

## COSTS OF TRADE

We have been primarily focused on the "gains" to be made from trade. To remind ourselves, let us remember that these gains are that production will be "reorganized" on an international scale so that the most efficient producers will supply the world with the goods the world needs. In short, on a global scale, *more* goods are produced and are made available at *cheaper* prices.

We know the gains from trade. But what about the costs of trade?

We have hinted that specialization may involve costs in terms of displacement of workers from one sector to another, but have waved our hands a bit and said these costs are bound to be "temporary". I have assured you that workers displaced from the industry the nation surrenders will be eventually absorbed by the other industry into which the nation is specializing.

But there are some details to this process which merit our attention. In particular, the factors of production *released* by one industry may not be *absorbed* in exactly the same proportion in the other industry.

Consider the following two-country example of the United States and Mexico, both of which produce both cloth and grain. Let us suppose the comparative advantage calculations tells us that the US should specialize in grain and Mexico specialize in cloth.

Consider now what happens *internally* in the United States. Grain is produced by a quite different technique than stereos. In particular, grain requires a large amount of land and a relatively small amount of labor. But a clothing factory only takes a small amount of land and employs large amounts of labor.

Consequently, when American entrepreneurs *abandon* cloth-production and begin *setting up* grain farms, things can get a bit mismatched.

Suppose an American clothing factory needs 2 acres of land and 100 workers, but an American grain farm needs 20 acres of land and 20 workers.

In switching from one industry to another, the entrepreneur gets rid of 80 extra workers and needs to find 18 extra acres.

Who's going to hire the unemployed laborers? Where can he find the land he needs?

We now enter into the world of *factor markets*.

## FACTORS OF PRODUCTION

What is a *factor of production*? Basically, it's any input that goes into the production of a good.

### **Classification**

Economists like to classify factors into three broad types:

- (1) *Labor*
- (2) *Land*
- (3) *Capital*

The meaning of land & labor should be straightforward. But what is *capital*? In a nutshell:

*Capital*: produced goods that are used in the production of other goods.

In short, machinery, tools, factories and raw materials.

All three categories (Land, Labor, Capital) can be divided & subdivided even further, e.g. we can divide labor into *skilled* and *unskilled*, divide land into *fertile* and *infertile*, etc. Capital has two very special categories, *fixed* and *circulating*, i.e.

- (1) *Fixed Capital* = produced inputs that don't get completely used up in the production process (e.g. saws, hammers, looms, beasts of burden, computers, etc.).
- (2) *Circulating Capital*: produced inputs that get completely used up in the production process (e.g. cotton, seeds, feed for livestock, fuel, wool (in the production of cloth), reams of cloth (in the production of shirts), etc.)

Some people argue that the *division* between the factors is not very clear either. For instance, a skilled laborer needs education to become skilled -- so, in a sense, he is also a *produced* good (i.e. a type of capital -- sometimes called *human capital*).

All this can get very complex really quickly, so let us try to keep it as simple as possible and stick to the three broad categories of labor, land and capital.

## USING FACTORS

How do factors "go into" the production of another good? Basically, they provide factor *services*.

### **Services**

Factors provide *services* to producers, e.g.

- labor provides hours of human toil & brainpower & skill,
- land provides space & the services of nature,
- capital provides the power of tools, machinery & material inputs, etc.

Almost *every* production process uses some amount of *all* three factors. Even the smallest subsistence peasant requires some land and capital (seed and a hoe). Even a masseuse requires space & perhaps a chair or table for his client.

### **Intensity**

It is evident that, depending on what we are producing, some goods require relatively more of one factor than another.

In our example, the production of grain requires lots of land and a little amount of labor, when we compared it to cloth-making, which required a lot of labor and a little amount of land.

So, we can say that, in *relative* terms grain is *more land-intensive* than stereos. Or, equivalently, that grain is *less labor-intensive* than stereos.

## PAYING FACTORS

### **Entrepreneur**

Production is organized by an *entrepreneur*, or *firm*, a rather special type of "factor". Basically, the entrepreneur hires the factors of production, puts them into operation in a production process, and then sells the output.

In theory, the entrepreneur owns no resources himself. He is merely the "organizer of production". He must hire the labor, rent the land, borrow the capital in order to obtain their "services".

### **Ownership**

But *who* does the entrepreneur pay? Well, he pays the *owner* of the factors.

Who *owns* these factors? In a purely free market economy,

- laborers own labor,
- landlords own land
- capitalists own capital.

But in other economy types, ownership is different. In slave economies, slave-owners own labor. In socialist economies, the State owns all land & capital. In most modern "free market" economies, the State still owns *some* land & *some* capital.

### **Payments**

It is common to categorize the payment of factor services by type:

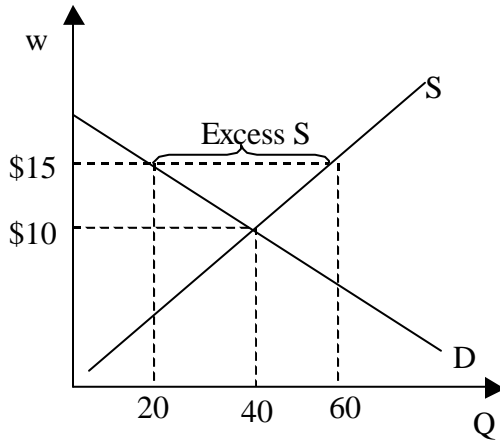
- (1) **Wages** are paid to laborers in return for labor services.
- (2) **Rent** is paid to landowners in return for the right to use the services of land.
- (3) **Profits** (usually in the form of dividends) are paid to capitalists in return for the right to use the services of their capital.

[What do entrepreneurs get paid? This is tricky. In theory, they own no resources, they are merely 'organizers' of production. The capitalist is the residual earner, and takes all that is left after land and labor are paid. In fact, many entrepreneurs happen to *also* be capitalists (i.e. owners of capital) and thus also make regular profits. But that is not necessarily the case. Do not confuse entrepreneurs with CEOs and other corporate officers, as these are generally regarded as laborers (i.e. managers who get paid wages for "running" the enterprise). See our Appendices on Capitalism and Capital Markets for details.]

## FACTOR MARKETS

But *who* sets the amount to be paid -- the level of wages, rents & profits? In a free market economy, the answer is simply: "the Market".

