Jens Weidmann: Higher growth, lower inflation? - Digitalisation from a central bank's perspective

Speech by Dr Jens Weidmann, President of the Deutsche Bundesbank and Chairman of the Board of Directors of the Bank for International Settlements, at the reception hosted by the Deutsche Bundesbank at the annual meeting of the German Economic Association (Verein für Socialpolitik), Freiburg im Breisgau, 3 September 2018.

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1 Welcome

Ladies and gentlemen,

On behalf of the Deutsche Bundesbank, I would like to welcome you to this reception here at the Konzerthaus in Freiburg.

It gives me great pleasure to be here with you today. But I am particularly pleased that you are all here. By that I mean physically in person and not virtually. At the Bundesbank, but also in the fields of research and education, I'm sure, events like these are increasingly shifting from the real world to the virtual world. Presentations are being streamed live on the internet, and conversations are taking place via chat. This eliminates costly and time-consuming travel.

But despite all the technological advances, buffets, refreshments and social gatherings cannot be transmitted digitally, not yet anyway. And for most of us, real life is usually the more enjoyable option. It would be a shame if we had to forego the pleasure this evening.

But digital technologies have become ubiquitous. They now have a major influence on how we live and work. Most of you in this room are carrying a triumph of this development with you today: the mobile phone.

You could, however, argue that making phone calls whilst on the move is not particularly revolutionary. As early as 1958, the first analogue mobile telecommunication network was set up in Germany. To begin with, however, the bulky telephone devices weighed an impressive 36 kilos, which is why they were only found in cars. It was only possible to make calls whilst actually driving, because the telephones consumed an enormous amount of electricity. A battery capable of lasting several hours or even days was completely unimaginable.

Over time, the devices became smaller and lighter, until the first "mobile phones" came onto the market in the early 1980s. But despite all the technological advances, these analogue telephones are still essentially what they have always been: devices for making phone calls.

It was only in the course of digitalisation that mobile phones were transformed into mini-computers and thus into the clever all-rounders we could no longer do without in our everyday life. Today, smartphones also double up as cameras, navigation systems, game consoles, diaries, address books, pocket calculators and much more, all on one single device.

Although we cannot yet fly to the moon using our mobile phones, smartphones do, however, contain a memory chip which is several hundred thousand times larger than that used in the computer on board the Apollo 11 mission, which was sufficient to take the first human beings to the moon back in 1969.

This increase in the number of functions has also led to rapid growth in their distribution: there are now more mobile phones in the world than people. And yet the success story of the smartphone is just one example of the transformative power of digitalisation. Let's just look at the way we communicate with each other, keep ourselves informed or do our shopping today: so

much has changed in recent years that it would be easier to list what has actually stayed the same.

The increasing use of digital technologies is also taking companies and employees into a new, digital age. These developments are the focus of this year's conference.

From a central bank's perspective, the change process raises the question of the overall economic implications. In other words, what does the digital revolution mean for growth, employment and price developments? I would like to take a closer look at these aspects with you today.

2 Impact on productivity

"Productivity isn't everything, but in the long run it is almost everything." This quote by Paul Krugman emphasised the fact that a higher standard of living in the long term hinges on an economy's ability to boost its productivity.[1] And this is where technological progress through digitalisation comes into play.

This initially involves companies in the digital economy, such as manufacturers of telecommunications technology, software developers or service providers in the IT sector. Labour productivity is growing much faster in this sector than in the economy as a whole.

Although the share of these companies in terms of total value added is still rather small in Germany, this sector does make a significant contribution to overall economic productivity growth: since the mid-1990s, it has averaged a quarter of a percentage point per year. In other economies, such as in Sweden, Finland and some industrialised countries outside Europe, the contribution was significantly higher.

Digital technologies are also breaking into other industries and changing products and processes there, too. We have noticed something astonishing here since the mid-2000s, namely that productivity growth has weakened.

This has led some to speak of a new paradox of productivity. New, because we already observed a similar development back in the 1970s and 1980s. "You can see the computer age everywhere but in the productivity statistics," noted economist Robert Solow back then.[2]

How can this paradox be explained? Apart from possible measurement errors, the explanatory approaches can be roughly assigned to two camps:

The pessimists, especially Bob Gordon, generally view digitalisation as being less transformative than assumed.[3] Digital technologies offer less potential for major productivity gains than previous waves of innovation, which were driven, for example, by the development of the steam engine or electrification.

