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Chocolate Covered Econ.

Cocoa and the chocolate it makes have a strong connection to our society, our history, and our future. In some of the earliest known uses, the Mayans used cocoa in ritual beverages they drank at marriages. This also illustrates chocolates lasting connection to romance. For many years the Spanish conquistadores kept chocolate and cocoa to themselves. After nearly 100 years this monopoly was dissolved. The tasty treat soon became popular in France and shortly after in England. As the 1800’s came and went the steam engine allowed for faster grinding and a reduction in prices. This allowed people of all income to access chocolate, further increasing demand. Today the world consumes more than 3 million tons of cocoa annually (WCFhistory). Somehow immune to trends, fads, and competition, chocolate has remained ever-popular throughout its history.

The Process

Many steps must occur before a cocoa bean can be made into the chocolate that so many enjoy. Unlike many other crops we enjoy--such as apples, carrots, bananas, and grapes--cocoa must go through many steps before it even leaves the farm. Cocoa must be grown within 15-20 degrees of the equator. The plants must be carefully watched for any signs of stress from pests and disease as well as fertilized regularly. Most will reach peak production after 5 years of growth and will continue at that level for another 10. Due to the tropical climate every season is growing season. This means ripe pods can be found year-round, although most farms experience 2 major harvests a year.
Farmers remove the high up pods with the help of a long mitten-like steel tool. They often use cutlasses for the lower pods (right). These pods (left) all fall to the ground and are picked up by the farmers, family members, and sometimes neighboring farmers. Once picked by farmers, pods from the trees are "split with a sturdy stick" (WCF) and the beans removed. Pods contain 20-50 beans each. These beans consist of the Nib, which makes up the actual chocolate part, and an outer shell that protects it.

Once removed, farmers pile bean—often in Africa— or place them in large boxes. These are then covered with mats or banana leaves. The beans then heat up and the pulp that surrounds the beans ferments them. This fermentation lasts 3-7 days and creates the chocolate flavor the beans get when roasted. After fermentation the beans sun-dry for several more days. In some months of the year it may be necessary for the farmers to use solar dryers to expedite the drying process (WCF). When dry, farmers sell the beans to buying stations or local agents. From their beans are often held in a warehouse until ordered by a company.

Once a company receives the beans they must then roast them. They can choose to roast them shell on or shell off. either way the shells will eventually be removed before moving on to the next step. The nib is then ground into a paste, some of the nib becomes cocoa liqueur at this phase. This nonalcoholic liquid byproduct can be treated with an alkali solution in a process known as alkalizing. It can also be called “Dutching” because the product is called “Dutch processed cocoa”. This process makes the liqueur milder and more chocolaty. It also makes it stay longer suspended in a liquid, like milk (WCF). If the company chooses to they can further
treat the liqueur in a process called pressing. This process separates the liqueur into cocoa cakes and cocoa butter. Either that or the cocoa liqueur can be used to make chocolate.

Producers

Chocolate can be found in almost every treat. It permeates throughout the entire food industry. It can be found in different shapes and sizes, made for different holidays and occasions.

Yet, this confectionary delight does not originate anywhere near its consumers. Chocolate comes from the Cocoa Bean, which is grow in equatorial regions of the world. Places like the Ivory Coast, Indonesia, Ghana, and Nigeria produce the vast majority of the world's cocoa. The Ivory Coast alone produces more than the next five countries combined. The majority of cocoa consumption however, does not come from any of these places. Europe and North America consume nearly 75% of the world's Chocolate (Malikowski). This large difference in distance between the growers and consumers results in one of the most mobile foods in the world. This high velocity can also be attributed to the fact that 80-90% of cocoa comes from smallholder farms (WCF).

