

Public commodities

erm: draft Dec.6, 2018

stuff related to chapter 17 in KW

Note that I have use the noun *commodity* rather than the noun *good*, as in *public commodity* rather than *public good*.

It is more precise to use the word "commodity" than the word "good" when discussing public commodities because many public commodities are goods for some members of society and bads for other members, the war in Iraq being one such example, Obama being President another, so for Trump as President.

1 Public Commodities defined:

I define public commodities as those commodities that are noncongestible and everyone consumes every unit of the commodity that is produced.¹ But, What the hell does this mean?

Some buildup and explanation for the above definition:

Public commodities possess the property that multiple agents can consume the same unit of the commodity.

That is, a public commodity is *noncongestible* in the sense that one agent's consumption of a unit does not preclude or impinge on another agent's consumption of that **same** unit.² Noncongestible is a necessary condition for a commodity to be a public commodity. It is **not** a sufficient condition. Another word for noncongestible is nonrivalous.

For example, ice-creme cones are congestible in the sense that if you eat a particular ice-cream cone, everyone else is precluded from eating that same cone. **If** ice-cream cones were **not** congestible, we all could eat, and enjoy, the same cone.

Another term for non-congestible is *non-rivalrous* (the term KW use) as we are not rivals for consumption of a commodity.

Examples of congestible and non-congestible in a bit.

¹Note that the inability to recuse oneself from consuming the commodity is only important if the commodity is, at least for some, a public bad rather than a public good. Most text books only talk about public goods.

²Many commodities are congestible: one person's consumption precludes consumption by another. Most of the goods and resources we have discussed in class, to date, are congestible.

All economists would agree that non-congestible is a necessary condition for a commodity to be a public commodity, but not a sufficient condition.

All would add the property of *non-excludable*, non-excludable meaning that once units of the commodity are provided to one agent no other agent can be excluded from consuming those same units. *Excludable* means an individual can be excluded from consuming those units of the commodity.

In terms of my magical nongestible ice-cream cone, non-excludable means that once the cone is there for you to consume, other people cannot be excluded from consuming that same cone.

In contrast, imagine a commodity that is non-congestible, but excludable. What does KW call these types of commodities? Public commodities? NO. KW call them *artificially-scarce goods*.

What is an example. Is Santa Claus on Christmas Eve an example of such a commodity?

Yes, the fact that he comes to one kid's house on Christmas Eve does not preclude him from going to your house: Santa can be at every kid's house. However, Santa can exclude your house if you are baad or do no believe in Santa. So, Santa on Christmas Eve is not a public commodity.

How about downloadable (or streaming) songs, movies, and apps, or cable television? While they are non-congestible, they are excludable. They are excludable because their signals can be scrambled so that one needs a decoder to unscramble the signal.

Economists would say that non-congestible and non-excludable are both necessary for a commodity to be a public commodity. Some economists would say the two together are sufficient (Krugman and Wells seem to be in that camp).

The definition of a public commodity can be further restricted by assuming, in addition to non-congestible and non-excludable, that everyone is **forced** to consume all units of the public commodity - one cannot recuse oneself from consuming the commodity. Note that this last condition does not require that all are affected the same, but does imply non-excludibility.

As I note above, I define public commodities as those commodities that are noncongestible and everyone consumes every unit of the commodity.³

³Note, again, that the inability to recuse oneself from consuming the commodity is only important if the commodity is, at least for some, a public bad rather than a public good. Most text books only talk about public goods.

Note, commodities are *public* are public because of their nature, not how economic activity is or is not organized. For example, a commodity that that is non-congestible in the U.S. is also non-congestible in Cuba; congestibility is a property of the good, not where it is located.

Goods that are provided by the government might or might not be public commodities. Most goods provided by the government **are not** public commodities.

2 Examples:

2.1 pretty good examples

The Donald, in his capacity as President of the U.S., is a public commodity in terms of who he is and what he does for me is who he is and what he does for you—we both experience his presidential acts.⁴ That is, once he is the President of the U.S. for me, he is for you as well, even if your are French—nothing you can do about it—his Presidency is the same for us all.