In the other camp, the optimists, such as Erik Brynjolfsson, put forward the argument of time-lagged effects.[4] General-purpose technologies in particular, such as robotics or artificial intelligence, require additional innovations and investments for use in everyday business life. It takes time for new technologies to spread, to be integrated into production processes and to take full effect. Accordingly, the essential productivity gains have yet to come, he claims.

Regardless of who is right in the end, it is clear that companies can only exploit the potential that digitalisation brings with it if the necessary framework conditions are in place. For example, many digital technologies require access to a fast internet connection.

And Germany is lagging behind other industrialised countries in this respect. Last year, the maximum connection speed in Germany was 65 megabits per second on average. In Spain it

was no less than 85 megabits, and in Korea it was as high as 120 megabits.[5]

In particular, the expansion of the fibre optic network is making only slow progress here in Germany. Just two per cent of broadband connections are based primarily on fibre optic lines and thus on the technology that makes particularly fast internet connections possible. By contrast, the OECD average is 26 per cent.

This makes it all the more important for Germany to forge ahead and vigorously expand its digital infrastructure.

3 Impact on employment

Ladies and gentlemen,

One issue that is worrying many people is how digitalisation will transform the workplace. Self-driving robo-taxis and parcel-delivering drones still aren't a feature of our day-to-day lives. But there is no denying that digital technologies are making ever greater inroads into worlds that were long thought to be the reserve of human beings.

Nowadays, robots help doctors and carers; they crawl through narrow tunnels and shafts so that we don't have to; they mow the lawn, and they explore outer space and the oceans. Algorithms make investment decisions in a fraction of a second, and many a sports report these days is written by a robo-reporter.

As we venture into an era of automation, a witticism attributed to the economist Warren Bennis springs to mind, and I quote: "The factory of the future will have only two employees, a man and a dog. The man will be there to feed the dog. The dog will be there to keep the man from touching the equipment."

We haven't quite reached that point yet. But looking at some professions, one does wonder whether they will still be around in the medium term. The OECD estimates that nearly one in ten occupations could be automatable over the next few years.[6]

That said, there's one thing we shouldn't lose sight of. History books are full of occupations that don't exist any more. Or is there anyone here who still knows a copperplate engraver, a rag-and-bone man, a cooper or a wheelwright?

So being scared of losing one's job and resisting innovation were commonplace in earlier times of upheaval as well. Just take the protests launched by the Luddites in the 19th century. To this day, you will still find a four-liner – on the internet, of course – which goes like this: "Who got the idea of steam into their head? / It cost the waggoners their daily bread / They truly are in a bad way / Because of that damned railway!"[7]

While there is no doubt that the railway cost many coachmen, cartwrights and wheelwrights their jobs, it did create brand new type of jobs: track layers, train drivers and guards, to name but three.

We haven't run out of work yet. And digitalisation will also forge new professions. Social media managers, robotics engineers and drone pilots are just three I could mention here.

So you could say the new technologies can potentially unleash both creative and destructive energy – much like the "creative destruction" coined by Joseph Schumpeter. At present, one could argue that the job losses are being compensated for by new ones. At the same time, a shift is under way in employment prospects and relative wages.

Many routine activities will probably feel the pressure of automation particularly intensely. These

are areas where salaries may well feel the squeeze. Then again, there are other activities which appear to be benefiting from automation. Taken in isolation, this can lead to greater inequality in the distribution of income.

In this regard, digitalisation is having an impact much like that of globalisation, and it is presenting similar policy challenges as well. But the effect of digitalisation goes deeper still – it is transforming many job profiles and, as a result, the requirements which employees are expected to meet. Demand is on the increase for skillsets which a computer cannot replace: social skills and creativity, and also the ability to operate ever-evolving technologies.

If society is to come to terms with structural change, people need to be in a position to harness the opportunities which digitalisation presents. And education is the key to unlocking this potential.

But education should not be misconstrued as a phenomenon that is confined to the first third of our lives and is then over and done with. Quite the opposite: we need to make learning a firm fixture in our professional lives. And we need to establish a culture of lifelong learning. That is why I think what really counts is making sure that every employee has access to continuous professional development.

Of course, education needs to start much, much earlier in our lives: none of us were born digitised – not even the digital natives, as they are known.

