Chapter 2
Trust

Imagine that a group of people have discovered a mutually advantageous course of actions. At the grandest level, it could be that citizens see the benefits of adopting a constitution for their country. At a more local level, the undertaking could be to share the costs and benefits of maintaining a communal resource (irrigation system, grazing field, coastal fishery); construct a jointly useable asset (drainage channel in a watershed); collaborate in political activity (civic engagement, lobbying); do business when the purchase and delivery of goods can't be synchronized (credit, insurance, wage labour); enter marriage; create a rotating saving and credit association (*iddir*); initiate a reciprocal arrangement (I help you, now that you are in need, with the understanding that you will help me when I am in need); adopt a convention (send one another Christmas cards); create a partnership to produce goods for the market; enter into an instantaneous transaction (purchase something across the counter); and so on. Then there are mutually advantageous courses of action that involve being civil to one another. They range from such forms of civic behaviour as not disfiguring public spaces and obeying the law more generally, to respecting the rights of others.

Imagine next that the parties have agreed to share the benefits and costs in a certain way. Again, at the grandest level the agreement could be a social contract among citizens to observe their constitution. Or it could be a tacit agreement to be civil to one another, such as respecting the rights of others to be heard, to get on with their lives, and so forth. Here we will be thinking of agreements over transactions in goods and services. There would be situations where the agreement was based on a take-it-or-leave-it offer one party made to another (as when Becky's mother accepts the terms and conditions set by the firm called in by her to fix the plumbing). In other contexts, bargaining may have been involved (as when Desta's mother purchases household fineries at the regional fair, which is not altogether different from a Middle Eastern bazaar). Later in this book (Chapter 4) we will study an idealized version of prices in the markets Becky's family visits, where both buyers and sellers face take-it-or-leave-it offers. But we will not study how agreements are reached when bargaining is involved in either Becky's or Desta's worlds, nor look for principles of equity that might have been invoked during negotiation. To do that would take us into bargaining theory, a beautiful but difficult branch of the theory of games. We ask instead a question that is pertinent in both Becky's and Desta's worlds: *under what circumstances would the parties who have reached agreement trust one another to keep their word?*

Because one's word must be credible if it is to be believed, mere promises wouldn't be enough. (Witness that we warn others – and ourselves too – not to trust people 'blindly'.) If the

parties are to trust one another to keep their promise, matters must be so arranged that: (1) at every stage of the agreed course of actions, it would be in the interest of each party to plan to keep his or her word if all others were to plan to keep their word; and (2) at every stage of the agreed course of actions, each party would believe that all others would keep their word. If the two conditions are met, a system of beliefs that the agreement will be kept would be self-confirming.

Notice that condition (2) on its own wouldn't do. Beliefs need to be justified. Condition (1) provides the justification. It offers the basis on which everyone could in principle believe that the agreement will be kept. A course of actions, one per party, satisfying condition (1) is called a *Nash equilibrium*, in honour of the mathematician John Nash – he of *The Beautiful Mind* – who proved that it is not a vacuous concept. (Nash showed that the condition can be met in realistic situations.) The way I have stated condition (1) isn't due to Nash, though, but to John Harsanyi, Thomas Schelling, and Reinhard Selten, three social scientists who refined the concept of Nash equilibrium so that it could be applied to situations where Nash's own formulation is not adequate.

Notice that condition (1) on its own wouldn't do either. It could be that it is in each one's interest to behave opportunistically if everyone believed that everyone else would behave opportunistically. In that case non-cooperation is also a Nash equilibrium, meaning that a set of mutual beliefs that the agreement will not be kept would also be self-confirming. Stated somewhat informally, a Nash equilibrium is a course of actions (*strategy*, in economic parlance) per party, such that no party would have any reason to deviate from his or her course of actions if all other parties were to pursue their courses of actions. As a general rule, societies harbour more than one Nash equilibrium. Some yield desirable outcomes, others do not. The fundamental problem every society faces is to create institutions where conditions (1) and (2) apply to engagements that protect and promote its members' interests. When we come to study what economics has to say about the ideal role of the state (Chapter 8), we will have much to add about those interests.

Conditions (1) and (2), taken together, require an awful lot of coordination among the parties. In order to probe the question of which Nash equilibrium can be expected to be reached – if a Nash equilibrium is expected to be reached at all – economists study human behaviour that are *not* Nash equilibria. The idea is to model the way people form beliefs about the way the world works, the way people behave, and the way they revise their beliefs on the basis of what they observe. The idea is to track the consequences of those patterns of belief formation so as to check whether the model moves toward a Nash equilibrium over time, or whether it moves about in some fashion or other but not toward an equilibrium.

This research enterprise has yielded a general conclusion. Suppose the economic environment in a certain place harbours more than one Nash equilibrium. Which equilibrium should be expected to be approached – if the economy approaches an equilibrium at all – will depend on the beliefs that people held at some point in the past. It also depends on the way people have revised their beliefs on the basis of observations since that past date. But this is another way of

saying that history matters. The narrative style of empirical economics that I spoke of earlier becomes necessary at this point. Model-building, statistical tests on data relating to the models, and historical narratives have to work together synergistically if we are to make progress in understanding our social world. Unfortunately, the study of disequilibrium behaviour would lengthen this monograph greatly. So I shall only allude to it from time to time. We will discover that, fortunately, a study of equilibrium behaviour takes us a long way.

We started this chapter by observing that mutual trust is the basis of cooperation. In view of what we have learned about the multiplicity of Nash equilibria, we are now led to ask what kinds of institution are capable of supporting cooperation. To answer that, it will prove useful to classify the contexts in which the promises people make to one another are credible.

Mutual affection

Consider the situation where the people involved care about one another and it is commonly known that they care about one another. The household is the most obvious example of an institution based on affection. To break a promise we have made to someone we care about is to feel bad. So we try not to do it. From time to time, though, even household members are tempted to misbehave. As people who live together can observe one another closely, the risk of being caught misbehaving is high. This restrains household members even when the temptation to misbehave is great.

That said, the household can't engage in enterprises that require people of many and varied talents. So households need to find ways to do business with others. The problem of trust reappears at the interhousehold level. This leads us to search for other contexts in which people can trust one another to keep their word.

Pro-social disposition

One such situation is where people are trustworthy, or where they reciprocate if others have behaved well towards them. Evolutionary psychologists have suggested that we are adapted to have a general disposition to reciprocate. Development psychologists have found that pro-social disposition can be formed by communal living, role-modelling, education, and receiving rewards and punishments (be it here or in the afterlife).