(picture above: Cargill)
**Shortage**

In recent years cocoa has suffered a shortage. Crop yields have fallen as demand continues to rise. In 2013 supply fell short of demand by 174,000 metric tons, a trend that has continued since then. This poses a problem for many chocolate makers, as M&M maker Mars Inc. estimated a world demand of 125% the present by 2020. That would mean an additional 1 million metric tons of cocoa in a market that can not even keep up with current demand (Josephs). With it’s less than hearty nature and specific growing regions, cocoa seems to be a very difficult product to expand.
CCN 51

Cocoa producers have begun searching for an answer in this quagmire they find themselves in. One possible solution is a crop known as CCN 51. A 50 year old Ecuadorian strain of cacao, CCN 51 has a yield 4 times the world average and a high content of the coveted cocoa butter. As with many crops, this higher yield comes at a price. CCN 51 has a less intense flavor than many other types of cocoa. Sometimes it can even be described as acidic. This results from an excess of pulp that cover the beans after harvesting. During the fermentation process this excess pulp causes an overwhelming and somewhat acidic flavor. It also has less of a tolerance for environments outside of Ecuador (Josephs). Despite this, for high production groups like Mars, this high yield crop fits the needs of a shortening supply.

Some worry that this new crop could choke out the older more flavorful varieties, especially in the Amazon river basin (Josephs). Despite this, companies that work in the basin—such as Cargill—have said they do process CCN 51. Farmers in Africa, where ⅓ of the world's crop can be found, feel the switch to a single crop seems dangerous. The obvious benefits of a higher yield crop could be out weighed by a more hidden chance of a disease wiping out a whole crop (Josephs). Given the plants roughly four year maturity, a scenario such as this could cripple the entire industry. Even if the plant was only adopted by ¼ of the producers in the world, a disease could easily cause the collapse of the entire system. This sort of threat has before damaged crop growing in places like the State of Bahia in Brazil. There the Witches’ Broom fungus, which covers the cocoa plants in white stalks, has hindered the region's ability to supply (Cargill).
Amazon Expansion

With the dwindling supply of cocoa, some companies have sought to expand their supply chain. One such company, Cargill, has begun a project to expand use of the Pará state along the Amazon River. Cocoa grow in this region comes from many smallholder farms. Somewhat reminiscent of pre-Great Depression farming in the U.S. these farms consist of often times family owned operations that produce a smaller quantity of cocoa. Cargill seeks to tap into this large group of suppliers via consolidators. Consolidators consist of independent transport
companies that pick up the beans from these smallholder farms and transport them to a Cargill buying facility in Altamira. This can be a difficult prospect given that the road these consolidators use, the Trans-Amazonian highway, is often washed out during the rainy seasons. The trucks used can carry anywhere from 30-40 smallholder farms crop (Cargill).

At the Altamira station, sacks of beans from the trucks are poured into a large screener that shakes out loose pebbles and other matter. The beans then get repackaged and a sample is taken from each. These samples are bisected and inspected by expert farmers from the region. Those that pass this quality control are loaded back onto trucks and taken to a docks where they are loaded onto barges and sent towards Cargill’s processing plant in Bahia (Cargill).

(Above) the Trans-Amazonian Highway (Cargill)

**Ebola Price Scare**

Over the last few years a disease has ripped through headlines and caused real panic in the minds of people throughout the world. Ebola created a panic that led to a lot of crazy
judgement. The cocoa market was not immune to this panic. If the market consists of human interaction, then the fear that interaction could stop could easily fuel a market panic. A false shortage drove prices up by huge margins as Ebola began to grip the west African coast, home to the largest cocoa producers in the world. Despite adequate stockpiles in warehouses and no real signs of decline in the supply, prices rose dramatically. This seems to be a prime example of what Bob Shiller warned of in “Irrational Exuberance”. People's fear guiding the market more than any sound economic reason (Martin). Despite a reduction in news coverage and general panic, cocoa prices have remained stagnant.

