

ECN230 SRP session 6. Trade and Technology: Effects on Jobs and Wages

WAGE DIFFERENTIALS AND EMPLOYMENT

For years, the OECD extolled the virtues of “flexible” labour markets, in which relative wages are free to adjust in line with supply and demand. This implies that there is likely to be some trade-off between inequality and unemployment. It is worth considering the mechanism by which wages that are more flexible should create more jobs. Technological change and increased competition from developing countries reduce the demand for low-skilled workers in the rich world. In theory, in countries with flexible wages, the relative pay of low-skilled workers should fall. This will then encourage firms to hire more of them, so unemployment should rise by less than in countries with rigid wage structures [1].

Since the 1980s, wage inequality has widened significantly in countries that have deregulated their labour markets – most notably the US, Australia, the UK and New Zealand. For instance, in 1979 a US male worker just below the top 10% (or decile) of the wage distribution earned 3.2 times as much as a man just above the bottom decile; by 1995 that ratio had increased to 4.3. In contrast, in most continental European countries the ratio remained broadly unchanged or even narrowed: in Germany, it was only 2.2 [1].

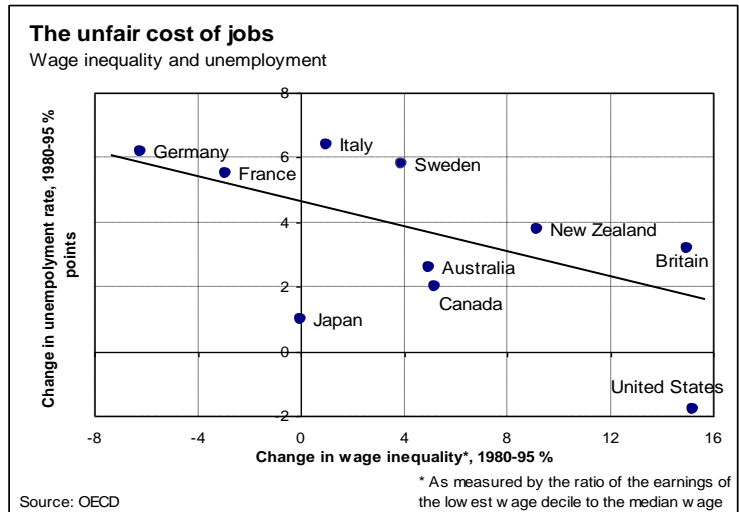
In much of Europe minimum wages, centralised wage bargaining and generous welfare benefits created a floor for pay, compressing wages at the bottom end of the pay distribution. For instance, during 1985-95 the US allowed its minimum wage to fall in real terms, to 34% of the median wage. In France, in contrast, the minimum wage was close to 60% of the median. This makes low-skilled workers significantly more costly relative to skilled ones. So one would expect French firms to respond to lower demand by cutting jobs more sharply [1].

According to the theory, countries with the widest wage differentials should enjoy the lowest unemployment rates. That seems to be true if one does a simple comparison of, say, the US with Germany. However, an OECD study¹ in *Employment Outlook*, which looked at a range of rich countries, found no such link. Simple correlations suggest no significant tendency for unemployment rates to be higher among low-skilled workers in countries in which the wage distribution was compressed at the lower end. These results suggest that the straightforward trade-off between jobs and equality may be too simplistic [1].

The OECD’s study included only a small number of countries. An analysis by Francine Blau and Lawrence Kahn, economists at Cornell University,² found that, as a percentage of the population of working age, employment rates for low-skilled workers were relatively lower in countries in which the earnings distribution was compressed. Second, and more important, the OECD analysis failed to take into account other factors that influence levels of unemployment, such as standards of education and training. Because these vary across countries, one would not expect to find a perfect correlation between levels of inequality at any single point in time [1].

A more direct test of the value of flexible labour markets is how they respond to shifts over time in the demand for different types of labour. A comparison of changes in unemployment rates and changes in inequality (as measured by the gap between the wages of those in the

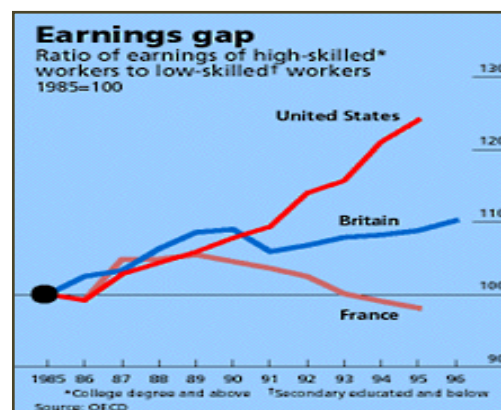
bottom decile of the wage distribution and the median) during 1980-95 showed a much closer correlation. Countries that allowed the relative wages of low-skilled workers to fall saw, in general, the smallest increase in unemployment (see chart, inequality and unemployment) [1].



Perhaps the best way to interpret the OECD’s study is that wage flexibility is a necessary, but probably not a sufficient, condition for lower unemployment. Flexible labour markets also need to be combined with other policies, such as better education and training or welfare reform, to ensure that the low-skilled do not get trapped on the bottom rung. To argue that continental Europe no longer needs to deregulate its labour markets to bring down their high structural rates of unemployment would therefore be wrong [1].

The role of trade on North’s labour markets

Studies in the 1990s showed a widening gap between the earnings of university graduates and the less educated, particularly in the US and UK. In other wealthy countries with less flexible labour markets, the rise in wage inequality was not so marked (see chart, earnings gap); but the least educated were still less likely to be employed, relative to the best educated, than they were in the 1970s [2].



Many people saw the hand of freer trade, especially trade with developing countries, in the (1) rising wage inequality and/or (2) higher unemployment among the unskilled. It is a common fear that jobs in rich countries are under threat from developing countries where wages are lower. Less-educated workers are affected more from this competition, and so fall further behind the better educated [2].

¹ OECD, “Earnings Inequality, Low-Paid Employment and Earnings Mobility”. *OECD Employment Outlook 1996*.

² Blau, F.D. and L.M. Kahn, “International Differences in Male Wage Inequality: Institutions versus Market Forces”, *Journal of Political Economy*, vol 104(4), 1996, p. 791-837.

Economists agreed that trade had little effect on wages of unskilled workers in rich countries. They disagreed about why. A huge amount of economic research produced scant evidence that trade had much to do with it. Instead, the wider gap seemed mostly due to technological advances, which boosted the productivity and wages mainly of the better educated while leaving the least educated lagging. In a review of the literature by Matthew Slaughter of Dartmouth College and Phillip Swagel of the IMF³, they confirm that the disagreement among economists was not about trade's impact being slight, but rather a methodological dispute pitting economists who specialise in trade against those who work on labour markets [2].

Trade economists argue that trade affects wages through the prices of imports and exports. Suppose that a rich country, which has a relatively large proportion of well-educated workers, starts trading with a poor country that has plenty of uneducated labour but relatively few graduates. Both countries specialise according to their relative strengths—the rich country in making things that use more brainpower; the poor country in industries that use relatively less. Both countries are made better off, but the least educated workers in the rich country may lose out. Why? Because import competition forces down the relative prices of the goods they make, pushing down their wages [2].

The theoretical foundation holds that trade is beneficial in all sorts of ways. Consumers have access to goods they could not otherwise enjoy or more choice is on offer through trade. Economists since Adam Smith have argued that it makes countries richer. Trade creates larger markets, which allows for greater specialisation, lower costs and higher incomes. Economists have long accepted that this overall boost to prosperity is not evenly spread [3].

To answer such questions on trade's employment and wage implications, the theory considered was first developed in the 1940s, known as the Stolper-Samuelson theorem. Wolfgang Stolper and Paul Samuelson (1941)⁴ predicted that removing trade barriers would have different effects in different countries. In a country with lots of skilled labour (like the US), exports will tend to be intensive in skilled labour, so free trade should raise the wages of the skilled workers relative to the unskilled. If unskilled labour is more abundant, its exports will be intensive in unskilled labour, so workers with skills will lose. [4][3]. Yet many economist were sceptical that such losses occurred to any significant degree in practice. Workers in industries affected by trade would find new jobs in other fields [3]. Nevertheless, economists did recognize that while trade brings gains to the economy as a whole, it can have substantial effects on the distribution of income. When that effect appeared modest, economists heaved a sigh of relief and moved on [5].

Labour economists, however, argue that trade affects the labour market mainly through the volume of trade, not through prices. The idea is that by importing goods, a country is essentially importing the labour used to make those goods. Imports of goods made by low-skilled workers thus have the same effect as an increase in the supply of low-skilled workers: they drive down wages. Thus, changes in a country's imports and exports can be used to estimate the effect on the demand for local workers. From that, the impact on wages is worked out [2].

Each side finds fault with the other's approach. Trade theorists dislike the labour economists' method because, they say, it is not just the number of toys shipped across the border that affects wages in the toy industry. The mere threat of foreign competition may be enough to force down prices and wages, whether or not imports are large. Nor, they say, is it right to assume that imports displace goods made by local workers one-for-one: if the US made all its toys at home rather than importing them from China, the price would be higher, and fewer toys would be sold [2].

