Increasing vs Constant Opportunity Cost
Econ 201/Haworth

Let's assume we have a country, we'll go with Country X since that seems to always be the country we use, and say that this country produces 2 different goods. We'll assume those goods are wheat and rye. Note that wheat and rye are both types of grass grown as grains, and are very similar in terms of appearance, how they are harvested, etc.

When we operate under the assumptions of the PPC model, we can say that the PPC of Country X is represented by the following table.

	A	**B**	**C**	**D**	**E**
Quantity of Wheat	200	150	100	50	0
Quantity of Rye	0	100	200	300	400

Assume that Country X is considering a change of production that involves moving from point C to point D (e.g. due to a change in demand). If we calculate the opportunity cost of rye, when the country moves from point C to point D, then we get the following.

Opportunity cost of each unit of rye as we move from pt C to pt D = 0.5 units of wheat

Suppose we calculate the opportunity cost of rye as this economy moves from pt B to pt C, or from pt D to pt E. If we do, then we discover that the opportunity cost associated with those changes would also be 0.5 units of wheat.

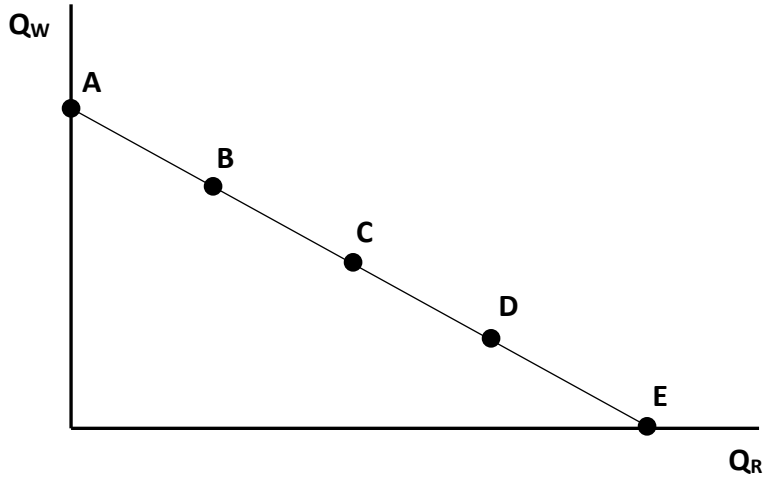
If we move back to point C from point D, the opportunity cost of each unit of wheat would be 2 units of rye. That is, we have the following:

Opportunity cost of each unit of wheat as we move from pt D to pt C = 2 units of rye

Similarly, suppose to calculate the opportunity cost of gaining wheat as we move from pt C to pt B, or from pt E to pt D. If we do this, then we also find that the opportunity cost of wheat between these other points is also 2 units of rye.

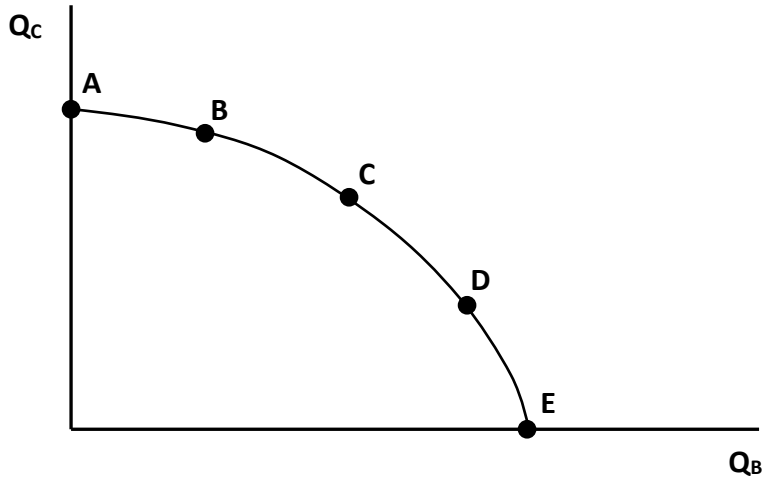
When the opportunity cost of producing a good is always the same, no matter which pair of points you move between, and this is true for both goods (i.e. the opportunity cost of gaining rye is always 0.5 units of wheat, and the opportunity cost of gaining wheat is always 2 units of rye), then we have constant opportunity cost.