A **factor market** is like in any other market -- except that the demanders are not consumers but entrepreneurs/firms, while the suppliers are not firms but factor-owners. But the mechanics are the same. We can depict, say, the labor market as follows:



Where notice the price axes measures *wages* ( $w$ ) and the quantity ( $Q$ ) depicts amount of laborer-hours hired. Similar markets can be drawn for land (where price is rent and quantity is acres of land) and capital (where price is profit and quantity is number of machinery & tools).

In our diagram, the demand curve is the demand for labor by entrepreneurs/firms. The supply curve is the supply of labor by laborers.

A similar logic underlies their shape: if wages are too high (say \$15 per hour), firms won't want to hire as many laborers or make them work so long (demand is low) but more workers are willing to show up or work more hours (supply is high).

In the figure, at \$15 per hour, there is an *excess supply* of labor. This is actually the same as **unemployment** as more labor is offered (60) than is desired (20).

If the "Law of Markets" works as it is supposed to, then wages will decline from \$15 to \$10. At this wage, the amount of labor needed = amount of labor supplied. The labor market clears and there is no unemployment anymore.

## FACTOR PRICE CONTROLS

For a variety of reasons, many countries, states, towns, etc. impose regulations on factor prices. Let us consider two of the most popular ones:

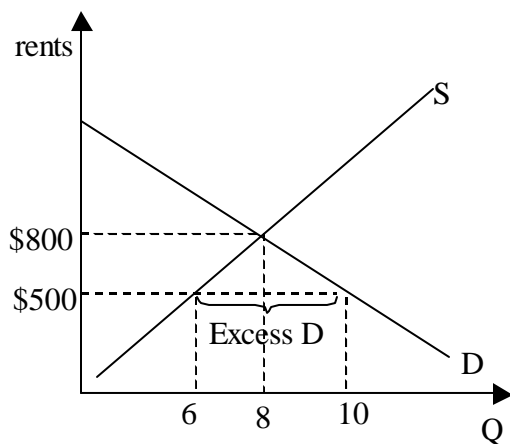
### **Minimum Wages Laws**

Many economists condemn laws that set a minimum wage to be paid to labor. In our example above, if the minimum wage is set at, say, \$5, then it causes no harm. The market clears at \$10 and that will be the price laborers (on average) receive anyway. But if the minimum wage is set too high -- say, at \$15 -- then the Law of Markets is prevented from working. By law, the actual wages *cannot* fall to \$10. It will be stuck at \$15.

That is why economists say that minimum wage laws can cause unemployment (we'll come back to analyzing the mechanics of unemployment later).

### **Rent Controls**

A converse policy issue is that of rent controls. Consider the diagram below, where price is rents and quantities are expressed in millions of housing units. If the market is permitted to work, then the market will clear at \$800 rent, where total demand for houses will equal total supply.



But if rent controls are imposed so that, on average, it is legally forbidden to charge more than \$500 in rent, then the supply of housing units will decline to 6 million and the demand for housing will rise to 10 million -- creating an excess demand (or shortage) of 4 million housing units.

Of course, this is not a complete explanation for homelessness, but it is an important factor in that phenomenon in many large cities. Those who are able to find housing (i.e. the 6 million) will certainly be better off from the rent controls; but those who aren't lucky enough to find any (i.e. those in the 4 million) are much worse off.

## LINKING FACTOR MARKETS TO GOODS MARKETS

All markets are linked -- and the linkage between factor markets (labor, land, capital, etc.) and goods markets (grain, computers, clothing, stereos, etc.) is a very important one.

In short, there is a direct link between the *demand curve* in the factor market and the *supply curve* in the goods market.

This should be intuitively obvious: the more stereos a firm wants to supply, the more labor, land & capital it must hire.

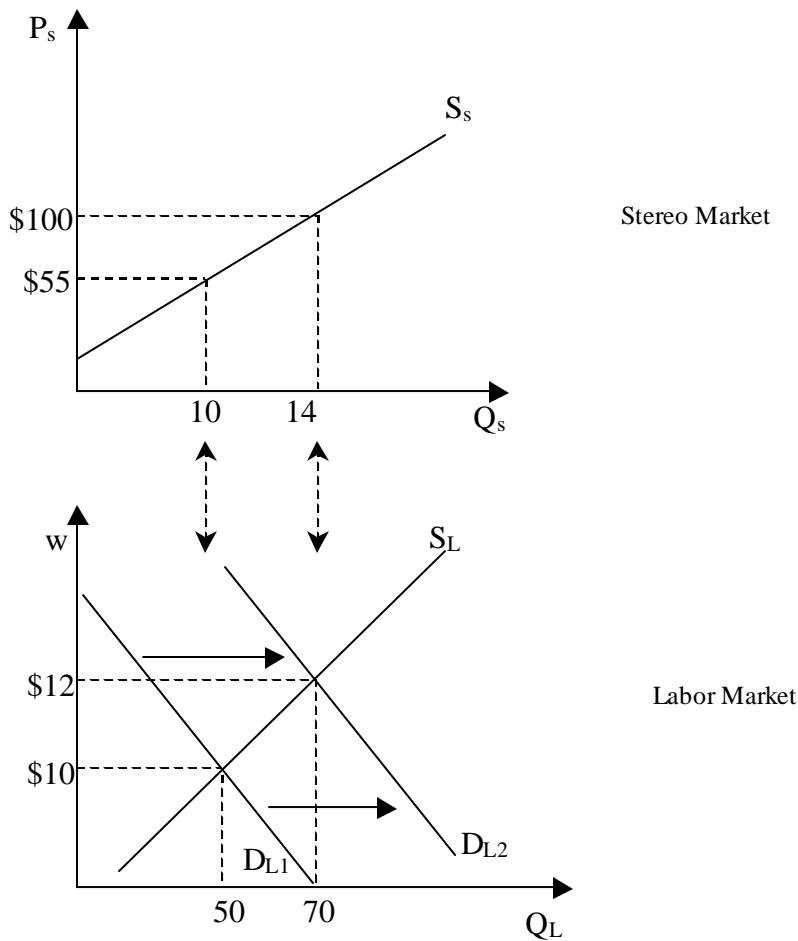
So, we can say that the amount demanded of any factor *depends* on the amount of the good the firms wishes to supply.