I once incorrectly imagined Santa Claus on Christmas Eve was a public commodity. His time on Christmas Eve is definitely not congestible, the fact that he makes it to my house, does not preclude him from making it to your house, so he has this property of a public commodity.

But, Santa coming to my house, since I was good, does not imply he makes it to your house—he might skip you because you are Jewish or Muslim. So, my consumption of a Santa visit does not force a Santa visit on you. He also might not come to your house because you were BAAAD.

One can be excluded by Santa. And, I guess, you can stop Santa from coming by being bad or by being sufficiently poor, or being Jewish.

We can all watch the same TV show on HBO, so the show is not congestible. But HBO can exclude you, so the show is not a public commodity. It is also not a public commodity, because my watching an HBO show does not require you to watch the show (if HBO has not excluded you, you can exclude yourself).

Global warming is a public commodity, a global public-commodity. If we burn a bunch of carbon to heat up the planet for me, it will also be hotter for you - nothing you can do about it. Another degree of global warming for me, is another degree for you.

Polar bears saved from extinction is a public commodity. If a stock of 10,000 is preserved, we all live in a world with this polar bear population, independent of whether you contributed, or not, to the World Wildlife Foundation.

⁴We are considering The Donald in his role as Commander in Chief not his role as husband and father. What he does with Melania stays with Melania, or in Vegas if they do it in Vegas.

2.2 Most things that are not public commodities

Most things are not public commodities

Private goods (congestible and excludable) are not public goods

Most goods that are provided by the government are not public goods. For example, roads and public schools are not public goods in the economic sense of the word.⁵ So we need to distinguish between public goods and goods provided by the government.

The atmosphere is not a public commodity. It is definitely congestible and no two individuals can consume the same unit of air. If air was noncongestible, pollution would not be a problem and everyone could breathe the same liter of air. (If access to the air is uncontrolled, it is a scarce common-property resource—remember that CP resources and public goods are different beasts—see the next lecture)

Being realistic, there are no pure public good and no pure private goods: consumption always has some effect, often small, on others. Even though my closet has no windows and is soundproof, the neighbor gets upset when I go into my closet and I try on Victoria Secret bras (somehow the neighbor just knows and is jealous).

⁵This should be an exam question. I think it is.

The classic textbook-example of a public commodity is national defense.

If we bomb ISIS in the middle east, this is a public commodity. We all have to live with it.

If a missile shield protects me from North Korean missiles, it protects everyone else as well.

3

3.1 The market is incapable of efficiently allocating public goods.

Their nature makes their efficient allocation by a market *impossible*

This is the heart of Public Economics. If you become an economics major, take a course in Public Economics.

Why can't the market efficiently allocate public commodities?

The main reason is that a potential producer of a public good can't make all those who benefit from its availability pay for it—this is called the *free-rider* problem.

That is, a private producer of a public good does not have the ability to charge each consumer for the amount she consumes: people won't freely pay for something if they can automatically get it for free when someone else pays the cost of production.

In more detail, societal efficiency dictates that all commodities be produced up to the point where the cost to society of the last unit produced (marginal social cost) is just equal to the benefits to society from the last unit produced (the marginal social benefits).

For public commodities, marginal social benefits are the **sum** of benefits all members of society get from the last unit produced.⁶

A private firm will produce units of the public commodity if they can make a profit doing so. so will will produce a public commodity only up to the point where marginal private cost of production equals their marginal **revenue**

But for public commodities marginal revenue will be way less than marginal social benefits: there is no way the firm can get all member of society to pay the amount that they each value the last unit produced because once a unit is produced everybody consumes it regardless of whether they pay. This is called the *free rider problem*.

Only an entity with the power to tax (the government) is capable of producing public commodities in the efficient quantities.

⁶For a purely private good only one member of society benefits from each unit, the individual consuming it, not everyone as with a public good.

If the public commodity is a bad for some, their benefits will be negative, and total social benefits will be the sum of positives and negatives.

