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# How Markets Work



# Markets, Money & Prices



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# Why Markets?

## WHY EXCHANGE?

Yesterday, when you ate your dinner, the meat may have come from Argentina, the green beans from Kenya and a farmer in Vietnam could have produced the rice. The farmer probably planted the seedlings already last year and it may have been his son who harvested the crop once it was ripe. Someone packed the rice and shipped it to Sweden. It was delivered by truck to your local store, where it was shelved for you to pick it up. Also the packaging, the ship and the truck have their provenance. The truck, for instance, may have been designed by....

While we take all of this for granted today, it is actually quite amazing if we pause and think about it for a while: *How where all these complete strangers-at various times and places-aligned to produce that dinner of yours?* And why must it be so complicated to get a decent meal?

## THE TENSION BETWEEN VARIETY AND SPECIALIZATION...

Both as individuals and families, firms and countries, we must choose what to produce and what to consume. These choices are subject to a troublesome tension, that between our **love of variety** and the possible gains from **specialization**. On the one hand, we wish to consume a large variety of products and services such as food, cloths, and haircuts and even a variety of different foodstuffs including fish, meats and vegetables. On the other hand, most people become much more productive if they specialize in producing a single good—or even a few tasks in the production of a single good—for which they are relatively well suited. Some people may be physically strong others may have an innate gift for handling cattle. Some countries have an abundance of sun and fertile soil while others have long coast lines and rich fishing waters. With specialization follows repetition and thus knowledge, improving productivity even further.

## ...IS EASED THROUGH EXCHANGE...

This tension between our love of variety and the gains from specialization is eased through **exchange**. We do not consume what we produce and vice versa. Instead we trade. If Anderson can produce one kilo of apples in an hour but only half a kilo of pears, while Peterson can produce a kilo of pears but

only half a kilo of apples, an exchange of apples for pears will allow them both to specialize in their respective areas of expertise while maintaining a mixed diet at the same time.

...WHICH REQUIRES COORDINATION...

But specialization and exchange does not arise all by itself. Anderson needs to know that it is apples that he is relatively suited for. He needs to know how many kilos of apples to produce, when and where to deliver them and to whom. And Anderson must also know what to require in return for these apples. Exchange calls for **coordination**.

If everyone would live alone on isolated islands, eating what they produce themselves, there would be no need for coordination. Robinson Crusoe did not have any difficulties in deciding how much corn and rice to grow or how much grapes to dry into raisins for the winter months. He knew what he liked and he quickly learned his proficiency in different activities. Also within a family it is often easy to divide the work and share the yields. Everyone knows every one else's strengths and weaknesses as well as what they like and not. It is easy to talk to one another face to face and to find a joint decision.

But, again, how did all those complete strangers, scattered around the globe, contributing at different times, align to provide the dinner you had yesterday?

...ACHIEVED BY INSTITUTIONS SUCH AS MARKETS

The core of economics is the study of exchange and how coordination may come about through various institutions such as firms, markets and money as well as even more basic **institutions** such as contracts and ownership. In this book we will primarily study the role of **markets** and take firms, contracts and other institutions as given.

While the word market used to mean a specific place where people met to exchange their goods at certain times, it is used in a slightly more abstract sense today. The rice market, for example, can be thought of as the collection of all rice transactions, possibly restricted by some geographical boundaries and interval of time.

Markets are different. They work by many different procedures, usually referred to as **market forms**. In most consumer markets in Sweden exchange typically occur at terms decided by the seller only. These terms are decided in competition with other sellers. In intermediate goods markets, exchange more often occurs through bargaining and auctions. There are also more "institutionalized" exchanges for trading commodities and financial instruments where brokers simultaneously offer bid and ask prices according to well-defined rules.

The market outcome—who sells what to whom and at what price, and by implication, who produces what and who consumes what—clearly depends on people's preferences for dif-



ferent goods and services and the available technologies for producing them. But as we will see the market outcome also depends on many fine details of how markets work, such as the exact rules for bidding in an auction, what information different buyers and sellers have, how many competitors there are, and so on.

## WHO DOES WHAT?

So people should probably specialize and exchange goods with one another. But who should then do what?