The labour economists retort that the trade economists' price-based studies also have flaws. Data on the prices of traded goods are often inadequate. These studies may fail to distinguish trade from other factors that affect wages. As an economy grows and its people get richer, they spend a smaller share of their income on cheap clothes and more on fast cars. That would push down the wages of a textile worker compared with those of a design graduate; but it would have nothing directly to do with trade. Ascribing all changes in the price of traded goods to freer trade is thus misleading [2].

Despite these differing approaches, it is remarkable that both camps broadly agreed that trade had done little to increase inequality, and that technology has played a far bigger part. Even so, there is still plenty of research to be done, and plenty to argue about. Both schools have struggled to disentangle the effects of trade from those of technology. Faced with increased competition from abroad, firms can cut costs by replacing workers with machines: trade and technology then go hand in hand. Trade's impact is also hard to isolate when considering changes in the composition of an industry's workforce. Clothing firms in rich countries, for instance, employ a higher proportion of designers and a lower proportion of sewing-machine operators than they used to. In part, this is a response to foreign competition, but it is also a reaction to changing tastes, and to the fact that production processes are easier to automate than design or marketing [2].

Another question is whether price trends are actually consistent with increasing trade pressure on low-skilled workers. There is a running argument among economists about whether prices in low-skill industries have fallen compared with those in industries using relatively more high-skilled workers. If not, then trade would seem to have had little impact on inequality. The evidence is mixed. In its *Employment Outlook*, the OECD concluded that in 18 member countries relative prices of low-skill products did fall during the 1980s. In the US, the focus of most of the research in this field, some studies point one way, others the opposite [2].

Whatever further research throws up, it seems unlikely to overturn the current consensus: that greater trade has contributed a little to wage inequality, but not much. That leaves both trade experts and labour-market scholars in agreement that restricting imports would be a clumsy and ineffective way to make low-wage workers better off [2].

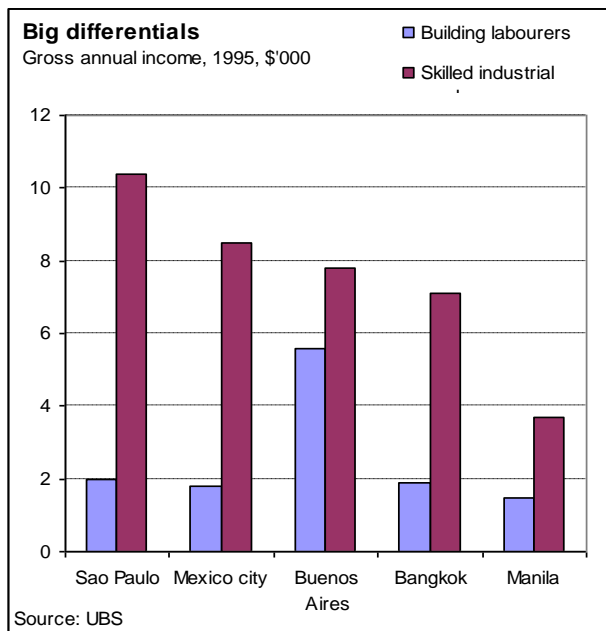
The role of trade on South's labour markets

As noted, rising wage inequality in rich countries is blamed on trade. As tariff barriers fall and imports rise, a rich country competes with goods made by better-paid workers. Some factories close, others slim their payrolls to cut costs. At the same time, however, liberal trade causes exports to increase: new factories open, others increase their payrolls to expand production. Working out the net effect on the pay of different workers is a problem [4].

³ "The Effect of Globalisation on Wages in the Advanced Economies". IMF working paper. April 1997.

⁴ W. Stolper and P. Samuelson, "Protection and real wages", *Review of Economic Studies*, 1941.

While the changing distribution of income in rich countries, especially in the US and UK, has been widely noted, less well known is the fact that similar changes have occurred in some developing countries. Pay differentials between skilled and unskilled workers are often high (see chart, big differentials); a skilled industrial worker in Thailand, for example, earned around \$7,100 in 1995, according to UBS, a Swiss bank, while an unskilled building labourer earned barely one-quarter as much. The lowering of tariffs widened the gap in some countries. In Mexico, the difference between a university-educated worker's pay and that of an unskilled worker rose by a third between 1987 and 1993 [4].



What makes these figures intriguing is that, on the face of it, they contradict the evidence from rich countries and refute the Stolper-Samuelson theorem. Why? Because the theory suggests that freer trade should reduce inequality in poorer countries, just as it increases it in rich ones. In effect, the theory says that whatever sort of labour is most abundant in the economy before liberalising is the one that prospers most as a result of trade. Poor countries have lots of unskilled labour. They should therefore export goods that are intensive in unskilled labour, pushing up its wages [4].

If the Stolper-Samuelson theory works anywhere, it should work in developing countries. Trade often plays a much more important role in many developing economies than it does in rich ones, and many poor countries undertook radical trade liberalisation in the 1990s. The average tariff in Latin America, for example, fell from 45% in 1985 to 13%. Yet Donald Robbins, of Harvard University, found that wage disparities increased after trade liberalisation in Chile, Uruguay, Colombia, Costa Rica, and Mexico⁵ [4].

While it is rash to draw firm conclusions from a study on this handful of countries, Mr Robbins's findings demand an explanation. (Unfortunately, few others publish the detailed information on individual workers that is required to track wage inequalities.) What has gone wrong with the theory? There are three possible answers:

- **Other factors drive wages.** In every case, much else will have changed during the span of time over which wage inequality is being compared – a change in the trade regime is only one of many differences. In general, growth is

going on. This means that countries are accumulating capital and new technologies, a process that will itself have a big effect on the distribution of income. Many other disturbances may play a part. In Latin America, for instance, countries have wrestled with high inflation, deep recessions and huge swings in foreign-capital inflows. Any of these shocks could have influenced wages and overshadowed the direct impact of trade [4].

- **Trade raises the demand for skills.** Traditional trade theory makes two big assumptions – that both rich and poor countries use the same kind of technology, and that capital is internationally immobile. The question is not whether these assumptions are false: they obviously are. The question is how much it matters. By reducing its trade barriers, a country may be able to import more new capital equipment. This will bring new technology, which will raise the demand for higher-skilled workers to use it. Thus, freer trade will raise the premium paid to skilled workers in a way not envisaged by Stolper-Samuelson [4].

- **The China effect.** Trade theory traditionally lumps all developing countries together as having relatively unskilled workforces, but substantial differences among them exist. China has hundreds of millions of unskilled workers and relatively few with skills. Many middle-income countries that compete with China in world trade (Colombia, or Chile) have relatively high average skill levels. In such countries, trade liberalisation might be expected to cause the wage gap to rise as it does in rich countries [4].

The evidence on wage inequality in the developing countries is greeted by many as “further confirmation” that trade hurts the poor. That would be wrong. Greater inequality may mean only that higher incomes are rising faster than lower ones, not that lower ones are falling.

(However, this could imply a dual economy – the existence of a modern high-wage sector and a low-wage traditional sector.) Beyond that, far from confirming anything, the results only deepen a mystery. They challenge the theory which seemed, to some, to explain why trade harmed low-income workers in rich countries. If that theory does not fully explain wage changes in the developing world, it may also be deficient when applied to rich countries. Widening wage inequality in rich and poor countries may lie not with trade but elsewhere [4].

A LINK BETWEEN TRADE AND WAGE INEQUALITY?

In August 1960 Wolfgang Stolper, an American economist working for Nigeria's development ministry, embarked on a tour of the country's poor northern region. In this bleak commercial landscape one strange flower bloomed: Kaduna Textile Mills, built by a Lancashire firm a few years before, employed 1,400 people paid as little as £4.80 (\$6.36) a day in 2016 prices. And yet it required a 90% tariff to compete [6].

Skilled labour was scarce: the mill had found only six northerners worth training as foremen (three failed, two were “so-so”, one was “superb”). Some employees walked ten miles to work, others carried the hopes of mendicant relatives on their backs. Many quit, adding to the cost of finding and training replacements. Those who stayed were often too tired, inexperienced or ill-educated to maintain the machines properly. “African labour is the worst paid and most expensive in the world,” Stolper complained [6].

He concluded that Nigeria was not yet ready for large-scale industry. “Any industry which required high duties

⁵ “Evidence on Trade and Wages in the Developing World”, OECD Development Centre Technical Paper No 119. December 1996.

impoverished the country and wasn't worth having," he believed. This was not a popular view among his fellow planners. But Stolper's ideas carried unusual weight. He liked "getting his hands dirty" in empirical work. And his trump card, which won him the respect of friends and the ear of superiors, was the "Stolper-Samuelson theorem" that bore his name [6].

The theorem was set out 20 years earlier in a seminal paper, co-authored by Paul Samuelson, one of the most celebrated thinkers in the discipline. It shed new light on an old subject: the relationship between tariffs and wages. Its fame and influence were pervasive and persistent, preceding Stolper to Nigeria and outlasting his death, in 2002, at the age of 89. Even still, the theorem shapes debates on trade agreements like the Trans-Pacific Partnership (TPP) between the US and 11 other Pacific-rim countries [6].