We don't have to choose between the two viewpoints; they are not mutually exclusive. Our capacity to have such feelings as shame, guilt, fear, affection, anger, elation, reciprocity, benevolence, jealousy, and our sense of fairness and justice have emerged under selection pressure. Culture helps to shape preferences, expectations, and our notion of what constitutes fairness. Those in turn influence behaviour, which are known to differ among societies. But cultural coordinates enable us to identify the situations *in* which shame, guilt, fear, affection, anger, elation, reciprocity, benevolence, and jealousy arise; they don't displace the centrality of those feelings in the human makeup. The thought I am exploring here is that, as adults, we not only have a disposition for such behaviour as paying our dues, helping others at some cost to ourselves, and returning a favour, we also ease our hurt by punishing people who have hurt us

intentionally; and shun people who break agreements, frown on those who socialize with people who have broken agreements, and so on. By internalizing norms of behaviour, a person enables the springs of his actions to include them. In short, he has a disposition to obey the norm, be it personal or social. When he does violate it, neither guilt nor shame would typically be absent, but frequently the act will have been rationalized by him. Making a promise is a commitment for that person; and it is essential for him that others recognize it to be so.

People are trustworthy to varying degrees. When we refrain from breaking the law, it isn't always because of a fear of being caught. The problem is that although pro-social disposition isn't foreign to human nature, no society could rely exclusively on it. How is one to tell to what extent someone is trustworthy? If the personal benefits from betraying one's conscience are large enough, almost all of us would betray it. Most people have a price, but it's hard to tell who comes at what price.

Societies everywhere have tried to establish institutions where people have the incentives to do business with one another. The incentives differ in their details, but they have one thing in common: *those who break agreements without cause are punished*. Let us see how that is achieved.

Laws and norms

There are two ways. One is to rely on an external enforcer, the other on mutual enforcement. Each gives rise to a particular type of institution. Depending on the nature of the business they would like to enter into, people invoke one or the other. The coded term for one is the *rule of law*; for the other, it is *social norm*. People in the rich world rely heavily on the former, while in the poor world people depend greatly on the latter. Subsequently we will study the claim that it is *because* they have been able to depend extensively on the former for centuries that people in the rich world are now rich.

I shall illustrate the two methods of enforcement with the help of a numerical example of bilateral agreement. The numbers will allow us to draw insights without fuss. The example itself is based on the 'putting-out system' of production, widely practised in Europe in the 17th and 18th centuries and prevalent in poor countries today in the crafts. The system amounted to a patron–client relationship, but for our purposes here it can also be thought of as a partnership.

Imagine that person *A* owns some working capital (raw material, say), worth $4,000 to him. *A* knows *B*, who has the skills to use that capital to produce goods worth $8,000 in the market. *A* doesn't have those skills. However, *A* has access to the market, which *B* doesn't. *A* proposes to advance his capital to her, with the understanding that he will sell the goods once *B* produces them and share the proceeds with her. If *B* was not to work for *A*, she would use her time to produce goods for her home, worth $2,000 to her. In order to get her to accept his offer, *A* proposes a sharing rule that is hallowed by their tradition: the $8,000 would be used first to compensate both parties fully – $4,000 for *A* (the amount *A* would enjoy from the best

alternative use of his working capital, which economists call the working capital's *opportunity cost*) and $2,000 for *B* (which is the opportunity cost of *B*'s time and effort); the remaining $2,000 would then be divided equally between the two. *A* would receive $5,000 and *B* $3,000. Each would gain $1,000 from the arrangement.

B regards the proposal as fair, but is worried about one thing: why should she trust *A* not to renege on the agreement by keeping the entire $8,000 for himself?

External enforcement

Here is one possible way to ensure that *B* could trust *A*: the agreement is enforced by an established structure of power and authority. In many societies, tribal chieftains, village or clan elders, and warlords enforce agreements and rule on disputes. Here we imagine that the external enforcer is the state and that the agreement is drawn up as a legal contract. We include on this list the implicit 'social contract' among citizens not to break the law. However, if contracts are to offer a viable means of doing things, breaches must be *verifiable*; otherwise, the external enforcer would have nothing to go by if asked to rule on it. To be sure, lawyers, like Becky's father, make a handsome living precisely because verification is fraught with difficulties. Rough estimates suggest that in the US, expenditure on the legal profession (lawyers, judges, investigators), on people who work in insurance (loss adjusters, insurance agents), and on those in law enforcement (the police) make up $245 billion a year, which is about 2% of the US's GDP; and I haven't included the defensive measures people take against possible litigations, burglary, and theft.

We leave aside the problems that arise in verifying breach of contract (but see Chapters 4–5) and note that if the punishment the state imposes for a violation is known to be severe relative to the temptation *A* faces to violate, *A* will be deterred from going that route. If *B* is aware of the force of that deterrence, she will trust *A* not to renege. And *A* will trust *B* not to renege, because he knows *B* doesn't fear that he will renege. In Becky's world, the rules governing transactions in the market place are embodied in the law of contracts. Becky's father's firm is a legal entity, as are the financial institutions through which he is able to accumulate his retirement pension, save for Becky's and Sam's education, and so on. He has an employment contract with his firm. The agreements he has reached with the saving and pension institutions are legal contracts. Even when someone in the family goes to the grocery store, the purchases (paid in cash or by card) involve the law, which provides protection for both parties (the grocer, in case the cash is counterfeit or the card is void; the purchaser, in case the product turns out on inspection to be substandard). Formal markets, from which people enter and exit when they need to or wish to, are able to function only because there is an elaborate legal structure that enforces the agreements known as 'purchases' and 'sales'. Moreover, it is because Becky's family, the grocery store's owner, and the credit card company are confident that the government has the ability and willingness to enforce contracts that they do business together.

Given that enforcing contracts involves resources, what is the basis of that confidence? After all, the contemporary world has shown that there are states and there are states. One answer –

in a functioning democracy – is that the government worries about its reputation. A free and inquisitive press helps to sober the government into believing that incompetence or corruption would mean an end to its rule, come the next election. Notice how this involves a system of interlocking beliefs about one another's abilities and intentions. The millions of households in Becky's country trust their government (more or less!) to enforce contracts, because they know that government leaders know that not to enforce contracts efficiently would mean being thrown out of office. In their turn, each side of a contract trusts the other not to renege (again, more or less!), because each knows that the other knows that the government can be trusted to enforce contracts. And so on. Trust is maintained by the threat of punishment (a fine, a jail term, dismissal, or whatever) for anyone who breaks a contract, be the contract legal (Becky's father's employment contract) or social (the contract between the voters and the government in Becky's world to maintain law and order). We are in the realm of beliefs that are held together by their own bootstraps (our earlier condition (2)).

What I have presented is only the sketch of an argument. The complete argument is similar to the one which shows that social norms also offer a way to enforce agreements. So I turn to that for details.

