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Digitalisation of the Welfare State

Werner Eichhorst and Ulf Rinne Digital Challenges for the Welfare State

INTRODUCTION

Many ongoing changes in the labour market can be summarised under the keyword ‘digitalization’.¹ Although the risks associated with this process generally appear manageable and there is no reason to be overly concerned or even alerted (Eichhorst and Rinne 2017), our world of labour is indeed changing to a substantial extent. Hence, there are a number of challenges associated with this process, for which it is reasonable to prepare in due course. Since digitalization is often very broadly defined, it appears useful to break down this process into its two main components (Degryse 2017).

The first component of digitalization can be labelled ‘automation’. It comprises the increasing use of robots, machines and algorithms in value chains, which is no longer restricted to simple routine tasks. Related to this component is the more general perspective on the future of work in the light of technology-induced productivity growth, which particularly focuses on its potential impacts on aggregate (and occupation-specific) employment. Hence, the controversial debates about the ‘end of work’ technological unemployment and polarization are also related (Eichhorst *et al.* 2017, for details). Representative for this strand of the literature, Autor and Salomons (2017) find that the negative employment effects of productivity growth within industries have been offset by spill-over effects in the rest of the economy to date. Aggregate demand has therefore been remarkably stable, and job losses have been outweighed by new employment opportunities. However, underlying employment shifts, mostly into tertiary services, are skill-biased and tend to polarize labour demand.

¹ Globalization, demographic change, and changing values and attitudes towards work are also important developments related to (and drivers of) ongoing changes in the labour market (BMAS 2017).

The second component of digitalization may be summarised under the label ‘platform economy’. It refers to an entirely new business model that includes new real and virtual services and, importantly, online outsourcing. In fact, online outsourcing may be viewed as a new form of (digital) Taylorism, and the ‘crowd’ may be viewed as a new player in the labour market (Degryse 2017). Similar to developments during the industrial revolution, labour can once again be divided into its constituent parts – albeit this time, at least potentially, on a massive, virtual and global scale, where these constituent parts are increasingly automated and connected flexibly to each other (Eichhorst *et al.* 2017).

Digitalization as a whole, but especially its second component – the platform economy – may lead to significant ‘digital challenges’ for the welfare state. These challenges include the question of how the welfare state handles new social inequalities and a potential ‘digital divide’, for example, by developing the individual skills and abilities that digitalization and future jobs require (Buhr *et al.* 2016). But ‘digital challenges’ also relate to the potentially eroding foundations and basic concepts on which the welfare state was historically built upon. Forward-looking policy responses, inter alia in the areas of taxation and social security, may therefore ultimately require a new institutional perspective on workers, firms, and the welfare state.

ERODING THE FOUNDATIONS OF THE WELFARE STATE

The entirely new business model of the platform economy blurs traditional definitions of the welfare state. The categories of self-employed and dependent employees, for instance, appear inadequate to properly classify and treat platform workers, the concept of a ‘firm’ cannot be easily applied to virtual companies that operate in the cloud, and national and country-specific policy approaches are also substantially challenged.

More specifically, standard employment relationships are fundamentally challenged by the platform economy – at least in areas where work does not require specific skills and can be sourced out easily. Following traditional categorizations, platform workers are usually classified as self-employed or freelancers, and



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they are therefore not covered to the same extent as dependent employees by social security, and particularly social insurance. This spurs unfair competition with traditional workers, who no longer act on a level playing field. Perhaps the most prominent and often cited example is in the transport business, where Uber drivers compete with rather heavily regulated taxi drivers. In this context, for instance, it is not clear whether Uber should be considered a transport company or digital service – with important implications for its workers.² Many self-employed persons and freelancers also lack appropriate pension insurance. If crowd-working is the main activity, the coverage and capacity to contribute to pension insurances and other types of social security is limited.³ Under current circumstances, platform workers would thus be largely dependent on tax-financed basic welfare or social security.