Consider a village with two individuals, named Anderson and Peterson, who both work 1500 hours per year. Their diet consists of apples and pears only. Each person wants to consume as much fruit as possible, but variety is absolutely essential. They both wish to consume one apple for every pear and vice versa. Expressed differently, if Anderson eats five apples but only four pears, he derives no utility from the last apple. We may thus measure a person's well-being or utility in terms of the number of *pairs* of apples and pears he eats. Eating seven apples and four pears is as good as eating only four apples and four pears. Both fruit-bundles can thus be said to give a utility of four.

Assume that Anderson can produce two apples in an hour but

### Exercise 1.1 Absolute advantage.

1. How many apples and pears would Anderson and Peterson produce and eat if they could not exchange fruit with each other?
2. How many pears would Peterson at most be prepared to give Anderson in return for one apple? How many pears would Anderson at least require from Peterson in exchange for one apple?
3. Anderson and Peterson agree (for some unexplained reason) to trade the fruit one for one. How many fruits do they trade with each other? Expressed differently, how many apples and pears will Anderson and Peterson produce and eat?
4. Compare the two outcomes.

only one pear, while Peterson can produce two pears but only one apple. We then say that Anderson has an absolute advantage in producing apples and that Peterson has an **absolute**

Before reading any further, please try to solve [Exercise 1.1](#). It is very important that you try to solve the questions as well as you can before looking at the solutions that are available below. The main purpose of learning economics should be to learn how to *analyze problems*, not to learn replicating solutions.

Anyway, here is the solution...

Anderson always produces the same number of apples and pears in order to consume even pairs. He has to work 1.5 hours to produce one apple-pear-pair. Since he works 1500 hours, he will produce and eat 1000 apples and 1000 pears. Also Peterson will produce and eat the same number of apples and pears.

If Anderson produces an additional apple and gives it to Peterson, Anderson has to produce half a pear less. But if Peterson would give Anderson half a pear in return for the apple, Anderson would still eat 1000 fruit-pairs. Thus, as described in [Fig-](#)

**FIGURE 1.1** How many pears would Anderson demand in return for an apple?

|        | START | CHANGED<br>PROD. | RESULT | TRADE | END  |
|--------|-------|------------------|--------|-------|------|
| Apples | 1000  | +1               | 1001   | -1    | 1000 |
| Pears  | 1000  | -0.5             | 995.5  | x     | 1000 |

[ure 1.1](#), Anderson would demand at least half a pear ( $x = + 0.5$ ) in return for an apple.

If Peterson receives an apple from Anderson, Peterson may produce one apple less and instead produce two additional pears. If he gives those pears to Anderson, Peterson will still eat 1000 fruit-pears. Thus, as described in [Figure 1.2](#), Peterson would at most be willing to give Anderson two pears ( $y = - 2$ ) in return for one apple.

**FIGURE 1.2** How many pears would Peterson be willing to give up for an apple?

|        | START | CHANGED<br>PROD. | RESULT | TRADE | END  |
|--------|-------|------------------|--------|-------|------|
| Apples | 1000  | -1               | 999    | +1    | 1000 |
| Pears  | 1000  | +2               | 1002   | y     | 1000 |

In sum, while Anderson only requires half a pear in return for an apple, Peterson is willing to give up as much as two pears. They clearly have an opportunity to improve their well-being, both of them at the same time, by collaborating with each other.

It is not clear in what proportions they should exchange apples for pears. There is a range of possible agreements that would benefit both, but trading one for one appears to be a natural compromise. As discussed later in the chapter on bar-

gaining, this is also what economic analysis predicts, at least under certain conditions.

If Anderson and Peterson specialize completely, Anderson can spend all his time producing apples, resulting in a total of 3000 apples, and Peterson can spend all his time producing pears, resulting in a total of 3000 pears. Exchanging 1500 apples and pears, both people will be able to eat 1500 fruit-pairs.

Both people thus improve their utility by specializing in the production where they have an absolute advantage and to trade fruit with their neighbor. They both benefit from eating 50% more fruit. One may say that GDP is increased by 50% as a result of exchange. There is growth without technical progress thanks to organizational progress.

## COMPARATIVE ADVANTAGE

Anderson suddenly becomes more productive in both apple and pear production and, as a result, he is now more productive than Peterson in both apple and pear production. Let's say that Anderson can produce eight apples or four pears in an hour. We say that Anderson has an absolute advantage in both fruits.