Mutual enforcement

Although the law of contracts exists in Desta's country, her family can't depend on it. The nearest courts are far away and there are no lawyers in sight. As transport is very costly, her village is something of an enclave. Economic life is shaped outside a formal legal system. Nevertheless, Desta's parents do business with others. Saving for funerals involves saying, 'I accept the terms and conditions of the *iddir*'. As there are no formal credit markets where they live, villagers practise reciprocity so as to smooth consumption. A recent study has found that in a sample of villages in Nigeria nearly all credit transactions were either between relatives or between households in the same village. No written contracts were involved, nor did the agreements specify the date of repayment or the amount repaid. Social codes were implicitly followed. Less than 10% of the loans were in default.

Why do the villagers trust one another? They do, because agreements are mutually enforced: a threat by members of a community that stiff sanctions will be imposed on anyone breaking an agreement would deter everyone from breaking it. This is a common basis for doing business in the poor world. Among the Kofyar farmers in Nigeria, for example, agricultural land is privatized, but free-range grazing is permitted once the crops have been harvested. Like Desta's household, Kofyar households are engaged in subsistence farming, so labour isn't paid a wage. However, unlike Desta's village, where household farms manage on their own labour, the Kofyars have instituted communal work on individual farms. Although some of this is organized in clubs of eight to ten individuals, there are also community-wide work parties. A household that doesn't provide the required quota of labour without good excuse is fined (as it happens, in jars of beer). If fines aren't paid, errant households are punished by being denied communal labour and subjected to social ostracism. In a different context, systems of codes have served to protect fisheries in coastal villages of northern Brazil. Violations are met with a

range of sanctions that include both shunning and sabotaging fishing equipment. And so on.

How is mutual enforcement able to support agreements? It is all well and good to say that sanctions will be imposed on opportunists, but why should the threats be believed? They would be believed if sanctions were an aspect of social norms of behaviour. To see why, assume for the moment that whether an agreement has been kept by each party is *observable* by all parties. No doubt this is a strong assumption, but as with 'verifiability', it is a useful starting point. Once we draw conclusions from it, we will be able to infer how communities could modify their institutions in situations where the assumption doesn't hold even approximately. That said, anyone who has visited villages in poor countries will know that privacy is not a fundamental right there. In tropical villages that I have visited, cottages are designed and clustered in such a fashion that it must be hard for anyone to prevent others from observing what they are about.

By a social norm we mean an accepted rule of behaviour. A rule of behaviour reads like: 'I will do *X* if you do *Y*'; 'I will do *P* if *Q* happens'; and so forth. For a rule of behaviour to *be* a social norm, it must be in the interest of each person to act in accordance with the rule if all others act in accordance with it; that is, the rule should correspond to a Nash equilibrium. To see how social norms work, let us return to our numerical example to study whether cooperation based on a *long-term relationship* can be sustained between *A* (we now call him the patron) and *B* (we now call her the client).

Imagine that the opportunity for *A* and *B* to do business with each other is expected to arise over and over again; say, annually. The time taken for *B* to produce her output is assumed to be well within a year. Let *t* denote time. So *t* assumes the values 0, 1, 2, . . ., and so on, *ad infinitum*; with 0 standing for the current year, 1 standing for the following year, 2 standing for the year following that, and so on, *ad infinitum*. Although the future benefits from cooperation are important to both *A* and *B*, they will typically be less important than present benefits. After all, there is always the chance that one of the parties will not be around in the future to continue the relationship, or that circumstances may change in such ways that *A* does not have access to his capital flow. To formalize this idea, we introduce a positive number *r*, which measures the rate at which either party discounts the future benefits from cooperation. (We will see that in the present example, it doesn't matter what *B*'s discount rate is. For expositional ease, though, I assume that both individuals discount their future costs and benefits at the rate *r*.) The assumption is that, when making calculations in the current year (which is $t = 0$), each divides his or her benefits in any future year *t* by a factor $(1 + r)^t$. (The term $(1 + r)^t$ denotes $(1 + r)$ multiplied to itself *t* times.) So, if *r* is positive, $(1 + r)^t$ exceeds unity for all future *t*; and since benefits in year *t* are divided by $(1 + r)^t$ when making calculations in the current year, the importance of those benefits decays by a fixed percentage *r* each year when viewed from today. The smaller is *r*, the greater is the weight placed on the benefits of future cooperation. We now show that, provided *r* is small, the pair could in principle enter a successful long-term relationship, where each year *A* advances \$4,000 to *B*, sells the goods *B* has produced for \$8,000, and pays her \$3,000. The formal theory of long-term relationships was developed by

the mathematicians Robert Aumann and Lloyd Shapley, and extended by the economists Drew Fudenberg, Eric Maskin, Ariel Rubinstein, and others. What I present here is an illustration of how the theory works.

Consider the following rule of behaviour that *A* might adopt: (i) begin by advancing $4,000 to *B*, (ii) sell the goods if she produces them during the year, (iii) share the proceeds according to the agreement, and (iv) continue doing so every year so long as neither party has broken the agreement; but (v) end the relationship permanently the year following the first defection by either party. Similarly, consider the following rule of behaviour that *B* might adopt: so long as neither party has reneged on the agreement, work faithfully for *A* each year; but refuse ever to work for him the year following the first violation of the agreement by either party.

The two rules embody a common idea: begin by cooperating and continue to cooperate so long as neither party has broken their word, but withdraw cooperation permanently following the first defection from the agreement by either party. Withdrawal of cooperation is the sanction. Game theorists have christened this most unforgiving of rules the 'grim strategy', or simply *grim*. We show next that grim is capable of supporting the long-term relationship if *r* is not too large.

First consider *B*. Suppose *A* has adopted grim and *B* believes that he has. He will advance her the capital at the beginning of year 0. *B*'s best course of action is clear: keep to the agreement. For suppose she reneges on the agreement. She would lose $1,000 (her share of $3,000 minus the $2,000 she would earn producing home goods), but gain nothing in any future year (remember, *A* has adopted grim). This means that no matter what *B*'s discount rate is, she couldn't do better than to adopt grim if *A* has adopted grim.

The harder piece of reasoning is *A*'s. Suppose *B* has adopted grim and *A* believes she has. If he has advanced the working capital to her, she will have worked faithfully for him in year 0. *A* now wonders what to do. If he reneges on the agreement, he would make a $4,000 profit ($8,000 minus the $4,000 he could have earned with his capital even if he had not entered into the relationship with *B*). But since he believes *B* to have adopted grim; he must also believe that *B* will retaliate by never working for him again. So, set against a single year's gain of $4,000 is a net loss of $1,000 (the forgone profit from the partnership) every year, starting in year 1. That loss, calculated in year 0, is the sum, $(1,000/(1 + r) + 1,000/(1 + r)^2 + 1,000/(1 + r)^3 + . . . *ad infinitum*), which can be shown to add up to $1,000/$r$. If $1,000/$r$ exceeds $4,000, it isn't in *A*'s interest to break the agreement, which means that he can't do better than to adopt grim himself. But $1,000/$r$ exceeds $4,000 if and only if r is less than ¼ or 25% (per year). We have therefore proved that if r is less than 25%, it is in each party's interest to adopt grim if the other party adopts grim. But if both adopt grim, neither would be the first to defect, which implies that the agreement would be kept. We have therefore proved that grim can serve as a social norm to maintain a long-term relationship between the patron (*A*) and the client (*B*).