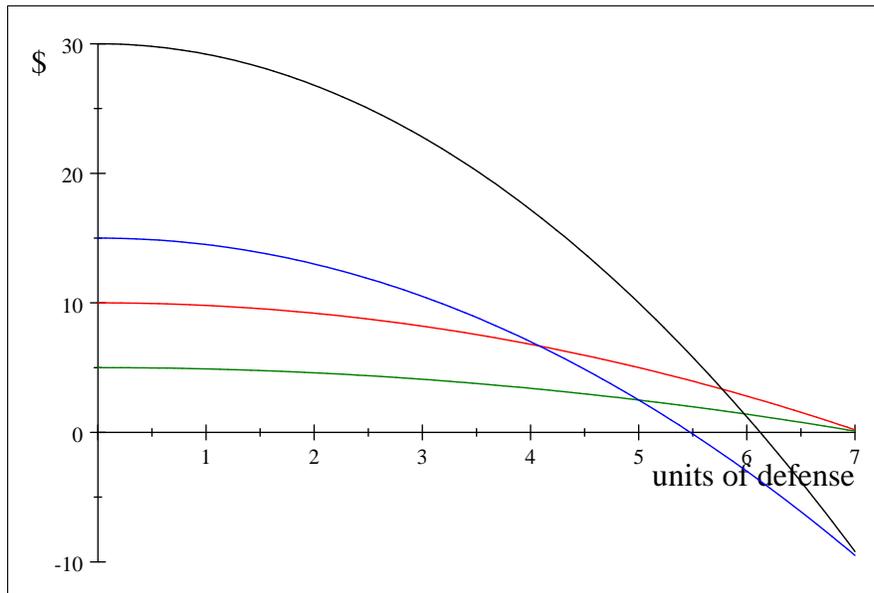
Imagine if ice-cream cones were public commodities; every time you buy and eat a cone I, and everyone else, consumes the same cone.

No way am I going to pay you or Hagan Daaz for my enjoyment of your cone, and Hagan Daaz is not going to produce the efficient number of cones from society's perspective. Assuming ice-cream cones are liked by all, the market will grossly under-produce them if they are public goods.

Imagine a society consists of three people where national defense is a public good. George's marginal benefits for cones is

$MB_G(d) = 10 - .2d^2$. For Alexa it is $MB_A(c) = 5 - .1d^2$ and for Fred it is $MB_F(c) = 15 - .5d^2$

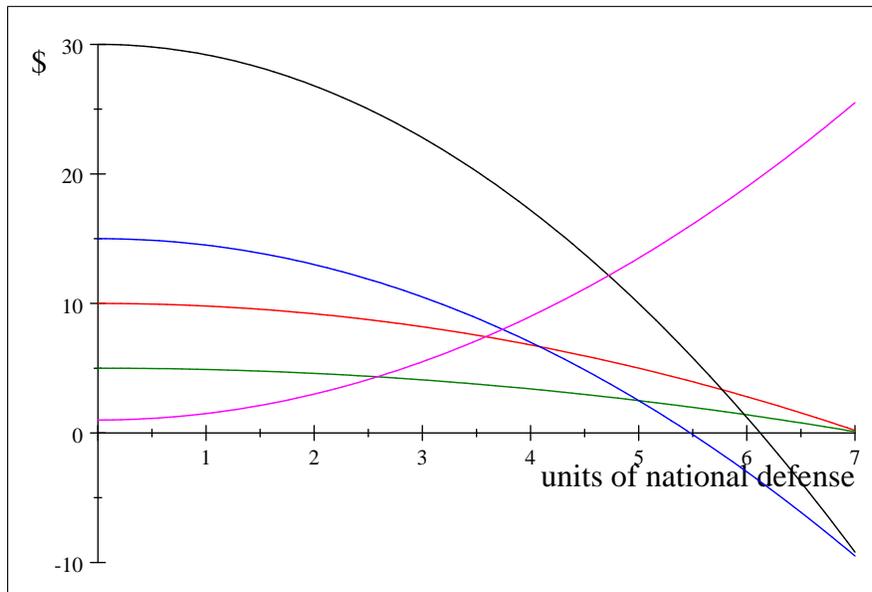
Keep in mind that they are all experiencing the amount of d that is produced.



