

The productivity riddle

Supporting long-term economic growth in the EU

SUMMARY

Productivity has a key role to play in the EU's long-term economic growth. The recent economic recovery has reversed the negative trend but concerns remain about long-term prospects. Productivity varies across the EU, with newer Member States reaching only about half the level of the older ones (EU-15) when measured in terms of gross domestic product (GDP) per hour worked, but showing a higher growth dynamic.

The recent poor productivity growth in the EU raises a number of important policy questions. First, there is no consensus on the reasons behind it or the best ways to remedy it. There are also conflicting views regarding how long this situation will continue. Most economists believe the current weak growth trend may be explained by a combination of cyclical and structural economic weaknesses that need to be addressed by a mix of shorter and longer-term measures.

Remedies for low productivity include increasing labour market participation, strengthening product market competition, encouraging demand, investment and lending to companies, as well as restructuring inefficient markets, disseminating technology and generalising digitalisation. In the EU context, particularly important factors conducive to productivity growth include creating a genuine single market for services, boosting digitalisation across economic sectors and addressing long-term challenges, such as the ageing society and rising income inequalities, as well as implementing long-awaited structural reforms in the Member States.



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Background

Productivity plays a crucial role in the evolution of economic growth and competitiveness. It is often defined as a ratio between the volume of output and the volume of inputs. In other words, it measures the [efficiency](#) with which the various production inputs, such as labour and capital, are used to produce a given level of output. Income can be generated by increasing the labour force (which is challenging with an ageing population and resistance to mass immigration), by boosting investment (which is expected to grow rather slowly), and by finding a more efficient combination of labour and capital and thus increasing productivity, which, in theory at least, can grow infinitely.

Productivity is an important notion in economics for many reasons. The more efficient an economy is, the less input it will use to generate a given amount of output. Alternatively, a given input would generate a higher amount of output. Importantly, over a long period, increases in real wages tend to reflect increases in productivity.¹ Furthermore, decreases in production costs may reduce the prices of products. More efficient production may also mean that working hours are shorter than in less efficient economies. These factors improve the standard of living for workers and consumers, encourage higher demand, more output and an increase in employment. Productivity improvements also mean that labour may be moved from one industry and allocated to another improving overall efficiency in the economy.

Measuring productivity in the economy

Both input and output can be calculated in various ways, allowing for a diverse range of statistical indicators for productivity. One of the most widely used benchmarks for productivity is gross domestic product (GDP) per hour worked, which is more precise than the labour productivity indicator measuring GDP per employee. Capital input on the other hand can be estimated on the basis of past investment data. Another important measurement, which takes into account the contribution to economic growth made by factors such as technical and organisational innovation, is total factor productivity (TFP). It incorporates the use of machines and other capital and workforce skills. As such it seeks to include the effects of the spillovers from technology and innovation that impact on the efficiency of production processes.

Businesses that achieve improvements in productivity achieve a better profit margin through lower costs. This allows them to compensate the employees more generously, accumulate more working capital and improve competitiveness in the global and domestic markets. From the government's perspective a larger economy generates additional tax revenues, allowing for tax cuts or increased investment in infrastructure and social services. Through all these channels improved productivity leads to long-term economic growth. Indeed, recent [estimates](#) show that over 60 % of cross-country differences in income can be explained by one factor: productivity. Furthermore, research by the World Bank identified a strong [correlation](#) between average firm-level total factor productivity (TFP) and aggregate per capita income levels across the EU.

[Research](#) shows that [factors](#) determining productivity are found at both enterprise and business environment level. At enterprise level, productivity factors include quality of management and of labour and capital inputs, the use of information technology, and research and development (contributing to a knowledge stock that can improve productivity), product innovation, gains in experience allowing processes to be streamlined, and decisions on firm structures. Productivity factors in the business environment include the existence of productivity spillovers affecting a broader range of firms, the existence of competition (that forces higher-cost producers out of business and raises the productivity bar for new entrants), adequate regulation (as poorly regulated markets are often inefficient), quality of public institutions, trade openness (as it may benefit the country through technology absorption) and flexible markets allowing companies to reallocate inputs to meet changed consumer demand patterns. The evidence concerning the effects of some other [factors](#), such as [taxation](#), size of government and foreign direct investment is mixed – these can be either beneficial or detrimental to productivity growth.