Firms operating in the platform economy follow many different business models and only share some common features. This complicates applying a universal approach towards platform firms and platform workers. In many instances, platforms ultimately create their own ‘markets’, and they also define the rules governing these markets. It appears, at least to some observers, as if “the platforms regulate the market” (Berg 2016, 18). Platforms may regulate market entry, market transactions and data collection in a given market, which is, in turn, ultimately defined by the platforms themselves. This leads to unfair competition with traditional firms employing dependent employees, parallel labour markets, and an erosion of labour law. Many platforms can effectively externalize social security obligations to their workers, and a possible expansion of freelance work or self-employment could thus undermine the social security model. This has also to do with market structures, as the supply of digital online work usually exceeds its demand by far.

In addition, novel features that characterise the digital economy may lead to substantial challenges in the area of taxation, including an eroding tax base and profit shifting (Li 2014). These features include strong reliance on intangible assets, massive use of data as a production factor, new business models, and the difficulty of determining the jurisdiction in which value creation occurs. While these challenges are actually not limited to the digital economy, it nevertheless makes them far more acute. For example, Li (2014) refers to a tax ‘base cyberization’ in this context, which adds to the existing problem of base erosion due to artificial tax planning structures.

The platform economy is global and (virtually) spans national borders, while its governing institutions are mostly national and historically rooted in

country-specific contexts. Unilateral approaches are certainly not a solution, and Robertshaw *et al.* (2015, 79) are not the only authors to identify a need for a global approach: “global policy formulations are required in the collaborative economy because it operates on a global scale, regardless of national or regional borders”.

Transforming the welfare state to match the new realities of the digital era therefore requires appropriate responses on the individual and institutional level. It is, however, not trivial to solve the ‘digital challenges’ without impeding digital growth. Any responses have to master a balancing act: on the one hand, they have to accommodate digital growth and promote the chances of digitalization, and on the other hand, it is essential to confine new social inequalities and to avert a potential digital divide.

COMBATING A POTENTIAL DIGITAL DIVIDE ON THE INDIVIDUAL LEVEL

On the individual level, it appears crucial to combat a potential digital divide by adequately preparing workers for imminent changes. Labour markets will become more complex and more flexible, with a profound impact on employment forms, occupations and skill requirements. In this context, the focus should be on education, training and lifelong learning.

For instance, employment forms will change as flexible working times, working time accounts, as well as mobile working and working from home will become the norm, rather than the exception (Eichhorst *et al.* 2017). An increasing scarcity of skilled labour, greater competition and more innovation will pave the way for new and innovative work arrangements. Flexibility in working hours and workplaces will also blur the lines between private and working life, with both desirable effects (such as new opportunities to realize a better balance between professional and family life) and potential negative effects (like excessive demands). But this also means that, for example, competencies like self-management and self-organisation will gain importance for a massive share of the population.

In addition, the traditional perspective on occupations is likely to change. A growing number of occupations already share common sets of tasks, skills and competencies – almost independently of the specific job profile, sector or industry in question. For example, almost every job requires at least some basic IT knowledge, and more and more jobs also require programming skills. This trend is likely to continue, and it also reflects the fact that data are becoming another main production factor in the digital economy (Li 2014). A fresh perspective on occupations may therefore make it important to ‘unbundle’ skills and qualifications, which means that vocational education and training systems will have to increasingly focus on providing specific skills in a very dynamic fashion over the entire course of a person’s labour market career in

² See Schmidt-Drüner (2016) who refers to a recent case in which a Spanish judge has submitted a preliminary question to the European Court of Justice. If Uber was considered a transport company, its drivers could for example (potentially) request the company to pay their insurance fees. But if Uber was considered a digital company, (national) regulations would be harder to apply.

³ See Leimeister *et al.* (2016) for Germany and Berg (2016) for the United States.

order to prepare individuals to learn and adapt more or less continuously, rather than offering a predetermined and fixed set of skills (which is nowadays referred to as an ‘occupation’) at the beginning of a person’s working life.