The paper was "remarkable", according to Alan Deardorff of the University of Michigan, partly because it proved something seemingly obvious to non-economists: free trade with low-wage nations could hurt workers in a high-wage country. This commonsensical complaint had traditionally cut little ice with economists, who pointed out that poorly paid labour is not necessarily cheap, because low wages often reflect poor productivity—as Kaduna Textile Mills showed. The Stolper-Samuelson theorem, however, found "an iota of possible truth" (as Samuelson put it later) in the hoary argument that workers in rich countries needed protection from "pauper labour" paid a pittance elsewhere [6].

To understand why the theorem made a splash, it helps to understand the pool of received wisdom it disturbed. Economists had always known that tariffs helped the industries sheltered by them. But they were equally adamant that free trade benefited countries as a whole. David Ricardo showed in 1817 that a country could benefit from trade even if it did everything better than its neighbours. A country that is better at everything will still be "most better", so to speak, at something. It should concentrate on that, Ricardo showed, importing what its neighbours do "least worse" [6].

Suppose that the best lawyer in town is also the best typist. He takes only ten minutes to type a document that his secretary finishes in 20. In that sense, typing costs him less. But in the time he spent typing he could have been lawyering. And he could have done vastly more legal work than his secretary could do, even in twice the time. In that sense typing costs him far more. It thus pays the fast-typing lawyer to specialise in legal work and "import" typing [6].

In Ricardo's model, the same industry can require more labour in one country than in another. Such differences in labour requirements are one motivation for trade. Another is differences in labour supplies. In some nations, such as the US, labour is scarce relative to the amount of land, capital or education the country has accumulated. In others the reverse is true. Countries differ in their mix of labour, land, capital, skill and other "factors of production". In the 1920s and 1930s Eli Heckscher and his student, Bertil Ohlin, pioneered a model of trade driven by these differences [6].

In their model, trade allowed countries like the US to economise on labour, by concentrating on capital-intensive activities that made little use of it. Industries that required large amounts of elbow grease could be left to foreigners. In this way, trade alleviated labour scarcity [6].

That was good for the country, but was it good for workers? Scarcity is a source of value. If trade eased workers' rarity value, it would also erode their bargaining

power. It was quite possible that free trade might reduce workers' share of the national income. But since trade would also enlarge that income, it should still leave workers better off, most economists felt. Moreover, even if foreign competition depressed "nominal" wages, it would also reduce the price of importable goods. Depending on their consumption patterns, workers' purchasing power might then increase, even if their wages fell [6].

There were other grounds for optimism. Labour, unlike oil, arable land, blast furnaces and many other productive resources, is required in every industry. Thus no matter how a country's industrial mix evolves, labour will always be in demand. Over time, labour is also versatile and adaptable. If trade allows one industry to expand and obliges another to contract, new workers will simply migrate towards the sunlit industrial uplands and turn their backs on the sunset sectors. "In the long run the working class as a whole has nothing to fear from international trade," concluded Gottfried Haberler, an Austrian economist, in 1936 [6].

Stolper was not so sure. He felt that Ohlin's model disagreed with Haberler even if Ohlin himself was less clear-cut. Stolper shared his doubts with Samuelson, his young Harvard colleague. The pair worked it out first with a simple example: a small economy blessed with abundant capital (or land), but scarce labour, making watches and wheat. Subsequent economists have clarified the intuition underlying their model. In one telling, watchmaking (which is labour-intensive) benefits from a 10% tariff. When the tariff is repealed, watch prices fall by a similar amount. The industry, which can no longer break even, begins to lay off workers and vacate land. When the dust settles, what happens to wages and land rents? A layman might assume that both fall by 10%, returning the watchmakers to profit. A clever layman might guess instead that rents will fall by less than wages, because the shrinkage of watchmaking releases more labour than land [6].

Both would be wrong, because both ignore what is going on in the rest of the economy. In particular, wheat prices have not fallen. Thus if wages and rents both decrease, wheat growers will become unusually profitable and expand. Since they require more land than labour, their expansion puts more upward pressure on rents than on wages. At the same time, the watch industry's contraction puts more downward pressure on wages than on rents. In the push and pull between the two industries, wages fall disproportionately—by more than 10%—while rents, paradoxically, rise a little [6].

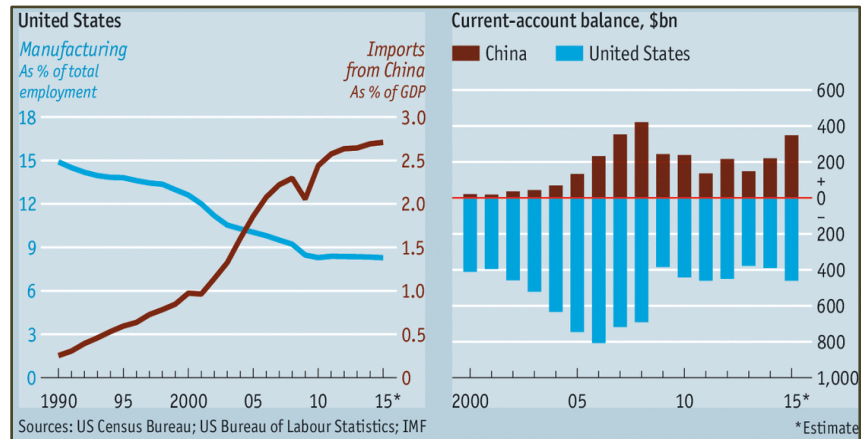
This combination of slightly pricier land and much cheaper labour restores the modus vivendi between the two industries, halting the watchmakers' contraction and the wheat-farmers' expansion. Because the farmers need more land than labour, slightly higher rents deter them as forcefully as much lower wages attract them. The combination also restores the profits of the watchmakers, because the much cheaper labour helps them more than the slightly pricier land hurts them [6].

The upshot is that wages have fallen by more than watch prices, and rents have actually risen. It follows that workers are unambiguously worse off. Their versatility will not save them. Nor does it matter what mix of watches and wheat they buy [6].

Stolper, Samuelson and their successors subsequently extended the theorem to more complicated cases, albeit with some loss of crispness. One popular variation is to split labour into two—skilled and unskilled. That kind of distinction helps shed light on what Stolper later witnessed in Nigeria, where educated workers were vanishingly rare. With a 90% tariff, Kaduna Textile Mills could afford to

train local foremen and hire technicians. Without it, Nigeria would probably have imported textiles from Lancashire instead. Free trade would thus have hurt the “scarce” factor [6].

In rich countries, skilled workers are abundant by international standards and unskilled workers are scarce. As globalisation has advanced, college-educated workers have enjoyed faster wage gains than their less educated countrymen, many of whom have suffered stagnant real earnings. On the face of it, this wage pattern is consistent with the Stolper-Samuelson theorem. Globalisation has hurt the scarce “factor” (unskilled labour) and helped the abundant one [6].



But look closer and puzzles remain. The theorem is unable to explain why skilled workers have prospered even in developing countries, where they are not abundant. Its assumption that every country makes everything—both watches and wheat—may also overstate trade’s dangers. In reality, countries will import some things they no longer produce and others they never made. Imports cannot hurt a local industry that never existed (nor keep hurting an industry that is already dead) [6].

Some of the theorem’s other premises are also questionable. Its assumption that workers will move from one industry to another can blind it to the true source of their hardship. Chinese imports have not squeezed US manufacturing workers into less labour-intensive industries; they have squeezed them out of the labour force altogether, according to David Autor of the Massachusetts Institute of Technology and his co-authors. The “China shock”, they point out, was concentrated in a few hard-hit manufacturing localities from which workers struggled to escape. Thanks to globalisation, goods now move easily across borders. But workers move uneasily even within them [6].

Trade and wages, revisited

In 2008, Paul Krugman, a leading trade economist (and *New York Times* columnist), began a presentation of a study of trade and wages at the Brookings Institution as follows⁶: “This paper is the manifestation of a guilty conscience.” Mr Krugman (1995)⁷ concluded that trade with poor countries played only a small role in the US’s rising wage inequality, explaining one-tenth of the widening skilled-unskilled labour income gap during the 1980s. Mr Krugman’s paper convinced economists that trade was a bit-part player in causing inequality, but several studies in the mid-1990s had similar findings. Other factors, particularly technological innovation favouring the skilled, were more important [5].

For a long time, the theory appeared to be right because the empirical consensus supported it. After the Second World War, rich countries mostly traded with each other, and workers prospered. Even as emerging economies had a larger role in global trade, in the 1980s, most research concluded that trade’s effects on workers were benign. However, China’s incorporation into the global economy was of a different magnitude. From 1991 to 2013 its share of global exports of manufactured goods rocketed from 2.3% to 18.8% (see charts on imports and current-account

balance). For some categories of goods in the US, Chinese import penetration—the share of domestic consumption met through Chinese imports—was near total [3].