The ICCO reports a price of 2979.42 US$/tonne as of May 7, 2015 (ICCO).
This may be due to a strong reliance of migrant workers from Liberia and Sierra Leone, both of which have been hit hard by Ebola. The Ivory Coast closed its borders to these countries early in 2014. Many large chocolate makers such as Nestle and Mars have banded together with the World Cocoa Foundation in attempts to educate the citizens and protect the crops (Tomson). A worker shortage could mean lower production out of farms in the most productive region in the cocoa industry. This could mean even higher prices around the world.

Fears of the spread of disease and the effects it could have on the market have caused their own effect on the market. With supply already facing shortcomings, any further disruption of the system could have profound effects. The saving grace of the industry so far has been the consistently rising demand for cocoa products. The most prominent increase has been in China. China jumped from 15th to 9th largest importer of cocoa powder and cake in 2014 (WCF). The expanding market has kept an expanding price from damaging revenue within the industry. However, if demand slows or prices rise too much, profits could begin to fall off. On the flip side, if prices remain this high without any fall in supply then revenue could become higher than ever. If this artificial price point becomes the new norm, and supply does not fall as the speculative price would show, then the entire industry would get away with a massive price increase without any real reasoning behind it. A profit would form simply based on the fear of the people.

**International Cocoa Organization and Agreement**

The International Cocoa Organization, or ICCO, was founded in 1973 and created the first International Cocoa Agreement at a conference in Geneva the same year. With a goal of a sustainable cocoa world economy, the ICCO member countries work together on everything
from tariffs and taxes to worker wages and fringe products. They now represent roughly 85% of the world's producers and 60% of consumers. They monitor statistics, pricing, aid in risk management, and attempt to streamline the cocoa process at every turn. The ICCO releases a quarterly report of cocoa statistics in order to try and promote market transparency (ICCO).

The ICCO also has a hand in advertising and marketing cocoa products in emerging markets. They have also attempted to promote the use of cocoa byproducts (ICCO). All of this has led to the growth of the industry. Despite being a small organization in the beginning, the ICCO has grown over its 7 different agreements and has become the foremost authority on cocoa trade. This massive partnership between countries has led to a more free flowing market. With easily traceable products and strong emphasis on quality this organization has brought the industry together to make something far greater than what it could have been.

In a less positive light, the ICCO is a partial form of collusion. Although refraining from direct price setting, like Opec, the ICCO does hold a large amount of sway over every aspect of trade practices. They indirectly control price via tax on goods and worker wage. Economically this has had resoundingly positive effects on the entire industry, much like OPEC.

The ICCO represents both public and private interests in the cocoa industry. The International Cocoa Council makes the decisions and consists of delegates from member countries. While the Consultative Board consists of private company experts from around the world and advises the council (ICCO).

According to the WTO, the majority of cocoa products are duty free. This makes cocoa fairly cheap to import and buy. This likely comes from the strong chocolate maker market in the US with firms such as Hershey's.
Exchange Rates

The US dollar presently stands at $1 for 588.75 West African CFA Franc. This is the currency of the Ivory Coast. It has risen over the last few years by about 100 West African CFA Francs. The graph below shows the exchange of $1 to the West African currency over the last 5 years. This relationship makes importing cocoa products very easy. Due to the nature of trade with West Africa it perfectly suits the situation for the US. As the strength of our dollar rises relative to theirs importing cocoa will become cheaper for many firms. This helps offset rising costs within the industry and could be a major factor in why the price of chocolate has not jumped as majorly as the price of cocoa has.

Similar if not far more dramatic rises in strength occurred versus the Cedi of Ghana. Currently $1 is worth 3.89 Cedi. This starkly contrasts the 2013 rate of $1 to 2 Cedi. This nearly doubled rate of exchange provides the US with less expensive cocoa from Ghana, the world’s 3rd largest producer.