Economists have found evidence of grim in social interchanges, but it would appear to be in

force mostly where people also have access to formal markets. In Desta's world, though, grim is not in evidence. Sanctions are graduated, the first misdemeanour being met by a small punishment, subsequent ones by a stiffer punishment, persistent ones by a punishment that is stiffer still, and so forth. How are we to explain this?

Where formal markets and long-term relationships co-exist, grim could be expected to be in operation. Grim involves permanent sanctions, which is a needed device for preventing people from engaging in opportunistic behaviour when good short-term opportunities appear nearby from time to time. But if, as in Desta's village, there are few alternatives to long-term relationships, communitarian arrangements would be of high value to all. Adopting grim would be an overkill in a world where people discount the future benefits from cooperation at a low rate. For that reason, the norms that are adopted involve less draconian sanctions than grim. A single misdemeanour is interpreted as an error on the part of the defector, or as 'testing the water' (to check if others were watching). This is why graduated sanctions are frequently observed.

Here then is our general finding: social norms of behaviour are able to sustain cooperation if people care sufficiently about the future benefits of cooperation. The precise terms and conditions will be expected to vary across time and place; what is common to them all is that cooperation is mutually enforced, it isn't based on external enforcement.

There is, however, a piece of bad news: people could end up not cooperating even if they care a lot about the future benefits of cooperation. To see how, imagine that each party believes that all others will renege on the agreement. It would then be in each one's interest to renege at once, meaning that there would be no cooperation. Even if *r* is less than 25% in our numerical example, behaviour amounting to non-cooperation is also a Nash equilibrium: *A* doesn't advance the $4,000 worth of raw material to *B*, because he knows that *B* won't work for him; she would refuse because of the fear that *A* won't keep his promise to share the proceeds; a fear that is justified, given that *A* intends not to share the $8,000 with her once she has produced those goods; and so on. Failure to cooperate could be due simply to an unfortunate pair of self-confirming beliefs, nothing else. No doubt it is mutual suspicion that ruins their chance to cooperate, but the suspicions are internally self-consistent. In short, even when appropriate institutions are in place to enable people to cooperate, they may not do so. Whether they cooperate depends on mutual beliefs, nothing more. I have known this result for many years, but still find it a surprising and disturbing fact about social life.

Could the pair form a partnership if *r* exceeds 25%? The answer is 'no'. As grim is totally unforgiving, no other rule could inflict a heavier sanction for a single misdemeanour. The temptation *A* faces to defect is less if *B* adopts grim than if she were to adopt any other rule of behaviour; which implies that no rule of behaviour could support a partnership if *r* exceeds 25%. Studying grim is useful, because it allows us in many examples, such as the present one, to determine the largest value of *r* for which cooperation is possible.

We now have in hand a tool to explain how a community can skid from cooperation to non-

cooperation. Ecological stress – caused, for example, by increasing population and prolonged droughts – often results in people fighting over land and natural resources (Chapter 7). Political instability – in the extreme, civil war – could in turn be a reason why both *A* and *B* become concerned that *A*'s source of capital will be destroyed or confiscated. *A* would now discount the future benefits of cooperation with *B* at a higher rate. Similarly, if the two fear that their government is now more than ever bent on destroying communitarian institutions in order to strengthen its own authority, *r* would rise. For whatever reason, if *r* were to rise beyond 25%, the relationship would break down.

Mathematicians call the points at which those switches occur *bifurcations*. Sociologists call them *tipping points*. Social norms work only when people have reasons to value the future benefits of cooperation.

Contemporary examples illustrate this. Local institutions have been observed to deteriorate in the unsettled regions of sub-Saharan Africa. Communal management systems that once protected Sahelian forests from unsustainable use were destroyed by governments keen to establish their authority over rural people. But Sahelian officials had no expertise at forestry, nor did they have the resources to observe who took what from the forests. Many were corrupt. Rural communities were unable to switch from communal governance to governance based on the law: the former was destroyed and the latter didn't really get going. The collective vacuum has had a terrible impact on people whose lives had been built round their forests and woodlands.

Ominously, there are subtler pathways by which societies can tip from a state of mutual trust to one of mutual distrust. Our model of the partnership between *A* and *B* has shown that when *r* is less than 25%, both cooperation and non-cooperation are equilibrium outcomes. The example therefore tells us that a society could tip over from cooperation to non-cooperation owing merely to a change in beliefs. The tipping may have nothing to do with any discernible change in circumstances; the entire shift in behaviour could be triggered in people's minds. The switch could occur quickly and unexpectedly, which is why it would be impossible to predict and why it would cause surprise and dismay. People who woke up in the morning as friends would discover at noon that they are at war with one another. Of course, in practice there are usually cues to be found. False rumours and propaganda create pathways by which people's beliefs can so alter that they tip a society where people trust one another to one where they don't.

The reverse can happen too, but it takes a lot longer. Rebuilding a community that was previously racked by civil strife involves building trust. Non-cooperation doesn't require as much coordination as cooperation does. Not to cooperate usually means to withdraw. To cooperate, people must not only trust one another to do so, they also have to coordinate on a social norm that everyone understands. That is why it's a lot easier to destroy a society than to build it.

How does an increase or decrease in cooperation translate into macroeconomic statistics? Our numerical example captured a salient point, that an increase in cooperation raises incomes by

permitting a more efficient allocation of resources: *A*'s working capital was put to better use under cooperation, as was *B*'s labour. Consider now two communities that are identical in all respects, excepting that in one people have coordinated at an equilibrium where they trust one another, while people in the other have coordinated at an equilibrium where they don't trust one another. The difference between the two economies would be reflected in their total factor productivity, which would be higher in the community where people trust one another than in the one where they don't. Enjoying greater income, individuals in the former economy are able to put aside more of their income to accumulate capital assets, other things being equal. So GDP growth there is higher. Mutual trust would be interpreted from the statistics as a driver of economic growth.

Communities and markets

How did people who now interact with one another get to connect in the first place? In Desta's village the answer is simple: mostly they have known one another from birth. People engaged in long-term relationships based on social norms – *communities*, for short – have to know one another, at least indirectly, through people they know personally. Desta's father, for example, knows most members of the *iddir* to which he belongs. The family know all those with whom they share the local commons. Communities are *personal* and *exclusive*. Members have names, personalities, and attributes. An outsider's word isn't so good as an insider's.

