Business Education & Accreditation
Vol. 12, No. 1, 2020, pp. 13-26
ISSN: 1944-5903 (print)
ISSN: 2157-0809 (online)

IBFR
www.theIBFR.COM

A PRIMER ON TRADE: REQUIRED CONDITIONS, GAINS, AND CONSEQUENCES

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ABSTRACT

This paper is intended to teach students, business managers, and policy makers about the fundamentals of trade. Whether it is between countries, firms, or individuals, the basics are universal. We start by describing the production possibility frontier. This frontier defines the combinations of maximum possible outputs in a two product system. Such a model can be expanded to more than two products; however, the two product model demonstrates the important aspects of production and avoids unnecessary complexity. Next, we introduces the concept of consumer preferences as this societal attribute determines what is eventually produced and consequently consumed in a closed system without trade. The no trade restriction is then relaxed and the potential advantages of trade are highlighted. Product price ratios must be within a suitable range to allow trade because traders do not typically trade their products directly for other products. These concepts are demonstrated with appropriate graphics. The next two sections state conclusions and policy implications. The paper concludes with suggestions for assessing student learning outcomes. At the end of the paper, there are several example practice problems and solutions related to the paper's content.

JEL: A22, F120, F410

KEYWORDS: Undergraduate Teaching, International Trade

INTRODUCTION

In today's world of commerce, trade (both domestic and international) is integral. The purpose of this paper is to inform the reader of the bases and benefits of international trade because many senior business students, as well as many seasoned business managers, do not fully understand the underlying requirements, advantages, and numerous other facets of trade. This appears especially true in the current political environment given the propensity of politicians to threaten international trading partners with tariffs and quotas. This paper is timely given the present geopolitical trade environment. For example, the recent retaliatory tariffs imposed by China on American grown soybeans have reduced that market 72 percent during the October 2018 – May 2019 period compared to the previous like period. During 2017, US soybean exports to China were valued at $12.3 billion. (Both sources: Economic Research Service of the USDA.) For beneficial trade to occur, certain economic conditions must exist. However, even if the proper economic conditions exist, they are necessary conditions but not sufficient conditions. In addition to the necessary economic conditions, prices and exchange rates must be in place to support trade. This paper outlines and discusses the necessary economic conditions for beneficial trade and then shows why supporting prices and/or exchange rates are also necessary for desired trade to occur. The next section of the paper provides a brief literature review. The third section is a presentation and discussion of the production possibility frontier (PPF). The fourth section combines the PPF with societal preferences. The fifth section introduces the concept of appropriate product prices that support international trade. The sixth and seventh sections state conclusions and policy impactions derived from the previous three sections. The final section contains suggestions that should allow for accessing student learning outcomes. Also, the final

section includes three example practice problems and solutions that illustrate many of the topics discussed in the paper.

LITERATURE REVIEW

The origin for much of the literature surrounding the concepts featured in this paper come from early 19th century writers such as Robert Torrens and David Ricardo. The theory of comparative advantage is a crucial component of this paper and is well described in Ricardo's seminal work, *On the Principles of Political Economy and Taxation* (1817). In this book, Ricardo is one of the first advocates for free markets and unrestricted international trade. Building upon these beginning, much of the theoretical framework for this paper is based on the Heckscher-Ohlin Theory. The basis of this theory is found in models developed by two Swedish economists - Eli Heckscher and his graduate student, Bertil Ohlin. (See Heckscher, Eli. 1919. "The Effect of Foreign Trade on the Distribution of Income." In *Ekonomisk Tidskrift*. p. 497-512. Bertil Ohlin first explained the theory in a book, *Interregional and International Trade*, published in 1933. Ohlin wrote the book alone, but he credited Heckscher with many of the model's core components, which were derived during Heckscher's prior work. (Heckscher supervised Ohlin's doctoral thesis; from which many of the ideas in the final Heckscher-Ohlin model originated.) Their work has been examined and expanded by many later writers.

Many writers and researchers have since extended these earlier works. First published in 1984, the Handbook of International Economics, edited by Ronald W. Jones and Peter B. Kenan, explains international trade and the results of these transaction. Some of the topics addressed in the first volume of this handbook are: prices for goods and input factors, resource allocation, income distribution, and other microeconomic aspects of international trade. The second volume addresses balance of payments, exchange rate determinants, and other macroeconomic aspects of international trade. A more recent Federal Reserve Bank of Dallas working paper by Giri, Yi, and Yilmazkuday (2018) is technical in nature. It attempts to determine whether higher gains from international trade are derived from more (rather than less) sectorial heterogeneity. In the process, the authors develop a trade model with multiple countries and multiple sectors. Peter Kallis (2015) tested for value-added real actual exchange rates as the result of international trade by countries with higher degrees of vertical specialization. He found no relationship in the short run, but evidence in the long run for countries with higher levels of vertical specialization.

The Production Possibility Frontier (Ppf): Firms, as well as countries, have choices as to *what* goods and services to produce. They also have choices as to *how much* of each selected good and/or service to produce. Nevertheless, these choices are always constrained by the physical, and perhaps the cultural, realities associated with the current sphere of operation. The physical restrictions generally reflect resource scarcities, but could be such things as a shortage of space to engage in the preferred economic activity. In addition, consumption preferences also guide production choice through the efficient exchange of goods and services in competitive markets. For the purposes of this paper, we ignore cultural restrictions such as religious and ethical preferences of the decision makers.