But the more a firm demands of a factor, the *more* of a reward it must give that factor to make it come forth.

That creates a link between good prices & factor rewards as well. If the price of stereos goes up, remember, firms increase the amount supplied of stereos. But to *produce* that supply, firms need to hire more workers. If there is unemployment, then they just hire them at the old wages. But, if there is no unemployment, they must offer them more pay in order to get more worker-hours.

In short -- there is a link not only between quantity of good supplied & quantity of factor demanded, but also between *price* of the final good and the *reward* paid to the factors.

Consider the picture below (it's a bit complex, but try to work through it):



(Top) Suppose that the supply curve of stereos is such that, when price is \$55 per stereo, firms want to produce 10 stereos. Suppose it takes 5 labor-hours to produce 1 stereo, then they need to hire 50 labor-hours to produce the 10 stereos.

(Bottom) So they go to the labor market. They are able to hire 50 labor-hours by offering them \$10 each (the firms' demand for labor is captured by the curve  $D_{L1}$ ).

(Top) Now suppose the price of stereos rises to \$100 each. Then, they want to produce 14 stereos. Now they need to hire 70 labor-hours.

(Bottom) So they go to the labor market. But when workers are only making \$10 an hour, they don't want to work more than 50 hours. So the firm has to increase the amount it is willing to pay them (shifting the curve rightwards from  $D_{L1}$  to  $D_{L2}$ ). In the end, they are able to call forth the 70 workers they need only by paying each worker \$12 an hour.

**In sum:** Notice that the rise in the price of stereos has led to an *increase* in the wages paid to workers who are to build them.



## THE LAW OF INCREASING COSTS

Our diagram above shows an interesting phenomenon: namely, that the *more* firms try to produce, the *costlier* it gets per unit produced. To produce 10 stereos, the firm need only pay workers \$10 per hour. To produce 14 stereos, they need to pay them \$12 per hour. So costs rise as firms try to produce more stereos. This is known as the *law of increasing costs*.

But we can go further. We can in fact show that the law of increasing costs *explains why* the supply curve is upward-sloping (something we skimmed on before).

Firms (owned by capitalists) are interested in making the greatest *profits* possible. The formula is:

$$\text{total profits} = \text{total revenues} - \text{total costs}.$$

So, let us go back to the example in the diagram. Start with **total costs**.

-- If a firm wants to produce 10 stereos, it needs to hire 50 workers at \$10 apiece. Thus their *total costs* are \$500.

-- If a firm wants to produce 14 stereos, it needs to hire 70 workers at \$12 apiece. Thus their *total costs* rise to \$840.

Now, let us pay attention to the **total revenue** side. If a firm can only *sell* stereos at \$55 a piece, how many should they try to produce?

-- if they produce 10, then their *total revenue* is \$550. So they make a total *profit* of \$50 (= \$550 - \$500).

-- if they produce 14, then their *total revenue* is \$770. So they make a total *loss* of \$70 (= \$770 - \$840).

So at \$55 per stereo, they won't supply 14 stereos, but only 10.

But if the price of stereos rises to \$100 a piece, then:

-- if they produce 10, then their *total revenue* is \$1,000, for a profit of \$500 (= \$1000 - \$500).

-- if they produce 14, then their *total revenue* is \$1,400 for a profit of \$560 (= \$1,400 - 840).

So, at \$100 per stereo, producing 14 stereos is not only profitable in itself, it is even *more* profitable than producing 10. Profit-oriented firms will definitely prefer to produce 14 now.

So, because of increasing costs, firms will supply a higher quantity of stereos *only* when the price of stereos is high enough. That's why supply curves slopes upwards (higher prices → higher supply)

## SPECIALIZATION AND INCREASING COST

Let us get back to our simple story of American grain and Mexican cloth. Remember that an average clothing factory needs 2 acres of land and 100 workers, but a grain farm needs 20 acres of land and 20 workers.

When trade between the two nations was opened, American producers closed down cloth factories and hurried to produce grain and export it to Mexico.

Because cloth-making is *more* labor-intensive than grain, then *more* labor is fired from the US cloth factories than is hired on the US grain farms (80 workers remain unemployed in every switch).

Conversely, as clothing is *less* land-intensive, then *less* land is released from the closing down of the factories than is needed by the new farms. (18 acres are needed but not available in every switch)

In short, the opening of trade with Mexico has led to specialization in the United States which has created an *excess supply of labor* and an *excess demand for land* within the US.

You can guess what will happen: the "Law of Markets" kicks into operation on the factor markets -- the wages of labor will begin to decline while the rents on land will begin to rise in an effort to "clear" the labor and land markets.

That starts to put a brake on specialization. As wages fall and land rents rise, moving to grain production becomes less and less attractive, while staying in clothing becomes more and more enticing.

It is common to say that specialization *turns factor costs against itself*. That is just a manifestation of the law of increasing costs.

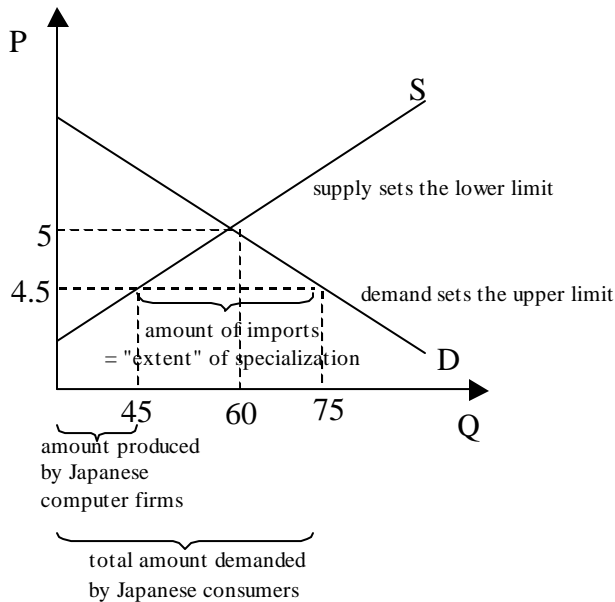
Now, the wages won't fall enough (or the land rents rise enough) to *reverse* the process of specialization. But it puts a quicker end to the *extent* of specialization.

