

Executive summary

A. Introduction

Unprecedented economic growth over the last quarter of a century has necessarily been accompanied by unprecedented economic change.

The dramatic opening of the world economy, combined with the rapid pace of technological change, have improved the welfare and living standards of billions of people around the world, including its poorest citizens. But this process has necessarily been accompanied by economic change and upheaval in the jobs market, as economies have shifted from lower to higher productivity and from declining industries to rising ones.

Technological progress and openness to trade – the two most important drivers of economic advances and change today – are also inextricably linked.

The rise of a more integrated global economy has accelerated the spread of innovation, information and know-how, and has spurred cross-border collaboration and competition, all of which have helped to fuel technological advances. At the same time, these technological advances – from containerization to improvements in air-travel, to the invention of the internet – have helped to bring about today's increasingly integrated global economy. The result tends to be a virtuous circle in which advances in technology lead to more openness to trade, and economic openness spurs technological advance, all helping to underpin deepening growth and greater integration of developing countries into the global economy.

The scale and pace of recent global economic change is unprecedented but the process is not new.

Since the Industrial Revolution some 200 years ago, economic development has progressively widened, deepened and accelerated, thanks in no small part to the interplay of technological innovation and global integration. Successive “waves” of development – for example, in Europe and North America in the 19th century, in the newly industrializing economies after the mid-20th century, and in the big emerging economies over the last 25 years – have depended both on harnessing new technologies and on integration into an increasingly global economy.

Continued economic progress hinges on the ability of societies to adjust, adapt and encourage inclusiveness.

The ability of workers to move from lower- to higher-productivity jobs, and from declining sectors to rising ones, is the essential mechanism by which trade and technological progress increase overall economic efficiency, promote development and improve living standards.

Although total labour market adjustment costs are typically much smaller than the total benefits of trade and technological change, these costs are often disproportionately borne by certain groups or communities, in the form of declining incomes or job losses.

The fact that some countries seem to be adapting to technological change and globalization better than others, by reducing obstacles to labour mobility in particular, and by more equitably and actively sharing the costs and benefits of change more broadly, suggests that government policy can play an important role in helping economies and societies to adjust to a changing world.

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B. Labour market outcomes: trends and analytical framework

A number of general labour market trends can be observed over the last 25 years, but the evolution of labour markets remains highly diverse across countries, suggesting that country-specific factors play a pivotal role in the functioning of the labour market.

Despite concerns about “jobless economic growth”, the labour force participation rate and employment-to-population ratio have remained relatively constant across most high- and low-income countries, although they have decreased in middle-income countries. These different trends may be partially explained by factors such as macroeconomic conditions, demographic and institutional changes, including the expansion of secondary and tertiary education, the increasing participation of women in the labour force and the declining participation of

men, and increased incidences of non-standard jobs, such as temporary contracts, part-time work and self-employment.

Unemployment rates do not exhibit any long-term trends. The incidence of unemployment varies greatly across and within regions. It rose sharply in most developed countries during the post-2007 Great Recession and declined only gradually thereafter. The Great Recession also impacted a large number of developing countries, in particular through an increase in their large informal economy.

Average real wages have continued to rise, albeit at a slower pace since the Great Recession, across most countries over the past 10 years, with emerging economies experiencing the biggest relative increases.

Besides business fluctuations and price inflation, part of the evolution of real wages is linked to the growing share of part-time and temporary employment, which is often associated with lower wages. For many developing and least-developed countries, self-employment and unpaid family work continue to be common types of employment, which often imply lower earnings and higher uncertainty in income streams.

Important transformations in the sectoral and occupational structure of employment have occurred in a large number of countries over the past two decades.

The share of overall employment in services has continued to grow in both developed and developing economies, while the share of employment in the agricultural and manufacturing sectors continues to decline or to stagnate in developed countries and in an increasing number of developing countries.

This trend has been accompanied in developed economies and a number of developing countries by a relative increase in the share of high- and low-skilled occupations in total employment, together with a relative decline in the share of middle-skill occupations. The skill premium, defined as the ratio between the wages of skilled and unskilled workers, has also increased across several developed and developing countries, while it has remained constant or decreased in others. As discussed in Sections C and D, the literature has identified a number of factors, including technological progress and globalization, that could explain these structural changes.