These great rates for both the exporters and importers help foster the free trade of cocoa from the west african region to the US. This also hinders any trade flow in the other direction. The weakness of both these currencies versus the dollar makes it harder for the West African countries to trace for US goods. This creates a sort of flow with goods flowing to the US and money flowing to West Africa.
Other Major Exchange Rates

Brazilian Real 1:3

Indonesia Rupiah 1:13152.50

Nigerian Naira 1:199.05

Overall Trade

Both the friendly exchange rates and the ICCO agreements have made cocoa trade inexpensive and efficient. The market for this product seems to be nearly perfectly built to provide the most streamlined flow of goods to consumers and money to producers. Import countries can buy large quantities of cocoa at fairly inexpensive price due to the great exchange rates and low restrictions on the product. While producers can easily move product due to friendly pricing, a system of transparency put in place by the ICCO, and the ICCO system of middle men that make purchase from smallholder farms more efficient. This creates a very efficient and somewhat admirable market that benefits both parties in numerous ways.
Works Cited


ACTIVITY 1

Consider the following table, which shows the number of labor hours required in two countries, Vastland and Morway, to produce two goods, wheat and cotton. Use this information to answer the following questions.

<table>
<thead>
<tr>
<th>Labor hours per</th>
<th>Labor hours per</th>
</tr>
</thead>
<tbody>
<tr>
<td>bushel of wheat</td>
<td>bale of cotton</td>
</tr>
<tr>
<td>Vastland</td>
<td>3</td>
</tr>
<tr>
<td>Morway</td>
<td>2</td>
</tr>
</tbody>
</table>

1. Which country has an **absolute advantage** in producing wheat? □
   Which country has an **absolute advantage** in producing cotton? □

2. Which country has a **comparative advantage** in producing wheat? □
   Which country has a **comparative advantage** in producing cotton? □

3. Which country could gain by specializing in producing wheat? □
   Which country could gain by specializing in producing cotton? □

4. If these two countries decide to trade, which of the following terms of trade would be beneficial to both countries?
   a. one bale of cotton for one bushel of wheat.
   b. one bale of cotton for two bushels of wheat.
   c. one bale of cotton for three bushels of wheat.
   d. one bale of cotton for four bushels of wheat.

5. Suppose Morway has 12 million labor hours available each year to produce wheat and cotton. Draw its production possibilities on the graph to the right. Label it PP.

6. Now suppose it can trade with Vastland at the terms of trade you circled in question #4. Draw its consumption possibilities on the graph to the right (assuming it specializes fully). Label it CP.

7. Describe how the two lines you have drawn show what Morway can gain from trade.

In econ right shifts are good. Via trade they can make those 6 bushels of still get cotton.
ACTIVITY 2

1. Suppose the world price of wheat is $3 per bushel. In Morway, where the government has closed the economy to foreign trade, the price of wheat is $5 per bushel. Now suppose a new government opens Morway to trade. Answer the following questions, which ask about the consequences from doing this.

a. What will happen to the price of wheat in Morway? \( \text{fall} \)
   
   b. Will more or less wheat be consumed in Morway? \( \text{more} \)
   
   c. Will more or less wheat be produced in Morway? \( \text{less} \)
   
   d. Will Morway be an importer or exporter of wheat? \( \text{importer} \)
   
   e. Which group(s) in Morway gain as a result of opening trade? \( \text{consumers} \)
   
   f. Which group(s) in Morway lose as a result of opening trade? \( \text{producers} \)
   
   g. Do the gains from opening trade outweigh the losses of doing so? Explain.

   \( \text{Depends on the scenario. In each situation, losses and gains will change. In this situation, I would say trade.} \)

2. The diagram to the right shows the Demand for raw sugar and the Supply of raw sugar within Vastland. Use this information in answering the following questions.

   a. Without trade, what would be the price of raw sugar in Vastland? \( \text{no sugar} \)
   
   b. Without trade, how much raw sugar would be produced and sold in Vastland? \( 10,000 \) \( \text{billion} \)

   Now suppose the world price of raw sugar is 10c per pound, and that Vastland producers are allowed to sell raw sugar in the world market.