In contrast, the hallmark of transactions enforced by the law of contracts is that they can take place among people who don't know one another. In Becky's world, people are mobile, a pattern of behaviour not unrelated to the fact that they are able to do business even with people they don't know. Becky frequently doesn't know the salespersons in the department stores of her town's shopping mall, nor do they know Becky. When Becky's parents borrow from their bank, the funds made available to them come from unknown depositors. Literally millions of transactions take place each day among people who have never met and will never meet. Often, the exchanges take place only once, unlike exchanges based on long-term relationships. *Markets* are prime examples of institutions offering such opportunities. In contrast to communities, markets are *impersonal* and *inclusive*. Witness the oft-used phrase: 'My money is as good as yours'.

Property rights

Property rights to a commodity are the rights, restrictions, and privileges regarding its use. The subject is central to economics because it is closely related to the incentives people have to use goods and services in one way rather than another. Ill-defined property rights to a commodity usually spell bad news, because no one is fully able to capture the benefits that can be obtained from it; which is another way of saying that, all things considered, no one has an incentive to put the commodity to its most efficient use. For brevity, we will assume that ownership of a commodity includes (i) the right to use it in the way the owner chooses and (ii) the right to exchange it for some other commodity (by selling or leasing it) or to offer it as a gift.

In talking of property rights, we shouldn't only mean *private* property. There are a number of commodities in Desta's village that are *communally* owned. Desta's community has historical rights to them. They are called 'common property resources' (*CPRs*), or simply the 'local commons'. CPRs are frequently natural resources (grazing fields, ponds, woodlands, coastal fisheries, mangrove swamps). But produced goods can be CPRs too. For example, villagers in the microwatersheds of poor countries have been known to build catchments that serve both as irrigation tanks and as fisheries. The tanks were built and are maintained by collective effort. They are regarded by villagers as CPRs. Where they are communally managed, CPRs aren't open to all, but only to those having historical rights. As the transactions involving them are typically not mediated by market prices, their fate can go unreported in national economic accounts (Chapter 7).

5. Children gathering fuelwood from the local commons

There is, however, a bad piece of news about institutions that regulate the use of CPRs. Entitlements to products from CPRs are frequently based on private land holdings: richer households enjoy a greater proportion of the benefits from the local commons. Access to the

more productive bits of CPRs in India are not infrequently restricted to caste Hindus. That women are sometimes excluded has also been recorded – for example, from communal forestry. Communities can be as ruthless as markets.

CPRs are to be distinguished from goods to which there is *open access*. The latter category consists of commodities that belong to everyone, meaning that they belong to no one. Except for the case of knowledge about 'facts of nature' (Chapter 5), it is unusual for someone to produce something and then allow free access to it; which is why commodities to which there is open access are typically unconfined natural resources, such as the atmosphere and the open seas.

Even when ownership isn't in dispute, it can be that a property is managed badly. This can happen if, for example, those who own it are unable to cooperate (an unmanaged CPR), or if those who manage the property resort to corrupt practices (inflating a firm's profits by dubious accounting practices), or if directors of companies make decisions that are not in the interest of shareholders. So long as community members don't discount the future benefits of cooperation at too high a rate, collective agreements over the use of CPRs can be made credible by recourse to social norms of behaviour. Why then do people typically fail to reach agreement on the use of open access resources? The answer is that cooperation would involve too many people with differing needs and intentions. Moreover, as cheaper ways for extracting natural resources are discovered and economic growth is accompanied by ever increasing waste material that must find room somewhere, the extraction rate under open access increases. These factors explain why fisheries in the open seas and the atmosphere as a sink for carbon emissions are under severe stress today. Open access resources are overused, because no one has to pay for the right to use them.

Whether ownership is private, communal, or whether it is 'open access' depends in part on the commodity's characteristics. Mobile resources are difficult to privatize, but some can be prevented from becoming open to free access. Communities have been known to share river water, and coastal fisheries are often CPRs. Agreements are kept either by an external enforcer or by mutual enforcement. The context matters.

It is no accident that as much as 20% of Desta's household income is from the local commons, whereas the CPR in Becky's neighbourhood provides households there with the opportunity at best to picnic. Historical studies tell us that CPRs decline in importance as economies grow. They decline because the relative scarcities of goods and services change with economic growth. Compared to manufactured capital and human capital, land is pretty much fixed in size. Moreover, scientific and technological advances make available more and more productive uses for land. Some people want to develop the land for one set of purposes, others for other purposes. As it becomes ever harder for communities to reach agreement over the use of land-based CPRs, the urge to privatize grows.

Goods and services: classifications

It is good practice to distinguish one object from another if they happen to be distinct. Goods

and services are commonly distinguished from one another by their physical and chemical properties (for example, potable water is different from wheat). People generally acknowledge that goods and services should be distinguished from one another also by their location, as is implicit in the disparagement that someone is 'bringing coals to Newcastle'. Thus, potable water in the Sahara is a different commodity from potable water in Alaska. The economist Erik Lindahl showed many years ago that to make sense of borrowing, saving, lending, and investing (Chapter 6), we should distinguish goods and services from one another also by the date of their appearance. As potable water today is a different commodity from potable water tomorrow, we should acknowledge the difference. It follows from Lindahl's account that a durable commodity should be regarded as the stream of services it is expected to provide over time.

The economist Kenneth Arrow showed that commodities should be distinguished from one another even more finely. He argued that in order to make sense of insurance and the stock market, we should distinguish goods and services from one another also by the uncertain contingencies in which they appear. It follows from Arrow's account that potable water tomorrow in case the weather will be cold is a different commodity from potable water tomorrow in case it will be hot.

Planning for the future requires that we make provisions of goods and services at future dates. When a trader in Becky's world buys wheat forward – that is, he pays now for a bushel, to be delivered in six weeks' time, say – he buys wheat of a certain composition (kernel size, moisture content, and so forth), to be delivered in six weeks' time, no matter what. By storing maize in their home, Desta's parents try to ensure that the household is able to consume maize until near the next harvest, no matter what. In terms of Lindahl's classification, both the trader and Desta's parents are purchasing 'dated commodities'. But the future is inevitably uncertain. By paying an annual insurance premium on their home, Becky's parents purchase a replacement for their home during the following year *if and only if* their home is damaged. (They don't get the premium refunded should their home remain undamaged at the end of the year.) The commodity they are buying is a home that replaces the present one during the following year if and only if their present home is damaged. In Arrow's terminology, they are purchasing a 'contingent commodity'.

Private goods, public goods, and externalities

By a *private good* economists mean a commodity whose use is both rivalrous and excludable. Food is a quintessential private good. If someone consumes an additional unit of food from a given amount, all others taken together will have a unit less to consume (that's 'rivalrous'); and so long as the rights to the food someone possesses are protected, he or she can exclude others from consuming any of it (that's 'excludable'). Most of the goods we consume or use are, in this sense, private. In sharp contrast, a *public good* is a commodity whose use is *non*-rivalrous and *non*-excludable. National defence comes readily to mind. If a nation has the equipment to protect itself against attack, it not only protects all who live there, it would cost nothing more to protect anyone else who comes to live there (that's 'non-rivalrous'); moreover, it wouldn't

be possible to exclude anyone who comes to live there from that protection (that's 'non-excludable'). There are public 'bads' as well. Effluence from paper mills is a ready example.