But we should know that already! *For that is the story we were telling in our demand-and-supply diagrams* earlier.

Remember that in our demand-and-supply depiction of international trade of our Japanese computer-stereo example, we saw that *even though* Japan was specializing in stereos, it didn't get rid of *all* its computer industry entirely. *Some* Japanese computers will still be built.

We said that that was primarily because of demand. Well, now it is time to complete the story. It is not *only* because demand is limited. It is also because supply is upward-sloping (increasing cost) making specialization less and less attractive the more and more it happens.

Demand and supply form the "boundaries" of the extent of specialization. The following diagram of the Japanese computer market may help illustrate what I mean:



Analyzing the supply curve, the very fact that Japanese firms began switching from computer to stereo production *drove up* the costs of moving into stereo production and drove down the costs of *staying* in the computer industry. This is the law of increasing costs in action. So as more and more Japanese firms switched, the more attractive staying in computers became, even though that is *not* where Japan had a comparative advantage.

But the law of increasing costs tells us that factor prices will adjust in a way that there will be *some* Japanese computer firms that will prefer to remain in business rather than switch over to stereos. Which is one of the reasons why, at the price of 4.5, some Japanese computer firms will *still* exist, producing some 45 computers.

The combination of the demand side & the supply side thus gives us the exact extent of specialization. It helps explain why Japan will not specialize *completely* and import *all* its computers.

## TRADE AND INCOME DISTRIBUTION

Why did we bother to bring up the complicated story behind the supply curve?

It is important because we are interesting in seeing how the opening of trade might affect *income distribution* within a country.

Consider the US-Mexico, grain-clothing example. After America opened trade with Mexico, it specialized in grain. But because grain & stereo industries use different factor proportions of labor and land, we saw that the very process of specialization drove down wages and drove up rents.

In other words, trade has *decreased* the income of workers, while *increasing* that of landlords.

This was part of the trade story we hadn't quite seen before. Granted that Americans *as a whole* are better off because they can buy more & cheaper Mexican cloth. But *within* the country the story is different.

Just because the US *as a whole* is better off from trade does *not* necessarily mean that *every* American is better off. If cheaper clothing does not offset US workers' lower wages, then clearly American workers *are not better off*. US landlords, of course, make a killing both ways -- they receive higher rents *and* cheaper clothing.

Our first instinct at this point is to ask the question again: is it possible that *both* US landlord & US workers are better off in their standard of living? I mean, can it be that clothing prices fall sufficiently so that they offset the decline in American wages, i.e. might US workers be able to buy *more* clothes than before?

Surprisingly, the answer is a resounding "No!" Opening trade *unambiguously* makes one group better off and another group worse off. This is known as the *Stolper-Samuelson Theorem*.

**Stolper-Samuelson Theorem:** opening trade raises the real returns to the factor used intensively in the export industry and lowers the real returns to the factor used intensively in the import industry.

This theorem was a surprising result when it was discovered in the 1940s. People thought that if the price of certain staples (like food, cloth, etc.) fell with trade, then perhaps that might be enough to offset lower wages. But Stolper-Samuelson Theorem says they don't.

Of course, the Stolper-Samuelson Theorem is a theoretical result. It has a long list of assumptions behind it. But it is still a bit disconcerting to those who pronounce that free trade is good for everybody. It isn't. There is *always* a group which loses out.

## EQUALIZATION OF FACTOR PRICES

The American economist Paul Samuelson -- the same one who discovered the Stolper-Samuelson theorem -- found another, also intriguing theorem about income distribution.

It has long been held by many opponents of free trade that opening trade leads to a "race to the bottom" in terms of factor returns. For instance, they argue that if trade is opened between the US & Mexico, American wages will fall down to Mexican levels. On the opposite side, the proponents of free trade argue that, no, it is likelier that Mexican wages will rise to the American level.

Who is right? In short, both. But the reasoning is more subtle than it appears.

The anti-trade argument seems to the intuitive reasoning that, say, American clothing workers will have to compete with Mexican clothing workers and as Mexicans demand lower wages, then American cloth-workers will be forced to accept lower wages too.

But this reasoning is flawed. If you trade according to comparative advantage, then you should be trading *different* goods. If trade goes according to comparative advantage, Americans *shouldn't* be trying to make clothing if Mexico has a comparative advantage there. American clothing workers will be shifted to, say, grain farming. So, you *shouldn't* be comparing US & Mexican clothing sector wages, but rather American grain sector wages and Mexican clothing sector wages.

*Nonetheless*, there will still be a tendency to *equalize pay across nations*, even if (1) workers are not allowed to move across borders and (2) workers are in completely different industries. This is known as the *Factor Price Equalization Theorem*.

**Factor-Price Equalization:** if nations specialize and trade according to their comparative advantage and the law of markets is allowed to work unhindered, then returns to factors will be the same across trading countries.

The reason why it works should be evident from the previous Stolper-Samuelson one.

In the grain-clothing case, Mexico specialized in clothing & US in grain. In the US case, that meant wages fell and rents rose. But in Mexico, the *opposite* would happen: as Mexican firms move away from grain and towards clothing production, workers become scarcer & land more plentiful, thereby putting upward pressure on Mexican wages & downward pressure on Mexican rents. In short, Mexican factor prices are moving in exactly the *opposite* direction than in the US.

Are these factor returns moving *away* from each other, or closer together? That depends on the initial position of both countries. But here's the clue: Mexico probably wouldn't have specialized in clothing if they weren't comparatively cheaper to produce. As cloth uses a relatively larger proportion of labor, then probably Mexico had lower wages & higher rents

than the US *before* trade began. Similarly, as the US found specializing in grain to be its comparative advantage, that implies that the costs of producing grain are lower, i.e. land is probably cheaper and workers more expensive in the US. Factor prices are implicitly or explicitly involved in calculating comparative advantage.

So, once trade was opened, Mexican wages climbed & American wages fell -- thus bringing them *closer* together.

What Samuelson went on to prove was that they meet at exactly where the free trade price is established. In other words, *free trade not only equalizes output prices* (e.g. prices of stereos & computers across countries) it *also equalizes factor returns* (e.g. wages & rents) across countries.

