



Allocation of Consumable Goods over Time: Speculation

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WHAT we eat today, we cannot eat tomorrow. We must allocate between *today* and *tomorrow*. After the summer's harvest of wheat, how much should we eat in the fall, winter, and next spring? Must a central planning agency set consumption quotas for each month until the next harvest? If not, how do we avoid famine in midwinter? In the United States no agency is responsible for seeing that we don't consume too much now. But some people, without delegated responsibility, devote their major activity to this task. In a capitalist system these individuals are acting in the interests of their own wealth; yet, in some mysterious way, their decisions influence the allocation of consumable goods over the year. In this chapter we shall study the way these actions affect that allocation. The example of the conservation of wheat between harvests will bring out the essential details. Although we discuss only harvests, the principles here apply to *all* goods, whether agricultural or manufactured.

The Risk-Taker in Commodity Markets

The wheat crop (assuming only one type of wheat) has been harvested. Must the farmers store it, gradually selling a bit each month until the next harvest? Farmers do not want to keep so much of their wealth in the form of wheat. They prefer to sell the wheat when harvested, letting someone else store it and bear the risks of changes in value of the wheat stock and decide how much to sell to consumers each month. Who buys the harvested wheat? The millers, who grind the wheat grain into flour, don't want to store a year's supply of wheat in advance. Even the housewives refuse to take on this duty, because they do not want to make commitments so far ahead. But there is a very simple

device to induce someone to store the wheat. If people refuse to store the harvested wheat, the price of wheat falls. There is an increased prospect of profit in buying wheat at the lower price, storing it, and selling it later at a higher price after some of the wheat is consumed. In a capitalist open-market system, anyone may buy wheat at harvest time in a self-serving endeavor to make a profit by selling it *later at a higher price*. This is known as speculation.

Without *professional speculators*, the price would fall still lower until the less venturesome, less perceptive people were induced to buy the wheat. For at a *sufficiently* low price of wheat, millers (and even housewives) could be induced to buy a year's stock of wheat, because prospects for profits before the next harvest would then look so good. Differences among people in the willingness to bear risk, in their talents and facilities for storing wheat, in the profit prospects that will induce them to risk buying wheat—all determine how low the price of wheat will be after the harvest.

Permitting *any* or all persons to buy stocks of wheat for speculative purposes keeps the price from falling so far, thereby giving farmers a higher price than if some of these buyers were not allowed to buy for speculation. And speculators' actually realized profits, if any, will be smaller. In the United States, anyone can buy and store wheat by telephoning a commodity-market broker who will arrange to have wheat purchased, stored in rented facilities, and insured against theft or spoilage.

The market for these transactions is the *futures* market. That market is characterized in folklore as a place where antisocial, money-mad speculators gamble on the price of wheat, corn, etc., causing prices to fluctuate even more as they are pushed down when farmers sell and pushed up when consumers buy.

We conjecture that this folklore about futures markets reflects the fact that many people do not understand the special character of a "futures" contract. An illustration will reveal the crux. You are a flour miller converting wheat grain to flour. You want your income to depend on efficient milling operations, not on a changing price of unmilled wheat grain. A drop in the price of wheat grain, after you have bought the grain, could ruin you. You can isolate your business income from that risk in three ways.

1. Don't buy any wheat in advance of your milling operation. Buy it only after you have an order to mill some grain into flour. But this is expensive and does not allow a smooth flow of production. You won't survive with this system.

2. Find someone else to own the wheat and store it in your place of business while you buy it from him as you mill the wheat. In this way any fluctuations in the value of the stock of wheat are borne by the other person. This is expensive to do, as you will see if you try to find someone to do it.