Mathematically, we can see that the opportunity cost of a good is basically a calculation of the slope of the PPC, and so if the opportunity cost is constant, then the slope is constant – which means the PPC is linear. If we graph the values in our table we see that this is obviously true.



This graph is an example of a linear PPC (i.e. constant slope), which also makes this an example of a PPC that has constant opportunity cost.

Does the PPC exhibit other types of opportunity cost? Yes, it does. While there is no such thing as decreasing opportunity cost, a PPC can sometimes exhibit increasing opportunity cost instead of constant opportunity cost. When this happens, we have a "bowed PPC". E.g., assume that we have a country like Country Z that only produces 2 goods, computers and bananas. We'll put the quantity of computers (Q_C) on the vertical axis and the quantity of bananas (Q_B) on the horizontal axis. A bowed PPC would be one that has the shape on the graph below, where increases in the production of one good lead to Country Z giving up more and more of the other good. I.e., increasing opportunity cost.



All of this leads to us concluding that whenever we draw a PPC, the curve will always have a negative slope (i.e. the PPC will always demonstrate that every choice has an opportunity cost), but that slope can either be linear (constant opportunity cost) or bowed (increasing opportunity cost). What causes a PPC to reflect constant or increasing opportunity cost? We can answer that question by way of an example.

Constant Opportunity Cost. Consider Country X, where they produce wheat and rye. Both goods are considered grasses or grains, which suggests that the harvesting process for both goods is the same. If every individual laborer is the same as every other laborer, then we have a situation where all labor is homogeneous (i.e. identical). Let's assume that in one day, each laborer is capable of producing 2 units of wheat or 4 units or rye.

Assume that Country X is only producing wheat, but that this country decides to produce more rye. To do so, Country X must move laborers out of wheat and into rye. When Country X moves the first laborer over to rye, Country X will lose 2 units of wheat, but gain 4 units of rye. If Country X moves another laborer over to rye, then Country X will lose another 2 units of wheat, but gain an additional 4 units of rye. This would continue until Country X is only producing rye at point E on our table. I.e., in order to gain any amount of one good (e.g. gain 4 units of rye), Country X will give up a set amount of the other good (e.g. lose 2 units of wheat).

This tells us that the opportunity cost, as we move along the Country X PPC will be constant. Why is it constant? Because every unit of labor is identical (i.e. homogeneous) in that all of them are capable of producing a set combination of wheat and rye on any given day. When the factors producing our 2 goods are homogeneous, we have constant opportunity cost.

Increasing Opportunity Cost. In Country Z, we have computers and bananas. Consider the labor you use to produce computers. Here, we will assume that laborers come in different heights and that this affects their ability to produce computers and bananas. E.g., assume that short laborers tend to be very good at producing computers, and that tall laborers are good at producing bananas. In one day, short laborers can produce 10 units of computer or 1 unit of banana, whereas tall laborers can produce 2 units of computer or 12 units of banana.

Let's assume that Country Z is producing at point A on the second graph (i.e. only producing computers). If Country Z decides to increase banana production, then they must pull labor out of computer production and place that labor in banana production. In doing so, Country Z must also decide which type of labor to move over to bananas. Of course, Country Z will first move a tall laborer from computers to bananas. When they do this, they will lose 2 units of computer, but gain 12 units of banana. As they continue to increase banana production (and decrease computer production), they will keep moving tall laborers over to bananas until there no tall laborers left in computer production.

If Country Z is at this point and wishes to get more bananas, then they must start moving short laborers from computers to bananas, since only short laborers remain in computers. When the first short laborer is moved to bananas, what happens? Country Z gains loses 10 units of computer and gains 1 unit of bananas. In other words, when Country Z sought to gain bananas, Country Z started out losing 2 units of computers when moving tall people out of computers and into bananas, but ended up eventually losing 10 units of computer when the short labor was moved to bananas. To put that another way, the opportunity cost of each additional banana eventually increased as we produced more and more bananas.

When opportunity cost is increasing as more of a good gets produced, we see the slope of the PPC change by greater amounts. I.e., as we move along the horizontal axis to the right on the second graph above, we see larger and larger downward decreases in the PPC (i.e. it gets steeper). As we move up the vertical axis toward more computers, we see sharper and sharper leftward decreases in the PPC. This is what happens with a PPC that exhibits increasing opportunity cost. We get this result when the factors which produce these 2 goods are not identical, but possess different skills or abilities. I.e., we get increasing opportunity cost when factors are heterogeneous (i.e. not identical).