Of course, "will be the same" is very strong. It is, once again, a theorem that is derived from the very contrived theoretical set-up with a whole lot of assumptions involved. In *theory*, this "equalization" is *supposed* to happen instantaneously, the moment trade opens and the law of markets works its magic. But, *in fact*, it is perhaps better to call it the "factor-price convergence" theorem as the law of markets doesn't work *that* fast. But the FPE theorem is known by that term, so we'll stick to it.

## THE ULTIMATE POLICY?

The Neo-Liberal case for free trade rests on two pillars: (1) there are mutual gains from trade for both countries *as a whole*; (2) free trade equalizes (or *tends* to equalize) factor incomes across countries.

Is there actual evidence for convergence of factor prices? The answer is yes. In many cases where trade has been opened between countries, you will find that the factor prices *do* adjust and come closer together. e.g. the incomes of workers in labor-intensive Portugal, Spain and Greece upon adherence to the EU rose dramatically within a few years.

The theorem tells us to expect that the people who benefit from free trade are the ones who used to be *underpaid* before, while those who lose out are those who were *overpaid*. In our example, before trade, Mexican workers were *underpaid* and Mexican landlords were *overpaid* relative to their American counterparts. With trade, Mexican workers have benefited from *higher* wages and *lower* grain prices, while Mexican landlords have lost out from lower rents.

This is one of the most powerful **defenses of free trade** that has yet been found. It is a mechanism for *equality* across nations. Even if free trade may not make Mexico *as a whole* as rich as the US. But it has a tendency to redistribute income *within* Mexico so that the Mexican worker is richer and the Mexican landlord is poorer.

Free trade advocates like to stress this result. While they may admit that free trade does not make *all* Mexicans richer, they point out that it certainly makes the *poorer* Mexicans richer. In political confrontations, free trade advocates like pointing out that they are **for the poor in poor countries**, while accusing their anti-globalization opponents of being *for the rich* in poor countries. Or, more accurately, they accuse the anti-globalization activists of mistakenly identifying "poor countries" with "poor people". Poor countries have rich and poor segments within them, even if their rich are few and not quite as rich as all that. Free trade, they argue, helps the poor of the poor.

Is this true? Empirical evidence seems to indicate that it is. Developing countries which have opened trade have not always gained as a whole. But their *poorest* segments have. To take an example, the standard of living of Chinese and Indian laborers, for instance, has risen remarkably in the past couple of decades as trade began being liberalized in these countries. Their incomes have doubled several times over and the goods they buy have, on average, gotten cheaper and cheaper (but not all; drugs, for instance, have gotten more expensive -- but that is because of the "globalization" of international copyright and patent laws, not free trade itself).

Of course, in comparison to a US worker, their standard of living is still very low. But when comparing the Chinese or Indian poor today with their situation a few years ago, the factual evidence shows a remarkable gain.

However, free trade advocates admit that free trade *can hurt* the poor in the rich countries. Even though we called American workers "overpaid" and American landlords "underpaid" in our example, there is no getting away from fact that American workers are, on average, poorer than American landlords (although keep in mind that high-salaried CEOs are also "workers" in the strictest sense.)

By Stolper-Samuelson, free trade will certainly hurt American workers. There is no way around that, either in theory or in fact. For this reason, Neo-Liberals stress that the *government* should get involved and offer what they call " **adjustment assistance**" to displaced American workers. The hope is that, in the long-run, economic growth will mop up the unemployed and bring their wages back up.

But that is really only a hope. The connection between trade and long-run *growth* is more tenuous. And we shall turn to this soon.



## Appendix I: CAPITALISM

Economists use the phrase "**income distribution**" to mean how the revenues received from the sale of output are distributed among the various earners.

Suppose a putative farmer (our 'entrepreneur') figures out that he can produce 100 bushels of grain on 20 acres of land by hiring 10 laborers for an hour using 5 hand-held hoes.

However, let us suppose our farmer is broke & broken. That is, he owns nothing himself – no land, no hoes – and, furthermore, has a busted arm that prevents him from undertaking manual labor himself. This farmer is thus a 'pure' entrepreneur – a man with a plan, but no resources. The only thing he can do is organize production.

But how is he to start? Ideally, he should go and hire some workers, rent some acres and find someone to lend him the hoes. But I said he was broke – he doesn't have a penny to his name. How is he to pay them?

Well, maybe he doesn't have to – at least not immediately. Rent is only due at the end of the month, and he only needs to write his payroll checks in a couple of weeks time, so perhaps he can produce the grain and sell it on the market *first* and *then* pay off the workers & landlords *afterwards*, with the money he receives from the proceeds of the grain sales.

Of course, in reality, grain production takes a long time and few workers are willing to show up to work or landlords to lease their lands for months on end without seeing at least some of the promised cash up-front. To work around this problem, the farmer can appeal to **credit**. That is, he can borrow the necessary cash from a bank to get his business started – to meet the workers' first payroll and give the landlords their first month's rent - and then pay off the bank later when the proceeds of the grain sales roll in.

Notice that both routes are in effect the same. Whether the laborer & landlord agree to work for free until the sales come in, or whether the farmer resorts to using bank credit, the farmer is in fact paying for his factors now *from* the proceeds of the future sales of the very products those factors will produce. You don't need to be rich (i.e. to have an accumulated pile of cash of your own) to start a business. You just need a plan and access to some sort of credit facility.

So for this plan to come off, the farmer just needs to make sure that his sales revenues will be greater than (or at least not less than) the costs of hiring these factors.

[*Aside*: In reality, this is a little uncertain. He knows the wage and rental costs now, but he is not certain what the price of grain will be in a year's time, when he gets around to selling it. He can make an educated guess, but things can still go wrong. For this reason, many farmers who don't want to deal with uncertainty actually try to sell their grain *in advance* of being produced, via some form of "**futures**" contract, i.e. sell it now at an agreed-upon price, but deliver it later. The buyer, or counterparty to the futures contract, would be, say, a

biscuit-making company who knows it will need grain in a year's time to make biscuits, but also doesn't want to put up with grain price risk and prefers to agree upon a set price in advance with the farmer now.

Contracts for commodity futures are written up & traded back and forth on organized exchange markets – principally the Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME). Being in the heart of the Midwestern farming country, Chicago was the natural meeting place for deals between farmers & food-processing companies, and has evolved greatly since.]