As well as inherent mobility obstacles, institutional and political conditions shape the

labour market performance, regardless of the origin of economic changes.

The complex interplay between factors shaping supply and demand for labour and their influence on wages and employment – including macroeconomic conditions, labour market institutions and mobility frictions or obstacles – and different external factors or structural changes – including trade and technological progress – is at the heart of labour market outcomes and it crucially affects the distribution of economic gains.

In a competitive labour market, unemployment can only arise if the wage rate does not adjust downwards to clear the market when there is an excess supply of labour.

Three main categories of unemployment have been identified. “Frictional” unemployment arises because a significant number of people are between jobs at any point in time. “Cyclical” unemployment arises when the decline in aggregate demand in the downswing phase of a business cycle leads to a decrease in labour demand but wages do not adjust downwards. “Structural” or “transitional” unemployment arises in the presence of wage rigidities for two reasons: either because there is a mismatch between the skills workers can supply and the skills employers demand; or because mobility obstacles prevent workers who lose their jobs from moving across either occupations or regions to fill new openings.

Search-and-matching models suggest that labour market institutions and regulations have an important influence on the cost of being unemployed and ultimately on the duration of unemployment.

More generally, the level of unemployment depends on the flow of individuals entering and exiting the labour market, the speed at which the unemployed find and accept a new job, and the conditions under which the bargaining over surplus takes place between employers and workers in the labour market exchange.

The speed, efficiency and effectiveness of the search process tends to increase, and therefore the level of unemployment tends to decrease, when access to information on jobs for applicants and on applicants for employers is improved by governments or otherwise. Similarly, the existence and the conditions of income support schemes for the unemployed affect the cost of being unemployed and thus also affect the speed at which they accept a new job.

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C. Impact of technology on labour market outcomes

Technological progress is the main source of economic growth...

Technological progress expands economic output and increases welfare by improving productivity – allowing more output to be produced with the same resources – and by enabling further innovation and development.

...but it is also the main source of labour market change.

However, by making some products or production processes obsolete, and by creating new products or expanding demand for products subject to innovation, technological change is necessarily associated with the reallocation of labour across and within sectors and firms.

Technology can increase the demand for labour, as well as decrease it.

Technology can, to varying degrees, assist the work of employees or render obsolete certain jobs. Autopilot technology on planes, for instance, assists the work of pilots, greatly increasing their overall performance. Automation technologies can, however, complete cognitive or manual tasks without human intervention. The corking of wine bottles in a winery, for instance, if undertaken by a machine, makes human labour input redundant.

Throughout history, technological change has been a source of anxiety for many workers. Labour-saving technologies, such as mechanization in agriculture, industrial robots in manufacturing, and automation in services, which has eliminated occupations such as elevator operators, have affected all sectors.

Labour-replacing technological change reduces the demand for labour. At the same time, however, it also reduces the cost of production and stimulates production, which in turn tends to increase labour demand. As a result of this and other factors such as local demand spill-overs (i.e., when new jobs generate additional demand in the local economy), the overall effect of labour-replacing technological change on labour demand is ambiguous.

The effects of labour-augmenting technologies on labour demand are also ambiguous, as they depend on how product demand responds to changes in relative prices induced by technological change. Whether technological change increases or

decreases overall labour demand is, therefore, an empirical question.

The empirical literature has generally found small and possibly even positive effects of technological change on aggregate labour demand and employment. There are, however, a few relevant exceptions, with some studies showing the negative effects on labour demand generated by technological change. A common theme in the literature is that, in developed and developing countries alike, the most relevant effects are on the structure, rather than on the level, of employment.

Technological change also affects the relative earnings of workers with different skills...

The rapid diffusion of information and communication technologies (ICTs) in the work place is consistent with an increase in the (relative) demand for skilled workers because ICTs and skills are complementary.