3. You can buy the wheat yourself before receiving any orders for the flour you will make from the wheat, at the same time placing a side contract with someone else, so that if the price of the wheat goes *up* (giving you a gain in wealth) you will give the gain to *him*, but he will compensate *you* for a *drop* in value of the wheat you are holding. You are *hedging* by "betting" with him on the value of wheat. In either event, your wealth is unaffected whether the wheat price rises or falls. This means of insulating your wealth from contingent events is called *hedging*. This is one thing the futures contract does. It is the cheapest known way of separating ownership of the wheat by the miller from his bearing the risk of fluctuations in wheat value. It also enables wheat millers to conduct their purchases of wheat more efficiently—but we shall not here elaborate on this important feature.

All three methods involve risk bearing. They differ in who bears it and in how that is arranged. They do not eliminate gambling or speculation or risk of loss or gain in value from holding wheat. That risk is inevitable when the wheat is kept unconsumed. Perhaps the reason futures contracts are so widely regarded as sheer gambling is that they separate the risk-bearing element so cleanly, efficiently, and *openly* from the *use* of the wheat, and therefore appear to be only devices to satisfy hungry speculators, bent on profiting from unanticipated changes in supplies or demands.

Control of the Rate of Consumption out of Stocks

What determines the *rate* at which the harvested stock of wheat is consumed? Who tells speculators how much wheat to sell each month for consumption? No one. Some *thing* does, and that thing is the current price of wheat relative to expected future prices.

Past experience, that prime source of knowledge, provides the basis for *expectations* of what the price of wheat will do between harvests. And the closer the current price is to future price expectations, the more will speculators be willing to sell currently, because profit prospects of holding wheat are diminished.

The present (*spot*) price of wheat is affected by the consumption demand and the supply of wheat coming into consumption channels from storage. If current consumption demand should increase, the *current* spot price of wheat will rise and reduce prospects of profits from storing wheat, thus inducing storers of wheat to sell more wheat to consumption channels. *The relationship between the current "spot" price for wheat and the price that is expected in the future affects the rate at which wheat will be released from storage into consumption.* And the prices (*futures* prices) of current contracts for future deliveries of wheat reflect beliefs and predictions about the future price. Why? People make contracts to deliver or to accept delivery in the *future* and will pay or be paid in the future at *presently* agreed-upon prices. This means that the prices now agreed upon for future delivery are predictions of what the price will be in the future; no one would purchase and store wheat today at a price higher than he thought the price would be in six months. Nor would anyone sell wheat *forward* (that is, contract to make future delivery) if the price were less than he thought it would be in the future.

"Futures" Prices and "Spot" Prices

Suppose it is now September, and you can buy wheat (in 5,000-bushel lots) for \$2 a bushel for delivery immediately—on the "spot." Today's *spot* price of wheat is \$2. Today, you also can make a *futures* contract for delivery of wheat upon payment of \$2.10 per bushel *next* May. The price of \$2.10 agreed to now, but to be paid in May, is called the *May futures price* (formed in September of the prior year). The difference between the two prices (spot and futures) usually just covers storage, insurance, and interest costs of holding wheat in the interim, because of competition among speculators.

Markets for Futures Prices

Prices in the commodity *futures* markets are reported in the financial sections of major newspapers. You will find (in September of 1972) something like the following for the wheat futures market (Chicago is the location of the market).

"Futures Price" of Wheat

September 1972 (harvest)	\$2.00
December 1972	2.04
March 1973	2.07
May 1973	2.10
September 1973 (harvest)	2.02
December 1973	2.06

The interval extends from one harvest beyond the next. Unless next year's harvest is anticipated to be a failure, the September (after-harvest) 1973 futures price presumably will be lower than the May 1973 (pre-harvest) price. May is the last month before the new crop harvesting begins. The September harvest cannot be used in the *preceding* May to increase the amount available for consumption; if it could, the May price would be pushed down and the September price raised.¹

These *futures prices* in today's futures markets provide predictions of what the spot price will be in the future. If anyone can make a better prediction of next May's spot price of wheat (that is, one that in fact turns out to be a more accurate prediction), he can quickly reap a fortune. For example, suppose the present (in September 1972) futures price for May 1973 is \$2.10, a price lower than he believes will actually exist in May of 1973. He could place a bet in this futures market that the presently quoted *May futures price* is too low and that next May's spot prices will be higher. The process for placing this bet is to buy now a *futures contract* for, say, 5,000 bushels of May 1973 wheat at \$2.10 a bushel—to be delivered to him and paid for next May. He agrees to this contract now in September at the presently quoted *May futures price* of \$2.10 per bushel. Then he nervously waits until May; if the spot price next May is higher than \$2.10, he can take delivery of the wheat and resell at the then higher price, reaping the difference as a profit. If the price is lower, he suffers a loss.