To demonstrate, let us assume a particular country decides to produce two products: personal computers (PCs) and TV sets (TVs). Given these two products, the country could decide to produce all PCs and no TVs or it could decide to produce all TVs and no PCs or a combination of the two. Furthermore, let us assume the resources to produce each are similar and interchangeable. How many PCs and how many TVs the country can produce is limited because the resources required to make them exist in limited amounts.

Figure 1: The Combined Production Possibility Frontier. The Production Possibility Frontier

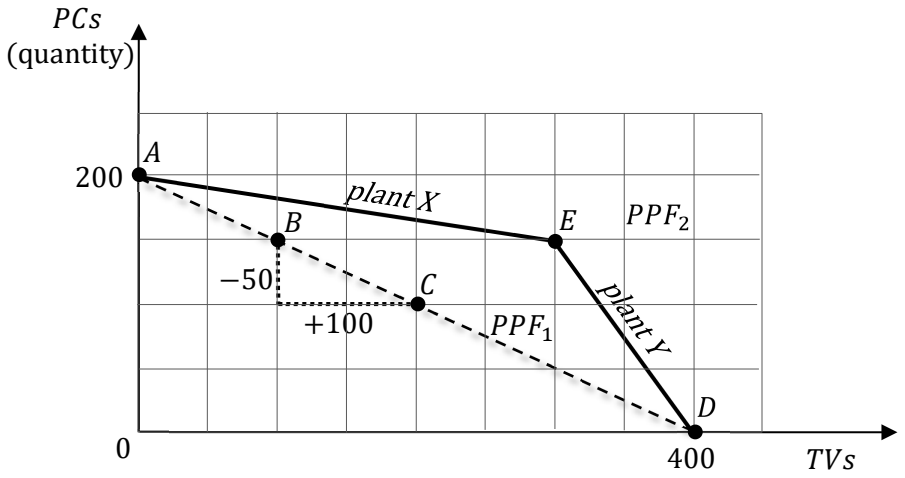


Figure 1: The Combined Production Possibility Frontier. PPF_1 is a linear production possibility frontier between points A and D. PPF_2 is a two-segment frontier that represents how the linear trade-off in production within two different production plants are joined to form a combined production possibility frontier.

To further this example, let us assume the country can produce a maximum of 200 PCs, if all of the available resources are devoted to the production of PCs and none to the production of TVs during a specific period (maybe one day). Likewise, if all of the available resources are instead devoted to the production of only TVs, then a maximum of 400 TVs can be produced. With these extremes, the simplest production trade-off between PCs and TVs is linear where one PC is equivalent to two TVs. Please see the dotted straight line in Figure 1. When all of the country's resources are efficiently put to task, there are literally 201 combinations of production such as 150 PCs and 100 TVs (point B) or 100 PCs and 200 TVs (point C), etc. The trade-off between PCs and TVs is described by the slope of the line $ABCD$ and is one PC for every two TVs. This ratio (1:2) may be because it takes twice as many hours of labor to produce a PC as it does to produce a TV, or because of some other constraint or production reality. Furthermore, the dotted line represents maximum production possibilities and is therefore known as the linear production possibility frontier (PPF_1). Any combination of PCs and TVs produced along the frontier requires the efficient use of the country's resources. If production of PCs and TVs is inefficient, production will be below and to the left of the dotted line. Efficient production combinations of PCs and TVs are only on the dotted line.

The dotted line PPF_1 is perhaps the simplest production possibility frontier model as it defines all of the possible combinations of PCs and TVs that can be efficiently produced by the country, but it is also the least realistic. Following the dotted straight line, if one PC is forgone, an additional two TVs can be produced at any point along the line (the slope of the dotted line). However, in the real world, the productivity trade-off seldom remains constant. If all production is devoted to PCs, giving up a few PCs in order to produce TVs would most likely result in more than two TVs being produced for every PC given up. This is because the most productive TV producing resources would be employed first when converting to TV production. But, as more and more TVs are produced by giving up more PC production, the conversion rate would decrease according to the law of diminishing marginal returns. (According the *Investopedia*, the law of diminishing marginal returns states that, at some point, adding an additional factor of production results in smaller increases in output. Read more: Law of Diminishing Marginal Returns.)
To better demonstrate the law of diminishing marginal returns, let us assume the production of PCs and TVs is accomplished by two plants – plant X and plant Y. Assume further they are different with respect to their ability to convert from producing PCs to TVs. For example, if plant X converts from producing PCs to TVs, it can forego one PC and gain six TVs. However, if plant Y converts from PC production to

TV production, it gains only two thirds of one TV for every PC foregone. This would imply the PC-only capacity for plant X is 50 PCs per day and for plant Y it is 150 PCs per day. And, the TV-only capacity for plant X is 300 TVs per day while TV only capacity for plant Y is just 100 TVs per day. If we assume the plants use the same amount of resources, then plant X has an absolute advantage in producing TVs and plant Y has an absolute advantage in producing PCs. Since plant X only has to reduce production of PCs by 1 unit to gain six TVs compared to plant Y's conversion performance, plant X has a comparative advantage in producing TVs. By looking at the problem the other way and referencing the inverse-slope of both lines, plant X will gain only one-sixth of a PC for every TV it foregoes while plant Y will gain one and a half PCs at a cost of one TV. Therefore, plant Y has a comparative advantage in producing PCs. A country can use comparative advantage to allocate resources and production efficiently between the two plants. The result is the combined production possibility frontier PPF_2 shown in Figure 1.