Krugman’s reversal was a surprise, but the issue had returned in the 2000s. Opinion polls suggested that Americans became increasingly convinced that globalisation harms ordinary workers, and in the two decades from 2016, working-class voters in many countries have been leery of it. Economists still tend to argue that trade does far more good than harm, but new research reveals that for many, the short-term costs and benefits are more finely balanced than textbooks assume [5][3].

As a commentator, Mr Krugman had become more sceptical. “It’s no longer safe to assert that trade’s impact on the income distribution in wealthy countries is fairly minor,” he wrote on the *VoxEU* blog. “There’s a good case that it is big and getting bigger.” He offered two reasons why. First, more of the US’s trade is with poor countries, such as China. Second, the growing fragmentation of production means more tasks have become tradable, increasing the universe of labour-intensive jobs in which Chinese workers compete with Americans [5].

Krugman’s 2008 paper set out to substantiate these assertions. Certainly, US trade patterns have changed. Poor countries’ share of commerce in manufactured goods has doubled. In contrast to the 1980s, the average wage of the US’s top-ten trading partners has fallen since 1990. All of which could increase trade’s impact on wage inequality [5].

The issue is by how much. If one simply updated the approach used in Mr Krugman’s 1995 paper taking into account more recent trade patterns, one finds that the effect on wages has increased. Josh Bivens⁸ of the Economic Policy Institute, a Washington, DC, think-tank, did just that and found that trade widened wage inequality between skilled and unskilled workers by 6.9% in 2006 and 4.8% in 1995. Nevertheless, even with that increase, trade is still far from being the main cause of wage inequality. Lawrence Katz, a Harvard economist who discussed Mr Krugman’s paper at Brookings, estimated that, using Mr Bivens’s approach, trade with poor countries can account for about 15% of the growth in the wage gap between skilled and unskilled workers since 1979 [5].

Even this is likely an overstatement. Imports from China have moved up-market from easy-to-produce products (footwear) to more sophisticated goods (computers and electronics). Hence, to use economists’ jargon, the “factor content” of US imports—in effect, the amount of skilled labour they contain—has not shifted downwards. Mr Katz

⁶ “Trade and Wages, Reconsidered”, P. Krugman, Brookings Papers on Economic Activity, 2008.

⁷ “Growing World Trade: Causes and Consequences”, P. Krugman, Brookings Papers on Economic Activity, 1995.

⁸ J. Bivens, “Globalisation, American Wages and Inequality”, EPI Working Paper 279, 2007.

says factor-based models suggest trade with poor countries explained only 5% of rising income inequality [5].

Mr Krugman argues that the effect is bigger, but that import statistics are too coarse to capture it. Thanks to the fragmentation of production, Chinese workers are doing the low-skill parts of producing computers. Just because computers from China are classified as skill-intensive in US import data, it does not prevent them from hurting less-skilled US workers. Mr Krugman may be right but, as he admits, it is hard to prove [5].

Robert Lawrence (2008)⁹, also at Harvard, looked at the same evidence and reached rather different conclusions. He pointed out that the contours of US inequality sit ill with the idea that trade with poor countries is to blame. If income were measured properly, the gap between white- and blue-collar workers has not risen that much since the late 1990s when China's global integration accelerated. The wages of the least skilled have improved relative to those in the middle. Some types of inequality have increased, notably the share of income going to the very richest, but there is little sign that wage inequality has behaved as traditional trade theory might suggest [5].

Mr Lawrence offers two reasons why. One possibility is that the US no longer makes some of the low-skilled, labour-intensive goods that it imports. In those goods, there are no domestic workers to lose out to foreign competition. Second, even when the US does produce something that is imported from China, it can be made in a different way, with more machinery and only a few high-skilled workers. If imports from China and other poor countries compete with more-skilled US workers, they may displace workers without widening wage inequality [5].

The lack of detailed statistics means none of these studies settles the debate. Globalisation might be becoming a bigger cause of US wage inequality, but contrary to the tone of the political debate, and the thrust of Mr Krugman's commentary, the evidence is inconclusive. "How can we quantify the actual effect of rising trade on wages?" Mr Krugman asked at the end of his paper. "The answer, given the current state of the data, is that we can't" [5].

US-China trade and US manufacturing employment

David Autor of MIT, David Dorn of the University of Zurich and Gordon Hanson of the University of California, San Diego, provide evidence that workers in the rich world suffered much more from the rise of China than economists thought was possible. In their 2016 study¹⁰, they write that sudden exposure to foreign competition can depress wages and employment for at least a decade [3].

The gain to China from this opening up has been enormous. Average real income rose from 4% of the US level in 1990 to 25% in 2016. Hundreds of millions of Chinese have moved out of poverty thanks to trade [3].

Another study¹¹ suggests that the US benefits too: over the long run, trade with China is projected to raise US incomes. In parts of the economy less susceptible to competition from cheap Chinese imports, the authors argue, firms profit from a larger global market and reduced supply costs, and should also gain—eventually—from the

reallocation of labour away from shrinking manufacturing to more productive industries [3].

Those benefits, however, are only visible after decades. In the short run, the same study found, that the US's gains from trade with China are minuscule. The heavy costs to those dependent on industries exposed to Chinese imports offset most of the benefits to consumers and to firms in less vulnerable industries. Economists' assumption that workers would easily adjust to the upheaval of trade seems to have been misplaced. Manufacturing activity tends to be geographically concentrated. So, the disruption caused by Chinese imports was similarly concentrated, in hubs such as the US's Midwest. The competitive blow to manufacturers rippled through regional economies, write Messrs Autor, Dorn and Hanson, battering suppliers and local service industries. Such places lacked growing industries to absorb displaced workers, and the unemployed proved reluctant (or unable) to move to more prosperous regions. Labour-market adjustment to Chinese trade was thus slower and less complete than expected [3].

As a result, the authors found (2013)¹² that competition from Chinese imports explains 44% of the decline in US manufacturing employment between 1990 and 2007. For any given industry, an increase in Chinese imports of \$1,000 per worker per year led to a total reduction in annual income of about \$500 per worker in the places where that industry was concentrated. The offsetting rise in government benefits was only \$58 per worker. In a paper from 2014, co-written with Daron Acemoglu and Brendan Price, of MIT, the authors calculate that Chinese import competition reduced employment across the US economy as a whole by 2.4m jobs relative to the level it otherwise would have enjoyed¹³ [3].

The costs of Chinese trade seem to have been exacerbated by China's large current-account surpluses (see right-hand side of chart): China's imports from other countries did not grow by nearly as much as its exports to other countries. China's trade with the US was especially unbalanced, importing far less than the US did from China. Between 1992 and 2008, trade with China accounted for 20-40% of the US's massive current-account deficit [3].

It's all comparative, but the model needs revising

Traditional trade theory, based on the ideas of David Ricardo, a 19th-century economist, is under challenge. Rich countries have democratic governments, so continued support for globalisation depends on how prosperous the average worker feels. Yet, in 2006, workers' share of the cake in rich countries was the smallest it had been for at least three decades (see chart, wages). In many countries, average real wages were flat or even falling [7].

If GDP per person is growing fairly briskly, how can most workers be missing out on real pay rises? Partly because a bigger share went to profits, and partly because high earners pocketed a huge slice of the gains in income, causing inequality to widen. The top 1% of US earners receive 16% of all income, up from 8% in 1980. Wage inequality in Europe and Japan also increased, but not by as much [7].

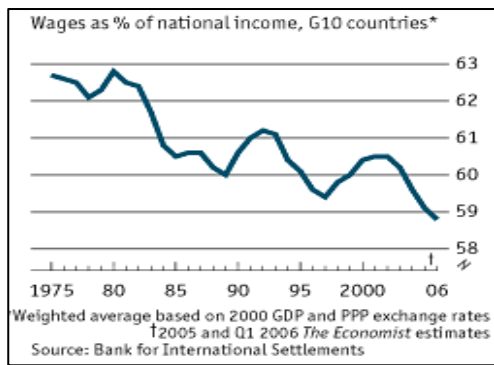
⁹ Lawrence, R. Z., *Blue Collar Blues: Is Trade to Blame for Rising US Income Inequality?*, Peterson Institute for International Economics, Jan. 2008.

¹⁰ D. Autor, D. Dorn and G. Hanson, "The China shock: Learning from labour market adjustments to large changes in trade", NBER Working Paper 21906, 2016.

¹¹ L. Caliendo, M. Dvorkin and F. Parro, "The impact of trade on labour market dynamics", NBER Working Paper, 21149, 2015.

¹² D. Autor, D. Dorn and G. Hanson, "The China syndrome: Local labour market effects of import competition in the United States", *American Economic Review*, 2013.

¹³ D. Acemoglu, D. Autor, D. Dorn and G. Hanson and B. Price, "Import competition and the great US employment sag of the 2000s", NBER Working Paper 20395, 2014.



Meanwhile, capitalists have rarely had it so good. In the US, Japan and the euro area, profits as a share of GDP were at or near all-time highs (see chart, corporate profits). The US corporate sector alone increased its share of national income from 7% in mid-2001 to 13% in 2006 [7].