Is there, in this new situation, any reason for Anderson to take part in an exchange with Peterson? Before reading any further, please try to solve [Exercise 1.2](#).

## Exercise 1.2 Comparative advantage.

1. How many apples and pears would Anderson and Peterson produce and eat if they could not exchange fruit with each other?
2. How many pears would Peterson at most be prepared to give Anderson in return for one apple? How many pears would Anderson at least require from Peterson in exchange for one apple?
3. Anderson and Peterson agree (for some unexplained reason) to trade the fruit one for one. How many fruits do they trade with each other? Expressed differently, how many apples and pears will Anderson and Peterson produce and eat?
4. Compare the two outcomes.

Anderson has to work 1.5 hours to produce four apple-pear-pairs. Absent trade, he will thus produce 4000 ( $4000 = 4 * 1500/1.5$ ) apples and pears. Peterson produces 1000 apples and pears.

When Anderson is more productive in producing both fruits, it is much less obvious that they two neighbors could gain anything from cooperating with each other. Why should Ander-

son ask Peterson to produce pears for him, when he is much more productive himself?

Surprisingly, the answer is almost the same as in the previous case. If Anderson produces an additional apple and gives it to Peterson, Anderson has to produce half a pear less. But if Peterson would give Anderson half a pear in return for the apple, Anderson would still eat 4000 fruit-pairs. Thus, Anderson would demand at least half a pear in return for an apple. If Peterson receives an apple from Anderson, Peterson may produce one apple less and instead produce two additional pears. If he gives those pears to Anderson, Peterson will still eat 1000 fruit-pears. Thus, Peterson would at most be willing to give Anderson two pears in return for one apple.

Even if Anderson is more productive than Peterson in terms of the number of minutes it takes to produce a pear, Anderson is actually less productive than Peterson in terms of the number apples given up to produce a pear. And it is the latter comparison that is relevant. If the two neighbors don't collaborate, they will both spend their full working day producing a mix of both fruits. When they produce pears, it is apples they actually give up, not time.

Expressed differently, the **opportunity cost** of a pear is some number of apples and Anderson's opportunity cost of producing a pear is two apples while Peterson's opportunity cost is only half an apple.

Thus, assume that Anderson produces one pear less. He will then be able to produce two extra apples. If Peterson at the

same time produces one pear more and one apple less, they can exchange an apple for a pear. Both Anderson and Peterson will then end up with a surplus of one fruit-pair, ie they will consume 4001 and 1001 pairs.

Actually they may trade much more. They can continue with these reallocations until Peterson spends all his time on producing 3000 pears. After trading half of those with Anderson, Peterson ends up with consuming 1500 apples and 1500 pears.

To produce the 1500 apples for Peterson, Anderson spends 187.5 hours of work. He also spends 187.5 hours to produce 1500 apples to eat in pair with the pears he received from Peterson. He therefore has 1125 hours left. During this time he can produce another 3000 apples and pears ( $3000 = 4 * 1125 / 1.5$ ). Anderson thus ends up consuming 4500 apples and pears.

Both people gain from specialization and exchange. Even if Peterson is less productive than Anderson, he has a **comparative advantage** in producing pears. By specializing in the fruit for which they have a comparative advantage and then exchange fruit with each other, both people can gain.



# Why Money?

## FROZEN CHICKEN FOR MILITARY AIRCRAFT

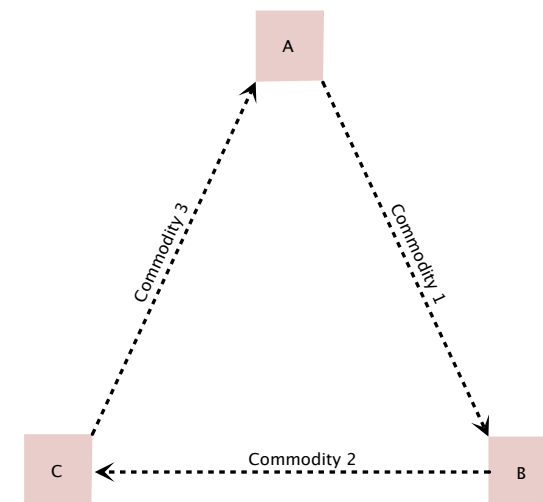
When the Swedish aerospace company Saab sells its multi-role fighter aircraft JAS 39 Gripen to Thailand, birds may be traded for birds **according to American embassy reports revealed by Wikileaks**. The Thai government demands that 80 000 tons of frozen chicken is accepted as part of the payment. The reports do not reveal whether Saab, in turn, paid its workers and share holders in frozen chicken the same year, chickens that they, in turn, may have used to pay their rents. And perhaps the landlords used the chicken to pay for their winter holidays in Thailand.

