For most of the twentieth century, China was poorer than Cameroon. In 1949, when the People's Republic of China came into being, the world's largest country was torn by civil war and ruled by a communist dictatorship. In the late 1950s, millions of people died in a famine induced by the failed policies of the government. In the 1960s, the university system was destroyed by the Cultural Revolution, when millions of educated citizens were forcibly relocated to work in the countryside. After all this, how did China become the greatest economic success story in history?

Two farming revolutions

A visit to Shanghai is enough to provoke the question. Clues to the answer can be found all over China. I picked up several of them on a train to the inland Chinese city of Zhengzhou.

The train itself was the first clue: it was more comfortable, faster, and more punctual than those back in England. China's road and rail network appeared to be in superb condition. Second, the Chinese seemed to have an excellent education system—I was soundly but politely thrashed at chess by a PhD in

economics, a young man who had never been outside China but who spoke mildly and thoughtfully in good English. Third, although the train was packed, there were few children and no large families. China's "one child family" policy has created a society where women have time to work and where the bulk of people are neither old nor young but in middle age, saving for the future. Those vast savings have provided the investment money for the roads, the trains, and more. At the minimum China clearly had the human resources, infrastructure, and financial capital required by traditional models of economic growth. Yet it did not always seem as though these resources would be well used; we already know that without the right incentives they will be wasted.

Under Mao, that waste was legendary. China's initial development efforts were two-pronged: massive investment in heavy industry such as steel, plus application of special agricultural techniques to make sure that China's vast population was fed. The policy focus was understandable. China's northern provinces are rich in high-quality coal, which logically could provide the basis of an economic revolution. Coal, steel, and heavy manufacturing had been the basis of the industrial revolution in the leading economies: the United Kingdom, the United States, and Germany. Meanwhile, agriculture had to be a priority for any Chinese government because there was barely enough fertile land to feed the country's hundreds of millions of people. From the window of the train to Zhengzhou I was looking out over Henan, China's most densely populated province. It is a freezing desert.

This two-pronged push was called the "Great Leap Forward." It seemed to make sense, but it was the greatest economic failure the world has ever seen. Mao conducted economic policy based on the hidden premise that if people tried hard, the impossible would happen. Zeal alone was sufficient. Villagers were ordered to build steel furnaces in their backyards but had no iron ore to put into them. Some villagers melted down good iron and steel—tools, even doorknobs—in order to meet the quotas demanded

by the state. Even Mao's personal doctor worried about the wisdom of a policy to "destroy knives to produce knives." The steel that emerged from the furnaces was unusable.

If industrial policy was a farce, agricultural policy was a tragedy. The Great Leap Forward had already pulled many workers off the land to labor at the furnaces or in public works like dams and roads. Mao ordered the people to kill grain-eating birds, and the population of insect pests exploded as a result. Mao personally redesigned China's agricultural techniques, specifying closer planting and deeper sowing to increase yields. Rice planted so closely together could not grow, but party officials, anxious to please Mao, staged shows of agricultural and industrial success. When Mao traveled by train to admire the fruits of his policy, local officials built furnaces in strips along the railroad and brought rice from miles away to replant, at the officially specified density, in adjacent fields. Even this charade could not be maintained without the use of electric fans, which were used to circulate air and prevent the rice from rotting.

Crop yields fell, of course, but even this would not have been disastrous without the state's insistence that the policy was working. When the defense minister raised the issue of the famine in a ministerial meeting, he was punished and ordered to write a "self-criticism." Less powerful figures who denied that there was a surplus were tortured. While crops were failing, China doubled its exports of grain from 1958 to 1961 as a symbol of its success. In Henan province, across which we were traveling in comfort just forty-five years later, state grain stores contained enough food to provide for the people but remained shut because the official government position was that there was a grain surplus. Meanwhile, people starved to death outside in the snow. Some were left unburied, others were eaten by desperate family members; neither fate was uncommon.

Estimates of the death toll from the famine range from 10 million to 60 million people, roughly the entire population of England, or of California and Texas combined. Even Chinese

government figures later acknowledged that 30 million people had died, although they blamed bad weather.