Returning to the main story, in order to make sure the plan is viable, the farmer-entrepreneur must make sure that:

$$\text{Total Revenues} > \text{Total Costs}$$

If the sales revenues don't cover his costs, the plan is a failure. He cannot afford to continue his business and must shut down.

The difference between total revenues and total costs is known as *profit*. Or:

$$\text{Total Profit} = \text{Total Revenues} - \text{Total Costs}$$

So, to stay in business, total profit must be positive. If it is negative, he is making a *loss* and must close.

To know whether he shall make a profit or a loss, the farmer must do his calculations. He must figure out how much he has to pay his factors and how much he can sell his product for. Remember, his plan was 10 labor -hours, 20 acres of land and 5 hand-held hoes to produce 100 bushels of grain.

Now, to get the necessary labor-hours, acres and hoes, he has to go to the markets for labor, land and capital and pay what they demand.

Let's say wages are currently \$10 per labor-hour. So to get 10 workers to work for an hour each (or one worker to work for ten hours) will cost him \$100.

Let's say rents are currently \$4 per acre. So to get 20 acres, he must pay landlords \$80.

What does it cost to get 5 hoes? Here's where the farmer gets the shock of his life. The farmer visits the capitalist and asks to borrow his hoes. But the capitalist puts it starkly to him: "Yes, I will lend you the hoes you need, but not for a fixed rental; rather, in return for using my hoes, you must promise to give me the *entire* profit of your enterprise!"

The capitalist thus becomes the **residual earner**, i.e. he gets whatever is left from the sales revenues after you pay off the workers and landlords.

Suppose grain sells at \$2 per bushel. Then using the formula:

$$\text{Total Profit} = \text{Total Revenue} - \text{Total Costs}$$

$$\text{Total Revenues} = \$2 \times 100 = \$200$$

$$\text{Total Costs} = \text{wages} + \text{rents} = \$100 + \$80 = \$180$$

So:

$$\text{Total Profit} = \$200 - \$180 = \$20.$$

The farmer will thus do his plan, receive \$20 and hand it all over to the capitalist. The capitalist ends up with \$20. That's what he gets for lending his hoes.

Notice we can write:

$$\text{Total Revenues} = \text{Wages} + \text{Rents} + \text{Profits}$$

$$\$200 = \$100 + \$80 + \$20$$

this is known as the breakdown of **income distribution**, i.e. how income from the sales is distributed between workers, landlords and capitalists.

[What about the bank? Remember the bank? Well this is a little subtle, but does not really change the formula.

Case #1 - Suppose he does it all without a bank, i.e. the farmer does a song-and-dance and persuades the laborer, landlord and capitalist to lend him their labor, land and capital for now upon the promise to pay them later. In this case, the formula is exactly as above: he pays nothing to nobody at first; but when the \$200 rolls in from the sales, *then* he pays the laborer \$100, the landlord \$80 and gives the residual \$20, the profit, to the capitalist.

Case #2 – Suppose the landlord and laborer demand cash up front. Then the farmer must borrow \$180 from the bank, pays off the laborer and landlord immediately. When the \$200 rolls around, he doesn't need to pay *them* again; they're already paid; so he uses \$180 to repay the bank loan, and hands the residual \$20 over to the capitalist.

Case #3 – Suppose the capitalist also demands the profit "in advance". In this case he borrows the full \$200 from the bank, pays off the laborer, landlord and capitalist immediately. When the \$200 rolls around, he pays the bank the full \$200 back.

Whether in Case #1, #2 or #3, the formula is the same. Sales revenues break down into wages, rents and profits. What (if anything) he owes the bank does not come in as a separate category. Credit is only a *means* to move around the timing of the payments.

However, if the bank charges **interest** on the loan, then the interest owed to the bank enters as a new category. Suppose the farmer opts for Case #2 and borrows \$180, but the bank demands 5% interest (= \$9 on a \$180 loan). Then when the \$200 rolls around, he must pay the bank back not the \$180 he borrowed, but \$189. How does he pay it? By deducting \$9 from the \$20 profit he was planning to pay the capitalist. So now the laborer gets \$100, landlord gets \$80, bank gets \$9 and the capitalist gets only \$11. The residual earner – the capitalist – receives less. In this case we must adjust the income distribution formula to

Revenues = Wages + Rents + Profits + Interest.

However, because not all enterprises use bank credit, it is common to ignore interest, or rather to subsume it as a part of profits (as interest owed is always paid out of residual profits) and to say simply "Profits" to capture "Profits given to capitalist + Interest to creditors (if any)".

[Side note: There is a famous theorem in economics – known as the **Modigliani-Miller theorem** – that proves that however the residual from the sales is broken down between equity (profits returned to capitalist) and debt (interest owed to creditors) doesn't really make much of a difference. Capitalists and creditors both dine on the same residual earnings after you pay off workers and landlords. So while the breakdown between equity and debt may affect the exact ownership structure of the firm (capitalists are owners and have voting power, the creditor doesn't), it does *not* affect income distribution or production decisions. So the only thing that really matters for income distribution is how much the total residual is (Profits + Interest) so might as well just call the whole thing "Profits" and leave our income distribution formula simply as Revenues = Wages + Rents + Profits.]

OK, enough distractions with credit. Let's get back on track. The farmer sets up his enterprise, earns \$200 which will be distributed (in advance or afterwards, however he sets up his credit to time it) as wages (\$100), rents (\$80) and the residual profits (\$20).

What does the farmer-entrepreneur *himself* get? Nothing it seems. That is because the *entire* profits, the residual earnings after deducting wages and rents, was claimed by the capitalist in return for allowing the farmer to use his hoes. There's nothing left over for the entrepreneur himself.

Some of you may feel the entrepreneur has been woefully cheated. For the right to borrow 5 hoes, he has to hand over all his profit? How does the capitalist lay claim on the entire profit of the enterprise?

So long as those 5 hoes have an owner, the farmer can't use them without the owner's permission. And the owner will try - and will succeed – in demanding the *entire* profit of the enterprise for them. Even more dramatically, by virtue of owning the hoes and being the residual earner, the capitalist takes directional control of the enterprise. The capitalist can *order* the entrepreneur to do whatever they want him to do, on the threat of taking the hoes away if he fails to comply.

The farmer has little choice. Without the hoes, his production plan can't go forward. But if he agrees to the terms for using the hoes, he surrenders all his profits and loses control of his business.