The "kinked," solid line of Figure 1 depicts the more realistic PPF_2 which incorporates the law of diminishing marginal returns at the "kink" (point E). The "kinked" PPF_2 is the new, more realistic, schedule of all the combinations of PC quantities and TV quantities the country can produce efficiently given the difference between plant X and plant Y described in the previous paragraph. It is more realistic in the sense that if the country wants to produce TVs and forego some PCs, the country will chose to convert plant X to TV production before it will convert plant Y to TV production. That is because the opportunity cost (what must be given up to produce one TV) is lower for plant X than it is for plant Y. (1/6 of a PC vs 1.5 PCs). This means that plant X has a comparative advantage in producing TVs relative to plant Y. In other words, to convert from one product to another product, the best choice is to covert where the opportunity cost is lowest. Again, points below and to the left of the kinked PPF_2 represent inefficient production combinations. Additionally, any points above and to the right of PPF_2 are beyond the production capability of the country. In a closed economy, PPF_2 also describes the limit of consumption.

Societal Preference Combined with the *PPF*

In a more complex world, there would be many, many "kinks" and this would result in the curved production possibility frontier PPF_3 that is concave to the origin, similar to curve AFD of Figure 2. In this case, societal preferences are a function of the quantities of PCs and TVs consumed by the society. Not shown in Figure 2 is a family of iso-preference curves, all of which would be convex to the origin. Each iso-preference curve represents a different level of societal satisfaction from consumption (i.e. standard of living). The further away from the origin, the more societal satisfaction or higher the standard of living. One, and only one, of these iso-preference curves (u_1) is exactly tangent to the PPF_3 at F. Point F represents the optimal combination of PCs and TVs that is both desired by the society and possible due to domestic production limits. Therefore, if the society is producing at any point other than F along PPF_3, consumption preferences will alter relative prices in competitive markets, forcing production to point F on the PPF_3. The slope of any straight line tangent to PPF_3 represents the relative prices of PCs vs. TVs at that point on the production possibility frontier. However, due to society preferences, equilibrium is not established until production moves to point F. At that point, the relative prices of PCs to TVs exactly match the relative prices that will maximize societal benefit (standard of living). This is depicted by the slope of the line tangent to both the PPF_3 curve and tangent to the iso-preference curve u_1. The relative prices are given by the slope of straight line w_1. In other words, production at any point other than F will create relative prices that are inconsistent with maximizing societal preferences. Pressure on prices, brought on by the purchasing choices of domestic consumers, will change production quantities of PCs and TVs until societal preference is maximized, given the limits of production resources, at point F.

Figure 2: A Closed Economy Equilibrium. Societal Preference without International Trade

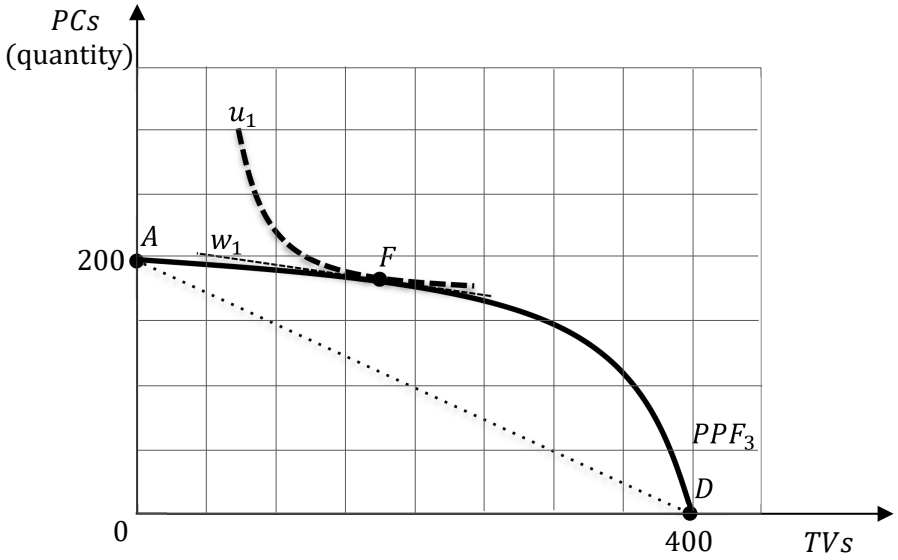


Figure 2: A Closed Economy Equilibrium. PPF_3 is a concave production possibility frontier between points A and D that represents the non-linear trade-off in production when many different production plants are sourced to form a combined production possibility frontier. Point F is where consumption preferences are maximized and in equilibrium with efficient production in a closed economy.