There seems to be a consensus that technological change has been skill-biased over the past few decades in developed and in developing countries. For the United States, it has recently been estimated that computerization is the central force driving changes in the levels of wages between different education groups, accounting for 60 per cent of the rise in the skill premium.

... and the composition of employment.

Recent shifts in the nature of work include a strong decline in occupations that are intensively made up of routine work. In the United States, routine employment decreased from 40 per cent of the population aged 20-64 in 1979 to 31 per cent in 2014. During the same period, non-routine manual employment (such as house-cleaning or babysitting) expanded by 3.9 percentage points and non-routine cognitive employment (skilled professional and managerial jobs) expanded by 6.7 percentage points.

As a consequence, employment shares have grown in occupations at the two extremes of the skill distribution, and fallen at the middle of the skill distribution, during the last 25 years. This phenomenon of hollowing out of job polarization – observed in most developed countries and in several developing countries – is linked to technological change, which affects workers variously, depending on the job tasks they perform.

From a theoretical perspective, technology improves the relative employment prospects of skilled workers performing non-routine tasks (which are not easily

automated) and tasks involving cognitive skills, which are complemented by ICT technologies. Conversely, technology worsens the relative employment prospects of middle-skilled workers performing routine tasks (which are easily automated) and has little direct effects on employment prospects of low-skilled workers performing non-routine manual tasks, which are neither easily automated nor subject to ICT-skill complementarity.

With few exceptions, the empirical literature confirms the idea that technological change has been a major driver of the decline in routine occupations, and of the consequent employment polarization, in developed economies, while in the case of developing countries, the evidence that technological change is biased against routine employment is mixed.

The upcoming wave of technological advances, in particular artificial intelligence and robotics, raises a number of issues, including their impact on the future of jobs.

Some experts argue that history will repeat itself and the next wave of technological advances will replace many existing jobs but create new ones. Other experts disagree, arguing that the new wave of technologies is different (in terms of speed, scale and force) and will replace human jobs at a massive scale, leading to a “jobless future”.

Several studies and reports have attempted to estimate the share of jobs that are at high risk of automation. Different methodologies and underlying assumptions lead to substantially different estimated shares of jobs vulnerable to automation. The estimated share of jobs at risk of automation tends to be larger in developing countries than in developed countries.

The estimated probability of automation does not, in any event, equal future unemployment, because the development, adoption and diffusion of future technologies will hinge on a number of factors, including feasibility, affordability, and the managerial culture within firms, as well as legal and regulatory frameworks and public acceptance.

While the debate remains unsettled and controversial, the upcoming technological progress is likely to continue being disruptive by having an impact on skills development, by making some skills obsolete but enhancing others and creating a need for new skills.

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D. Impact of trade on labour market outcomes

Like technological change, trade increases productivity and welfare.

Opening up to trade increases a country's welfare in a number of ways: through static gains – for example, by allocating productive resources more efficiently through greater specialization – and through dynamic gains – for example by encouraging the exchange of ideas that in turn accelerates innovation. The static gains from trade alone are significant. Some estimates indicated that gains from trade can be as high as one-third of a country's GDP compared to autarky.

Trade helps to allocate resources to the most productive activity in each country; however, like technological change, it simultaneously requires workers to adjust. The costs of these adjustments may be significant at the individual level and may require a policy response, but if considered for the whole economy, they are less than the overall gains from trade.

Many factors affect the costs of adjustment to trade or technological change, including aggregate savings and investment behaviour, business cycles, the initial industrial structure and the tariffs applied to particular sectors, and labour mobility. Labour mobility is not just a matter of regulation. The ease with which import-competing workers adjust to rising imports also depends on how diversified their own local labour markets are.

Trade increases overall wages and employment...

Many people work in trade-related activities. Jobs are created not only to fulfil a country's domestic demand, but also to produce goods and services that are directly exported to other countries, or that are used to produce goods and services that will be exported by other firms. Not only export-related activities, but also import-related activities produce jobs. In addition, both exporting and importing firms pay higher wages.

Evidence on the impact of trade on a country's aggregate labour market shows that trade tends to increase overall employment and real wages.

... but there are other effects, which may require a policy response.