Needless to say, children nowadays naturally adopt new technologies through play. You may have seen one of those online videos where a small child is standing in front of an aquarium and puts his thumb and forefinger on the glass in an attempt to zoom in and make the fish bigger.

But in tomorrow's workplace, being able to operate a smartphone won't be enough. That is why we need digital education to give young people a firm technical grounding and strengthen their media skills.

This is another area where action needs to be taken. The International Computer and Information Literacy Study (ICILS) found that German schoolchildren have average skills, if that.[8] The authors found that as few as one-third of teachers use computers regularly (i.e. at least once a week) during lessons. In this particular category, Germany actually brings up the rear among the countries surveyed.[9]

Swiss economist Thomas Straubhaar also highlighted the fundamental importance of education in the digital age in a recent op-ed piece he wrote for a German daily newspaper: "A good education system may be expensive," he conceded, but in the long run, he continued, one thing is even costlier, and that's a bad education system.[10]

4 Impact on inflation

Ladies and gentlemen,

As a central bank, we are interested in more than just the ramifications of digitalisation for the real economy. Another aspect, and one that is of particular importance, is its impact on price developments – keeping prices stable is, after all, our primary objective as monetary policymakers.

Digital transformation impacts on inflation through multiple channels.

One of them is the way technological progress pushes up productivity, driving down production costs. Prices ought to follow costs downwards, assuming there is sufficient competition.

Another is the shift in sales channels. It is becoming increasingly common to buy goods online rather in the local shop. As recently as in the year 2000, online trade accounted for a near-invisible 0.3% of retail sales. By last year, that figure had already climbed to just under 10%.

This can invigorate competition – after all, online marketplaces are where you will find providers from every corner of the world. At the same time, price comparison websites let consumers scan the entire market in just a matter of clicks, creating very high levels of price transparency.

Even if there are some who only look for information online and still end up shopping locally, the increased transparency nonetheless intensifies the competition and squeezes margins and prices. My US counterpart Jerome Powell spoke in his testimony to the Senate Banking Committee about the "Amazon effect story".[11] A study by the ECB concludes that the increasing use of online trade in the EU has reduced non-energy industrial goods inflation by 0.1 of a percentage point each year since 2003.[12]

There is another phenomenon which could have the opposite effect: the rise of dominant "superstar firms".

For the most part, these firms offer information-based goods which are sold online. It is a business model that involves substantial fixed costs but barely any variable costs. Just take the video-on-demand platforms – whether they have a large or a small customer base has little bearing on their overall costs.

Increasing returns to scale are also being generated in the social media or by peer-to-peer ridesharing or accommodation platforms, to name but two. Market leaders benefit from the network effect as well. The more active users a product has, the more attractive it becomes for others.

That is why some companies often emerge as winners as time progresses. They can then capitalise on the market power they gain to push up their prices and margins. To quote the title of a famous song by ABBA, "The Winner Takes It All", but do please forgive me for not breaking out in song.

Jan De Loecker and Jan Eeckhout estimate that the general rise in firms' price mark-ups in the United States increased the inflation rate by roughly one percentage point a year between 1980 and 2014.[13] That said, digitalisation is just one potential factor driving the rise in market power.[14]

The bottom-line impact on inflation of the contrary effects of digitalisation cannot yet be quantified with any real certainty. According to the Bank of Canada, the research findings so far indicate that digitalisation can have a small dampening effect on inflation.[15] Sweden's Riksbank, however, argues that the decline in the rate of inflation observed in Sweden in recent years is primarily connected with other factors.[16]

Another area where digitalisation is making itself felt is in the measurement of inflation.

In the online trade – and increasingly in the bricks-and-mortar retail world, too – prices can be altered at the push of a button. The job of changing one price tag for another is a thing of the past. This pricing mechanism, which is mainly deployed by big businesses, uses algorithms that respond to demand and change prices dynamically.

It's a phenomenon you might have noticed when you book a flight online – ticket prices vary strongly depending on how full the aircraft is and what time you make your booking.

In a paper prepared for the recent symposium of central bankers in Jackson Hole, Alberto Cavallo stressed that online competition is transforming pricing behaviour, writing that both the frequency of price changes and the degree of uniform pricing have increased.[17] But for

statisticians, prices that change frequently and fluctuate strongly are something of a challenge. These days, it's not enough to survey the price of a product once a month. So digitalisation is making it more difficult to measure inflation.