Up until this point, we have assumed a closed economy, which means no trade with entities outside of the country. However, if trade is possible, a country's consumption can become free of the production limits imposed by its PPF_3. In Figure 3, the slope of the straight line w_1 (the domestic wealth budget line) represents the relative domestic prices between PCs and TVs inside the country. But, if trade with the rest of the world is possible, world prices for PCs and TVs will most likely have a different ratio. Referring to Figure 3, line w_2 is one of a family of parallel straight lines (not shown), all with the slope of the relative world prices for PCs and TVs. However, w_2 is the only one that is tangent to the domestic country's PPF_3. The difference in domestic and world price ratios is shown as the different slopes of line w_1 and line w_2.

Figure 3: An Open Economy Where Standard of Living is Maximized Through Trade. Societal Preference with International Trade

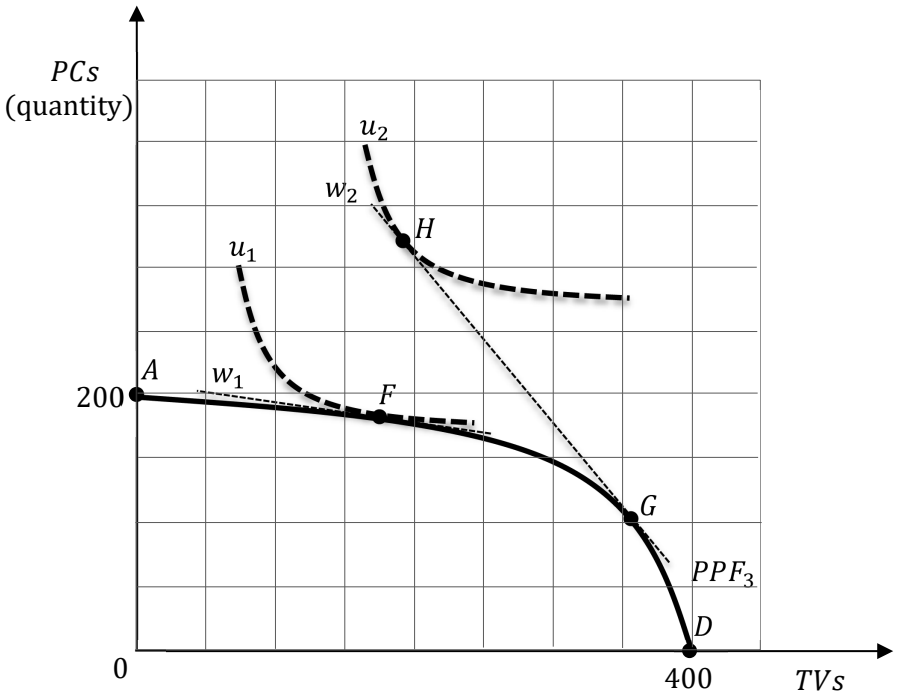


Figure 3: An open economy where standard of living is maximized through trade. In a closed economy, the iso-standard-of-living curve u_1 is achieved at point F along PPF_3 where consumption preferences are in equilibrium with efficient production tangent to the domestic price ratio (the slope of w_1). In an open economy, point G is where production coincides with the world price ratio (the slope of w_2). The country can produce at point G and trade internationally along the wealth budget line w_2 to increase their standard of living to u_2 at point H.

If the country can engage in the world trade of PCs and TVs, production should slide from point F to point G. Relative world prices will cause domestic production to move from point F to point G much like domestic consumption preferences influenced domestic relative prices and caused production to move to point F without world trade. At production point G, the country can trade up the straight line w_2 to point H. To do this, the country would produce excess TVs to trade for foreign PCs. Point H is at the point of tangency with u_2. As stated before, there is a family of iso-preference lines with higher levels of preference the further the distance from the origin so that the country prefers to consume anywhere on u_2 more than u_1. Iso-preference curves, other than u_2, are either unattainable (even with trade) or provide lower levels of societal benefit (i.e. a lower standard of living). The end result is, the higher standard of living at point H is because the society can now consume a larger combination of PCs (~320) and TVs (~190) than at any point on the PPF_3, which would be the case without world trade.

Necessary Prices for Trade

Figure 3 implies that a country trades exported goods and services for imported goods and services. In reality, the producer of exported goods and services wants to be paid in local currency, not in other imported goods and services. This is so production expenses can be paid in local currency. Therefore, w_2 has a slope that represents the relative world prices for PCs and TVs. Consequently, currency exchange rates must support international trade. Said differently, different opportunity costs are necessary conditions for international trade, but not sufficient conditions. Different opportunity costs must also be accompanied by accommodating currency exchange rates for international trade to occur and to be sustainable.

Currency exchange rates are determined by the supplies and demands for various national currencies. Currency supplies and demands come from such things as total international trade – not just two products between two countries as is the example in this paper. Other forces impacting currency exchange rates are the various national monetary policies and market conditions in the numerous worldwide capital markets. Therefore, currency exchange rates are the result of many, many factors and their complex interactions. All of these aspects of currency exchange rate determination are beyond the scope of this paper. Nevertheless, it should be noted there is a range of possible exchange rates that will support international trade in a particular good or service. This phenomenon could be depicted in Figure 3 by different slopes for w_2, the wealth budget line, as long as the slope of w_2 is different than the slope of w_1.