An important consequence of this activity is that increased current demand for wheat for delivery in the future pushes up the current "futures price" of future (that is, May) wheat from \$2.10 toward that predicted May price. In this way, beliefs that the current "futures" price of future wheat is too low will increase the current "futures" price and *reveal to the world* the new expectations of future spot prices.

Of course, for every buyer of a contract for future wheat, there must be a seller who promises to deliver wheat in the future. That other person may believe the spot price in the future will be lower than the current futures price, and, if *he* is correct, *later* he can buy wheat at the lower spot price in the future and deliver it to the buyer for the currently agreed-to higher futures price. Or that other person may be a *hedger*.

If the demand for current consumption increases so that the present price of wheat rises, continued storage will be less profitable unless it is also expected that the price in the future will be correspondingly higher. A faster rate of consumption will leave smaller stocks and higher prices in the future. Currently, therefore, *futures prices* in the futures markets will be pushed up. What will push them up? First, the knowledge of the faster rate of consumption of current stocks of wheat will induce speculators to anticipate higher prices in the future, and they will act accordingly by demanding more futures contracts. Second, there is a sort of automatic force in the sense that this force does not

¹ There is some downward pressure on May prices, for consumers will reduce current consumption in the expectation of buying and consuming more wheat at a lower price after the new crop is harvested.

require any general knowledge of a faster rate of reduction of the stock of wheat. This second force is the result of *hedging*. The larger the inventories of wheat, the more wheat that will be hedged by selling "futures contracts." The increased supply of futures contracts (reflecting large stocks) lowers the futures prices.

We are now in a position to see how a higher demand, higher spot price, and consequent faster rate of consumption out of inventories has an effect on futures prices. As the hedging inventory holders sell their wheat for the current consumption at a more rapid rate, they have less wheat to hedge, so that they want to cancel (buy back) their commitments to speculators to deliver wheat in the future. The increased demand to buy back futures contracts, as hedgers reduce their inventories, raises futures prices, which restrains their willingness to sell so much current wheat.

We have an answer to our question of who bears the risk of value changes of the wheat between harvests. Under the incentive of increased wealth (buying low and selling later at a higher price) anyone can shoulder this task—not because he *intends* to perform some socially useful function (rationing wheat from harvest to harvest). (Private interest motivates this method—a method not consciously designed or motivated by the social storage purpose but one discovered by a trial-and-error selective process and not widely understood by the members of society, not even by many of the speculators and farmers.)

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Illustrative Application: Coffee Futures Markets

To illustrate the interrelationships of prices, stocks, and speculative decisions, we shall use a "scenario" of public reaction to price movements of coffee futures. The scenario is only semi-imaginary, being based on recent actual events.²

The rumor spreads that the next coffee crop now blossoming in Brazil has been nipped by unseasonably cold weather. During these snaps, no one really knows how much the buds are affected, but there is an increased probability that next year's yield will be reduced. This implies greater (or surer prospects of) profits for those who own coffee today and who store it for next year's prospective higher prices. Immediately, the flow of coffee out of current stocks to consumption is reduced. Therefore, the current price of coffee to consumers will rise as less coffee is released for current consumption.

There is, of course, just as much coffee as there was before the news about a potential smaller crop. And yet the present (spot) price has risen. With the rise in price, congressmen, responding to housewives' protests, begin publicly to demand investigations. Sure enough, there is just as much coffee in existence *now* as before the rise, and greedy, antisocial speculators have driven up the price.