Stylised facts on productivity in the European Union

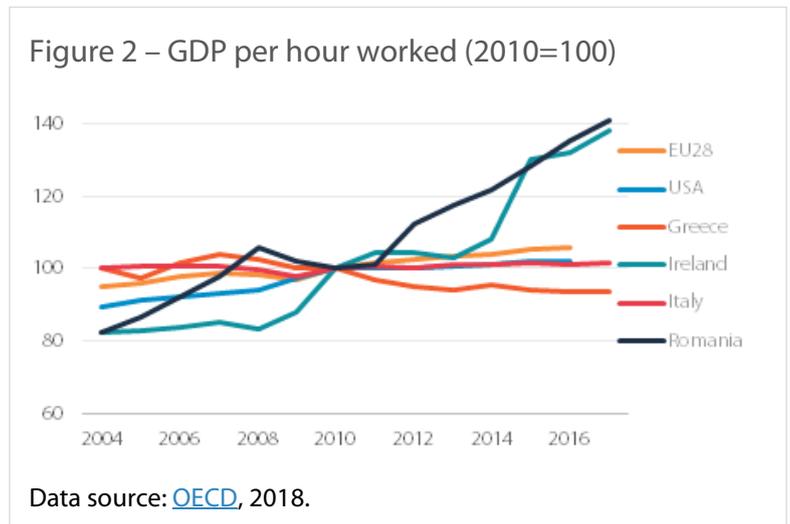
The data available on productivity is not entirely consistent. While the literature agrees on the main trends, there are nuances depending on data sources and methodologies used. Research by the [McKinsey Global Institute](#) analysing data starting as far back as the 1870s concluded that labour productivity growth peaked in Western Europe in the 1950s and 1960s.² In the United States (US) the best periods were around the First World War and during the second half of the 1930s. However, in both the US and European countries, labour productivity growth has mostly been declining since the 1960s, and decelerated further after the financial crisis to reach the present historic low.

A detailed look at the recent period can be obtained using the data from the [Conference Board](#) (see Figure 1).³ This points to rather muted labour productivity growth in the EU. In 1995, productivity growth in Europe was on a par with the rest of the world, at about 2%. However, during the crisis it plummeted more than in other parts of the world, and afterwards, although rebounding strongly, has not caught up again.



With the ongoing [economic recovery](#) of the EU, productivity growth is now similar to that of the US and other advanced economies,⁴ but falling behind the global average including the emerging markets. The [Conference Board](#) expects additional dynamic productivity improvement in the US, while the euro area is 'much more driven by a slowing rate of growth in employment and more or less similar GDP growth compared to 2017'.