CONCLUSIONS

Our goal was to provide a framework for understanding the requirements and conditions that foster meaningful international trade. This we have attempted to do using a simple example of two products (*TVs* and *PCs*) and a series of graphs that depict moving from the basic production trade-off to production with increasing marginal opportunity costs and from a closed domestic market to a world market with free international trade. The primary conclusion is quite straight forward. If we can trade with partners that have different opportunity costs, our country can enjoy a higher standard of living with trade than without trade. The basic reason for this conclusion is a given country can produce specific goods and services, for export, at a lower cost, in real terms, than other countries. Being able to do this allows for said country to import more desired goods and services than can be produced internally, even though said country may be able to produce all types of goods and services for domestic consumption. **A**t best, tariffs (and similar trade restrictions) should be temporary measures. They should probably be put into place to ease the transition from a closed economy to one that is engaged in free world trade.

Policy Implications

Unfortunately, to various degrees, real-world bounds prevent the realization of the actual benefits stated in our conclusion. In addition to transportation challenges and cultural restrictions, these include obstructions, such as tariffs, quotas, isolationism, and artificial currency exchange rates. Therefore, policy makers and business leaders must innovate and work to eliminate these barriers, if the full promises of worldwide free trade are to be attained. Consequently, more research is called for to create work arounds and to reduce the impediments to international trade. These efforts may take place in the fields of Finance, Economics, Political Science, Operations Management, etc.

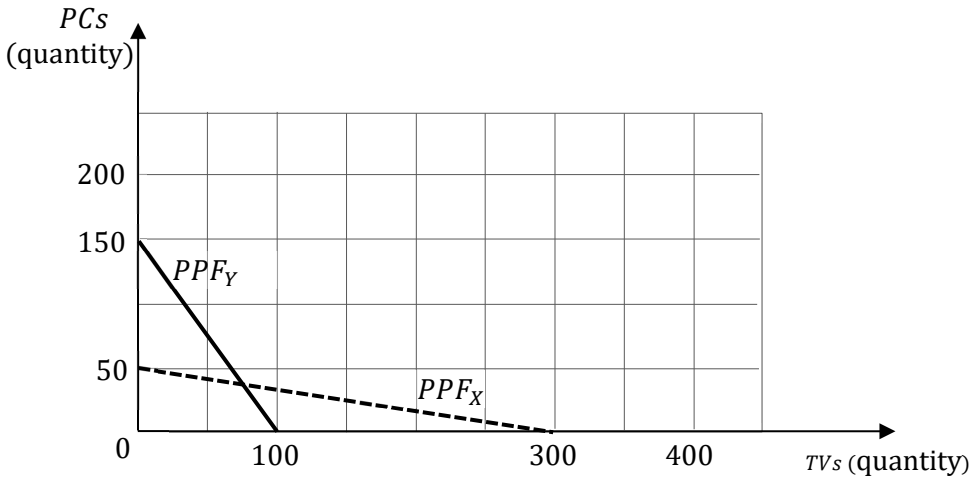
Assessment with Practice Problems

After presenting the contents of this paper, the instructor can assess the knowledge gained by his or her audience using the following three practice problems and associated solutions. The practice problems can be assigned as out of class homework or as an in class exercise and can be graded or non-graded. Regardless of the approach, after students complete their solutions to the problems, the instructor can show the authors' solutions. The assessment can conclude with discussions that address a variety of related topics.

Example Trade Problems with Solutions

1-A country has two production plants that can trade-off manufacturing personal computers (PCs) and televisions (TVs) at a constant rate. For the same amount of resources, the production possibility frontier of plant X is given by PPF_X and the production possibility frontier of plant Y is given by PPF_Y in the figure below.

Figure 4: The PPF's of Two Production Plants, PPF_Y And PPF_X, for Pcs and Tvs. Graph for Problem 1



a-Which plant has an absolute advantage in producing PCs and why?
b-Which plant has an absolute advantage in producing TVs?
c-Calculate the opportunity cost of plant X to produce one additional TV.
d-Calculate the opportunity cost of plant Y to produce one additional TV.
e-Which plant has the lower opportunity cost and hence has a comparative advantage in producing TVs?
f-Calculate the opportunity cost of plant X to produce one additional PC.
g-Calculate the opportunity cost of plant Y to produce one additional PC.
h-Which plant has the lower opportunity cost and hence has a comparative advantage in producing PCs?
i-Draw a *Combined* PPF into the figure above that shows the production possibility frontier of the country when both plants are producing efficiently.
j-If the country prefers to produce and consume 150 TVs,
i-what is the maximum number of PCs the country can both produce and consume at the same time? Label this point A on the *Combined* PPF.
ii-what is the total number of PCs and TVs plant X will have to produce? Label this point B on PPF_X.
iii-what is the total number of PCs and TVs plant Y will have to produce? Label this point C on PPF_Y.