   c. What would be the price of raw sugar in Vastland after trade is allowed? \( \text{10} \)
   
   d. How much raw sugar would be purchased by Vastland consumers after trade is allowed? \( 7,000 \) \( \text{billion} \)
   
   e. How much raw sugar would be produced in Vastland after trade is allowed? \( 2,000 \) \( \text{billion} \)
   
   f. How much raw sugar would be exported by Vastland sugar producers? \( 5,000 \) \( \text{billion} \)
   
   g. Which group(s) in Vastland gain as a result of allowing this trade? \( \text{producers} \)
   
   h. Which group(s) in Vastland lose as a result of allowing this trade? \( \text{consumers} \)
   
   i. Do the gains from allowing this trade outweigh the losses? Explain. \( \text{Market will even out. Trade is always a good thing.} \)
ACTIVITY 3

1. Consider the diagram to the right in answering the following questions. It shows the Demand and Supply of bort within Morway. Assume that the world price of bort is $2 per bushel.

   a. Without trade:
      What would be the price of bort? $4
      How much bort would be produced by Morway producers? 3 mil bushels
      How much bort would be consumed by Morway consumers? 7 mil

   b. With free trade:
      What would be the price of bort? $2
      How much bort would be produced by Morway producers? 1 mil bushels
      How much bort would be consumed by Morway consumers? 7 mil bushels

   c. With a 50% tariff on each bushel of bort:
      What would be the price of bort? $3
      How much bort would be produced by Morway producers? 2 mil
      How much bort would be consumed by Morway consumers? 5 mil
      How much revenue would the government of Morway earn? 3 mil

   d. In terms of gains from trade, rank the three situations described above (a–c) from the most beneficial to the least beneficial for Morway as a whole: c, b, a

2. The United States has trade barriers on the importation of sugar.

   a. What is the likely impact of these barriers on the price, consumption, and production of sugar in the United States? Higher price, lower consumption, higher production

   b. Whom do these barriers help? Whom do they harm? Producers helped, consumers hurt

   c. How do they affect the United States as a whole? minimal as seen by large amounts of consumption or consumption anyway, creation of substitutes like corn syrup
1. Consider the diagram to the right in answering the following questions. The diagram shows the Demand and Supply for vots, the currency of Morway.

   a. What is the equilibrium exchange rate of dollars ($) for vots (V)? $1 = $ \frac{2}{5} V$

   b. What is the equilibrium exchange rate of vots for dollars? $1.00 = \frac{5}{2} V$

   c. At a price of $3.00 per vot, is there a surplus or shortage of vots? _surplus_

   d. Assuming flexible exchange rates, would a vot likely appreciate or depreciate if its current price were $3.00 per vot? _depreciate_

2. Listed below are several events. For each, circle whether the Demand or Supply of vots has changed, in which direction it has changed (Increase or Decrease), and whether this would lead to an Appreciation or Depreciation in the value of a vot.

   a. Interest rates in Morway rise relative to that in other countries (including the U.S.).
      Demand or Supply _Increase or Decrease_ Appreciation or Depreciation

   b. A recession hits Morway.
      Demand or Supply _Increase or Decrease_ Appreciation or Depreciation

   c. Morway-produced products become recognized as being of very high quality.
      Demand or Supply _Increase or Decrease_ Appreciation or Depreciation

   d. Inflation rates in the U.S. fall relative to those in Morway.
      Demand or Supply _Increase or Decrease_ Appreciation or Depreciation

   e. Speculators begin selling vots.
      Demand or Supply _Increase or Decrease_ Appreciation or Depreciation

   f. There is decreased investment in Morway due to political unrest there.
      Demand or Supply _Increase or Decrease_ Appreciation or Depreciation

3. Suppose Morway is an exporter of cocoa. Select any one of the events above and describe the likely effect of the exchange rate change on both Morway's cocoa exports and its net exports.

   F: No one trades with unstable countries if they are around.  
   D: No matter what rate it changes, there will be no exchange.