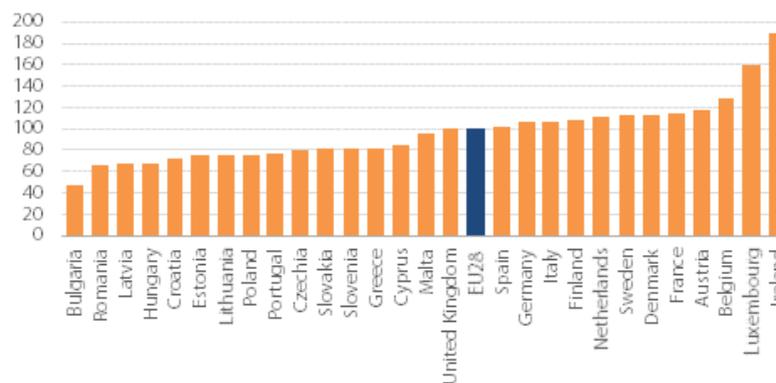
Looking closer at the EU, it is easy to see that productivity growth dynamics vary strongly between Member States. Since 2010 the strongest growth in productivity has been recorded in Romania and Ireland, while Italy and Greece are at the opposite end of the spectrum (see Figure 2). The growth of EU-28 productivity has remained stable and rather moderate, albeit slightly higher than that of the US.⁵ Countries from eastern Europe and the Baltic States in general have shown above-average productivity growth rates, which may be explained by their rapid catching up over the last two decades, starting from a much lower level than the major EU economies.⁶ In its 2018 compendium of productivity indicators the Organisation for Economic Co-operation and Development ([OECD](#)) states that labour productivity growth was much stronger in the EU before the crisis (2001-2007) than afterwards (2010-2016). It also notes that economic growth created many low productivity jobs, which resulted in real wages lagging behind productivity growth in many countries.



A snapshot of the current situation at national level can also be provided by considering labour productivity and its contribution to GDP (see Figure 3). The value of GDP per person employed and hours worked gives an overall indication of the productivity of national economies in relation to the EU-28 average. If the index of a country is above 100, the country's level of GDP per person employed is higher than the EU average.

In 2017, the Member States with above average productivity mostly encompassed northern Europe and Austria, France, Italy and Spain. [World Bank](#) economists argue that the productivity gaps in the EU are widening, and observe a scission between 'dynamic' northern and 'stagnant' southern Member States. Differences between countries are even more pronounced when [comparing](#) their most and least productive regions.

Figure 3 – EU labour productivity, 2017 (EU28=100)



Data source: [European Commission](#), 2018.

Data show that, already before the economic crisis, total factor productivity (TFP) growth was on a [downward trend](#) both in the euro area and in other advanced economies. This trend was exacerbated by the crisis. However, TFP growth has been increasing during the ongoing economic recovery, broadly returning to its rather anaemic pre-crisis rates. Indeed, a study by the [World Bank](#), which analysed micro-level data from millions of firms across the EU, confirms that productivity has evolved very little over time.

Another [study](#), taking into account data reaching back as far as the 1890s, demonstrates that TFP growth in the euro area, the US and Japan has decreased since the mid-2000s, and is now at a historic low. Askenazy et al. (2016) underline that TFP growth in the EU was [weaker](#) than in the US in both the pre- and post-crisis periods and that Europe may be facing the prospect of long-term [secular stagnation](#) (a protracted period of low growth, low inflation and low interest rates). [Indications](#) of a reduced role for TFP in contributing to economic growth in the recent period even exist for the faster growing Central and Eastern European countries of the EU. In the same vein, other [estimations](#) demonstrate that euro area countries are showing a deterioration (widening gap) in relation to US TFP following the information and communications technology (ICT) boom of the mid-1990s. Indeed, when directly comparing [output per hour](#) (using [purchasing power parities](#)), the US worker creates more value than the EU worker. This gap was nearly closed in the mid-1990s, with productivity levels being almost at parity, but has been widening ever since.

A more positive view may be drawn from recently available [estimations](#) of TFP for the years 2014 to 2016, which show that the EU had better growth rates than the global average, the US, and advanced and emerging economies. Interestingly, the Board notes that mature economies, to which the EU belongs, are 'increasingly driving global productivity growth, forecasting to account for nearly 30 % of global productivity growth in 2018, up from only 14 % in 2016. While emerging economies are still catching up with mature economies' productivity levels, the process is slowing down'.