Solutions to Problem 1

a-Plant Y has the absolute advantage in producing PCs because they are able to produce more PCs than plant X with the same amount of resources when only PCs are being produced (along the vertical axis).

b-Plant X has the absolute advantage in producing TVs as shown along the horizontal axis.

c-Use the slope to calculate the opportunity cost of the variable on the horizontal axis

$$\text{Opp Cost of TVs for plant X} = \frac{-50 \text{ PCs}}{+300 \text{ TVs}} = -\frac{1}{6} \text{ PC per one TV.}$$

d-Use the slope to calculate the opportunity cost of the variable on the horizontal axis

$$\text{Opp Cost of TVs for plant Y} = \frac{-150 \text{ PCs}}{+100 \text{ TVs}} = -1.5 \text{ PC per one TV.}$$

e-Plant X has the comparative advantage. It only gives up 0.167 of a PC to make one TV compared to plant Y that must give up 1.5 PCs. Said another way, plant X can produce six TVs by giving up one PC but plant Y can only produce 2/3 of a TV by foregoing the same.

f-Use the inverse slope to calculate the opportunity cost of the variable on the vertical axis

$$\text{Opp Cost of PCs for plant X} = \frac{-300 \text{ TVs}}{+50 \text{ PCs}} = \ -6 \text{ TV per one PC.}$$

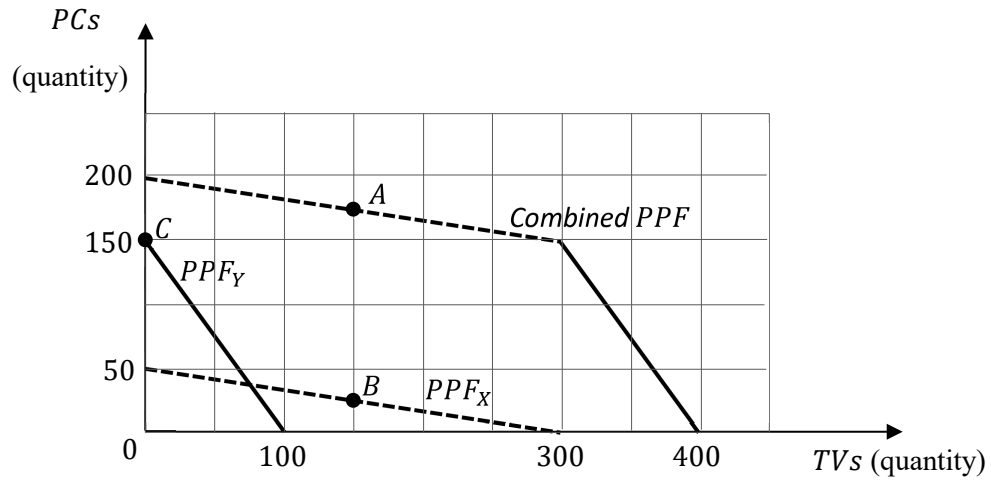
g-Use the inverse slope to calculate the opportunity cost of the variable on the vertical axis

$$\text{Opp Cost of PCs for plant Y} = \frac{-100 \text{ TVs}}{+150 \text{ PCs}} = \ -2/3 \text{ TV per one PC.}$$

h-Plant Y has the comparative advantage. It only gives up 0.667 of a TV to make one PC compared to plant X that must give up 6 TVs. Said another way, plant Y can produce 1.5 PCs by giving up one TV but plant Y can only produce 1/6 of a PC by foregoing the same.

i-Graphic Solution for Problem 1i

Figure 5: The Combined PPF of Two Production Plants with Production Levels A = B + C.



j. If the country prefers to produce and consume 150 TVs,

i-From the graph, when the country is producing 150 TVs, the maximum number of PCs that can be produced along the Combined PPF is 175 PCs. This is shown as point A on the graph.

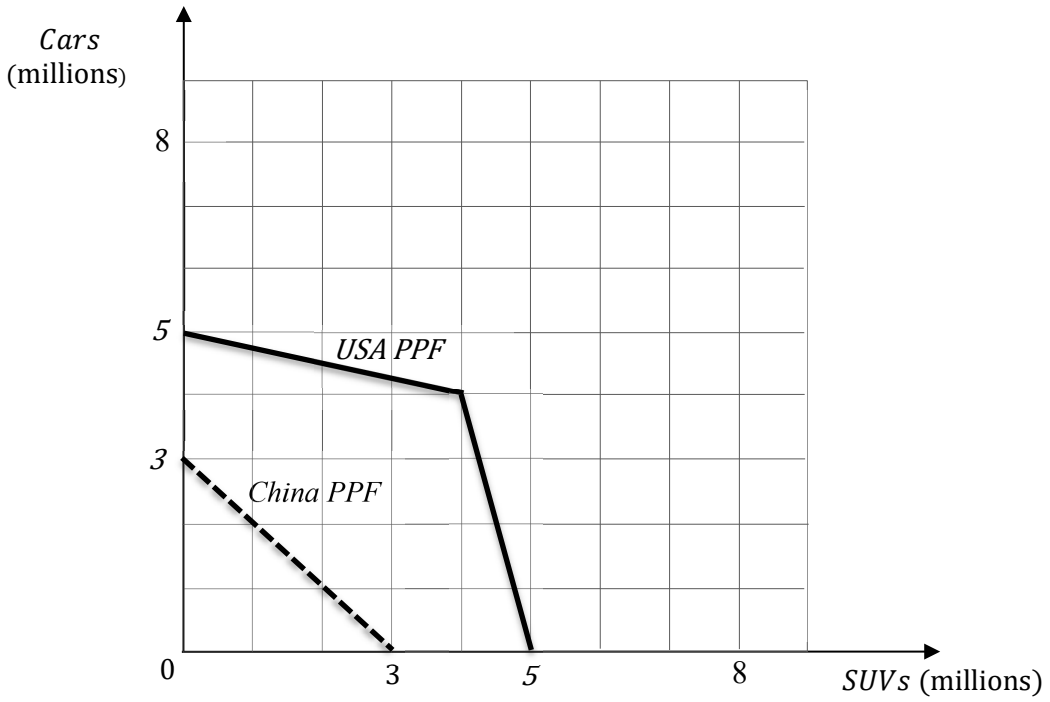
ii-Since plant X has a comparative advantage in producing TVs and an absolute capacity of producing as much as 300 TVs, plant X should produce all 150 TVs. Moving along PPF_X, plant X has enough resources to also make 25 PCs. This production combination is shown as point B on the graph.

