structure-conduct-performance paradigm.

The central concept driving this paradigm is that industry structure determines

market conduct, and market conduct in turn helps determine market performance.

Market conduct embodies the various pricing

and marketing tactics and strategies of businesses.

Such conduct includes at what level a firm or industry sets its price and output.

It also includes whether that firm or industry

engages in various kinds of non-price competition through

product differentiation and advertising.

These different kinds of market conduct in turn drive market performance.

Where performance is measured by yardsticks,

such as allocative and productive efficiency.

These yardsticks can tell us how well

or poorly a society's resources are being used.

This figure highlights some of the key features of the structure, conduct, performance paradigm.

Please study it carefully before moving on to our analysis of perfect competition.

[MUSIC]
[SOUND].
These are the sounds of Adam Smith's
invisible hand working in the marketplace.
It's the hustle and bustle of a
perfectly competitive market, where
numerous buyers and sellers
meet, consumers pay the lowest price for
the
most goods and all resources are allocated
efficiently.
It is the market structure by
which economists measure all other market
structures.
This is because beginning with Adam Smith,
many economists have
shown that Perfect Competition is the most
efficient type of market structure.
The irony of course, is that there are few
if any
industries, which can meet the
very restrictive Assumptions of perfect
competition.
A problem that we will discuss shortly.
For now, however, let's review each of
these restrictive assumptions to
understand their implications.
Arguably the most important requirement of
perfect
competition is Numerous Buyers And
Sellers.
When this assumption is met, any one
firm's output is minuscule compared
to the market output, like a grain of sand
compared to a beach.
Therefore what one firm does has no
influence on what other firms do.
This condition is important because it is
one
of the primary reasons why Perfectly
Competitive firms
are price takers rather than price makers.
This figure illustrates the Price Taker
concept.
It depicts supply, demand and equilibrium
in a perfectly competitive market for
widgets.
As we've already learned, equilibrium in
this market will
occur where supply-demand cross at P star
and Q star.
Now, because there are numerous buyers and
sellers in this perfectly competitive
industry, what do
you suppose will happen if any one firm
tries to raise its price above P star?
The correct answer is c, if one firm tries
to rise it price above P
star, customers will simply by their
widgets
from any one of thousands of other firms.
So quantity demanded falls to zero.
So here's the punch line, as seen in this
graph.
From the perspective of the firm, the
individual
firm's demand curve isn't downward sloping
at all.
As seen in this left hand industry graph.
Rather, the demand curve is perfectly
horizontal, as
in this right hand graph for the firm.
Now here's another question.
How would you describe the firm's demand
in terms of in elasticity?
Is it Elastic, Inelastic, or Perfectly
elastic?
That's right, demand is Perfectly elastic
Knowing this, let's now figure out what
any one firm's marginal revenue
is, so we can figure out how that firm
will maximize its profits.
Now, here's a pop quiz for you.
Do you remember the definition of the
marginal revenue?
Marginal revenue is simply the additional
revenue earned by
the firm from the sale of one additional
unit.
In this case, one more widget.
Knowing this definition, what then must be
the relationship between the industry
market price, and the firm's marginal
revenue, in a perfectly competitive
industry?
The correct answer is b.
In a perfectly competitive industry, price
equals marginal revenue.
This follows directly from the price taker
assumption and a perfectly elastic demand
curve.
And please remember that P equals M R
condition
as we move to the next assumption of
perfect competition.
That of Homogeneous products.
A homogenous product is a product such

that each
firm's output is indistinguishable from
any other firm's output.
Examples include commodities such as wheat
and coal.
In contrast, you can buy 30 different
brands of many different kinds of
differentiated products.
Soda is not soda, its 7-Up or Coke.
Cars are not cars, they are Fords and
Volvos and
so on.
The homogeneous product assumption is
important because it means that every
firm in the industry is selling exactly
the same product, so
that the only thing that first can compete
on is price
and not on other things such as product
design and product quality
[SOUND].
As we shall see in the next lecture,
a key different between perfect
competition and monopolistic
competition is that with monopolistically
competitive firms, products
are differentiated and non priced
competition is common.
Reentry and exit means just that.
Additional firms may freely enter an
industry when prices and profits
rise and just as easily exit the industry
in the presence
of losses.
In order for this free entry condition to
hold there must be no barriers to entry.
Such barriers range from exclusive patents
and the
large capital requirements symptomatic of
natural monopolies to the
ownership of valuable resources, such as
the bauxite
reserves owned by Alcoa, the world's
largest aluminum producer.
The free entry and exit assumption is
important.
Because, as we shall see shortly it helps
ensure
an efficient allocation of resources over
the longer run.
Perfect or complete information means that
both consumers and producers will
be fully informed instantaneously of
market prices and any changes in prices.
This condition ensures that consumers will
always pay the lowest price available
because they will always know what that
price is.
It also ensures that if any one producer
makes a technological break through and is
able to
produce a product more cheaply, all other
firms
will be able to reuse the same technology
instantaneously.