Barter and other types of in-kind transactions are associated with severe transaction costs. The reason is that **double coincidence of wants**—that you not only have what I want but also want what I have—are rare. The solution may be to use paper money as a medium of exchange.

## COMMODITY MONEY

Consider a country in which nobody wishes to consume what he can produce and where barter is difficult due to a lack of double coincidence of wants. To be more specific, assume that there are three types of individuals. People of type A can only produce a commodity called 1 that is only consumed by people of type B. People of type B can only produce a commodity called 2 that is only consumed by people of type C. People of type C can only produce a commodity called 3 that is only consumed by people of type A. This pattern is summarized in [Figure 1.3](#).

FIGURE 1.3 Absence of double coincidence of wants.



In this country trade must be *bilateral* since people only meet in pairs. To be more specific, assume that there are equally

many people of all types and that, each day, every person meets with a randomly selected person from both of the other types, but at different times. In the morning, every person of type C meets with a randomly selected person of type B. Then, at noon, every person of type B meets with a randomly selected person of type A. Finally, in the evening, every person of type A meets with a randomly selected person of type C. At all these bilateral meetings, it is possible for people to exchange commodities with one another, if they so wish.

Trade must also be *quid pro quo* since nobody can be sure to meet the same person again. That is, to receive something from somebody, one has to give something back at the same time and place.

And exchange is *efficient*. To be more specific, we assume that any person who gets to consume his desired commodity will feel better off, but the producer will feel worse off due to the effort involved in production. Clearly, the best possible day for any individual would be a day with consumption and no production and the worst possible day would be to produce but not to consume. More crucially we assume that people would prefer a day with both consumption and work to a day without both consumption or work.

If the country would be governed by a benevolent dictator, there would be efficiency. This dictator could order all people of type B to provide a person of type C with a unit of their commodity in the morning, all people of type A to provide a unit of their commodity to a person of type B at noon, and all people

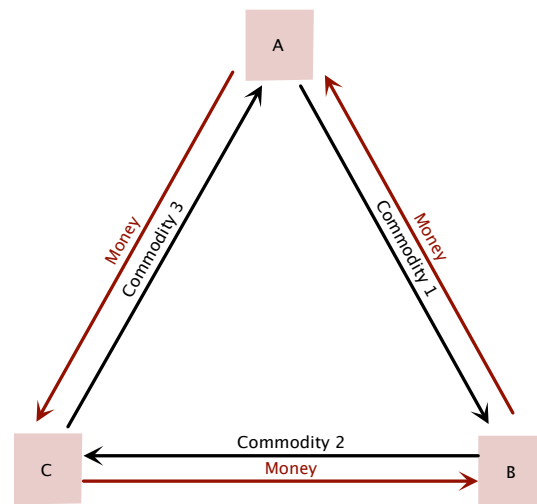
of type C to provide a unit of their commodity to a person of type A in the evening. Unfortunately, dictators are often not benevolent and they typically lack information about peoples' preferences and abilities. If the dictator cannot say who is an A person, B person or C person, he could not enforce his plan. So the idea of the benevolent dictator would not work.

Also voluntary exchange is complicated to arrange, since trade will only occur if mutually agreeable and since in each meeting only one party wishes to consume what the other can offer.

There is a solution, however, namely indirect trade, as described in [Figure 1.4](#). When C and B meet in the morning they may exchange commodities, a unit of commodity 3 for a unit of commodity 2. B will not consume commodity 3 but rather store it. Then, at noon, B and A may exchange a unit of commodity 1 for a unit of commodity 3. (The evening meeting between A and C will then be superfluous.)

With this arrangement, people of type B will act as middlemen, transferring commodity 3 from people of type C to people of type A. And B will not hesitate to accept commodity 3 in return for commodity 2, even if it has no consumption value for them, since they know it will have a trading value for them later on. When an object (such as commodity 3 here) is accepted in trade not to be consumed or used in production, but to be used to facilitate further trade, it becomes a medium of exchange and is called **commodity money**.