The productivity riddle

The evolution of productivity growth in the EU and other advanced economies raises a number of important issues, often referred to as the productivity 'riddle', or 'puzzle'. Firstly, there is no

consensus on the reasons behind sluggish productivity growth, nor on the most effective ways to remedy it. There are also contrasting views regarding the possible duration of this state. Some analysts regard it as structural while others see it as a being cyclical, i.e. a mere temporary pause preceding an acceleration due to the digital economy fully taking off. However, technological progress has been accelerating for quite some time now and has not reversed this long-term slowdown in productivity growth. A US Nobel Prize winner, Robert Solow, famously remarked in 1987 that: 'you can see the computer age everywhere but in the productivity statistics'.

Other issues debated by economists concern firm level, such as differences between enterprises situated at the productivity frontier and laggards, and the distribution of productivity growth across economic sectors. An overview of some of the main arguments in the current debate is outlined below.

Views on productivity slowdown

In its 2018 report the [McKinsey Global Institute](#) argues that there are three main waves explaining the productivity puzzle: the decline of a mid-1990s ICT-induced productivity boom, the negative financial crisis after-effects dragging productivity growth down, and a third major force, digitalisation, which has the potential to lift productivity growth. The first two waves combined their negative effects, while the third is still under way and has yet to show its positive effects. The first wave had an even more negative context in the EU – firstly, it did not achieve a boom as a block,⁷ but rather a delay in the adoption of ICT technologies and slower emergence of the knowledge economy⁸ caused a [slowdown](#) in labour productivity growth. Then the crisis reduced demand, resulting in overcapacities. This was coupled with a high level of uncertainty and low rates of investment (due to a credit crunch and weak enterprise balance sheets). Further consequences are subdued [R&D](#), a rise in [intangible assets](#), and weak capital intensity growth (all of which are crucial for productivity). In some countries employment dipped only marginally and then quickly [returned](#) to pre-crisis rates, while the output remained at a lower level. The report also found that, compared with the 1990s ICT uptake wave, the current digitalisation process demands a much more fundamental transformation of entire business models and operations. The uptake is therefore slow – the same report estimates that Europe operates at only 12 % of digital potential, and the United States at 18 %. A result of these three waves have brought 'job-rich but productivity-weak [recovery](#), with low value added but high hours worked growth, and a broad-based decline with a distinct lack of productivity-accelerating sectors'.

One of the strands of the debate suggests that the low productivity levels may be explained by measurement errors, due in particular to difficulties in quantifying the productivity of services and the digital economy, made even more difficult by the presence of intangible assets. However, while the overview of [literature](#) points to the existence of some mismeasurement effects, these are not [significant](#) enough to fully explain productivity growth deceleration. The review of research on mismeasurement suggests that it is likely to account at most for a third of the recent slowdown.

Others point to the slowing of [technological progress](#), with recent innovations having a less 'revolutionary' impact than those of the past, such as the electric engine. This is however contested, as the [opponents](#) of this view argue that for example the impact on productivity emanating from robots is as significant as that of the introduction of the steam engine or motorways. Evidence suggests that there has not been a major decrease in high-tech patent applications or resources devoted to innovation, which could suggest that present innovations are inferior to those of the past. It is therefore possible that there is currently a lag between innovation efforts and implementation, thus delaying productivity improvement. Nevertheless, it is worth noting that the [research and development intensity](#) of European firms is stagnant, while for its main international competitors it is growing, which may not bode well for the future.

Another issue examined by researchers is an increasingly uneven concentration of productivity, with some firms experiencing fast productivity gains, thanks to rapid technological progress, and others