[MUSIC]
At this point we have reviewed 4, of the major assumptions, of perfect competition. These assumptions, are important because the failure of 1, or more of them to hold, leads to imperfect competition. Imperfect competition, is a catch all term, that includes all 3 of the other major market structures, we will discuss. Monopoly, Oligopoly and a Monopolistic competition.

However, imperfect competition, is not the only possible market failure, associated with the failure, of the assumptions of perfect competition to hold.

Before we move on, let me quickly flag the other 2.

Perfect competition assumes, that the demand curve, accurately measures, the benefits of consumption to society, while the supply curve, accurately measures the cost of production to society.

If this assumption holds, what then must be the case, where the demand, and supply curves cross, in a competitive equilibrium?

This is a hard question, but the answer is interesting.

If the demand curve measures social benefits, and the supply curve measures social costs, then it must be true, that where the demand and supply curves cross, at market equilibrium, social benefits, must equal social costs.

As we shall see, this is an efficient outcome for society's resources.

Note however, that when this assumption fails, we have what is called the externalities problem.

Externalities, include things like pollution, and congestion, and in the presence of externalities, government intervention, like wise may be warranted.

Finally, perfect competition assumes, that the market demand curve, is the horizontal sum, of the individual demand curves.

I'm not going to explain, this in detail now, but what I want you to remember is that, when this assumption fails, we have what is called, the public goods problem.

Public goods, include things like, national defense, and roads, and bridges. And in the presence, of the public goods market failure, government may have to step in, and provide the goods.

Okay, let's stop, and assess where we are. I've just spent a fair amount of time, going over the very restrictive assumptions, of perfect competition. I've also indicated, that when 1, or more of these assumptions fail, there is a market failure.

I've taken a lot of time doing this, because the concept of market failure, is 1 of the most important, in all of economics.

In fact, the market failure concept is the theoretical foundation, upon which much of the economic rationale, for our modern government rests.

Indeed, this concept helps, explain a wide range of government activities, and agencies.

From the Pentagon, and the Federal Trade Commission, to the Environmental Protection Agency, and the National Institutes of Health.

[MUSIC]

Lets move on now to an analysis of the pricing and production rules under perfect competition.

And lets start with this question.

Given a market structure of perfect compettion, what kind of conduct with respect to pricing can we expect?

That conduct is captured in this equation.

Price equals marginal revenue, equals marginal cost.

Our task now is to prove this.

Of course showing that price equals marginal revenue is a piece of cake.

In fact, we are already did it in our earlier discussion in which we observed that the profit maximizing perfectly competetive firm is the price taker in the marketplace.

Therefore, the firm faces a horizontal, or a perfectly elastic demand curve.

So the firm's marginal revenue must be equal to price.

Having said that, lets go to the harder task, which is to show the profits are maximized when the firm sets marginal revenue to marginal cost.

This in fact is the profit maximizing rule, MR equals MC.

Let's demonstrate it first with the help of a table and then with a graph.

Here's the table, going through each of the columns and reminding yourself of the definition of each, is a good review of the last lecture.

Now see if you can fill in the empty boxes in the columns for marginal revenue, marginal cost and total profit, where total profit is simply total revenue minus total cost.

Does your table look like this?

So, looking at this table and applying our mr equals mc rule, at what price and quantity will profits be maximized?

To answer this question, notice the relationship between marginal cost and the price of $35 at an output level of eight, where price also equals marginal revenue.

Increase output from seven to eight has a marginal cost of $30.

Which is less than $35, so it makes sense to do so.

HOwever, increasing output from eight to nine has a marginal cost of $40 which is more than $35.

So it does not make sense to do so.

Therefore,eight8 units is the profit maximizing output.

Just as our MR equals MC rule indicated it would be.

As we shall see, this MR equals MC rule is an accurate guide to profit maximization for all firms, not just perfectly competitive ones.

In fact, the other portion of the equation, p equals MC is simply a special case of the MR equals MC profit maximizing rule for perfect competition.

Now here is a very interesting conclusion from our table.

If the profit maximizing firm always sets its output at a level where marginal cost equals marginal revenue, then it must be true that a firm's marginal cost curve must also be it's supply curve.