iii-Since plant Y has a comparative advantage in producing PCs and an absolute capacity of producing as much as 150 PCs, plant Y should produce the remaining 150 PCs. However, it has no

resources remaining to produce any TVs, hence *TV production is zero. This production combination is shown as point* C *on the graph.*

2-Two countries, the USA and China, on a monthly basis can produce both cars and SUV's according to the two production possibility frontiers shown in the graph.

Figure 6: The PPF's of Two Production Plants for USA And China. Graph for Problem 2



a-From the social planner's perspective, if both countries are currently making 100 percent cars and no SUV's, which country has the comparative advantage in SUV's and therefore should make the first SUV?

b-From the social planner's perspective, if both countries are currently making 100 percent SUV's and no cars, which country has the comparative advantage in cars and therefore should make the first car?

c-To maximize efficiency, the country with the comparative advantage should always be the one to make the next unit of a good. *Neatly* draw the production possibility frontier for the combined USA + China on the graph if they are allowed to trade (*this might be tricky*).

Solutions to Problem 2

a-When the USA operates at the point of 5M cars and 0 SUV's, the opportunity cost of making 1 SUV is

$$\text{USA opp. cost of SUV at point } (0, 5\text{M}) = \frac{-1\text{M cars}}{4\text{M SUVs}} = -\frac{1}{4} \text{ car/SUV}$$

When China operates at the point of 3M cars and 0 SUV's, the opportunity cost of making 1 SUV is

$$\text{China opp. cost of SUV at point } (0, 3\text{M}) = \frac{-1\text{M cars}}{1\text{M SUVs}} = -1 \text{ car/SUV}$$

Since the USA has the lower opportunity cost from a point of making 100 percent cars, the USA has the comparative advantage and should make the first SUV.

b-When the USA operates at the point of 0 cars and 5M SUV's, the opportunity cost of making 1 car is

$$\text{USA opp. cost of cars at point } (5\text{M}, 0) = \frac{-1\text{M SUVs}}{4\text{M cars}} = -\frac{1}{4} \text{ SUV/car}$$

When China operates at the point of 3M cars and 0 SUV's, the opportunity cost of making 1 SUV is

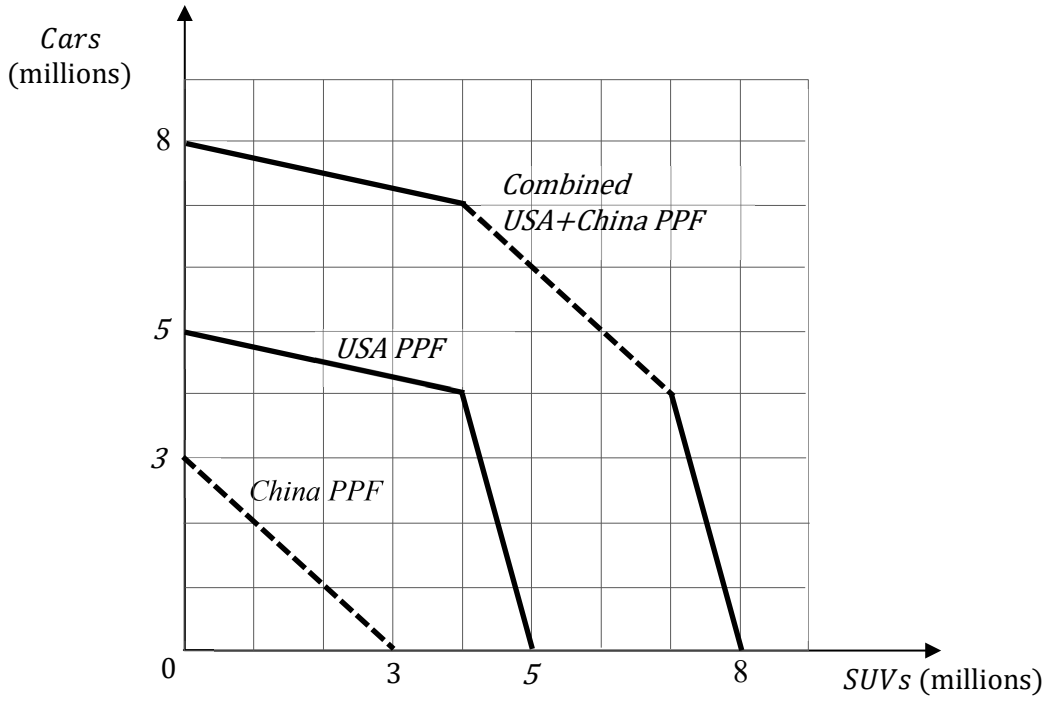
$$\text{China opp. cost of cars at point } (3\text{M}, 0) = \frac{-1\text{M cars}}{1\text{M SUVs}} = -1 \text{ SUV/car}$$

Since the USA has the lower opportunity cost from a point of making 100 percent SUVs, the USA has the comparative advantage and should make the first car.