Fred blue, Alexa green, George red

The black line is the marginal benefit to society from each additional unit of national defense, $MB_S(d) = 30 - .8d^2$. (it is the vertical sum of the three lines). Note how marginal social benefits from cones goes negative at a bit over 6 cones. Why is that?

Now include the marginal cost curve for producing units of national defense. Let's make it purple.



Fred blue, Alexa green, George red

The efficient amount of public-good cones is a bit less than 5 cones (where $MB_s(d) = MC(d)$).

If national defense these cones were sold by profit-maximizing firms less than 5 units would be produced, maybe even zero. To make it profitable to produce the 5th unit, the firm would have to get everyone to pay their marginal benefit from each additional unit, including the 5th unit.

Once the firm produces a unit of defense for one individual the other two automatically get it for free, so the other two cannot be compelled to pay for an existing cone.

As I said above, national defense is the classic example of a public commodity. To achieve the efficient amount the government has to determine the efficient amount and get it produced, forcing everyone to pay for it through taxes. The market fails when it comes to producing national defense and other public commodities.

Reducing global warming is another example, an example of a public bad. So reducing global warming is a public good. If China reduces their CO_2 emissions enough to reduce the increase in global temperature by one degree, everyone else in the world experiences that one-less-degree, and experiences it at a zero cost.

to them—the rest of us cannot be excluded and, in fact, are forced to experience the effect.⁷

Ditto if the U.S. reduces their CO_2 emissions. The efficient amount of global warming reduction will, likely, not be achieved because everyone will try and free ride on everyone else, a market failure.

⁷Note that countries like Russia and Canada will likely benefit from global warming.

One might view the consumption of a public commodity as an extreme type of externality. When I consume another unit of national defense, you are forced to as well, whether you like it or not, so there is an external effect



Environmental resources such as animal species and ecological systems can have a public-commodities aspect to them. Consider wolves. If wolves are reintroduced in Colorado, their presence will be cognitively experienced by all of us. My enjoyment from knowing that wolves roam Colorado does not preclude you from enjoying or hating the existence of those same wolves.⁸

Reintroducing wolves is like attacking Iraq; one citizen's loving it does not preclude others from loving or hating it, but we all have to live with it.

There are some environmental resources whose existence affects us even if we do not "use" or "consume" them in the traditional senses of these words.

I value the wilderness of Alaska even though I have never been there and have no desire to go – too cold and too scary. I feel the same about wetlands - I won't want to swim in a swamp with big snakes, but am glad there are swamps. I am not glad there are big snakes.

Wolves are a public commodity in terms of their non-use value (positive or negative).⁹

⁸The public commodity is the presence of the wolves. That said, if a wolf eats you (or one of your cows), that does not mean he is also eating me, so some aspects of their actions are not public in nature. The big bad wolf can do things that only affect rancher Rob.

⁹Non-use values are values you experience without having to take any appreciable action. E.g. you can value an ecosystem without visiting it: you value knowing it exists. E.g. You can value that we in the U.S. have free speech, without talking more or less that you would without free speech.

Something like a national Park such as Yellowstone produces both use and non-use values.



Different names for these types of values are non-use values, passive-use values and existence values. Such values can be positive or negative – I hate knowing snakes exist or that people in the Sudan are starving.

Existence is an aspect of a commodity that is public because my valuing the existence of the resource does not preclude you from valuing the existence of the resource, and, its existence is experienced by you whether you like it or not.

Many environmental resources have a public-commodity aspect in that they produce non-use values which need to be summed across individuals to get the social benefit of the resource. My being damaged by an oil spill in Alaska (or by the BP spill in the Gulf) or the destruction of the World Trade Towers did not preclude you from being damaged.

The government for the last few years was trying to collect damages from BP damages from the Gulf spill. Total damage would be the sum of the damages to all of us, even if most of us have not been to the Gulf. Damages to the American people are the sum of what each of us what would have been willing-to-pay to not have had the spill happen. BP recently settled this damage claim for approximately \$18 billion. (for many years I worked on this case)

One last thing about public commodities, make sure you understand the distinction between public resources and common property resources. The next lecture will on CP resources. This lecture is about public goods.