Richard Freeman, an economist at Harvard University, points to several reasons why the traditional theory needs modifying. First, the sheer size of the emerging giants' labour forces shifted the global capital-labour ratio (which determines the relative rewards of workers to capital) massively against workers as a group. China, India and the former Soviet Union's entry into market capitalism in effect doubled the world supply of workers, from 1.5 to 3 billion. These new entrants brought little capital with them, so the global capital-labour ratio dropped sharply. According to economic theory, this should reduce the relative price of labour and raise the global return to capital—exactly what has happened [7].

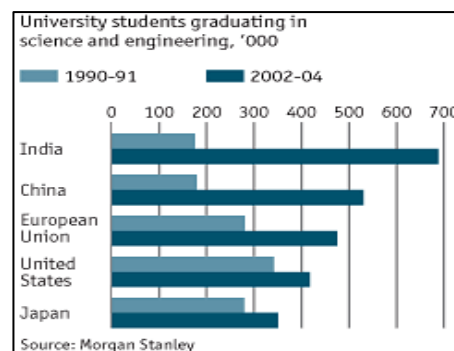
Over time, competition should reduce profit margins and distribute benefits back to consumers and workers in the form of lower prices. However, downward pressure on wages in rich countries could continue for a long time. China still has perhaps 200m underemployed rural workers who could move to factories until the mid-2020s, so wages for low-skilled workers are rising more slowly than productivity, reducing China's unit labour costs (see chart, wage costs [10]) [7].



Over the long term, real wages tend to track average productivity growth, but since the 1990s, workers' real pay in many developed economies also increased more slowly than labour productivity. The real weekly wage of a typical US worker in the middle of the income distribution has

fallen by 4% since the start of the recovery in 2001. Over the same period, labour productivity rose by 15%. Even after allowing for health and pension benefits, total compensation rose by only 1.5% in real terms. Real wages in Germany and Japan were also flat or falling. Thus, the usual argument in favour of globalisation—that it will make most workers better off, with only a few low-skilled ones losing out—is not being borne out by the facts. Most workers are being squeezed [7].

A second reason why the traditional trade model needs modifying has to do with a rise in emerging countries' skill levels. The model's construct was such that only rich countries had educated workforces able to produce skill-intensive goods. Poor countries having invested heavily in education can now compete in more sophisticated markets. Every year, 1.2m engineers and scientists graduate from Chinese and Indian universities, as many as in the US, the EU and Japan combined and three times the number ten years ago (see chart, university grads). In 1970, the US accounted for 30% of all university enrolments worldwide; that share is now at around 12%. Thus, there has been a big increase in the global supply of educated as well as unskilled workers [7].



Third, there is a flaw in the traditional trade model, says Mr Freeman. The assumption is that rich countries would make high-tech products and developing economies low-tech ones. In fact, rich countries no longer have a monopoly on high-tech capital and know-how. The OECD says that in 2004 China overtook the US as the world's leading exporter of information-technology goods. This exaggerates China's move up the ladder: laptop computers, mobile phones and DVD players are no longer cutting-edge technology, and they are typically only assembled in China by foreign firms, with most of their high-value components being imported. Even so, the faster spread of technology to poor countries is weakening the rich world's comparative advantage in high-tech sectors. As emerging economies start to export high-tech goods and services, this reduces the prices of such products in world markets, and hence the wages of skilled workers in the developed world [7].

Mobile factors

Societies everywhere are becoming more concerned that globalisation in its many forms (movement of labour and capital and trade in services as well as in goods) may be to blame for a broader majority of workers losing out. However, the fears in advanced economies about emerging economies focus on lost jobs to low-cost foreign competitors, but the real threat is to wages, not jobs. Eventually, job losses in manufacturing should be offset by new jobs elsewhere so long as labour markets are flexible. In contrast, trade with emerging economies can have a big impact on both average and relative wages. In the longer run, trade and offshoring (i.e., moving manufacturing and production facilities abroad) should have little effect on total employment in rich countries; rather, they will change its composition [7].

In addition to the shift in global capital-to-labour ratios, globalisation has lifted profits relative to wages in several ways other ways. First, it is no longer just dirty, blue-collar jobs in manufacturing that are being sucked offshore (with or without foreign investment abroad) but also white-collar service jobs, which used to be considered safe from foreign competition. Telecoms charges have tumbled, allowing workers in far-flung locations to be connected cheaply to customers in the developed world. This has made it possible to offshore services that were once non-tradable. Morgan Stanley's Mr Roach has drawn attention to the fact that the "global labour arbitrage" is moving rapidly to the better kinds of jobs. It is no longer just basic data processing and call centres that are outsourced to low-wage countries, but also software programming, engineering design, medical diagnostics, accounting, finance and business consulting, and law. These can be delivered electronically from anywhere in the world, exposing skilled white-collar workers to greater competition [7].

Second, employers' ability to shift production, whether or not they take advantage of it, has curbed the bargaining power of workers in rich countries. In Germany in the early 2000s, for example, several big firms negotiated pay cuts with their workers to avoid offshoring, i.e., moving production to central Europe. Third, increased immigration has depressed wages in sectors such as catering, farming and construction [7].

The standard retort to such arguments is that outsourcing abroad is too small to matter much. Fewer than 1m US service-sector jobs have been lost to offshoring. Forrester Research forecasts that by 2015, a total of 3.4m jobs in services will have moved abroad, but that is tiny compared with the 30m jobs destroyed and created in the US every year. The trouble is that such studies allow only for the sorts of jobs that are already being offshored, when in reality the proportion of jobs that can be moved will rise as IT advances and education improves in emerging economies [7].

Alan Blinder at Princeton University believes that most economists are underestimating the disruptive effects of offshoring, and that in future two to three times as many service jobs will be susceptible to offshoring as in manufacturing. This would imply that at least 30% of all jobs might be at risk. In practice, the number of jobs offshored to China or India is likely to remain modest, but the mere threat that they could be can depress wages [7].

Moreover, says Mr Blinder, education offers no protection. Highly skilled accountants, radiologists or computer programmers now have to compete with electronically delivered competition from abroad, whereas humble taxi drivers, janitors and crane operators remain safe from offshoring. This may help to explain why the real median wage of US graduates has fallen by 6% since 2000, a bigger decline than in average wages [7].

In the 1980s and early 1990s, the pay gap between low-paid, low-skilled workers and high-paid, high-skilled workers widened significantly. However, since then according to a study by David Autor, Lawrence Katz and Melissa Kearney, in the US, UK and Germany workers at the bottom as well as at the top have done better than those in the middle-income group. Office cleaning cannot be done by workers in India. It is the easily standardised skilled jobs in the middle, such as accounting, that are now being squeezed hardest. A study by Bradford Jensen and Lori Kletzer, at the Institute for International Economics in Washington, DC, confirms that workers in tradable services that are exposed to foreign competition tend to be more skilled than workers in non-tradable services and tradable manufacturing industries [7].

None of this makes a case for protectionism. Offshoring, like trade, is beneficial to developed economies as a whole. The increased mobility of capital and technology does not invalidate the theory of comparative advantage, as some commentators like to argue. China and India cannot have a comparative advantage in everything; they will export some things and import others. Emerging economies' comparative advantage will largely remain in labour-intensive industries. A country's trading pattern is determined by its relative capital intensity compared with other economies. Emerging economies still have relatively little capital, so they are unlikely to become significant capital-intensive exporters until their capital-to-labour ratio catches up. That will take time. Developed economies will retain their comparative advantage in knowledge-intensive activities because they have relatively more skilled labour, but that advantage will be eroded more quickly in future [7].

Developed economies still benefit hugely from trade with emerging economies. Increased competition and greater economies of scale boost the growth in productivity and output. Consumers enjoy lower prices and a greater variety of products, and shareholders enjoy higher returns on capital. Although workers will continue to see their pay squeezed, they can still gain as consumers or as shareholders, either directly or through their pensions. The snag is that richer people own more shares, so the increased return on capital tends to reinforce income inequality [7].

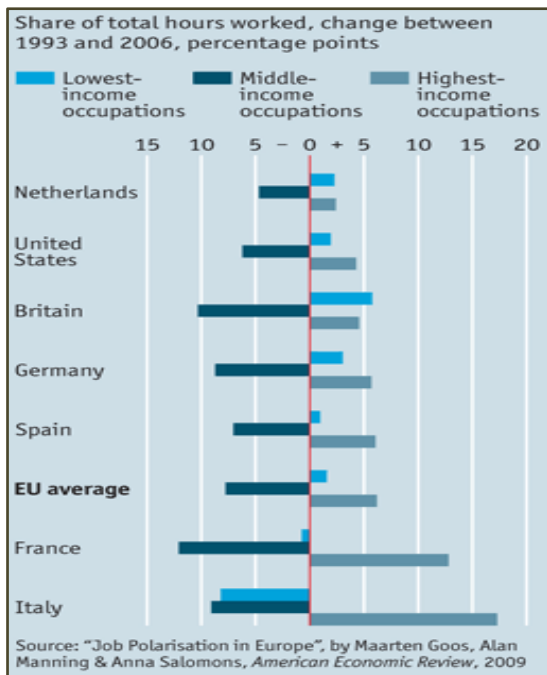
The fact that many workers seem excluded from the spoils of globalisation is a big challenge to orthodox economics. Many of its practitioners refuse to come clean about the costs to workers of trade with emerging economies for fear of handing ammunition to protectionists. At the same time, protectionists exaggerate those costs and ignore the benefits. It is time for a more honest debate about trade [7].