lagging behind. The differences between these pioneering companies and those lagging behind have been identified by the [OECD](#) leading to the conclusion that technological diffusion is stalling and dragging productivity down. Possible reasons for this are the growing costs for firms lagging behind of moving from a production-based economy to one based on ideas, as well as rising entry barriers and a decline in the [contestability](#)⁹ and competitiveness of markets. The fact that old firms are often not replaced by new entrants has been identified by [ECB research](#). However, the European Commission 'Science, research and innovation performance of the EU 2018 (SRIP) report' found the opposite [trend](#), with converging levels of productivity between the EU and the US. Looking at the sectoral distribution of productivity, this research confirms that only companies in the high-tech sector (particularly in the ICT and health sectors) are enjoying rapid productivity growth, while overall 'EU firms continue to be relatively specialised in medium-tech sectors (such as the automobile industry), and are slacking in new [high-technology sectors](#) when compared to United States firms'. Another analysis sees manufacturing as one of the EU's strengths and reports it to be second only to the ICT sector in terms of productivity gains both before and after the crisis. Services generally display lower productivity than manufacturing and, with their rising importance in the EU, they may be dragging aggregate productivity down.

Research also points to the fact that significant labour productivity gains can arise from the [reallocation](#) of resources (including labour and capital) from low- to high-productivity firms, which may be responsible for up to half of productivity growth in a mature economy. Conversely, capital misallocation in the euro area appears to be growing, thus contributing to slowing [productivity](#).¹⁰ The OECD 2015 [productivity report](#) identifies human capital misallocation (the skills mismatch) as an important factor in productivity losses. In the EU, the skills mismatch is a well-known fact – four in 10 EU employers have [difficulties](#) finding employees with the right skills. The shortages are particularly acute in the ICT/digital sector, which is crucial for productivity growth. The Commission estimates that by 2020 there will be 500 000 fewer ICT specialists that the [economy](#) will need. A recent study for the European Economic and Social Committee ([EESC](#)) estimates that as a result of the negative impact on productivity of this mismatch, 80 eurocents are lost for each hour of work.

The [slowdown](#) in global trade and the fact that the [global value chains](#) have matured also weaken productivity growth. Increased exposure to foreign competition and the use of imported input can both help to improve the quality and variety of goods that firms rely on in the production process and thus stimulate productivity growth.

Macroeconomic conditions are also likely to have contributed. Current conditions can be characterised by a high propensity to save, relative to a lower propensity of businesses, households, and the public sector to invest. Rising inequalities mean that an increased share of income is going to high-income households that are less likely to spend it. An economic environment with weak demand does not encourage businesses to invest even if [interest rates](#) are extremely low. Low consumption and investment hamper productivity growth and with it income growth, thus further depressing demand, which creates a vicious cycle and leads to economic stagnation. In addition, this low interest rate [environment](#) helps to keep [unproductive firms](#) afloat. The rise in old firms that survive despite being plagued by persistent problems has been identified recently by the [OECD](#) and the [Bank of International Settlements](#). Worryingly, long-term trends like the ageing of society, rising inequality, and the declining [labour share of income](#), may continue to hamper productivity growth.

To sum up, the low level of productivity is likely to be explained by a combination of both cyclical and longer-term structural factors and is due to 'the unusually deep and long recession leading to a sizeable decline in (production) factor utilisation in many countries – that was superimposed on a sharply slowing productivity trend'.¹¹

Remedies and outlook

The future of productivity growth in Europe remains uncertain. Economists argue that the crisis caused 'productivity hysteresis' – a persistent productivity loss originating from a seemingly

temporary shock. Pessimists argue that this hysteresis is here to stay, while the more optimistic voices say that this can be avoided by making the right [policy choices](#). Economic [research](#) suggests that supply-side [measures](#) such as increasing [labour market](#) participation, reducing taxes and reforming tax systems, as well as strengthening market product competition, show positive long-term effects on productivity. It has also been demonstrated that the reduction of stringent product and labour market regulation helps to accelerate the [diffusion](#) of ICT. Other actions recommended by a majority of economists include encouraging investment and lending to companies, as well as supporting the restructuring of inefficient markets and the diffusion of technology and digitalisation.