Of course, under such conditions, the entrepreneur might as well quit. So the capitalist is usually willing to give him a *little* of the profit as a form of compensation for managing & directing the enterprise. Or not. The capitalist might decide to just let him quit and hire a

professional manager, a specialized laborer, to do the directing and just pay him a regular management wage to run the farm. The farmer-entrepreneur, the one who came up with the idea and organized the whole thing, is squeezed out of his own enterprise, the firm loses its founder. The capitalist, who really did nothing more but contribute a bunch of rusty hoes he happened to have lying around – he did not contribute the vision, not the ideas, not the plans, not the sweat, blood & tears that went into creating this enterprise - is fully in the control seat.

I mean, the landlord and worker also contributed no less essential bits – the land and labor – yet they came out with just a fee for their contributions. They didn't swallow the enterprise as a whole or steal it away from the entrepreneur. But the capitalist managed to.

How can the capitalist get away with it?

The short answer: Because he can.

The long answer is much longer. One German economist spent nearly a lifetime trying to figure out how and why capitalists get to pull off this trick and the implications of it. His name was **Karl Marx**, and his explanation is set out in a massive treatise composed of three thick volumes, simply titled *Capital* (or *Das Kapital*, in the original German).

Marx conclusion was really little more elaborate than our own: because they can. More precisely, because of the simple fact that hoes happen to be *owned* by someone. Upon this little fact, the capitalist manages to set the terms and get control of all the enterprises and businesses in a country. Upon this little fact, the entire system rests. Upon this little fact the modern world has been built – and all the blessings and sins (and there are a lot of sins) that go with it.

So dependent is the modern world upon this odd little owner of hoes that Marx named the entire system after him – the *capitalist* system.

Change this little fact – abolish private ownership of hoes, allow the farmer to use any hoe he wishes, or borrow them from a communal shed - and we no longer have capitalism, the system crumbles and all the sins of the world disappear.

The *essence* of capitalism, Marx claimed, is that hoes are privately owned by somebody. The *essence* of communism is that hoes are not owned by any particular person, but by the entire community. That, in Marx's opinion, was the thing that made all the difference.

To go from capitalism to communism, Marx asserted, you don't need to change anything else. Everything else can remain as is. Markets can be allowed to operate, land can be privately owned, profit can be pursued if desired, people are free to do what they want, to be as selfish and exploitative as they like. But just change this one little fact – that capital (hoes, tools, machines) are privately owned - and the entire society will change dramatically into some sort of permanent utopia.

Marx is not the only economist who spent years trying to figure out how the capitalist got away with it. There were others, most notably a group of **Austrian** thinkers nearly contemporaneous to Marx, who came to a different conclusion. Their names aren't nearly as well-known, but worth mentioning a few – Eugen von Böhm-Bawerk and Friedrich von Wieser mainly, and their students Joseph Schumpeter, Friedrich Hayek and Ludwig von Mises.

Yes, the capitalist gets away with all the profit, the Austrians admitted. But so they *should*. After all the capitalist agrees to be the residual earner. Unlike the landlord or the worker, he doesn't have the comfort of knowing exactly what he will get for his hoes. If the enterprise does well, yes, he makes out like a bandit and takes all the profit. But if the enterprise does poorly, the losses fall on him. After all, he is the residual earner. Landlords and workers are paid first, he gets only what remains. And if there is nothing, he gets nothing.

Yes, you may say he is not personally contributing brains or blood, that he is just lending some pieces of forged metal that, frankly, doesn't sound much by the way of a personal sacrifice, so maybe it's not that big a deal if he doesn't make much off them. True. But the capitalist sacrificed something to lend them to you. He could have used those hoes himself on his own land. Or lent them to some other farmer who could have made good use of them and given him money for them. So there is opportunity cost at play. By not giving the capitalist a decent return for his hoes, you are depriving him of bread & butter he could have otherwise put on his table.

Moreover, if there is less than nothing, if the firm actually makes a loss, then he is really screwed. A firm in bankruptcy will sell off his hoes to pay off what is owed to everyone else. From the sale of the hoes, the landlord gets his back rent, the workers get their wages owed and the creditors their outstanding debt, before the capitalist sees a dime. He gets whatever is left after everyone else is paid off, if there is anything left at all. Sure, the laborer is upset he loses his job. But he is still intact and can find another one. Sure the landlord loses his rent, but he can rent his land again. But the capitalist loses the hoes themselves. They're gone, poof. He loses something permanently, something he had before he got lured into this kooky enterprise.

And the entrepreneur? Well, he doesn't actually lose anything himself. He just walks away with his hands in his pockets – penniless, yes, but remember he also started penniless. So he hasn't lost anything himself. A little depressed perhaps at seeing his idea fail, but otherwise none the worse for wear.

So the capitalist not merely contributes the hoes, he also shoulders all the **risk**. This is sweat, tears & sleepless nights. And it is for *this* that he is so amply rewarded. And because of this that he has more riding on the success or failure of the enterprise than the other factors, and consequently a greater reason to claim control of the enterprise.

## APPENDIX II: THE CAPITAL MARKET

Firms get labor from the labor market, land from the real estate market and capital from the **capital market**.

You may have heard the term "capital market" used to refer to the **stock market**. And that is exactly what the capital market is. The stock market is the place where firms hire tools and machines from the owners of tools and machines.

You may find this a little odd, as I am sure many of you might have usually thought that stock markets is where people buy and sell little pieces of paper – **stocks** or **shares** of a company – and not tools or machines.

But what *is* a stock or a share? A share of *what* exactly? Firms? But what are firms? They are "entrepreneurs", organized entities that combine land, labor and capital to produce output. But they don't actually "own" anything. They don't "own" their machines any more than the "own" the labor which uses them.

When you buy a "share" of a company, what you are really buying is a share not of its land and labor, but of its *capital*, i.e. the stock of tools, machinery and raw material inventories the firm uses. You become the *owner*, in whole or in part, of the screwdrivers, computers, welding machines, desks, and factory plant. It may also include some abstract or intellectual capital, such as patents and brand name. That capital equipment does not belong to "the firm", it belongs *to you*. And the firm is "borrowing it" from you to make whatever it is they're making.