It is often argued that generous social-insurance and redistribution policies are inconsistent with globalisation because in an open world governments cannot raise taxes and spending in isolation. If real wages continue to stagnate and no compensation is forthcoming, political support for globalisation may fade and the vast gains from the biggest economic stimulus in world history would be lost [7]. ♦

Technology: hollowing out of labour markets

The difficulty of programming a robot to fold a towel and outdo a human can help explain why the past couple of decades have been so unkind to middle-class workers in the rich world. In the 1970s and 1980s employment in middle-skilled, middle-income occupations—salespeople, machine operators, factory supervisors, secretaries, and bank clerks—grew faster than that in lower-skilled jobs. In the early 1990s, something changed. Labour markets across the rich countries shifted from a world where people's job and wage prospects were directly related to their skill levels. Instead, with few exceptions, middle-class employment began to decline as a share of the total while the share of both low- and high-skilled jobs rose (see chart, hours worked). The pattern was similar in countries with very different levels of unionisation, prevalence of collective bargaining and welfare systems. This "polarisation" of employment almost certainly had a common cause [8].

The development of information technology (IT) is the leading candidate. Computers do not directly compete with the abstract, analytical tasks that many high-skilled workers do, but aid their productivity by speeding up the more routine bits of their jobs. They do directly affect the need for people like assembly-line workers or those doing certain clerical tasks, whose jobs can be reduced to a set of instructions, which a machine can easily follow (and which can consequently be mechanised). At the other end of the



employment spectrum, as the example of the towel-folding robot neatly demonstrates, low-skilled jobs may not require much education, but they are hard to mechanise [8].

Clear evidence in favour of this hypothesis comes from a study¹⁴ by Acemoglu and Autor who used data from the US Department of Labor on the tasks involved in different occupations. By classifying these tasks as routine or non-routine, the authors were able to grade occupations as more or less vulnerable to automation. This method identified the jobs of secretaries, bank tellers and payroll clerks as among those most dominated by routine tasks. (Bus drivers and firefighters are among those at the opposite end of the spectrum.) They found that employment polarisation in the US between 1980 and 2005 was indeed most marked where jobs vulnerable to automation initially predominated [8].

Similar patterns of job polarisation were documented in the UK and other European countries, but there was no clear cross-country evidence about the importance of IT in explaining them. Filling this gap is a study by Guy Michaels, Ashwini Natraj and John Van Reenen of the London School of Economics (LSE)¹⁵, which uses industry-level data from 11 countries—nine European ones, plus Japan and the US—during 1980 and 2004. Across the board, the economists find that industries that adopted IT at faster rates (as measured by their IT spending, as well as their spending on research and development) also saw the fastest growth in demand for the most educated workers, and the sharpest declines in demand for people with intermediate levels of education [8].

Once the role of technology is accounted for, openness to trade has no effect on the extent of polarisation. However, the adoption of IT might itself be a function of globalisation. Nicholas Bloom, Stanford University, and Mirko Draca, and Van Reenen, LSE, looked at rates of IT adoption within Europe¹⁶. They conclude that industries that faced more direct competition from Chinese imports after China entered the World Trade Organisation responded by innovating more to move up the value chain.

¹⁴ D. Acemoglu and D. Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings" in *Handbook of Labor Economics*, Vol. 4, O. Ashenfelter and D.E. Cards (eds.).
¹⁵ G. Michaels, A. Natraj, and J. Van Reenen, "Has ICT Polarized Skill Demand? Evidence from 11 Countries over 25 Years", NBER Working Paper No. 16138, June 2010.

During 2000-07, 15% of Europe's technology upgrade is explained as a response to Chinese competition [8].

This helped European productivity but, given the effects of technology on employment, contributed to the hollowing out of the labour market. Technology also enables some higher-end jobs to move to countries with large pools of highly educated workers. Mr Autor¹⁷ reckons that this is not yet a major factor explaining trends in US employment and wages, but it could become one over time, again altering the relationship between skills and job opportunities [8].

Recession has exacerbated polarisation. In 2007-09, US blue- and white-collar jobs, dominated by the middle-skilled, were shed rapidly. Employment in managerial and professional jobs and low-skilled service sectors grew slightly or fell much less sharply. The US Bureau of Labor Statistics predicts that employment in low-skilled service occupations will increase by 4.1m (14%) during 2008-18. The only major job category with greater projected growth is professional occupations, which are predicted to add 5.2m jobs (17%) over the same period [8].

In the 20th century, job prospects rose with additional education, but job choices, like the labour market, are becoming more polarised. Policymakers trying to get more people to complete school may not be enough. Because school education alone increasingly means declining job options, young people need to go through college, too [8].

Productivity and Wages

The brutal years of the 1930s were followed by the most extraordinary economic boom in history. A generation ago economists had nearly abandoned hope of ever matching the post-war performance when a computer-powered productivity explosion took place. In the 2020s there are tantalising hints that the economic and social traumas of the first two decades of this century may soon give way to a new period of economic dynamism [13].

Productivity is the magic elixir of economic growth. Increases in the size of the labour force or the stock of capital can raise output, but the effect of such contributions diminishes unless better ways are found to make use of those resources. Productivity growth—wringing more output from available resources—is the ultimate source of long-run increases in incomes. It's not everything, as Paul Krugman, a Nobel economics laureate, once noted, but in the long run it's almost everything [13].

Economists know less about how to boost productivity than they would like, however. Increases in labour productivity (that is, more output per worker per hour) seem to follow improvements in educational levels, increases in investment (which raise the level of capital per worker), and adoption of new innovations. A rise in total factor productivity—or the efficiency with which an economy uses its productive inputs—may require the discovery of new ways of producing goods and services, or the reallocation of scarce resources from low-productivity firms and places to high-productivity ones [13].

¹⁶ N. Bloom, M. Draca and J. van Reenen, "Trade-induced technical change: The impact of Chinese imports on innovation and information technology", LSE Working Paper, Jun 2010.
¹⁷ D. Autor, "The polarization of Job Opportunities in the US Labor Market: Implications for Employment and Earnings", Center for American Progress and The Hamilton Project, Apr 2010.

Globally, productivity growth decelerated sharply in the 1970s from scorchingly high rates in the post-war decades. A burst of higher productivity growth in the rich world, led by America, unfolded from the mid-1990s into the early 2000s. Emerging markets, too, enjoyed rapid productivity growth in the decade prior to the GFC, powered by high levels of investment and an expansion of trade which brought more sophisticated techniques and technologies to the developing-economy participants in global supply chains. Since the crisis, however, a broad-based and stubbornly persistent slowdown in productivity growth has set in (see chart, productivity). About 70% of the world's economies have been affected, according to the World Bank [13].



Accounting for the slowdown is a fraught process. The World Bank reckons that slowing trade growth and fewer opportunities to adopt and adapt new technology from richer countries may have helped depress productivity advances in the emerging world. Across all economies, sluggish investment in the aftermath of the GFC looks a culprit: a particular problem in places with ageing and shrinking workforces. Yet while these headwinds surely matter, the bigger question is why new technologies like improved robotics, cloud computing and artificial intelligence have not prompted more investment and higher productivity growth [13].

Broadly speaking, three hypotheses compete to explain these doldrums. One, voiced by the techno-pessimists, insists that for all the enthusiasm about world-changing technologies, recent innovations are simply not as transformative as the optimists insist. Though it is possible that this will turn out to be correct, continued technological progress makes it look ever less plausible as an explanation for the doldrums. AI may not have transformed the world economy at the dramatically disruptive pace some expected five to ten years ago, but it has become significantly, and in some cases startlingly, more capable. GPR-3, a language-prediction model developed by OpenAI, a research firm, has demonstrated a remarkable ability to carry on conversations, draft long texts and write code in surprisingly human-like fashion [13].

Though the potential of the web to support an economy in which the constraints of distance do not bind has long underwhelmed, cloud computing and video-conferencing proved their economic worth over the past year, enabling vast amounts of productive activity to continue with scarcely an interruption despite the shuttering of many offices. New technologies are clearly able to do more than has generally been asked of them in recent years [13].

That strengthens the case for a second explanation for slow productivity growth: chronically weak demand. In this view, expressed most vociferously by Larry Summers of Harvard University, governments' inability to stoke enough spending constrains investment and growth. More public investment is needed to unlock the economy's potential. Chronically low rates of interest and inflation, limp private

investment and lacklustre wage growth since the turn of the millennium clearly indicate that demand has been inadequate for most of the past two decades. Whether this meaningfully undercuts productivity growth is difficult to say. But in the years before the pandemic, as unemployment fell and wage growth ticked up, US labour productivity growth appeared to be accelerating, from an annual increase of just 0.3% in 2016 to a rise of 1.7% in 2019: the fastest pace of growth since 2010 [13].