If you were a speculator—and they're people of all types: dentists, carpenters, students, salesmen—what would you tell complaining congressmen? What, according to economic analysis, were the source and the effects of the current price rise? Could you defend yourself by saying that you deserve not censure but a medal for having benefited *all* mankind; or were you working against the interest of other people? Your defense might run something like this:

² In addition to the coffee market, today there are organized open futures markets for at least the following goods: wheat, soybeans, oats, corn, cotton, barley, sorghum, sugar, cottonseed oil, soybean oil, hides, lard, eggs (frozen, powdered, and shell), potatoes, frozen chickens and turkeys, silver, tin, rubber, cocoa, platinum, pepper, flaxseed, copper, lead, zinc, wool, pork-bellies, and orange juice. One for Scotch whisky may open soon. One for onions was outlawed!

"It is true that news of the cold weather suggested the coffee buds would be nipped and the coffee harvest reduced. This would mean higher prices *next* year. I believed that if I bought some of this year's currently stored crop at present spot prices, I could later sell it at next year's higher prices at a tidy profit. Fortunately, I was one of the first who believed the crop damage was severe and was able to buy claims to coffee from people who did not believe the future supply looked smaller. I was not alone; many people were competing for current stocks of coffee. Soon, those who had coffee were not willing to sell at the former prices. They, too, looked forward to selling the coffee next year rather than this year. Less coffee was released from stocks for consumption. No one would sell existing stocks at a price less than he could get by holding until next year (allowing for the costs of storage, insurance, and interest). The current price, therefore, rose almost to the expected future prices as reflected in 'futures prices' of coffee. This higher current price was necessary to attract some coffee out of storage and to induce consumers to decrease consumption to match the smaller flow of coffee out of storage. All this is summarized in the first fundamental law of demand, which states that less will be consumed as price increases.

"I bought coffee as a speculator. However, quite incidentally and unintentionally, my action—like those of the many other similarly motivated, foresighted, more informed persons—augmented the supply of coffee for next year, by adding part of this year's stored stocks to next year's reduced harvest. The consumer next year will have more coffee to consume and at prices lower than if we speculators had not carried more coffee from this year over to next year. For that, the consumers should thank us—not condemn us!

"We speculators did not cause the reduced supply of coffee next year. Nature did that. There simply *is* going to be *less* coffee next year. The choice facing people therefore is: 'Shall we continue to consume coffee today *as if* there were not going to be less next year, and then reduce consumption next year by the full reduction in the harvest? Or, shall we reduce consumption this year in order not to have to reduce it so much next year?' The choice is *not* more coffee rather than less, nor is it lower prices rather than higher prices. It is 'when shall the available coffee be consumed?'

"If I must *defend* my actions rather than merely *explain* them, I would say that, like the middlemen in the refugee camp, we speculators enabled people to obtain greater levels of utility than they otherwise would have obtained, despite their protestations about the currently higher price of coffee. From the fact that prices are predicted to be higher next year than now, I know that people *prefer* to give up a pound now in order to have one more next year. This is precisely what the higher futures price for next year's coffee means, relative to the present price this year. And if we are right in that forecast, we will make a profit; if wrong, a loss. The profitability of our activity is an acid test that people did want some coffee shifted to the future.

"As speculators, we have immediately relayed to people our prediction of less coffee relative to other goods next year. We are not responsible for that *bad event*, but we are responsible for anticipating the effects of impending unfavorable events so that people can more cheaply adjust to them—so as to keep their utility greater than if the news of the coming crop failure were hidden until even more of the current crop was eaten up. We speculators are blamed for bad events because people either confuse *news* of the event with the *event*, or because they sometimes think that news of bad future events is worse than not knowing about it.

"You say, 'But what if your predictions were wrong? Suppose only a few buds on each tree were damaged, while the hardier undamaged buds produced even bigger coffee beans—more than enough to compensate for the reduced number, so that the crop next

year was going to be even larger! Or suppose the cold snap did no damage at all. Or maybe the news about cold weather was simply false. After all, South American governments have been known to issue false bad news about an impending coffee crop precisely to drive up the price of coffee now, so that they could sell some of their existing stock at higher prices. What then?