This is how this situation looks graphically.

Using the data from our previous table.

Now, how might you calculate the firm's profit, simply by looking at the graph?

Here's some options.

Did you get it right?

Profits are measured by A, B, C, D.

One way to think about this is that total revenue is simply price times quantity or the rectangle A, D, G, F.

Total cost then, is simply the average total cost or ATC times the quantity sold.

This yields the rectangle BCGF.

Subtracting it from ADGF gives us the green profit box ABCD.

Voila.

Now, suppose that instead of looking like this, the firm's ATC is actually a lot higher and looks like this.

This could happen, for example, if it had to pay higher wages or more for its raw

materials.

How much profit would the firm make now?

Did you get it right?

The firm suffers a loss of A, B, E, D.

Now, here's a harder question.

GIven the firm's loss, should it close its doors and go out of business?

If not, why not?

The perhaps surprising answer is that, at least in the short run,

the firm should remain in business even in the face of negative profits.

The reason has to do with what's called by varying names

as the shutdown rule, the shutdown condition, or the close-down case.

The shutdown point comes where revenues just cover variable

costs, or where losses are equal to fixed costs.

When the price falls below the level where revenues are equal

to variable costs, the firm will minimize its losses by shutting down.

To further understand this rule, remember that a firm must

still cover its contractual commitments even when it produces nothing.

That means in the short run, the firm must still pay fixed costs

such as rent, interest on bank loans, and salaries to key management personnel.

To illustrate the shutdown rule.

Suppose the firm in our example has fixed costs of $40.

The rectangle of loss only equals $20.

Clearly it is better off to continue to operate in the short run because

losses are minimized.

Put another way, what would you rather lose, $40 or $20?

Now here's a really tough question.

In light of the shutdown rule, how must we change our

definition of the firm's supply curve as it relates to marginal cost?

The firm's marginal cost curve is still at supply curve, but this is true

only for that portion of the marginal cost curve that lies above the AVC.

If you got this, go to the head of the class.

In fact there are lots of industries that go

through cycles of large short run losses without shutting down.

Knowing what you know about the shut down rule, which type of industry is likely to

incur such losses.

An industry with low fixed costs like coffee shops and dry cleaners or a

capital intensive industry with high fixed cost like automobiles and the airlines.

It's the capital intensive industry of course.

The higher the firm's fixed cost the most it has to by shutting down.

While a firm can lose money in the short run, no firm can keep doing it forever.

So what does the competitive equilibrium look like in the long run?

Take a look at this figure.

It illustrates that in the long run, a perfectly competitive industry will be in equilibrium where price equals average total cost.

At this point, firms will earn what economists call alternatively either normal profits or zero economic profits.

In order to understand this condition, let's first talk about what we mean when we say zero or normal economic profits.

To do so, let's go back to our distinction in the last lecture, between account profits, and economic profits.

Recall that accounting profits are calculated simply by subtracting total revenues and total costs.

Recall further that what is leftover after taxes is available to be distributed as dividends or kept by the firm as retained earnings.

Now suppose you go into business for yourself and in order to do so, you have to forego a $40,000 a year after tax salary.

That's the opportunity cost of your own resources of going into business.

Now if you wind up at the end of the year with accounting profits of $40,000.

You have earned zero economic profits because your accounting profits just cover your opportunity costs.

It likewise follows that if you wind up with less that $40,000, your economic profits are negative.

And more than $40,000 your economic profits are positive.

Now let's generalize this zero economic profits concept to businesses and investors.

Let's suppose that you have a $100,000 that you just inherited from a rich aunt in Paducah.

Who always thought you were a lovely child because you ate your broccoli.

What do you do with the dough?

Of course, you could blow it all on a Mercedes and a trip around the world, but suppose instead you decided to invest it.

What kind of rate of return on your funds can you expect?

Well, the conventional wisdom in economics is that if you invest your money in the stock market.

Over time, the inflation adjusted real rate of return on your investment will be roughly three percentage points.

Above the return you could've earned investing in risk free government bonds.

So after adjusting for risk, any investment yielding you that return would be considered a normal profit or zero economic profits.

And note here that your profit from an accounting standpoint isn't zero at all

You've simply been fairly compensated for your equity capital, no more and no less.

By the way, we'll talk more about some of these investment considerations in our lecture on capital.

With that said, let's go back to our long run equilibrium condition to illustrate market performance under perfect competition.

My claim is that in the long run, a perfectly competitive industry will produce where price equals average total cost at its minimum.

And earn zero economic profits.

The question of course is how does the industry remarkably wind up at the particular point?