Public goods are the mirror image of resources to which access is open. In contrast to open access resources, which are overused, public goods are undersupplied if people are left to their own devices. The economists Knut Wicksell and Paul Samuelson traced the reason for that undersupply to the incentives people have to *free-ride* on the provisions others happen to make. The point is that once a public good is supplied, it is a commodity to which access is open. But the private incentive to supply the good won't take that benefit into account. Wicksell and Samuelson argued that the problem can be overcome only by collective action. That action can take one of two forms: (i) public provision; (ii) publicly subsidized private provision. Where the geographical reach of a public good is confined (forest cover in microwatersheds; local sewage systems), 'public' may mean the community or the local government. In either case we are in the realm of local politics. In Desta's world, local public goods are usually supplied by the community; in Becky's, they are the responsibility of local government. In neither world does the market take the lead. Where the public good is confined within a national boundary (national defence), collective action means state involvement, and so, national politics. When the public good is unconfined (the global circulation system governing climate), collective action can only mean involvement of the international community, and so, international politics.

The private provision of public goods confers an extreme form of an effect known as *externalities*. By an externality, we mean the effects that decisions have on people who have not been party to the decisions. In some cases the effects are beneficial (they are known as *positive* externalities); in other cases they are detrimental (*negative* externalities). Primary education and public health measures confer positive externalities. If I become literate, I benefit; but so do others who are literate, because they can now communicate with me via non-oral means. Similarly, if I get inoculated against an infectious disease, I benefit; but so do others who are susceptible to the disease, because they are no longer in danger from me. Imagine now that education and inoculation are institutionalized as private goods. Each household would underinvest in both, because none would take into account the benefits they would be conferring on others.

In contrast, crowding on highways and sulphur oxides in a city's airshed involve negative externalities. If you drive your car on the highway, presumably you benefit; but you add to congestion and so cause others to suffer on the highway. Similarly, when your car emits sulphur oxides, others living under the airshed suffer a loss. Each such case involves the free-rider problem, much referred to by political commentators today. The idea that free-riding and externalities are related is old. The economist A. C. Pigou noted the problem in the 1920s and advocated the use of taxes and subsidies, respectively, for reducing the private supply of negative externalities and increasing the private supply of positive externalities.

Money

By subsistence agriculture, economists mean self-sufficient agrarian households. Desta's

household isn't quite like that, but it is close enough. Becky's household is very different. Her parents' income is used to obtain the goods and services her household consumes. The household does that by trading in the market. If you were to itemize the number of transactions Becky's household makes each year, the vast majority – consisting mostly of very small items, such as groceries – are for immediate consumption. Payments in Becky's world are made in money, expressed in US dollars. The notes and coins that form a part of what goes by the name 'money' possess no intrinsic worth. So why do people hold them? Why do we need a medium of exchange in the first place?

Imagine a world where everyone is known to be utterly trustworthy; where people don't incur any cost in computing, remembering, and recognizing people; and where every transaction – whether here and now, or across time, space, and uncertain contingencies – can be carried out costlessly. In that world people would be able to do business with one another merely on the basis of their word. There would be no need for money.

We don't live in that world. To see why money is a necessary medium of exchange in the world we live in, imagine that person *A* possesses wheat, person *B* rice, and person *C* maize. Let us suppose also that *A* likes rice, *B* maize, and *C* wheat. Bilateral exchanges of goods (more commonly known as 'barter') would be impossible because of an absence of what economists call a 'double-coincidence of wants': *A* wants *B*'s rice but can't barter with *B* because *B* doesn't care for *A*'s wheat; and so on. The example is stark, but the problem it poses is very general. The use of money as a medium of exchange enables people to do business with one another even in the absence of a double-coincidence of wants. Money is a legal tender in both Becky's and Desta's worlds because the governments in their countries say it is a legal tender and back that statement with the power of their authority. Paul Samuelson constructed a model not dissimilar to the one we studied earlier (of a partnership between persons *A* and *B*) to show that, although money is intrinsically valueless, people hold money because they want to be able to purchase goods and services without possessing goods and services with which to barter. So money is not only a medium of exchange, but also a store of value. Becky's household wouldn't be able to survive if it didn't live in a monetary economy. Desta's household, being nearly self-sufficient, could just about survive. However, we should avoid imputing causality when there is none. If Becky's household lived in a place where markets were absent, it too would try to be self-sufficient. The family would be destitute if her father tried to live on his skills as a lawyer. Of course, even Desta's parents need money to purchase the goods available in the few markets that exist in their village environment. They accept money in exchange for the liquor Desta's mother brews and the teff her father grows.

Notes and coins issued by the government are not the only kind of money in Becky's world. Business transactions most often use cheques drawn from one bank to another. As current account balances also serve as a medium of exchange, they are also money. When signing a contract, the relevant parties entertain certain beliefs about the dollar's future value, by which I mean beliefs concerning the bundles of goods and services a dollar will purchase in the future. Those beliefs are based in part on their trust – more accurately, *confidence* – in the US government to manage the value of the dollar. Of course, the beliefs are based on many other

things besides, but the important point remains that money's value is maintained only because people believe it will be maintained. Similarly if, for whatever reason, people fear that the value will not be maintained, then it won't be maintained. Currency crashes, such as the one that occurred in Weimar Germany in 1922–3, are an illustration of how a loss in confidence can be self-confirming. Bank runs share that feature, as do stock market bubbles and crashes. There are multiple social equilibria, each supported by a set of self-confirming beliefs. One of the most important purposes of monetary policy is to maintain the value of money.

Money enables transactions to be anonymous. Those anonymous transactions are concluded in one go, as when Becky buys CDs in the department store of her town's shopping mall and pays for the purchases in cash. Millions of transactions take place each day between people who have never met and will never meet. The problem of trust is in great part solved in Becky's world by building confidence in the medium of exchange: money.

Because of an absence of good roads, electricity, and running water, markets are unable to penetrate Desta's village. Becky's suburban town, in contrast, is embedded in a gigantic world economy. Becky's father is able to specialize as a lawyer only because he is assured that his income can be used to purchase food in the supermarket, water from the tap, and heat from cooking ovens and radiators. Specialization enables people to produce more in total than they would be able to if they were each required to diversify their activities. Adam Smith famously remarked that the division of labour is limited by the extent of the market. Earlier we noted that Desta's household doesn't specialize, but produces pretty much all daily requirements from a raw state. Moreover, the many transactions it enters into with others, being supported by social norms, are of necessity personalized, thus limited. There is a world of a difference between markets and communities as the basis of economic activities because there is a world of a difference between laws and social norms.