But a third explanation provides the strongest case for optimism: it takes time to work out how to use new technologies effectively. AI is an example of what economists call a "general-purpose technology", like electricity, which has the potential to boost productivity across many industries. But making best use of such technologies takes time and experimentation. This accumulation of know-how is really an investment in "intangible capital" [13].

Recent work by Erik Brynjolfsson and Daniel Rock, of MIT, and Chad Syverson, of the University of Chicago, argues that this pattern leads to a phenomenon they call the "productivity J-curve". As new technologies are first adopted, firms shift resources towards investment in intangibles: developing new business processes. This shift in resources means that firm output suffers in a way that cannot be fully explained by shifts in the measured use of labour and tangible capital, and which is thus interpreted as a decline in productivity growth. Later, as intangible investments bear fruit, measured productivity surges because output rockets upward in a manner unexplained by measured inputs of labour and tangible capital [13].

Back in 2010, the failure to account for intangible investment in software made little difference to the productivity numbers, the authors reckon. But productivity has increasingly been understated; by the end of 2016, productivity growth was probably about 0.9 percentage points higher than official estimates suggested [13].

This pattern has occurred before. In 1987 Robert Solow, another Nobel prizewinner, remarked that computers could be seen everywhere except the productivity statistics. Nine years later US productivity growth began an acceleration which evoked the golden age of the 1950s and 1960s. These processes are not always sexy. In the late 1990s, the soaring share prices of internet startups hogged the headlines. The fillip to productivity growth had other sources, like improvements in manufacturing techniques, better inventory management and rationalisation of logistics and production processes made possible by the digitisation of firm records and the deployment of clever software [13].

Early evidence suggests that some transformations are very likely to stick, and that the pandemic quickened the pace of technology adoption. A survey of global firms conducted by the World Economic Forum this year found that more than 80% of employers intend to accelerate plans to digitise their processes and provide more opportunities for remote work, while 50% plan to accelerate automation of production tasks. About 43% expect changes like these to generate a net reduction in their workforces: a development which could pose labour-market challenges but which (almost by definition implies improvements in productivity) [13].

The J-curve provides a way to reconcile tech optimism and adoption of new technologies with lousy productivity statistics. The role of intangible investments in unlocking the potential of new technologies may also mean that the pandemic, despite its economic damage, has made a productivity boom more likely to develop [13].

Economist, Free exchange, “Cost conscious”, 22 Jun 2019, p. 61.

Productivity and wages in general equilibrium

Since 1950 the real cost of new vehicles has fallen by half, that of new clothing by 75% and that of household appliances by 90%, even as quality has gotten better. Tumbling prices reflect decades of improvements in technology and productivity. But the effect is not economy-wide. Cars are cheaper, but car maintenance is more expensive, and costs in education and health care have risen roughly fivefold since 1950.

There are many explanations for the ballooning cost of services, but the long-run, steady rise in such prices relative to those in the economy is not simply explained by the common scapegoats. In “Why are the prices so damn high?” Eric Helland of Claremont McKenna College and Alex Tabarrok of George Mason University write that quality has improved far too little to account for it. Excessive administrative costs is not the answer either. In the US the share of all education spending that goes on administration has been roughly steady for decades. Health-care spending has risen faster than GDP in rich countries, despite the vast differences in the structure of their health-care systems.

The real culprit, they write, is the steady increase in the cost of labour – of teachers and doctors. That in turn reflects the relentless logic of Baumol’s cost disease, named after William Baumol, who first described the phenomenon. Productivity grows at different rates in different sectors. It takes far fewer people to make a care than it used to – where thousands of workers once filled plants, highly paid engineers now oversee factories full of robots – but roughly the same number of teachers to instruct a schoolful of children. Economists reckon that workers’ wages should vary with their productivity. But the real pay has grown in high- and low-productivity industries alike. That, Baumol pointed out, is because teachers and engineers compete in the same labour market. As salaries for automotive engineers rise, more students study engineering and fewer become teachers, unless teachers’ pay also goes up. The cost of education has risen because the rising pay needed to filling teaching posts. Other factors matter too, can explain, for instance, why Americans pay more than Europeans for health care and higher education. But across countries, none is as important as the toll exacted by cost disease.

Baumol’s earliest work on the subject, written with William Bowen, was published in 1965. Messrs Helland and Tabarrok’s work feels novel because the implications of cost disease remain unappreciated in policy circles. For instance, the steadily rising expense of education and health care is almost universally deplored as an economic scourge, despite being caused by something indubitably good: rapid, if unevenly spread, productivity growth. Higher prices, if driven by cost disease, need not mean reduced affordability, since they reflect greater productive capacity elsewhere in the economy. The authors use an analogy: as a person’s salary increases, the cost of doing things other than work – like gardening, for example, rises, since each hour off the job means more forgone income. But that does not mean that time spent gardening has become less affordable.

Boosting the supply of labour by increasing immigration could depress costs in both high-productivity sectors and in low-productivity ones. But the cost of education in terms of cars would remain eye-watering. Innovation in stagnant sectors, while welcome, would shift the problem of cost disease elsewhere. A burst of productivity growth in education – because of improved online instruction, say – should contribute to a decline in the price of education per student. But because a given instructor could serve many more students than before, teachers’ potential income would rise, luring some would-be doctors away from the study of medicine and exacerbating the problem of cost disease in health care. A productivity boom in health care might shunt the cost disease to dentistry, or child care, or veterinary medicine.

The only true solution to cost disease is an economy-wide productivity slowdown – an one may be in the offing. Technological progress pushes employment into the sectors mores resistant to productivity growth. Technological progress pushes employment into sectors most resistant to productivity growth. Eventually, nearly everyone may have jobs that are valued for their inefficiency, e.g., concert musicians, or artisanal cheesemakers, or members of the household staff of the very rich. If there is no high-productivity sector to lure such workers away, then the problem does not arise.

These possibilities reveal the real threat from Baumol’s disease: not that work will flow toward less-productive industries, which is inevitable, but that gains from rising productivity are unevenly shared. Low income workers must still pay higher prices for essential services such as health care.

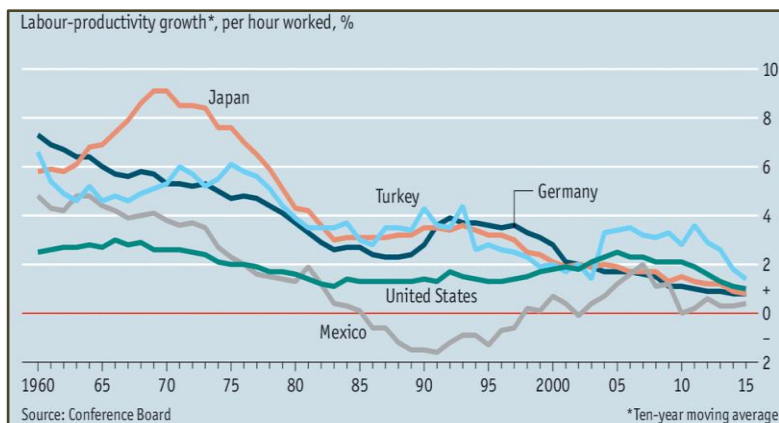
Low wages cause and are a result of low productivity

Countries grow richer when they learn how to produce more valuable stuff per person. Sadly, many advanced economies seem to have lost the knack. Except for a brief spurt around the turn of the millennium, productivity has grown painfully slowly in rich countries over the last four decades (see chart, labour-productivity growth)—a factor, economists reckon, that has contributed to stagnant pay. Labour productivity in the US fell at a startling 2.2% annual pace in the fourth quarter of 2015; growth of 0.6% for the year as a whole was better, but hardly impressive [9].

Orthodox explanations for the problem fall into one of three categories. The first, championed by Robert Gordon at Northwestern University, suggests humanity has run out of big ideas¹⁸. Recent technological advances, the argument goes, lack the transformative power of the inventions of the

19th and early 20th centuries. Electricity and indoor plumbing altered lives in a far more fundamental way than the digital revolution has managed. However, this story has several inconsistencies. Developments in artificial intelligence and robotics seem as transformative as the gains in software and computing that powered the productivity boom of the late 1990s. The breadth of the productivity slowdown also weakens Mr Gordon’s thesis. Productivity growth has slumped not just in the rich world, but also in developing countries such as Mexico and Turkey, which should be able to boost efficiency easily by adopting existing productivity-boosting technology [9].

¹⁸ R. Gordon, “The Rise and Fall of American Growth: The US Standard of Living since the Civil War”, 2016.



Optimists argue instead that the issue is a measurement problem. Technological progress often raises productivity in ways that statistical agencies struggle to detect. The tumbling cost of digital media (vast amounts of which are in effect free) subtracts from measured GDP. Measuring improvements in the quality of goods like smartphones can be difficult to capture. Mismeasurement probably plays only a small role in the slowdown. Chad Syverson of the University of Chicago estimates the US productivity slump amounted to \$2.7 trillion in lost output since 2004, or about \$8,400 for every American¹⁹. This was far more than most estimates of the unmeasured gains from information technology. David Byrne and John Fernald of the Federal Reserve and Marshall Reinsdorf of the IMF suggests there is little reason to think that official data are worse now than in the 1990s when measured productivity growth was much higher²⁰ [9].