FIGURE 1.5 Fiat money.



Commodity money are problematic, however, as both storage and transportation is often costly. In order for the arrangement with indirect trade and commodity money above to work, a B-person must value consumption higher than the combined effort of production and storage and transportation. Otherwise, no one would be producing anything and no one would be consuming anything. There would be no exchange. Markets would not exist.

In sum: Direct barter does not work when there isn't a double coincidence of wants. Indirect trade with commodity money is plagued by problems of transportation and storage and may also cause markets to fail. (And credit is not a solution in our situation either.) Socially valuable production and consumption will not occur due to the problems of organizing exchange.

## FIAT MONEY

Assume now that someone provides the country with a load of small pieces of paper called one-euro bills. The bills are suddenly distributed during a night and each person of type C receives one bill. The bills cannot be used for anything and are completely worthless.

Except, of course, that the creator of the bills suggest that anyone in possession of such a bill may leave it in exchange for a unit of service. And if the whole population accepts this idea, they may start to trade.

In the morning, B-people provide C-people with services. In exchange every producer receives a one-euro bill. At noon, A-people provide B-people with services. In exchange every producer receives a one-euro bill. In the evening C-people provide A-people with services. As a result, during the first day after the invention of Euro bills, everyone consumed and produced one unit of service. And, when the day ends, all C-people again holds a one-euro bill, which they can use to buy services on the morning of day 2. This pattern of exchange is described in [Figure 1.5](#).

There are no transportation and storage problems.

But why do people of type C accept to provide people of type B with services in exchange for a piece of paper? The answer is, of course, that they expect that people of type A will accept the money in exchange for services later during the day. People of

type A, in turn, accept money as they expect people of type C to accept the money in the evening. Thus, only if all parties are certain that everybody else will accept the paper money as payment for future services will this arrangement work.

If an object with no intrinsic value becomes a medium of exchange, it is called **fiat money**. Fiat money takes on value, essentially as a self-fulfilling prophecy. Whether or not fiat money can serve as a medium of exchange hinges crucially on whether people believe that it will. In other words, the use of money involves a strategic element and aspects of social custom.

## BIBLIOGRAPHIC NOTE

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This section is based on Kiyotaki, N., & Wright, R. (1989). On money as a medium of exchange. *The Journal of Political Economy*, 97(4), 927-954.

## Why Prices?

Let us now turn back to Mr. Anderson and Mr. Peterson in the fruit-producing village. Recall that we used to assume that they both know that they would gain from specialization and exchange. Such knowledge may arise naturally in a small village. They can both actually watch the other person working and figure out their relative proficiencies. And they both know the other person's preference for eating fruits in pairs. It is relatively easy for them to get together and jointly work out the following plan: (i) Anderson is to produce 3000 apples, (ii) Peterson is to produce 3000 pears, (iii) Anderson is to hand over 1500 apples to Peterson, (iv) Peterson is to hand over 1500 pears to Anderson, (v) Anderson is to consume 1500 fruit pairs, (vi) Peterson is to consume 1500 fruit pairs.

But, what if the village isn't that small? What if we are talking about the "global village" with seven billion people and who knows how many goods and services? What if the inhabitants cannot watch one another working and eating? What if they

know neither how productive each and every neighbor is in every possible productive activity, nor what their neighbors like to consume and in what proportions? What if they cannot all meet at the same time and agree on a common plan? Will cooperation in the form of specialization and exchange then break down? Not so, fortunately.

To solve the problem, we equip Mr. Anderson and Mr. Peterson with money. And we require that every good and service has a price in terms of money. To be specific, let's say that the price of all fruits is one euro apiece. That is there is some market place where anyone can go to buy or sell any quantity of any fruit they wish for one euro by the piece.

For simplicity, we still consider the small village with only two people and two goods, but require this economy to use the big-village institutions of money and prices. How would Mr. Anderson and Mr. Peterson behave in such a world of prices? Please solve [Exercise 1.3](#) before reading any further.

As before, Mr. Anderson and Mr. Peterson both work 1500 hours per year. Their diet consists of apples and pears only and they only wish to consume the fruits in even pairs. Anderson can produce two apples in an hour but only one pear, while Peterson can produce two pears but only one apple. The price of apples and pears is one Euro.