Culture

The models we have been studying capture those all-too-familiar situations where cooperation requires institutions (arrangements for implementing agreements, which specify who is to keep an eye on whom, who is to report to whom, and so forth), but where non-cooperation is a possible outcome even when those institutions are in place. We know that certain institutions work smoothly in some places, but not in others. A nation may adopt an enlightened constitution, but whether its citizens can bring themselves to work within it is a different matter. What people choose to do depends, among other things, on their beliefs about one another. The theory I am developing here doesn't explain those beliefs; what it does is to identify those that are self-confirming. Economists call them *rational beliefs*. Nothing philosophically deep is meant by the term 'rational' here: rational beliefs are beliefs that are self-confirming, nothing more. The models have also told us that, in a wide variety of everyday situations, rational beliefs are not unique. Some give rise to outcomes that protect and promote human well-being, others thwart it. What gives rise to one set of rational beliefs rather than another? Could it be culture?

In his famous work on the influence of culture on economic development, the sociologist Max Weber took a community's culture to be its shared values and dispositions, not just beliefs. Studies as widely cast as Weber's can't easily be summarized, but the causal mechanism Weber himself would seem to have favoured in his work on the Protestant ethic and the spirit of capitalism leads from religion, through personal practices and political culture, to institutions, and thereby to economic outcomes.

Using culture to explain economic performance hasn't been popular among social scientists in recent decades; but there has been a revival. For example, economists have constructed a measure of trust in societies from the World Values Survey, which in the early 1980s and 1990s surveyed 1,000 randomly selected individuals in each of 40 countries and asked them if, generally speaking, they would say that most people could be trusted or that they could not be too careful in dealing with people. Trust was measured by the percentage who replied that most people could be trusted (the percentages were found to be pretty much the same in the two surveys). The investigators controlled for differences in GDP per head among the countries that were surveyed. The data revealed that trust, on the one hand, and judicial efficiency, tax compliance, bureaucratic quality, civic participation, infant survival rate, educational achievement, the performance of large firms, and growth in GDP per head, on the other hand, moved together. In statistical jargon, they were positively (and significantly) correlated. Not surprisingly, the data also revealed that trust and government corruption moved together, but in opposite directions. The two variables were negatively (and significantly) correlated.

We could conclude from the World Values Survey that trust is good for economic growth and several other good things besides. But the survey didn't identify the reasons why the degree of trust in each of the countries sampled was what it was. Nor *could* it identify the reasons. This poses a problem. As trust doesn't get created in a vacuum, its presence cries out for explanation. Which means that the presence of trust shouldn't be used to explain the presence of something else. What the statistical findings tell us is that such emergent features of an economy as the degree of trust people have in one another go hand in hand with economic progress, they tell us nothing more. Statisticians remind the rest of us repeatedly that correlation isn't the same as causation. It is an instruction social commentators have all too often ignored.

That said, to have observed a positive correlation between trust and economic progress is informative because the theory we have been developing here predicts positive correlation. If the correlation had been *negative*, we would have been utterly surprised. We would have questioned the finding and gone back to the drawing board, either by redoing the survey, or by trying to identify hidden variables in the data that could account for it.

All this is in line with a train of thought regarding institutions that I have been exploring here, that long-term relationships are often *substitutes* for trust in government officials to deliver public services or for confidence in the ability of formal markets to function adequately. Perhaps people enter into long-term relationships when the other institutions that could serve similar purposes are unreliable.

In addition to questions on trust, the World Values Survey contained a list of character traits and practices, including thrift, saving money and objects, determination, obedience, and religious faith. The survey asked people to identify the one they regarded as the most important. Based on their responses, political scientists have constructed an index of culture that reflects the personal motivation to achieve. Controlling for other factors, differences in economic growth and the index of personal motivation were found to go together – they were positively and significantly correlated.

This finding shouldn't be given a causal interpretation either. The motivation to advance oneself could depend on one's expectations regarding the chance that hard work pays off. Parents would instil personal ambition in their children only if they were sanguine that such ambition would not be thwarted by the social order. Women wouldn't rise beyond their station if they (rationally!) feared retaliation against them for their temerity. Even an attitude can be a determined rather than determining factor. When it's the former, an observed statistical link between the culture of, say, thrift and economic progress should be interpreted as a relationship, nothing more. I am using the term 'culture' here to denote differences in the beliefs people hold about one another. Culture in this view is a coordinating device.

Attitudes toward others and toward one's institutions are significant aspects of a society's culture. The models we have studied so far have focused on the latter. In what follows we look at the former, by studying socially influential behaviour.

