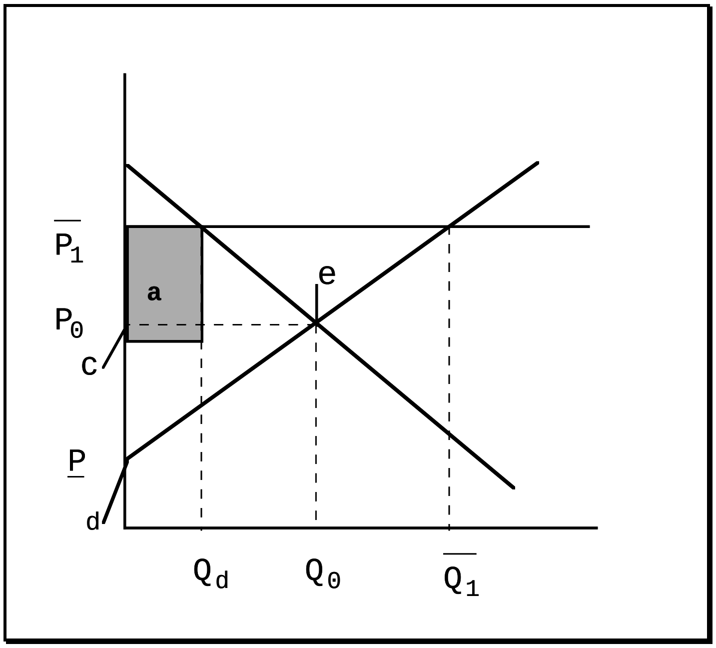
disequilibrium markets revisited

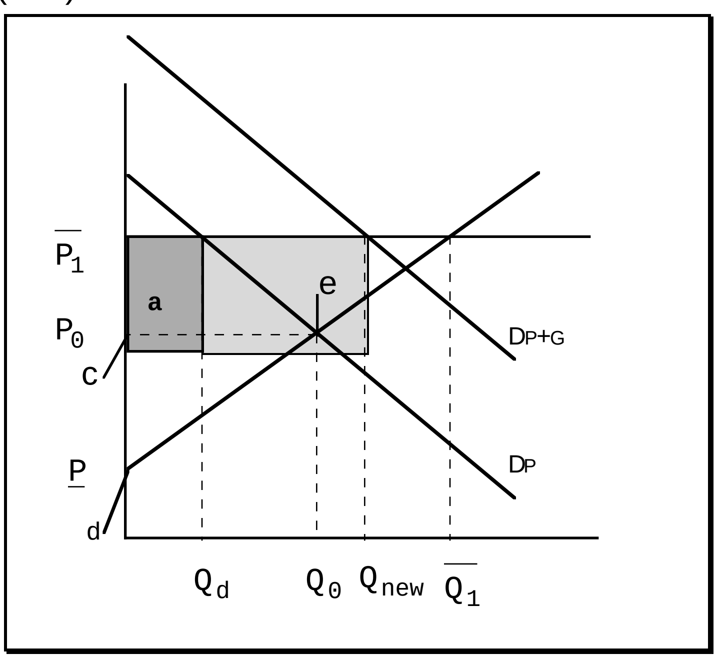


Situation here: oversupply. How do you handle the welfare effects here?

Consumer surplus is fine: do the normal analysis. Producer surplus is tricky, because we don't know who gets to produce.

There were 5 different approaches listed last time; one of them was RANDOM ALLOCATION. Here's how that works.

This is a labor market. All of the laborers $\overline{Q_1}$ are willing to work at $\overline{P_1}$. Each of them has a different surplus level. Assuming random allocation means assuming that everyone has the same chance of getting a job. That means that we use the average valuation of workers (where average is across the whole range of values $\underline{P}$ and $\overline{P_1}$. PS is shaded area a. PS is a-(ecd).

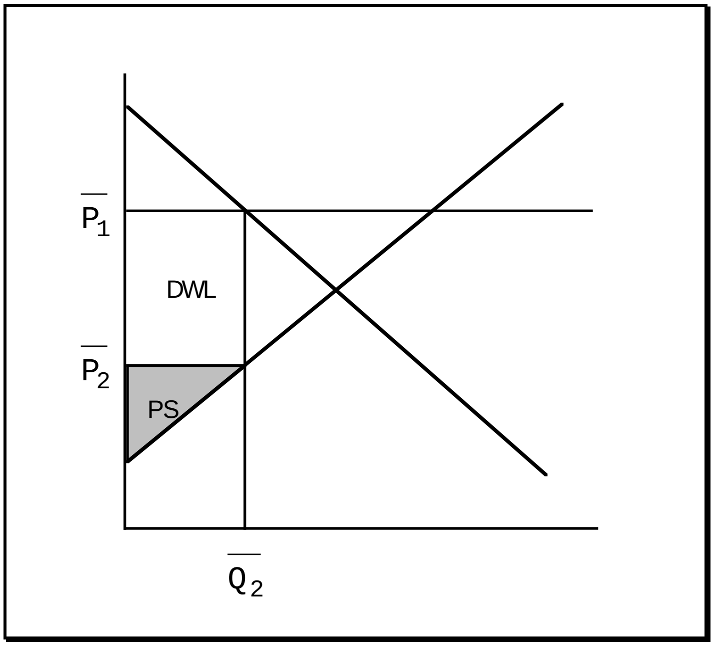


What happens when the government enters the market? Normally the price would rise, but here it doesn't; only Q changes. What is Q? Just the additional Q times the price (the plain gray area).