"The answer is simple. If speculators are wrong and if anyone else thinks he can predict better, all he has to do is out-predict the present speculators, and his fortune is made. Moreover, if speculators or people who store coffee make *perverse* mistakes in foresight, they will lose wealth, which, in part, pays the rest of the community for the error. Speculators will have paid more for the coffee than they will get when they sell it.

"I will not go so far as to say that any damage done to other people by our *erroneous* forecasts is made up to them by the losses we incur—a transfer of some of our wealth to the rest of society. In part this is correct, but our *perverse* forecasts do more damage than our loss of wealth to the rest of society can offset. They do damage in the sense that if our forecasts had been more correct, everyone could have achieved a more desirable adjustment in his consumption patterns over time than he did achieve. Obviously, the more accurate our forecasts, the better for us and for everyone else. The less accurate they are, the worse for us, and the worse for everyone else. However, and this is crucially important, the results are not as bad for everyone else as they would be if everyone had to do his own forecasting and storing of stocks for his own consumption, thereby bearing the full consequences of his own forecasts—right or wrong.

"Clearly, then, the issue is not whether the forecasts of speculators are correct or incorrect. The issues are instead: (a) What systems exist for making and acting on better forecasts? (b) What systems exist for allocating coffee among people over time *and* for allocating the risks and consequences of the erroneous forecasts? Any system will have erroneous forecasts. Which one will have fewer erroneous forecasts? Who will bear the major burden of the consequences of erroneous forecasts?"

And so our scenario ends. While it answered one question, it ended up by posing new ones, to which we turn.

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Allocation of Risks In Futures Markets

Do the speculative markets, to which everyone has access, predict future prices more accurately than some other possible scheme? The organized futures market in onions was abolished by federal law in 1959. Among those who wanted the markets closed were firms that specialize in assembling, storing, sorting, and distributing onions to retailers. Without an open futures market, information about onion conditions is less widely dispersed; insiders, such as these processors, can benefit by their more exclusive access to information and opportunity to buy and sell onions. How they managed to induce enough congressmen to vote for that legislation is a question for your professor of political science. However, as it happens, this prohibition provided a fine opportunity to compare the behavior of prices of onions—with and without futures markets. The record is clear. With the organized futures markets for onions, the forecasts were more accurate than when they were closed. In particular, spot consumers' prices varied less between crops with open speculative markets than without them. In other words, the forecasts of future prices—the futures prices—influenced spot prices more accurately toward what was going to happen, avoiding large fluctuations when spot price responds to unforeseen events.

How should consequences of forecasting errors be borne? It has been contended that

only experts should be allowed to make speculative decisions; this would avoid the errors made by less-informed people. To this there are several comments. First, if experts are now better informed than the consensus of the markets, they could easily get wealthy very rapidly by speculating. Furthermore, experts' superior information would help move the present spot and futures prices in the "correct" directions. Second, there is the problem of finding experts. When the government employs a group of specialists in this matter, the specialists are not automatically superior forecasters. The predictions of "experts" differ. If, despite these inherent difficulties, a group of experts were responsible for making forecasts and controlling the storage rates, who bears the losses when the forecasts are erroneous? In other words, how are the consequences of ignorance about future events to be allocated among people? Shall we require that all people, whether they individually want to or not, shall bear, in proportion to their taxes, the changing wealth values of the stocks of stored commodities? If the speculative activity were a voluntary arrangement with open futures markets, those who want to bear more of the risk can hold more of their wealth in the form of goods to be stored, and those who want to be relieved of those risks can own other forms of wealth. This points up one fundamental attribute of a capitalist system: It permits individuals to adjust their patterns of risk bearing, as well as their pattern of consumption goods. If you wish to avoid the wealth changes of certain goods, you can choose to own some other goods. You can concentrate your risks on a few particular goods or on a large class of goods, by appropriate patterns of ownership of goods. Complete avoidance of risks is not possible, but selectivity and choice of types of risks are possible with open markets and private-property rights. But whether that is desirable, economics cannot say.