In the "world of truth" described in chapter 3, such disasters cannot happen. Mistakes, certainly, will be made—perhaps more frequently than under central planning. But the mistakes stay small; in market economies we call them "experiments." If venture capitalists back them, they do not expect many to succeed. When they succeed, they make some people rich and bring innovation to the whole economy. When they fail—which is more often than not—some people will go bankrupt, but nobody will die. Only command economies can promote experimentation on such a fatally extravagant scale and suppress informed criticism. (Mao was not alone. The Soviet president, Nikita Khrushchev, made a similar mistake following a visit to the United States, when he ordered Soviet fields to be replanted with the corn he had seen growing in Iowa. The failure was a catastrophe.) It is worth remembering that market failures, while sometimes serious, are never as tragic as the worst failures of governments like Mao's.

In 1976, after many more crimes against his own people, Mao died. After a short interregnum, he and his followers were replaced by Deng Xiaoping and his allies in December 1978. Just five years later, the change in China's economy was incredible. Agricultural output, always the headache of the Chinese planners, had grown by 40 percent. Why? Because those planners had brought the "world of truth" into China. As we discovered in Cameroon, incentives matter. Before 1978, China had some of the most perverse incentives in the world.

Before Deng took power, Chinese agriculture had been locally organized into collectives of twenty or thirty families. People were rewarded with "work points," which were awarded based on the output of the collective as a whole. There was little opportunity for personal improvement either through extra effort or ingenuity. As a result there was little of either.

The government also purchased and redistributed food from regions that produced a surplus, but did so at a severely depressed price, discouraging more fertile regions from making the most

of their agricultural land. Many rural workers were underemployed. The very system that was designed to boost China's agricultural output and make the nation self-sufficient was undermining it. China's output of grain, per person, was as low in 1978 as it had been in the mid-1950s, just before the Great Leap Forward.

Deng had little time for such folly and immediately embarked on a program of reform, announcing that "socialism does not mean poverty." To improve agriculture, he had to get the incentives right. He started by raising the price paid by the state for crops by nearly a quarter. The price paid for surplus crops rose by more than 40 percent, substantially increasing the incentive for fertile areas to produce more crops.

At the same time, a few collectives experimented with subcontracting land to individual households. Instead of clamping down, the government allowed the innovation to see whether it would work, just as a market economy allows small-scale experiments. Households who were renting land from collectives had every incentive to work hard and think of smarter ways of doing things because they were rewarded directly for their successes. Crop yields immediately increased. The experiment spread: just 1 percent of collectives had used the "household responsibility system" in 1979; by 1983 98 percent had switched to the system.

These reforms were linked with a number of other pieces of liberalization: the retail price of grain was allowed to rise, further increasing the incentive to produce what was needed. Restrictions on trade between regions were eased, so that each region could enjoy its comparative advantage. Production quotas were soon abandoned altogether.

The results were dramatic: agricultural output expanded by 10 percent a year in the first half of the 1980s. More impressively still, more than half of the increase was attributable, not to working harder or using more machinery but to more efficient farming and harvesting methods. Much of that productivity increase was directly attributable to the abandonment of the collective system. In the five years following the reforms, the average real

income of farmers doubled. It was not Mao but Deng, by using the power of markets and prices, who had achieved the great leap forward.

All these statistics are best understood by thinking back to chapter 3 and the world of truth. Partly by accident, partly by benign neglect, and partly by design, Deng introduced the world of truth to Chinese agriculture. Those who had good ideas, good luck, and who worked hard, prospered. Bad ideas were quickly abandoned. Good ones spread rapidly. Farmers grew more cash crops and devoted less effort to crops that were difficult to grow; all of this was the unsurprising result of introducing a price system. China had begun to travel along the so-called capitalist road.

There was plenty of capital available, too: about a third of national income was saved rather than consumed, roughly twice as much as in Cameroon.

Initially, China was able to get fairly good returns out of this capital. In the early 1950s, when the main task was to rebuild essential infrastructure and industry, every 100 yuan invested added 40 yuan to China's annual output, an impressive return. This should not be surprising. The tasks facing the Chinese government were clear enough: in particular, what had been broken during the war and the revolution needed to be fixed. All that was needed was for the government to give the orders.

The trouble came later. Even setting aside the chaos of the Great Leap Forward and the Cultural Revolution, the Chinese state found itself increasingly unable to get value out of its investments. By the time Mao died in 1976, every 100 yuan invested were adding only 18 yuan to China's annual output. This was less than half as efficient as two decades before. Given that the government and state enterprises were, between them, investing such a large chunk of the nation's income, this reduction in the efficiency of investment was a crippling waste.

A sympathetic observer might conclude that it was inevitable that after the obvious investments had been made, returns would fall. This might be true for a cutting-edge economy like Japan or the United States, but in 1976 China was still desperately poor. Few people had cars, telephones, electricity, or running water. In such a poor country, the right investments can achieve very high returns by providing such basics of modern life. There was plenty of effective investment to be made, but the state didn't know how to make it.