Third is that ossifying rich economies are worse at shifting people from obsolete firms and stagnant towns to more productive ones. For instance, the rate of US startup formation has fallen steadily since the late 1980s, according to Jorge Guzman and Scott Stern of MIT²¹. The US economy produces plenty of the right sort of firms, with lots of growth potential; however, fewer of those firms grow big. A few, high-growth startups account for most new private-sector jobs. Since 2000, the US's high-growth firms have not expanded much faster than their plodding peers. Weak competitive pressures could be to blame. Profitable firms are increasingly likely to bank their earnings than to plough them back into the business²². Regulation may also be a problem. Guzman and Stern find that entrepreneurial potential in some places, such as San Francisco and surroundings is far larger than in others, such as Detroit. Restrictions on construction constrain the movement of people from stagnant to dynamic places. Chang-Tai Hsieh of the University of Chicago and Enrico Moretti of the University of California, Berkeley,²³ suggested that if it were easier to build in and around San Francisco, and thus cheaper to live there, employment in the area could rise by more than 500%, while many cities in the Rust Belt could all but vanish [9].

Orthodox economics suggests plenty of ways to nurture productivity growth—and wages—such as supporting research and cutting red tape. Some in the profession are also beginning to ask whether the link between low productivity and low wages may run in both directions. Low pay allows firms to employ workers profitably in marginal jobs and to continue to use workers even though

robots or software could replace them. Investments in automated checkout machines, for example, are less attractive when there are lots of cheap humans around [9].

João Paulo Pessoa and John Van Reenen of the London School of Economics, reckon low UK wages, which fell during the Great Recession, help account for weak productivity growth during the subsequent recovery, since firms felt less pressure to economise²⁴. Similarly, abundant, cheap labour may help explain how the US economy managed to produce the unusual combination of soaring

employment and weak wage growth in the last years. By allowing economies to operate with lots of labour-market slack and by relying on falling pay to boost competitiveness, governments have enabled firms to make careless use of low-wage labour. By prioritising a return to full employment, politicians could give a much-needed kick to both wages and productivity [9].

Competition in SE Asia with rising costs in China

The textile trade is as footloose as its customers are fickle. It goes wherever clothes can be made cheaply and reliably. Until recently, that meant China. As Chinese wages soar (see chart, average wage [11]), buyers look elsewhere. China still dominates the business, but South-East Asia could be the next big thing. It supplies nearly half of the EU's garment imports and 41% of the US's. Orders are shifting to lower-wage economies such as Cambodia and Vietnam, where garment factories are mushrooming. Vietnam is already the second-largest supplier of clothes to the US [10].



Nevertheless, the new tigers are still cubs, importing fabrics from China to stitch into clothes. One way to catch up and compete with China would be to knit together textile and garment producers in the Association of Southeast Asian Nations (ASEAN), creating a regional supply chain. Vietnam does not produce denim, but Indonesia does, and its denim can be exported tariff-free within ASEAN to sew into jeans. This sort of partnership, promoted by the US's aid agency, is attractive to fashion buyers who prefer an integrated, one-stop service, and is a step towards the creation of ASEAN's single market [10].

¹⁹ C. Syverson, "Challenges to mismeasurement explanations for the US productivity slowdown", NBER Working Paper 21974, Jan. 2016.

²⁰ D. Byrne, J. Fernald and M. Reinsdorf, "Does the US have a productivity slowdown or a measurement problem?", Brookings Papers on Economic Activity, spring 2016.

²¹ J. Guzman and S. Stern, "The state of American entrepreneurship? New estimates of the quantity and quality of entrepreneurship for 15 US states, 1988-2014", 2016.

²² R. Decker, J. Haltiwanger, R. Jamin, and J. Miranda, "Where has all the skewness gone? The decline in high-growth (young) firms in the US", NBER working paper 21776, Dec. 2016.

²³ C. Hsieh and E. Moratti, "Why do cities matter? Local growth and aggregate growth", NBER working paper 21154, May 2015.

²⁴ J.P. Pessoa and J. Van Reenen "The UK productivity and jobs puzzle: Does the answer lie in labour market flexibility?", Centre for Economic Performance Special paper, Jun 2013.

The idea is not new, but China's rising wages gives it life. Since mid-2010 the price of US garment imports has risen by about 10%, says Peter Brown of Kurt Salmon, a consultancy, partly due to high cotton and oil prices, and to China's wage inflation. ASEAN needs to make it easier to move goods around. Their transport costs are high. New roads and railways, plus faster customs clearance, all help, but infrastructure bottlenecks that delay shipments are a no-no for fast fashion. Winter frocks delivered in the spring are worthless. For buyers, China's mix of scale, speed and flexibility is hard to beat. Suppliers in Southeast Asia lag behind China, says Pablo Isla, chief executive of Spain's Inditex, which owns Zara, a "fast fashion" retailer [10].

Guess, a US fashion retailer, vowed to cut the share of Asian goods it sourced from China from half to one-third, within 18 months. Other global brands are following suit. "Every company is pointed down this path," says Jeffrey Streader, a former executive at Guess. ASEAN manufacturers are forming alliances. For example, Phongsak Assakul, who owns a textile mill in Bangkok, ships his pre-dyed fabrics by road to neighbouring Cambodia, where another factory cuts and sews them into summer blouses for Benetton, an Italian brand [10].

China still has plenty of cheap labour in northern and inland cities, far from overheated coastal boomtowns. As it grows richer, wages will rise in the hinterland, too. Its factories will continue to churn out clothes, but they will increasingly shun simple items, such as polo shirts. Even Chinese firms outsource low-end clothes manufacturing to Vietnam and Cambodia, observes Peter Hevicon, a Hong Kong-based buyer for Debenhams, a UK retailer. When wages rise in South-East Asia, the rag trade will move again [10].

Africa's economic paradox: why poor does not always mean cheap

The World Bank publishes rough estimates of price levels in different countries, showing how far a dollar would stretch if converted into local currency. By this measure, Kenya was more expensive than Poland in 2018 [12].

This is surprising. The cost of living is generally higher in richer places, a phenomenon best explained by the economists Bela Balassa and Paul Samuelson. They distinguished between goods that can be traded internationally and many services, like hairdressing, that cannot. In rich countries, manufacturing is highly productive, allowing firms to pay high wages and still charge internationally competitive prices. Those high wages also drive up pay in services, which must compete for workers. Since productivity is low in services, high pay translates into high prices, pushing up the overall cost of living [12].

Among developing economies, however, the relationship between prices and prosperity is less clear-cut. Prices in Chad, for instance, were comparable to those in Malaysia, where incomes were 14 times higher. Fadi Hassan of Trinity College Dublin finds that in the poorest fifth of countries, most of them in Africa, the relationship goes into reverse: penniless places cost more than slightly richer ones. A 2015 paper from the Centre for Global Development (CGD), a US think-tank, accounted for various factors which could explain differences in prices, including state subsidies, geography and the effects of foreign aid. Even then, African countries are puzzlingly expensive [12].

One explanation is dodgy statistics. African countries may be richer than they seem. When Nigeria revised its figures in 2014 to start counting industries such as mobile phones, GDP almost doubled. They may also be

less pricey than economists reckon, because poor people buy second-hand clothes or grow their own food [12].

A more intriguing explanation comes from food prices. The relative cost of food, compared with other goods, is higher in poor countries. In Africa, the absolute cost is sometimes high, too. Nigerians would save 30% of their income if they bought their food at Indian prices, finds a recent study by the OECD, a think-tank. Meat costs more in Ghana than in the US [12].

Mr Hassan thinks that low agricultural productivity explains the puzzle. In much of Africa farmers scratch away at thin soils, with little fertiliser and no irrigation. An Asian-style Green Revolution is only slowly taking root. Weak infrastructure also drives up prices, as can be seen in Wakulima, a wholesale food market in Nairobi. Moses Mungai has driven a maize lorry for four hours to get here, from a border town in the foothills of Kilimanjaro. But he says it took four days to collect the crop from local farms. When the rains come he has to hire a tractor to navigate soupy roads. Counties charge levies on commodities passing through. Middlemen take a cut.

Whereas Balassa and Samuelson divided economies into two (manufacturing and services), Mr Hassan divides economies into three, by also distinguishing agriculture. Like manufacturing, agricultural productivity can grow vigorously. But like services, this fresh farm output is sold locally, he assumes, which drives down prices. Thus when farm productivity rises, the poorest countries become both richer and cheaper.

The CGD researchers note an interesting corollary: manufacturing wages in Africa, though low, are higher than in Asian countries at similar levels of income. African workers need more dough to buy their daily bread.

If that is right, then cheaper food may boost manufacturing by making wages more competitive. From 18th-century Britain to 20th-century Asia, industrial revolutions are often preceded by agrarian ones. Poor countries must hope for a repeat.

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