But on the other hand, digitalisation opens up new opportunities as well. Web scraping – a statistical method to automatically capture online prices – is just one example I could mention here. Alberto Cavallo and Roberto Rigobon are already using web scraping to collect huge amounts of online data as part of their Billion Prices Project in order to prepare daily price indices, which have interesting leading indicator properties.[18]

5 Potential implications for monetary policy

Ladies and gentlemen,

One thing is clear: digitalisation has many faces. Some of those faces we've already become familiar with, some we're just getting to know and others we can only guess at for now. There can be no doubting its potential to influence productivity, employment and inflation. But what does it all mean for monetary policy?

There is a lot of talk about monetary policymakers' capacity for effective intervention. The financial crisis saw central banks take their interest rate policy to the limits, with barely any room to bring policy rates lower.

When it comes to interest rates, the lower bound is like the perimeter lines of a football pitch, which set the boundaries of the playing area and players' room for manoeuvre. The importance of room for manoeuvre is something that Oscar Wilde recognised back in his day: "In modern life margin is everything," he has one of his characters proclaim in the play "Lady Windermere's Fan".

And we may well see room for monetary policy manoeuvre shrink in future. If digitalisation were to dampen inflation over a prolonged period of time, nominal interest rates would fall, narrowing the gap to the lower bound. This increases the likelihood – all else being equal – of monetary policymakers having to resort to non-standard measures to remain capable of effective intervention.

From what we have seen so far, though, it looks like the inflation-dampening effect of digitalisation is fairly minor. It is also worth bearing in mind that the effects of reduced costs and increased competition stem from an adjustment process. In the new long-term equilibrium state, potential for price cuts would already have been exhausted and the impact on inflation would have ceased.

However, the reverse is also conceivable. If digitalisation brings increases in productivity and potential growth, the natural rate of interest will rise. This would push up nominal interest rates, giving conventional monetary policy more room to play with.

The fact that capacity for effective action has become such a key issue for monetary policy in the first place actually has nothing to do with digitalisation. It has more to do with the low inflation and the low interest rates of recent years, both of which are, first and foremost, after-effects of the financial and economic crisis.

Nevertheless, some observers already think that this could be the new normal. They are concerned that central banks are coming up against the lower bound with their policy rates more and more frequently and are having to turn to non-standard instruments. That's why some economists propose aiming for a higher rate of inflation, anticipating that this would provide a greater safety margin to the interest rate floor.

But there are side-effects and risks associated with raising the target inflation rate, something which the Bundesbank highlighted at length in its June Monthly Report this year.[19]

At this point, let's bear in mind the vital importance of firmly anchored inflation expectations for effective monetary policy. Putting up the inflation target causes inflation expectations to shift. But there is absolutely no guarantee that they will quickly fall into line with and remain anchored at the new target rate.

Ben Bernanke once put it like this: “If we were to go to 4% and say we’re going to 4%, we would risk a lot of … hard-won credibility, because folks would say, well, if we go to 4%, why not go to 6%? It’d be very difficult to tie down expectations at 4%.”[20]

This is why I am convinced that we should continue aiming for inflation of below, but close to, 2% over the medium term and not arouse any doubts as to our credibility as monetary policymakers.

In any case, with regard to the natural interest rate and the long-term outlook, a growth-promoting economic policy and structural reforms are the right way to go.

And we can set about this at both the national and the European level. It is particularly crucial, for instance, that we harness the possibilities offered by digitalisation, by improving educational opportunities, expanding the digital infrastructure, bolstering cyber security and modernising the legal framework. The time has come for Europe to finally complete the digital single market.[21]

A higher growth path leads to a higher general interest rate level, which would give monetary policy more water under its keel again.

6 Conclusion

Ladies and gentlemen,

“Computers are useless. They can only give you answers.” Pablo Picasso is supposed to have said that, over half a century ago.

And with that, he joins the ranks of famous inaccurate predictions – in some ways. For there is a grain of truth in those words. Wherever things hinge, in particular, on asking the right questions, in the world of research for example, computers are – as yet – just a tool. They cannot replace humans in those areas.

But digitalisation is shaking things up. We will wait with bated breath to see what computers and artificial intelligence can do in the future.

A newspaper recently ran a story about the Swiss bank UBS having created a virtual clone of its chief economist. The idea is for his digital likeness to advise wealthy clients on their investments in future. Evidently, we economists are not immune to being replaced by computers either.

Thank you for your attention.

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