Mr. Anderson will earn two Euros per hour he spends growing apples and one Euro per hour he spends growing pears. He thus decides to grow only apples and earns 3000 Euros per



### Exercise 1.3 Why prices?

1. How many apples and pears will Mr. Anderson and Mr. Peterson produce and consume? How much will they trade?
2. Compare this “big village” outcome governed by prices with the “small village” outcome discussed above.
3. What information does Mr. Anderson need to make his decisions? What information does he not need?
4. What if the price of apples is three euro and the price of pears is one euro?
5. Would you consider this story a complete explanation for how prices coordinate different people’s plans?

year. He uses this income to buy (keep) 1500 apples and to buy 1500 pears.

Mr. Peterson specializes in the production of 3000 pears. Also he consumes 1500 fruit pairs.

Note that the two men’s plans are well aligned. They both specialize according to advantage and the quantity of pears that

Anderson expects to buy, Peterson expects to sell. This outcome is the same as that agreed in the “small village.”

To make his decisions, Mr. Anderson uses his knowledge about his own productivity in the different production activities as well as his knowledge about what he likes to eat. In addition he uses the information about the prices prevailing in the market. He does not need to know anything about Mr. Peterson’s productivity or consumption preferences. They don’t need to communicate before they start to produce.

If the price of apples had been twice the price of pears, Peterson may have chosen to produce both apples and pears and not participate in any exchange. He would then produce and consume 1000 fruit-pairs. Anderson would have been even worse off. He would have specialized in apples but found no one to trade with. This outcome is thus worse (for Anderson) than the outcome when no one can trade.

This story shows how prices may allow people to specialize according to advantage and how prices may coordinate their plans. But the story also demonstrates that this favorable outcome does not only hinge on the use of money and prices. The favorable outcome also hinges on a “detail,” namely that the price of apples and pears are set to clear the market. In this case they would have to be set equal. Our story is thus incomplete, since it does not explain why the price of fruits would be set equal.

Actually, as long as the price of apples is less than two times the price of pears and higher than half the price of pears, both

people will gain from trade. Work out the details as an additional exercise. Assume for example that the price of pears is one euro and check how the outcome differs if the price of apples is  $\frac{1}{2}$  or 1 or 2 euro.

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# Aims of this Book

The story about Anderson and Peterson demonstrates that both people would gain from specialization and trade, nothing more. Trade presumes agreement, which is not guaranteed. Anderson and Peterson are eg likely to disagree on the terms of trade, as both parties probably want to secure the best possible deal for themselves. And if they are too greedy, they may well end up making incompatible demands, and trade may be disrupted.

This book is concerned with how markets work: what the rules of the market are, how people behave when they exchange goods and services with one another under these market rules, and what the final outcome is. The question is if markets make people produce the goods they are relatively suited for, consume the goods they enjoy, and exchange the difference? In other words, are markets efficient? A first example of why markets may fail is the absence of a double coincidence of

wants. A second example of why markets may fail is that prices do not clear the market.

The book is primarily focused on the details of individual markets rather than on how all the different markets in the economy interact. The book is also focused on final and intermediate goods markets leaving, in particular, labor and financial markets out. We will also disregard public provision of goods and services.

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## STYLIZED FACTS

One of the aims of this book is to present some important “stylized facts” about how markets work. Examples include:

1. Medical companies set very different prices for the same drug in different countries, even though the production costs are the same and the distribution costs are similar.
2. When a patent for a medical drug expires and new firms start producing copies, the producer of the original drug lowers its prices. Similarly, the hourly price for driving lessons is lower in municipalities with many driving schools than in municipalities with only a few schools.
3. Large retail chains often buy their products cheaper from their suppliers than smaller retail chains can.
4. Mobile phone operators allow their customers to choose from a menu of different pricing plans, typically including a

flat-rate plan with a high monthly fee but with no additional costs for making calls.

5. Software companies often market versions of their programs with some features disabled. This practice may appear somewhat puzzling as disabling features increase the software companies' costs.
6. For a long time 7UP was marketed as the un-cola to set it apart from competing soft drinks. The commercial radio stations in Sweden do not appear to strive for differentiation. Most of them simply play the same hit lists over and over again.
7. The industries that are relatively concentrated in Sweden are also relatively concentrated in other countries, but some industries remain concentrated also in large economies such as in the US.
8. Mergers often reduce the merging firms' profits, but raise their share-prices. So, why do all these unprofitable mergers occur? And how can share prices increase when profits are reduced?