As long as it was obvious what to order people to make or to build or to grow, this didn't matter much. But as the population grew, technology advanced and long-demanded investments were made, the communist economies slipped farther and farther away from the memory of the price system. Real market economies change quickly. In South Korea, 80 to 90 percent of workers,

land, and capital were working or being used for different purposes in the 1970s than they had been in 1960—in 1960, agricultural output was 45 percent of the economy and manufacturing output less than 10 percent. By the early 1970s, the manufacturing sector was larger than the agricultural sector. More importantly, within those sectors, workers were training and retraining, firms were starting up and closing down. Korea's export industries used to make toys and underwear, but now they make memory chips and cars. If, in 1975, a planner for the South Korean government had tried to run the economy based on outdated information from 1960, the result would have been a catastrophe. Fortunately, nobody did. Such folly was left to the North Koreans. Command economies from North Korea to the Soviet Union to China simply lacked the information necessary to keep making the right choices.

Unlike Cameroon, where individuals and companies have little incentive to invest, Maoist China had no problem with incentives—after all, the leaders had the power of life and death over their followers. But incentives alone are not enough. Chapter 3 showed that the world of truth created by markets produces good outcomes not just because it provides incentives, but because it generates information about the costs and benefits of all kinds of goods and services through the price system. The socialist systems of the Soviet Union and China provided the strongest incentives imaginable, but not the information necessary to use them correctly. Rather than responding to demand from world markets, like the South Koreans did, the Chinese responded to demands from Mao: plant crops more closely, kill birds, melt down your tools to make new tools.

To get any value out of the vast sums of investment capital available, the Chinese government began a gradual shift to a market system. Where successful agricultural reforms had paved the way, more complex and far-reaching reforms of the whole economy were to follow. Fifteen years after Deng came to power, returns on investment had quadrupled: for every 100 yuan invested, China's annual output grew by 72 yuan: each investment

paid for itself after just 500 days. Nor was this because the government had scaled back its investment and was cherry-picking only the very best projects. Quite the reverse: investment levels were even higher than in the 1970s. It's small wonder the economy grew spectacularly. But how were the high returns to investment achieved?

Growing out of the plan

Like the Soviet bloc economies, China's industrial sector was controlled by planners. The plan specified, for instance, that a particular steel mill would produce a defined quantity of steel, that that steel would then be used for certain specified purposes, and that a standard quantity of coal (0.8 tons of coal were said to be required for each ton of steel) would be delivered to the steel mill in order to make production possible, and so on. The calculations required were tremendously complex, even presuming that junior bureaucrats were supplying honest information about costs and quality. (Everybody had an incentive to claim that the machinery and materials they had to manage were insufficient and of poor quality, and to claim that nevertheless their output was vast and excellent. Without a world of truth, the real story was impossible to uncover.) But, leaving aside Mao's fatal utopian whims, such a system could work tolerably well for a time because each year the planners had the previous year's plan to guide them.

As the economy grew and changed, the process of adjusting output requirements and making capital investments wisely became increasingly difficult: this is why the returns to capital in China were so much lower in 1976 than in the 1950s. A market system would have done much better, but it was no simple matter to create one. Markets do not work well without market-supporting institutions: in a market economy, people need banks for commercial loans, contract law to resolve disputes, and confidence that their profits will not be confiscated. Such institutions

cannot be set up overnight. Meanwhile, many workers in a socialist economy are engaged in unproductive activities and might simply starve unless the adjustment process was phased in or they received some kind of compensation. The problems were most acute for the industrial sector of the economy because it was most closely tied into the plan system, was the vehicle the government used to generate savings, and was the source of most government investment.

Had Deng decided simply to abandon the plan and switch to a market system overnight, the likely outcome would have been a scramble to establish property rights, the collapse of the financial sector (because many government-run banks had made loans that could never be repaid), and widespread unemployment, even starvation. It is conceivable that things might have worked out for the best quite quickly, but it is likely that they would not. (In the former Soviet Union in the 1990s, such "shock therapy" resulted in economic collapse.)

What is more, such extreme reforms would have offended so many vested interests—including huge numbers of ordinary people—that they might have been politically impossible. Deng, who had been purged twice under Mao's chairmanship yet returned to lead the country, well understood the value of political credibility.