If the proponents of the digital economy are correct, the biggest upward productivity trend will materialise when digitalisation finally kicks in. [Digitalisation](#) is likely to have positive effect on operational efficiency, cost reduction, streamlined labour requirements, and enhanced innovation in companies. Furthermore, it could reshape entire business models and industries as well as barriers to entry (for example, via online marketplaces and platforms). However, this process is not without its risks as it may raise [income inequalities](#) and the market power of first movers potentially having an adverse impact on competition. Another important factor, the [ageing workforce](#), on one hand could lower future productivity, and on the other could force wider implementation of automation, which has an opposite effect.

In the EU context creating a genuine [single market](#) for services is very important. [World Bank](#) research shows that 'service sector reforms can increase EU productivity by an average of 5 %, provide more and better jobs, stimulate investment and further deepen integration'. However, a new breakthrough would be needed since the last big push occurred in 2006. Digitalisation and artificial intelligence have the potential to increase long-term productivity in services. For example, e-commerce is believed to be two times more productive than store sales, but is only responsible for 18 % of business turnover. To reap the benefits of the rising digital economy the EU should support all companies and citizens to expand their adoption of the necessary digital tools by means of measures such as targeted public procurement and investment in research and development, digitisation of the [public sector](#), development of necessary infrastructure, support for clusters and innovation hubs, and action to address skills mismatches and privacy and cybersecurity issues.

Completing the banking and capital markets unions is also important to help to improve the [allocation of capital](#) and raise investment. Another avenue to pursue is to support the [intangible economy](#), which is crucial for productivity, but needs far more attention and effort from policymakers, firms and society. There is also a need to support productive investments and grow the purchasing power of lower income consumers to support demand.

Owing to the varied nature of the causes of slower productivity growth, the International Monetary Fund (IMF) [prescribes](#) addressing 'remaining crisis legacies in the short run while pressing ahead with structural reforms to tackle longer-term headwinds'. While the crisis-related negative trends seem to be weakening and may dissipate in the future to put the European economy on a long-term growth path the structural factors need to be addressed. The majority of forecasts for economic and also productivity growth for the years ahead remain positive, which makes it a good [moment](#) to press on with the necessary reforms.

However, for now the pace of structural reforms remains low, particularly in the euro area. In its country-specific recommendations in particular, the EU advocates [reforms](#) that have positive effect on productivity, such as improving the functioning of the labour market, developing better education and training systems, strengthening competition and encouraging innovation. It is also striving to complete the single market. However, as remarked by the [IME](#): 'there are significant limitations on what Brussels can do to speed up reforms in Member States'.

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ENDNOTES

- ¹ This is not universally [true](#) – wages are thought to [lag](#) behind productivity in advanced economies, particularly since the recent crisis. This can be partly explained by rising [wage inequalities](#).
- ² The sample included: France, Germany, Italy, Spain, Sweden and the United Kingdom.
- ³ Measured as GDP per person employed.
- ⁴ These include the EU and Australia, Canada, Hong Kong, Israel, New Zealand, Singapore, South Korea, Taiwan, Iceland, Norway, Switzerland, United States and Japan.
- ⁵ There is however a long standing productivity gap between the EU and the US, measured in value created per hour when compared directly using purchasing power parities, as explained later in this briefing.
- ⁶ See p. 40 of the OECD's [2018 Compendium of Productivity Indicators](#).
- ⁷ This boom was not as pronounced in the EU as in the US. The [ITIF](#) report says that although some Member States (such as Sweden) 'gained roughly as much from ICT as the US, many others, including France and the Mediterranean countries, have benefitted significantly less – overall Europe trails significantly behind'.
- ⁸ A major [research paper](#) on the topic sums up the main reasons as: lower growth contributions from investment in information and communication technology in Europe, the relatively small share of technology producing industries, and slower advances in technology and innovation.
- ⁹ A contestable market is one without barriers to entry or exit.
- ¹⁰ This view is challenged by other [researchers](#) who argue that the capital misallocation varies across the EU.
- ¹¹ J. Fernald, [Cyclical Downturn or Slowing Trend? A Review Article on Productivity Puzzles across Europe](#), 2018.

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