NOTE: Since the USA has a "kink" in their PPF at point (4M, 4M), they have a comparative advantage in both goods.

c-Start from 100 percent all cars. The combined PPF of USA + China will intersect the vertical axis at 8M cars total and 0 SUVs. Since the USA has the comparative advantage from this point as was determined in (a), the USA should make the first 4M SUVs. The slope of the combined PPF from point (0M, 8M) to point (4M, 7M) is the same as the USA,$-\ 1/4\ \text{car/SUV}$. At point (4M, 7M), China is making 3M cars and 0 SUVs and the USA is making 4M cars and 4M SUVs.

Figure 7: The Production Possibility Frontier for Combined USA + China Production. Graphic Solution to Problem 3c



If the USA makes even 1 more SUV past (4M, 4M) on its PPF, the USA will be operating past the kink in its PPF such that its opportunity cost for making SUV's changes dramatically worse to $-4\ car/SUV$.

At point (4M, 7M) of the combined PPF, China now has the comparative advantage in making SUVs with a lower opportunity cost of $-1\ car/SUV$. Hence, China should make the next 3M SUVs. The slope of the combined PPF from point (4M, 7M) to point (7M,4M) is the same as China's, $-1\ car/SUV$. At point (7M, 4M), China is making 0 cars and 3M SUVs and the USA is making 4M cars and 4M SUVs.

At point (7M, 4M), China is making 3M SUVs and cannot make any more. The USA can still make 1M more SUVs, but it must trade off 4M cars to do so. Hence, the USA will make the last 1M SUVs and the combined PPF will intersect the X axis at 8M units of SUV and 0 cars.

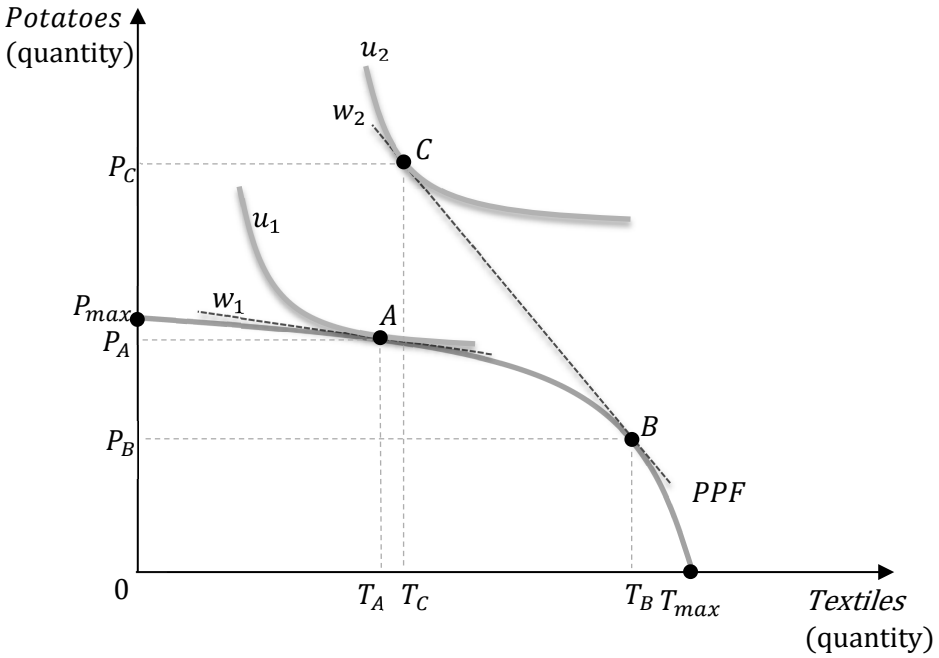
3-Consider a country that produces and consumes only Potatoes and Textiles. Use a graph and narration, a production possibility frontier, and utility curves to answer the following:
(Graph Potatoes on the vertical axis and Textiles on the horizontal axis)

Describe how the country with a closed-economy reaches a stable equilibrium of production and consumption and show and discuss the relevance of the domestic price ratio of the two goods.

Describe what will happen to production and consumption when the country opens its border to international trade when the world price ratio is different from the domestic price ratio.

Solution to Problem 3

Figure 8: Societal Equilibrium Without and with International Trade. Graphic Solutions to Problem 3a and 3b



a-In a closed economy, the iso-standard-of-living curve u_1 is achieved at point A along PPF where consumption preferences coincide with efficient production and the domestic price ratio (the slope of w_1).

b- In an open economy, point B is where production coincides with the world price ratio (the slope of w_2). The country can trade internationally along the wealth budget line w_2 to increase the standard of living to u_2 at point C.

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ACKNOWLEDGEMENTS

The authors would like to thank two anonymous reviewers of this journal for their requested changes and suggestions which greatly improved an earlier version of this paper.

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