While certain regions, sectors, and individuals benefit considerably from trade, others can be left worse off in the absence of adequate policy responses. These effects are similar to the varied impact of technological change.

A number of factors other than import competition have contributed to rising disparities across regions. Automation is a key factor, as illustrated by the increased use of industrial robots. The available empirical evidence suggests that trade can explain up to 20 per cent or 25 per cent of the recent decline in US manufacturing jobs. This implies that factors other than trade, such as technological change, may explain up to 80 per cent or more of the decline in manufacturing jobs in the United States.

There has been a lot of debate around the impact of China's economic rise. There is evidence for the United States, for example, that in regions less exposed to direct import competition, employment developed favourably compared to employment in more exposed regions. Yet the debate over the labour market effects of import competition needs to encompass other issues.

In the United States, for example, there is no conclusive evidence of nation-wide job losses from import competition. Indeed, when researchers take into account that, while some manufacturing jobs may be lost in a given region or a city, other jobs may be created in other regions or other cities or in the services sector, their findings suggest positive overall effects of trade on employment.

Trade increases the demand for skills...

Trade can lead to a reallocation of economic activity and therefore can lead to changes in a country's employment structure at the level of tasks, occupations, firms or sectors.

In advanced economies, trade increases the relative demand for high-skilled workers, especially in non-routine occupations. It thus behaves in a similar manner to skill-biased technological change. The main channels appear to be specialization in skill-intensive activities, the offshoring of routine tasks and increased innovative activity as a response to competition from low-cost exporters. Trade also leads to a higher demand for high-skilled workers in developing economies, mainly because of technology diffusion through imports of capital goods, intermediate inputs and know-how.

The increased demand for skills often translates not only into an increased share of skilled workers in

employment, but also into a higher skill premium, that is, an increase in the nominal wages of high-skilled workers relative to low-skilled workers.

... but the gains also accrue to less skilled workers and poorer individuals.

There is evidence in developing countries that it is not only the wages of skilled workers, but also the wages of unskilled workers, that increase thanks to trade.

Furthermore, trade increases the purchasing power of poor, low-skilled workers more by enabling them to purchase cheaper imported products, and therefore its impact on the relative real wage can be favourable to the poorer.

Trade has fostered a transition from middle-class manufacturing jobs to services jobs.

Trade can lead to shifts of employment between broad sectors. In some advanced economies, it may accelerate the transition to a services-based economy because their comparative advantage is often strong in the tradable services sector.

In developing countries, trade is expected, in combination with other factors, to accelerate the shift of employment out of the primary, often informal, sector to both the industry and services sectors.

Trade has supported employment opportunities for women in some countries.

Trade expansion and increasing specialization in the textile sector have opened up job opportunities for women. In the Republic of Korea, the share of women employed in manufacturing grew from 6 per cent in 1970 to around 30 per cent in the 1980s and early 1990s. The importance of manufacturing as an employer of female labour in the Republic of Korea has since declined (to 14 per cent in 2007), but the sector still employs 10 times more women today than in the 1960s.

Given that time and mobility constraints are greater for women, particularly those with children, technological developments like e-commerce can have an important impact on work for women.

Because trade creates job opportunities for skilled workers, it increases the incentive to undertake schooling. This is particularly beneficial for women who have traditionally received less education than men, as is particularly the case currently in many developing countries.

Yet, there is evidence that women face higher constraints than men when it comes to accessing foreign markets.

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E. Policy responses to labour market adjustment and distributional changes

Governments can help workers to manage the cost of adjusting to technological change and trade, while making sure that the economy captures as much as possible the benefits from these changes through a mix of adjustment, competitiveness and compensation policies.

Adjustment policy refers broadly to measures taken to lower the cost of reallocating resources, in particular labour, as a result of technological change or greater trade competition. Beyond improving economic efficiency, adjustment policy offers a way to compensate those who lose out from the dislocation caused by economic change. Adjustment programmes can also help to maintain political support for innovation and trade openness.

Adjustment policies may be general – for example, labour market, education and social policies are designed to help workers adjust to economic change, no matter what its initial cause may have been – or specific, as with trade adjustment programmes.