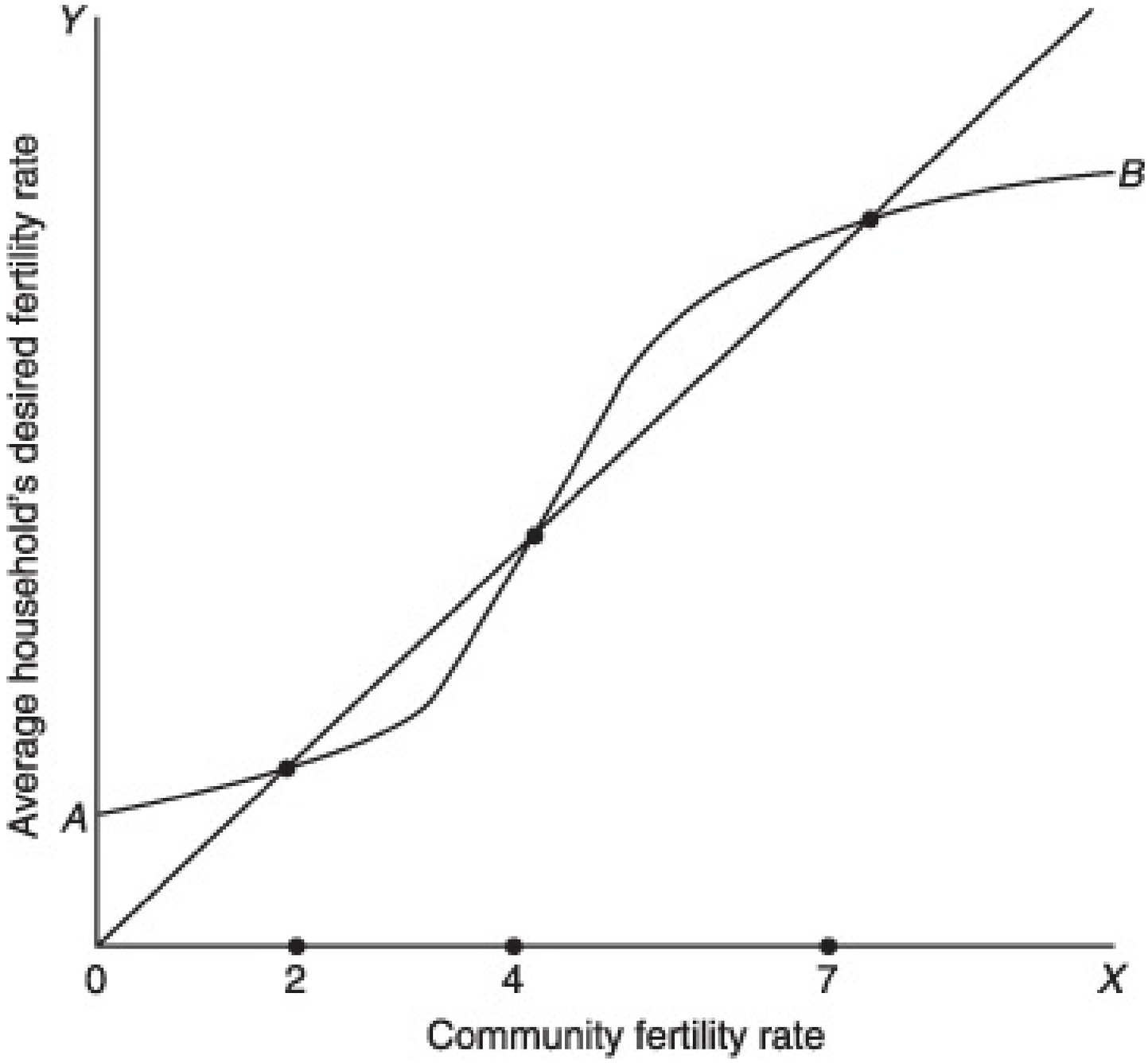
Socially influential behaviour

The fertility rate (TFR) in Desta's world is more than twice as high as in Becky's world (Table 1). What accounts for the huge difference?

In Chapter 6 we will explore such factors as the costs and benefits parents experience from having children and the relative ease with which households have access to modern reproductive technology and health care. Here we focus on socially influential behaviour as a possible factor. Conformity is one example. By conformity, I mean imitative, or herd, behaviour. Reproductive behaviour is *conformist* if, other things being equal, each household's most desired size is larger, the greater is the average household size in the group with which it identifies.

In Figure 6, I have drawn a hypothetical curve, AB, which reflects the dependence of the average household's desired fertility rate (Y) on the community's fertility rate (X). It is upward-sloping, reflecting conformist behaviour. I have so drawn AB that it intersects the 45-degree line at three values of X: 2, 4, 7. The hypothetical community would be at a reproductive equilibrium at each intersection: as long as the community's fertility rate is 7, the average household would most desire 7; but if it is 2, the average household would desire 2. So, conformism can be the reason for the existence of multiple reproductive equilibria. This means that communities that are separated from each other, but are otherwise identical, could behave very differently. In our example, it could be that the TFR in some communities is 2,

while in others it is 7. (A TFR of 4 is also a reproductive equilibrium, but it is unstable, meaning that if a community's TFR were ever so slightly different from 4, it would diverge from 4 even more with time.)



6. The relationship between the average household's desired fertility rate and the community's fertility rate

People tend to identify with more than one group. Often, our food habits have been acquired from our parents, our work habits influenced by those in our profession, our leisure habits by our class, and our reproductive goals by our religion or ethnic background. It may be that we conform because we care about our status, and our actions signal our willingness to be a part of our group. No matter what the basis of conformism happens to be, there would be practices encouraging high fertility rates that no household would unilaterally wish to break. Those

practices could have had a rationale in the past, when mortality rates were high, rural population densities were low, the threat of extermination from outside attack was large, and mobility was restricted. But practices can survive even when their original purposes have disappeared, especially perhaps if people look over their shoulders at what others are doing before deciding what they themselves will do.

Conformist behaviour would change over time if the reference group on whose behaviour households base their own decisions changes. Even within a group there are those who experiment, take risks, and refrain from joining the crowd. They are the tradition-breakers, often leading the way. Demographers have noted that educated women are among the first to make the move towards smaller families. Middle-class behaviour can also be the trigger for change. A possibly even stronger pathway is the influence newspapers, radio, television, and the internet exert by transmitting information about lifestyles elsewhere. In other words, the media can be a vehicle by which conformism increasingly becomes based on the behaviour of a wider population than the local community: the reference group widens. Increased conformity with the behaviour of people in distant lands can even be mistaken for growth in individualism. We now have the beginnings of a theory of *demographic transitions*, by which we mean a relatively brief period of time during which the TFR cascades down from a high figure to a relatively low figure. In recent years there have been signs of demographic transitions even in parts of sub-Saharan Africa, where the TFR has dropped from 7–8 to 4–5. But there remain parts of the continent where the TFR remains nearly 8.

In her study of demographic change in Western Europe over the period 1870–1960, Susan Cotts Watkins found that in 1870, before the large-scale declines in marital fertility had begun in most areas of Western Europe, demographic behaviour differed greatly within countries. The fertility rate among provinces (counties, cantons) differed considerably, even while differences within provinces were low. There were spatial clusters within each country, suggesting the importance of the influence of local communities on behaviour. By 1960, though, differences within each country were less than they had been in 1870. Watkins explained this convergence in behaviour in terms of increases in the geographical reach national governments enjoyed over the 90 years in question. The growth of national languages could have been the medium through which reproductive behaviour spread.

More transient forms of herd behaviour are fads and fashions. Imagine that each person can choose one of two actions, *P* and *Q*. Suppose that everyone has an intrinsic preference for *P*, but that people also like to conform. To model this, imagine that each person would choose *P* over *Q* if the proportion of people choosing *Q* is expected to be less than 65%, but that each person would choose *Q* over *P* if the proportion is expected to exceed 65%. The figure 65% is a *critical mass*. (Mathematicians would call the critical mass a *separatrix*.) Once again, simple herd behaviour could lead everyone to adopt *Q*, even though they would all have preferred that everyone had adopted *P*. A dynamics similar to the one I have just sketched to describe demographic transitions shows that fads and fashions can disappear without much prior notice.

Competitiveness (trying to ‘beat the Jones’s’) can also lead to socially influential behaviour. Surveys in which people in Desta’s world were asked to report how happy they were as compared to the past have confirmed that income matters to the very poor: reported happiness was found on average to have increased with rising incomes. But similar surveys have found that income doesn’t contribute to happiness among people who have a good deal more than the basic necessities of life. Those who are poorer in Becky’s world are certainly less happy; but even though there was economic growth in the periods covered by the samples, the distribution of declared happiness remained pretty much the same.

A possible explanation is that, when income levels are reasonably high, the extent to which someone feels happy is influenced by his income *relative* to the average income of his reference group. In the presence of such a competitive urge, a ‘rat race’ ensues and resources are wasted. The multiple equilibria are of growth rates in incomes. In each equilibrium people grow richer on average and consume more, but don’t feel any happier.