Note that putting people to work benefit claims for projects are most important in this scenario, where there's oversupply of labor.

When you don't know how the allocation is done, random allocation is probably the best assumption to make about the market.

What if you know that folks queue to get labor? Who's going to get selected?



Those with the lowest reservation price are most willing to stand in line; they will get there first/have most incentive to stand in line and they'll be the ones to get the available labor. The problem is that these people are paying for these jobs by waiting in line: the upper bound on the price they pay is, of course, the reservation price (if the wait in line is too long they'll go away). The question is how large is PS?

In a perfectly functioning market, all the people who have reservation prices lower than $\overline{P}_1$ will know fully how long they have to stand in line to fully realize their surpluses, they'll show up at exactly the right time (they'll all show up at the first time necessary because that's the only way to be sure to preserve their surplus). Anyone with a reservation price higher than $\overline{P}_2$ won't show up.

What this means for welfare: all those who get the jobs have inconvenience costs less than $\overline{P}_1$; in fact, the deadweight loss of standing in line is the difference between $\overline{P}_1$ and the highest price suppliers insist on at $\overline{Q}_2$ ($\overline{P}_2$). Those who don't show up won't lose anything here.

This isn't particularly realistic: there isn't perfect information, so there will be additional waste for those who show up and are disappointed. The time wasted could be so high that the entire PS triangle is absorbed by deadweight loss.

<u>We'll come back to this later. For now, on to DISCOUNTING (chp. 6)</u>

Suppose a project where costs and benefits come at different times (a construction project with building costs up front and returns to investment over time).

Memorizing formulas is most of the game, but sometimes there may be a condition that isn't reflected in the formulas you know. Then, knowing how they're derived allows you to adjust them appropriately, so that's why we're going to derive some of them.

<u>Basics</u>:
Think of a world where there's no banking or credit. How many oranges would you be willing to give up now to get 100 oranges later?
depends in part on your preferences on when you want to consume
depends on your expectations for today and the future (if there is disease in the orange tree, you'd be willing to pay a higher number of oranges now to get some later because you don't think you'll get any later otherwise, but if you know you'll get some future oranges you'd be willing to give up far fewer oranges to get some in the future).

Accounting for these dependencies would be very difficult (we'd have to ask everyone about both of them and hope they wouldn't have incentive to lie).

Fortunately, we do have credit markets so we have a measure of
We assume a single interest rate as discount rate, and that everyone can borrow and lend all they want to at that one interest rate. This, of course, is an approximation: lending is risky, so they build in a premium to cover losses for bad loans. We assume this premium, and thus the risk, away for now. Lending is also a moneymaking enterprise, so banks build in a premium to make profits. For now, we assume this away as well.

Therefore we have one interest rate/discount rate
    r = real interest (annual rate).

Knowing this, what is the value today of a dollar received one year from now?
    Value V1 of $1 one year from now is both the amount that you
        would have to lend in order to get a dollar a year from now

could borrow against it today.

Value in 1 year = principle + interest = $V1 + rV1 = \$1$
$V1(1+r) = 1$
$V1 = 1/(1+r)$

Value now of a dollar 2 years from now
$V2 + rV2 + r(V2 + rV2)$ = principle + interest year 1 + interest year 2
$(V2 + rV2)(1+r)$
$(V2)(1+r)(1+r)$
$V2(1+r)^2 = 1$
$V2 = 1/(1+r)^2$

General formula: $V = 1/(1+r)^t$

These formulas apply to both costs and benefits.

Suppose a stream of values X0, X1, X2, ...XT
The present value of this stream = $X0 + X1/(1+r) + X2/(1+r)^2 + ... + XT/(1+r)^T$

add summation notation

Note that for the zero term, we're raising the denominator to the zero power, which turns it to 1.

What should the formula look like if the real interest rate is different in different years? (Go back to the basics).

Formula works fine regardless of the signs of the Xs.

<u>THIS CHANGES THE FUNDAMENTAL PRINCIPLE</u> slightly: "Select the program with the highest *present discounted* net benefits." Winning projects in this scenario have a greater benefit return than you'd get if you kept the money and invested it.

Note that as long as your discount rate and your dollar values are in the same terms (real or nominal), you don't have to worry about the underlying inflation rate because it's already accounted for.

How will this apply? You'll have figured out a reasonable guess about the returns over time, select a discount rate (which we'll discuss later), and you'll plug it into the formula.

How do you get an idea of how these look? (Assume that the returns are equal size over time.)

Example 1: $Xt = x$ for all $t = 1,...,\infty$

$V = x/(1+r) + x/(1+r) + ... + x/(1+r)^\infty$

multiply the equation by $(1+r)$. After all the cancellation, you have

$V + rV = X + V$

$V = x/r$

This is the formula for the present value of an infinite stream of constant-value returns.

Example: $Xt = x$ for $t = 1, ... ,T$

$Xt = 0$ for $t>T$

$V = x/r\{1-(1/(1+r)^T)\}$

This is the formula for the present value of a finite stream of constant-value returns.