(Speculative holding of goods is inevitable. People differ in attitudes or willingness to bear the risks of losses of wealth consequent to emerging prices. Given these differences, each individual can move to a preferred position, as he sees it, if he will let the risks be borne by those who are more confident about a price rise, or more willing to bear risks inherent in the uncertainty of futures prices. Of course, he will have to pay them to bear those risks, but if they regard carrying such risks as less burdensome than he does, the cost will be less than if he bore the risks. Abolishing futures markets raises the costs of performing the storage function, because it prevents those who are more willing to bear these risks from doing so, and forces the less willing persons to bear these risks.)

Having chosen not to bear the risk of wealth changes of a certain good, a person should not complain later if its price rises. His complaints would amount to the assertion that "hindsight is wonderful" and that insurance is wasted if the insured-against disaster doesn't happen! (In this case, by not holding stocks in advance of use, he has insured against decreases in their value.)

Sometimes it is mistakenly believed that speculation can be avoided by legally imposing fixed prices on commodities. This is identical to painting the thermometer to avoid a fever. (Price controls do not prevent shifts in demand or supply. They reduce the opportunity of people to adjust by exchange to differences in interpersonal values among goods as well as among risks.)

Speculative Markets under Different Economic Systems

Who will bear the profits and who the losses is an issue in all societies, and it cannot be evaded by abandoning a capitalist system. Only the method of allocation changes. In a

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capitalist system, individuals can negotiate among themselves, offering to exchange "this" risk of loss or gain for "that" risk. Just as people negotiate for the particular pattern of consumption goods they shall have, so they can negotiate about the pattern of risks they shall bear. Although the option of bearing no risk at all is open to *no* man, in a capitalist society risks may be exchanged for risks on other kinds of wealth. In a socialist system, the risks of value changes, for state-owned goods—or those owned by the people as a whole—are borne by everyone in accord with tax liabilities and access to state services. The risk patterns are not individually negotiable with other people.

If you believe a person should have less choice of risk patterns and if you think risks should be separated from the people who control the use of goods, you will prefer to reduce the scope of private property. But if you prefer a wider choice of risk patterns and a closer correlation between risk bearing and control of use, you will prefer a greater range of private property.

Summary

- 1 Allocation of goods between harvests is affected by present prices relative to prices expected to prevail in the future. A drop of spot prices immediately upon harvest induces some people to buy the crop and hold some of it in the expectation of a profit.
- 2 Futures markets are markets in which contracts are made in terms of future prices. Current "futures" prices negotiated in a futures contract—which is essentially a contractual agreement to compensate or be compensated for a price change—are predictions of what price will be in the future of the good.
- 3 Not everyone has to carry his own consumption supply through the interharvest period. People who are more willing to bear the risks of wealth fluctuations in the good will be the formal "speculators." People who use large stocks of the good in their business can shift the major portion of risks of price changes to speculators by futures contracts. Without hedgers seeking to have speculators bear the risks of price changes, the futures markets would not survive.
- 4 Concurrent increases in the "futures" prices and in the present (spot) price of a good may reflect, not a smaller current stock on hand, but an anticipated smaller future stock or larger future demand. More of the current stock will be carried over to the future, by releasing less for current consumption, which raises current prices.
- 5 Higher predicted (futures prices) values for the future will attract goods from the present (by reducing present consumption), whereas lower expected future values will increase present rates of consumption of existing stocks, leaving less for the future. (Future goods cannot shift to the present; instead, less of presently available goods are shifted to the future.)
- 6 Economic systems differ in the determination of who will bear which risks of the changing values of existing goods. In capitalism, they are individually negotiable or pooled. In socialism, they are pooled and borne by people more in accord with their tax liabilities and their access to state services.