Your "share" is just an ownership deed on the capital stock. It is a piece of paper identifying you as the owner of this screwdriver, those bolts, that oven and that welding machine.

Of course, shares are not usually so explicit as to specify and list, in itemized form, exactly *which* tools or machines you own. Rather, it is more expedient to just put all the tools & machines in a pile (the 'capital stock') and assign you an ownership share of that pile. So a share will usually say something like "The holder of this share has a claim of ownership over 1/1000th of the capital stock of Acme Inc." rather than "The holder of this share owns the red screwdriver that is usually in that yellow box that sits at the left corner of the first floor of Sector G of Acme's Flint plant". But make no mistake: whether specified as part of an amorphous mass of the total capital stock or itemized as a specific screwdriver, doesn't make a difference to the principle. That's *your* screwdriver, in whole or in part, that they're using in Sector G.

If it's your screwdriver, can you take it back? Sure you can. Anytime. Drive up to Flint, locate Sector G, find the yellow box, and take it home. It's yours, not theirs.

Of course that's not the most convenient way of taking it back. Far more expedient is simply to *sell* the screwdriver to someone else, someone who is happy to lend it to Acme Inc. The screwdriver itself doesn't need to move, it's just the owners that change.

And that's what happens on the **stock market** *every day*. When people buy and sell shares, they are buying & selling screwdrivers, or rather the owners of screwdrivers are swapping their ownership claims around. "I'll trade you the screwdriver in Sector G of Acme's Flint plant for the twelve bolts that hold down that third oven on the second floor of Nabisco's biscuit plant in Akron."

Why would you propose such a trade? What do you know or care about screwdrivers or oven bolts? Because as an owner of the capital stock, you are entitled to the *profits* of the firm. If you don't feel Acme Inc. has been giving you enough of a return for the right to use your screwdriver, take it back. Or rather swap it for the oven bolts in Akron. After all, you might believe Nabisco Inc. is promising to give you a greater profit return if you lend those bolts to them.

The profits of a company are distributed to the capital-owners – the shareholders – every quarter in the form known as '**dividends**'. If Acme Inc. makes \$100,000 in profit this quarter, it will distribute those profits to all the shareholders in proportion to the amount of capital they own. If you own 1/1000th of the stock, then you will be getting a dividend check from Acme for \$100. For what? For lending them your screwdriver, of course.

A \$100 return for lending one measly red screwdriver sounds like a real jackpot. And if someone else realizes that, they are likely to offer to buy that screwdriver from you – offering you twice, thrice or a ten times what you originally paid for the screwdriver. That is, the value of your share – your ownership claim on that screwdriver - goes up. That's what we mean when we say a firm's "price" goes up on the stock market. Everyone wants to buy ownership claims on screwdrivers and lend it to them to get a piece of those splendid dividends. But if Acme is in trouble and hasn't been able to turn a profit and fails to pay you much of any dividends, you're not likely to get much of any offers for that screwdriver. So the value of your ownership claim – the stock market price – goes down.

### **Stock Market versus Replacement Value**

Ideally, stock markets should value the company capital stock "properly". If the value of your share is trading on the stock market at \$200, there's something fishy going on. Why should I pay \$200 for your share, for your screwdriver, when I can just go to a corner hardware store and buy another red screwdriver for \$12.99 and lend it to Acme, Inc.?

Stock market analysts like to compare the "stock market value" against the "replacement value" of a company as a way of deducing whether a firm's shares are overvalued or undervalued by the stock market.

Acme Inc.'s Flint plant is just a big building full of machines & tools. In theory, we could create a exact replica of that entire factory from scratch simply by going to the hardware store and buying exactly the same machines and tools - \$12.99 for the screwdriver, \$499 for a welding machine, etc. The cost of reproducing the entire factory tool-by-tool is known as the "replacement value".



Suppose that we perform such a calculation and figure out that Acme Inc. has a replacement value of \$1 million – that is we can reproduce its factories exactly by spending \$1 million on tools and machines.

What's the stock market value? Suppose that Acme has 100,000 shares issued and they're trading on the stock market for \$10 apiece. So the stock market value of the company is  $100,000 \times \$10 = \$1$  million.

In this case, the stock market value is exactly equal to the replacement value. The stock market is "properly" valuing Acme Inc. as the sum of its capital parts.

In financial lingo, we sometimes say the firm's "Q-Ratio" (ratio of stock market value to replacement value) is exactly 1. (the "Q-Ratio" was a concept devised by American economist James Tobin.)

But suppose instead it turns out shares are trading at \$20 apiece. In this case, the stock market value of the company is  $100,000 \times \$20 = \$2$  million. That is twice the value of its replacement value (\$1 million). In this case, we can say the company is "**overvalued**" by the stock market. It is worth more than the sum of its parts. (or Q-ratio is greater than 1).

This should raise a few eyebrows. But companies can defend being somewhat overvalued on account that there might be some intangible elements to a particular firm that are not captured by straightforward calculation of replacement value – e.g. the particular Acme managers happen to be exceptionally superb, or the brand name is particularly powerful, or its particular market situation is particularly strong and with great future prospects, things that you might not be able to carry over to a pure replica factory.

Fair enough. Intangible factors may justify stock market value exceeding replacement value somewhat, but not by too much. A company whose stock market value is twice, thrice or ten times its replacement value is probably too overvalued and should be regarded suspiciously. It is a good clue that the price of its shares is probably over-inflated and unsustainable in the long run.

Conversely, it is also possible for company's stock market value to be lower than their replacement value. If Acme's shares are trading at \$6 per share, the stock market value of Acme is  $100,000 \times \$6 = \$600,000$ . But the replacement value of the Acme is \$1 million. In this case, the company is undervalued. (or Q-ratio is less than 1).

Companies which are undervalued are susceptible to predatory **liquidators**. Meaning: it makes profitable sense for someone to buy up the undervalued stock of the firm and then dismantle the firm, selling off its capital, machines & tools, piece by piece. The revenues gained from the sale of the capital on the second-hand market will be greater than what it costs to buy the entire company on the stock market.

Liquidators are unpopular for an obvious reason: they are destroying long-term jobs, old companies and brand-names, for the sake a few opportunistic bucks. In their defense, they are releasing resources (not only capital, but also labor) that were tied up in poorly-performing companies. Such is the Darwinian world of modern capitalism.