The answer lies in one of our original assumptions, free entry and exit into the market.

Let's work this out together and let's start with the total market for widgets and the individual firm in short run equilibrium in this market.

Note that the equilibrium market price is $50.

Equilibrium quantity in the industry is 100,000 units and economic profits are zero.

Now, what do you think will happen to both

of these figures after a report comes out in the
American Medical Journal.
Showing that widgets can reduce the incidence of Alzheimer's disease among senior citizens.
Well, for starters, demand curve will shift outward, reflecting an increase in demand.
This will in turn, increase the firm's prices and marginal revenue
and lead to an increase of profit above the zero level.
But that's not all.
What happens next?
Because of the lure of high profits, additional firms will enter the industry.
What will this do to the industry supply curve, price and profits?
The correct answer is B.
Did you get it right?
Entry by new firms shifts the supply curve out and returns the industry to long run equilibrium.
This drives the price back down to $50 and economic profits back to zero.
So far so good.
But why does the process always stop at zero economic profits?
We'll think of the process in reverse.
Suppose that instead of extolling the virtues
of widgets as a cure for Alzheimer's.
The American Medical Journal had warned that
widgets significantly increase the risk of break cancer.
What would have happened to demand and supply and price and profits?
Take a minute to draw the adjustment process.
Demand shifts in.
Price goes down and so do profits.
In the short run, firms can incur losses.
But over the long run, they exit the industry.
This shifts the supply curve in, driving up
price and driving economic profits back to zero.
Thus, in the long run, perfectly competitive firms
earn a normal profit, no more and no less.
The importance of this conclusion about long run equilibrium lies
in its implications for the efficiency of the perfectly competitive market.
We can think of efficiency in at least two dimensions of market performance:
allocative efficiency and productive efficiency.

Productive efficiency occurs when price equals
minimum average total cost, the condition
of market conduct that holds when
a competitive industry is in long-run
equilibrium.

Productive efficiency, simply means that
the firm is using
the minimum amount of resources to produce
any particular output.

Implicit in this observation is that the
firm is also using
the best available, least cost technology.
If it doesn't, it will not survive.

Allocative efficiency is a slightly more
difficult concept and in
economics, you may encounter several
different definitions of allocative
efficiency.

One of the most cumbersome, describes
Pareto optimality,
the condition first identified by the
economist Alfredo Pareto.

An allocation of resources is pareto
optimal when no possible reorganization of
production can make anyone better off,
without making someone else worse off.

In this sense the concept of
allocative efficiency goes beyond the
productive efficiency
illustrated by our now familiar production
possibility frontier An economy is clearly
inefficient
if it operates inside the PPF and no one
needs
suffer or decline in utility by moving to
the PPF frontier.

Therefore, at a minimum, an efficient
economy is on its PPF.

Nonetheless, allocative efficiency goes
one step further and
requires not only that the right mix of
goods be produced, but also that these
goods
be allocated among consumers to maximize
consumer satisfaction.

Now, I know this all may seem a little
complicated.

Well let's not get confused.

All we are really talking about here is
the best possible allocation
of the a society's resources.

And knowing what we already know, it's
easy
to prove that perfect competition yields
this result.

For starter, we know that the demand curve
reflects
the willingness of a consumer to pay for
the product.

And under the assumptions of perfect
competition, it
therefore must reflect the social benefits
of that product.

At the same time, we know that the supply
curve
reflects the costs of production and
therefore must
reflect the social costs of producing the
product.

It follows that, in a perfectly
competitive market, equilibrium occurs
where supply intersects demand, so that
social benefits equal social costs.

Moreover, at this point of equilibrium,
the marginal
cost of production exactly equals the
marginal benefit, or
utility of consumption.

We know this to be true, because from
consumer theory, we know
that consumers choose purchases up to the
point where price equals marginal utility.

At the same time, we've already proven
that
in a competitive market, price will equal
marginal costs.

Therefore, MU must equal MC.

Now let me show you one more way of
looking at allocative efficiency.

Let's start by drawing a demand curve.

In economics, we call the area under the
demand curve, the consumer surplus.

This shaded triangle A, provides a dollar
measure of the difference between
what consumers would've been willing to
pay, and what they actually pay.

By the same token, there is a producer
surplus.

This shaded triangle, B, is the area above
the supply curve.

It measures the difference between the
price at which producers would have
been willing to supply a good and the
price they actually receive.