So Deng and like-minded reformers adopted a more tentative strategy. In 1985 the size of the "plan" was frozen: the production levels specified by the government did not grow as the economy grew. Instead, state-owned firms were allowed to do as they wished with any extra production. Efficient coal manufacturers would find that efficient steel manufacturers wanted to buy extra coal to make extra steel, which would be sold on to efficient construction firms. Inefficient firms that tried to expand got nowhere.

This strategy turned out to work very well for several reasons. First, it was easy to understand, and the commitment to freeze the size of the plan was a credible one. Such a credible commitment was important: if the planners had constantly tried to expand and update the plan in the light of the information emerging

from the fringe market, that market would quickly have ceased producing useful information. Plant managers, realizing that any successful changes they made would quickly be absorbed into next year's plan, would have stuck to safe choices.

Second, because the plan was kept fixed, a certain stability was guaranteed. Workers who had jobs could keep them. Things were guaranteed not to get worse—but if growth resulted, there was the possibility that they could get better. Many people grabbed that possibility, preferring long hours and poor conditions in a textile factory, even if they had to travel thousands of miles from their families, to their previous occupation of scraping a living—or failing to do so—on the most marginal, arid farmland.

Third, the market operated exactly where it needed to: at the margin. Remember that marginal costs and marginal benefits are what really matter for the efficiency of an economy. Imagine the decision of a factory manager trying to decide whether to produce one extra ton of steel, from which he can keep the profits. If he knows the marginal cost (the cost of producing one extra ton) and the price he is offered is a market price (which reflects the benefits to someone else of one extra ton), then he will make the right decision: produce if the price is higher than the marginal cost. The output of the factory will be efficient.

Decisions about what happens to the rest of the steel are not important for whether the quantity of output is efficient. Nine tons out of ten could be produced and allocated in accordance with the plan, but it is the decision about the tenth ton that matters for efficiency.

What this meant was that efficient firms expanded to meet extra demand: an eleventh ton and a twelfth followed the tenth. That demand was coming from expanding sections of the economy, which really needed supply, rather than from the planners. Managers got to keep profits and reinvest them—and had an incentive to make sure that the investments were profitable.

Inefficient firms, by contrast, did not grow. As long as the government kept subsidizing them through the plan (it gradually stopped doing so in the 1990s), they could still keep producing

forever; but since the Chinese economy was well over four times as big in 2003 as it had been when the plan was frozen in 1985, the relative importance of those firms shrank very quickly. The economy, quite literally, grew out of the plan.

Entry and scarcity power

We know that a market system limits the scarcity power of firms; most firms face competition, and sectors of the economy that are not very competitive tend to attract new competition over time. The competition and free entry of new firms, by limiting scarcity power, pushes powerfully toward efficient production, new ideas, and consumer choice.

The Chinese reformers needed to encourage entry and limit scarcity without resorting to a dangerously unpredictable strategy of rapid liberalization. They hoped to improve the performance of the state sector, introduce new public sector companies as competitors, gradually foster a private sector, and slowly open up to international competition. If one source of competition didn't work out, there was always another. The most important competitors at first were local-government-owned "township and village enterprises." Despite the name they were often huge industrial monsters. Later, privately owned and foreign companies were allowed to set up and grow, too.

As late as 1992, only 14 percent of industrial output was being produced by privately owned or foreign firms, while the state sector was responsible for nearly half of output. The output of local-government township and village enterprises made up most of the remainder. The Chinese economic miracle was not really about privatization. What mattered was not who owned the companies, but that the companies were forced to compete in a relatively free market, driving down scarcity power and bringing in the information and incentives of the world of truth.

The effects are even measurable. Remember, way back in chapter 1, we discovered that high profits were often a signal of scarcity power. If new entry and stronger competition were removing

the scarcity power of state-owned firms, we would expect their profit rates to fall.

That is indeed what happened. Chinese firms in the 1980s had very high rates of profit: many sectors had profit rates of over 50 percent (for a fairly competitive economy, you would expect not more than 20 percent and often much less). Profits also varied a lot from sector to sector depending on the arbitrary pricing of the plan: the oil refining sector had a profit rate of almost 100 percent, the iron mining sector just 7 percent. In all cases, the government confiscated the profit and reinvested it.

As the economic reforms began to bite, profits started to fall; they also started to converge, as the most profitable sectors faced the fiercest competition from local government, private, and foreign firms. During the 1990s, average profit rates fell by over a third; in the juiciest sectors they fell by at least a half. The effect of all this was to reduce waste, give Chinese customers better return for their money, and make China a potential player on world markets. Scarcity power disappeared.