## METHODOLOGY

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The second and main aim of the book is to introduce some methods that have proven useful for analyzing how markets work, to understand regularities such as those just mentioned.

## MODELS = IMAGINARY ECONOMIES

Understanding in economics often takes the form of constructing a model. An alternative name would be imaginary economy. The exercise about Anderson, Peterson, apples and pears above is an example of such a model or imaginary economy. The stylized fact we wish to understand with that particular model is the drive for exchange itself. By constructing a simple imaginary economy consisting of only two people and only two goods and assuming (i) that both people wish to consume apples and pears in fixed proportions and (ii) that they have different productivities, we could demonstrate that Anderson and Peterson wish to specialize and trade with each other. Even if the example with absolute advantage may seem trivial, the second example with comparative advantage is much less transparent. But playing around with explicit productivity numbers clarifies that it is comparative advantage, not absolute advantage, that make them exchange apples and pears.

Still, many people are put off by this simplistic approach. Nobody cares about the imaginary Messrs. Anderson and Peterson. Apples and pears may strike you as rather silly metaphors for goods and services in general. And while most people love variety, fixed proportions is a blatantly false description of such preferences. Since when is caricature science?

We use imaginary economies for at least two reasons. The first reason is that real-world markets are far too complex for us to "see" what is going on. Constructing an imaginary economy

allows us to disregard many details that we may have reasons to believe are unimportant for the issues at hand. By only thinking about an economy with two people and two goods, rather than seven billion people and who knows how many goods, the analysis is easier. The second reason is that we can make experiments in imaginary economies. If we wish to investigate if a certain tax would hurt certain people, we can study this issue without actually increasing the tax and possibly hurting these people.

But simplification is also a weakness. Simplifying assumptions are by definition false descriptions of the world. We can never be sure that what is true in an imaginary world is also true in the real world. To make up our minds we need common sense: Is it likely that our conclusions (e.g. that comparative advantage drives trade) rely in some critical way on our simplifications (e.g. that people wish to eat apples and pears in fixed proportions)?

We may also believe more in the predictions if the same predictions can be generated in many different models that are characterized by different sets of simplifying assumptions. But, ultimately, our belief in the economic models should rest on empirical testing.

## GAME THEORY

Studying markets is studying peoples' exchange of goods and services with one another. Exchange is interactive. What one person does clearly affects the welfare of others. What one person does also affects what choices other people wish to make. Anderson can specialize only if Peterson does. Decisions are in other words interdependent. For this reason we will make heavy use of the theory of interdependent decision making, better known as game theory.

This is not a course in game theory, but as we repeatedly apply game theoretic analysis to economic problems, you will gradually learn how to use it. And, actually, we do start out with a quick primer in Part I.

## EMPIRICS AND IDENTIFICATION

Empirical work is important both to test if our models succeed to describe the way markets work and also to quantify important relationships.

We will look at one empirical issue. Since competition is one of the key factors determining how well markets work, we will introduce some empirical methods that have been used to measure competition in markets. The question is what data do we need to collect and how should we analyze the collected data if we wish to say how much the firms in a market compete with each other?



## PUBLIC POLICY

The third and final aim of this book is to describe the role of some public policies such as competition policy and regulation that have been introduced to improve how market work.

## ADDITIONAL EXERCISES

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I hope that you take this course and read this book because it is fun. But I also hope that you wish to learn how to analyze economic problems at the same time. You will consequently be asked to solve problems and recapitulate the main points as you read. Let's start immediately:'

1. Why do people trade goods and services with one another?
2. What is the difference between absolute and comparative advantage?
3. What is meant by opportunity cost?
4. What is meant by commodity money? What problem does commodity money solve? What problems does such money cause?
5. What is meant by fiat money? What problems does such money solve?
6. What is the role of prices?

Wait, please answer the questions before reading any further. And answer them carefully.

Taking tests improves learning. Newly published research shows that students who read a passage, then took a test asking them to recall what they read, retained 50 percent more of the information a week later than students who used other methods, eg studying the material repeatedly.

## BIBLIOGRAPHIC NOTE

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