We can use the concepts of producer

and consumer surplus to measure both the efficiency
loss of a deviation from the perfect competition equilibrium, as well as its distributional implications.
Let me show you.
Here's the market for ice cream cones.
In a perfectly competitive equilibrium, at a price of
p sub e and the quantity of q sub e.
At this equilibrium,
what is the consumer surplus and what is the producer surplus?
Here are some choices.
The correct answer is B.
The consumer surplus is the triangle C.
And the producer surplus is the triangle E.
Remember, consumer surplus measures the difference between what can consumers would of been willing to pay and what they actually pay.
And the producer surplus is the difference between the price at which producers would have been willing to supply a good and the price they actually receive.
Now suppose a monopolist corners the market for ice
cream cones and raises the price to P sub m.
In this case, quantity falls to Q sub m.
Now, here's your first question.
What is the distributional of impact of this monopoly pricing on consumers?
The correct answer is A.
Consumers have to pay more for less quantity,
and the rectangle B is transferred to the monopolist.
That means consumers are poorer and the monopolist is richer.
Now here's the really big question.
What portions of consumer and producer surplus represent
the loss of allocative efficiency from monopoly pricing?
And let me give you a hint.
The efficiency loss on the consumer side comes from the
consumption of ice cream that is forgone, under monopoly pricing.
By the same token, the loss of efficiency on the producer's side comes about by a reduction in output and an under supply of resources to the ice cream market.
The correct answer is B.
The loss of consumer surplus is measured by the triangle C
while the loss of producer surplus is measured by the triangle E.
Together, the triangles C and E measure the
loss in allocative efficiency from the monopoly pricing.
Economists call this lost the deadweight loss.
Please remember that particular term, because you'll
hear a lot in microeconomics, deadweight loss.
From this example, you can see why people don't like monopoly, it not only transfers income from the many to the few, It also creates an efficiency loss in the process.
But we'll talk more about that in the next lecture.
[MUSIC]
For now, let's end this lesson with at least two, if not three cheers, for perfect competition.
In this regard, we've proven that a perfectly competitive market yields the most
efficient use and allocation of resources, as embodied in productive and allocative efficiency.
Yet still, there are several problems.
First, perfect competition is rarely, if indeed ever,
totally mirrored in reality.
There are just too many restrictive assumptions to be met.
And as we have discussed, when one or more of these assumptions fail, we get any one of a number of market failures ranging from
imperfect competition and externalities to the public goods problem.
So you might ask, if perfect competition doesn't
ever really exist (no period) Why study it?
Well, for one thing perfect competition gives us a benchmark
against which to measure how our other three market structures perform.
Monopoly, oligopoly, and monopolistic

competition.

It also gives us appropriate guidance as to when and how to intervene in the market to correct market failures, as well as how to measure our success or failure at doing so.

Which leads me to the other major problem with perfect competition.

While its results maybe efficient, they are not necessarily fair.

This problem in equity lies in this observation.

The efficient allocation of resources achieved by perfect competition is contingent on the initial distribution of income.

That means if you change the distribution of income, you can get a different efficient allocation of resources, and by implication, a different consumption pattern.

Let's meet less out this abstraction with an example.

Consider a country, like Guatemala, were less than 5% of the people control over 90% of the wealth.

The patterns of consumption in Guatemala, between the rich few and the many poor are likely to be starkly different.

While the rich few can afford huge villas and fancy clothes and fleets of limousines and eat steak every night, many of the poor peasants live in rags and shacks, eat beans and rice, and can't even afford to buy bicycles.

Now in a world of perfect competition, that can be a perfectly efficient outcome.

Yet, it is also true that if income were distributed more evenly in Guatemala, we'd see an equally efficient allocation of resources, but one with a very different structure of demand.

Indeed a lot more people could afford to buy more housing, and refrigerators and air conditioners, and motor scooters and small cars, while the consumption of villas and limos and steaks would go way down.

So, which of these two efficient outcomes do you believe is more fair?

That is a normative or prescriptive question, one that asks the question.

What should be?

I'd like to tell you that economists can answer such normative question, but I can't.

Deciding normative questions are more properly the domain of politicians and philosophers and votes at the ballot box, or revolutionaries in the jungle.

In contrast, the more proper role of the economist is positive or descriptive analysis, describing what is, rather than what should be.

Having said that, positive economics, nonetheless, can offer great insights about how different types of government policies can affect the distribution of income and consumption.

Therefore, positive economic analysis is essential in many normative policy debates.

In the next lesson, we'll provide considerable fodder for the great normative debates over imperfect competition.

In the meantime, please remember that economics is not something to be memorized but rather something to conceptualize.

So as you study it.

Think about it too.

Your job and your business just might depend on it.

[MUSIC]