Adjustment policies may involve active or passive labour market policies. Active labour market policies aim to increase the likelihood of unemployed workers finding new jobs, through training or job-search assistance, for example. Passive labour market policies, on the other hand, help by providing financial support to workers who have lost their jobs.

Adjustment programmes may be activated in advance of economic dislocation, or assistance can be made available only after the economic effects have been felt.

Often, it is important to consider the wider social and political context in which adjustment policies operate. Research suggests that the degree of trust and confidence that the various sectors of society, such as business, labour and government, have in one another contributes to successful adjustment programmes.

Based on experiences in industrial countries, the economic literature offers some

suggestions on how to make adjustment programmes work more effectively.

General adjustment programmes can deal with a wider range of economic changes but trade-targeted programmes can be cheaper than those that cover all types of these shocks.

There is room for governments to increase the funding of adjustment programmes so that a larger fraction of those who lose out from economic change get the required assistance and support. Programmes tailored to worker and country specifications appear to perform better.

Many countries use a mix of active labour market policies, employment protection, and provision of compensation to those who lose out. The specific balance to be struck will likely vary by country and circumstances.

This need for a mix of approaches also broadly applies to developing countries but one needs to take into account the larger share of workers in the informal, agricultural and state-owned enterprise sectors of those economies.

Self-employment and the informal labour market can provide a useful buffer for workers displaced from formal employment.

Economic shocks are likely to have a far larger effect on workers in the agricultural and state enterprise sectors in developing countries, given that a greater share of the labour force is employed in these sectors. Solutions might involve tailoring adjustment programmes in developing countries to reflect the particular challenges that arise from those sectors.

Policies that increase the competitiveness of the economy can make it more responsive to the opportunities created by innovation and trade.

Given that both technological change and trade tend to increase demand for skilled workers, greater investment in education and training will allow workers to respond better to economic change.

The quality, cost and reliability of infrastructure have a far-reaching impact on competitiveness. Among the key sectors in this regard are transport, power, telecommunications, and even housing. These are crucial not only to production, but also for moving goods, services and people within and across national borders and also for communicating and acquiring information.

Improving the functioning of the credit market can improve the competitiveness of domestic firms by lowering the cost of borrowing and making it easier for enterprises to finance their expansion or their requirements for working capital.

Trade measures can be used to increase the competitiveness of a country's producers. Negotiating greater market access in foreign markets reduces the trade barriers faced by a country's producers and allows them to sell more to foreign consumers.

If a country is integrated into global value chains (GVCs), reducing its own import barriers, and particularly those affecting intermediate inputs, may also increase its competitiveness in global markets, since imports of intermediate goods are essential to exports in GVCs.

Trade facilitation reform, through implementation of the WTO Trade Facilitation Agreement, lowers trade costs and offers another way to increase a country's competitiveness.

Governments can take measures to address possible adverse distributional consequences of technological change and increased trade competition.

While the process of labour market adjustment to technological change and increased trade competition may lead to permanent income losses for certain workers, recent research suggests that it is possible for governments to address this risk through measures that involve compensation and redistribution.

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F. Conclusions

Benefitting from economic progress involves adjusting to economic change.

Technological advances and trade opening have yielded enormous benefits for economies overall, but they can also adversely affect specific groups and regions – a problem which a number of countries are currently struggling to address. A key problem is the mismatch, or “friction”, between the new skills demanded by an increasingly information-driven global economy and the older skill set of many workers. People need more creative and effective help in adjusting to economic change, irrespective of whether it is driven by technology or trade. The

goal is to find an appropriate balance between labour market flexibility, on the one hand, and employment security, on the other.

The labour adjustment challenge may be local but the ramifications can be global.

Today's labour market problems are largely traceable to domestic policy shortcomings, but a failure to find answers could have global ramifications. By providing a forum where governments can meet, talk and negotiate, the WTO offers an indispensable platform – with other relevant international organizations – where governments can arrive at cooperative “win-win” approaches to the opportunities, as well as the challenges, of ongoing global economic change.

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