With respect to the future of jobs and skills, there are two very popular, but also entirely different scenarios (Hirsch-Kreinsen 2016). The first of the two scenarios, usually labelled as ‘polarization’, offers a more pessimistic outlook with a growing gap between complex, high-skilled jobs on the one hand and simple, low-skilled jobs on the other. This growing gap is accompanied by a dramatic decline in jobs in the middle of the skills distribution in this scenario. By stark contrast, the second scenario offers a more optimistic outlook. Often referred to as ‘upgrading’, the level of skills and qualifications is here assumed to rise across the entire distribution. The increasing use of robots, machines and algorithms would thus lead to an occupational upgrading and a specialization of workers in this scenario. Human labour would become more complementary to technology, more skill-intensive, but also potentially more rewarding for the individual.

It is, however, important to realize that these two different outlooks are just scenarios about future developments – reality may still be very different. For example, while a tendency towards employment polarization can be observed in a number of countries, this trend has been, at least to date, clearly less dramatic in Germany than in other European countries (Goos *et al.* 2014; Eurofound 2015). In this context, it can be shown that Germany’s dual apprenticeship system is related to less employment polarization (Rendall and Weiss 2016). This proves once again that institutional settings, in this case especially in the area of education and training, can make a difference. This also applies to the question of whether or not a scenario of ‘upgrading’ or a scenario of ‘polarization’ is a more likely future outcome in the labour market.

What should thus be the appropriate policy responses to increase the chances of the ‘upgrading’ scenario as a future outcome in the labour market? First of all, a general requirement for tomorrow’s workforce is referred to as ‘upskilling’ (European Commission 2016). Qualification requirements will most likely increase across the board in the future, and important skills that will be required include creativity, social intelligence, and entrepreneurial thinking (Rinne and Zimmermann 2016). The education system, and more specifically the vocational education and training system, therefore needs to be adapted accordingly to find effective ways to provide workers with the required skills and qualifications.

In this context, Germany’s dual apprenticeship system, which combines vocational schooling and structured learning on-the-job (Eichhorst 2015), may actually serve as a role model; in at least two important ways. The first important aspect is its strong demand orientation. It guarantees that graduates’ skills are tailored

to the demands of the labour market, and it avoids obtaining useless qualifications. The second important aspect are some universal skills that are (implicitly) promoted, including fundamental problem solving competencies, a high identification with the employer, a specific working spirit and work ethic, and a general openness to new challenges.

In addition, the need for hybrid and interdisciplinary vocational training models will very likely increase significantly in the future, partly in response to the rising complexity of the world of work (BMW 2017). This will require, among other things, revised and new curricula that span multiple disciplines and that are more strongly oriented towards real working processes. Hence, stronger cooperation and closer links between educational institutions, training providers, and firms are needed too. The good news is that digitalization also opens up new possibilities in the area of vocational education and training. These vast opportunities should be tapped, which means adequately preparing students, but importantly also teaching professionals to effectively and efficiently use instruments such as e-learning or blended learning approaches.⁴

Educational challenges, however, are not only related to the critical period of labour market entry at the beginning of an employment career. Similar challenges also arise in earlier and later stages of a person’s life. For example, it is often argued that IT skills such as programming should already be promoted in schools, as they are an important cultural skill for the 21st century (BMW 2017). Again, such an approach also requires extra efforts in teacher training, which should at least include some basic IT knowledge. Finally, there will also be an increased need for life-long learning, which must be appropriately met because the demand for advanced and further training for all groups of employees at all qualification levels will increase dramatically across the board. Further and continuing education has to become the norm, rather than the exception, to prepare workers for continuous changes. This requires (financial) incentives for workers and firms – especially as far as general skills are concerned, and where public investments may even be tax financed (Weber 2017). However, it also requires support, guidance and monitoring to effectively steer workers’ and firms’ efforts.

A NEW PERSPECTIVE ON WORKERS, FIRMS AND THE WELFARE STATE

New business models of the platform economy may also require a new institutional perspective on workers, firms and the welfare state. Challenges with respect to workers concern, for example, the areas of social security and income declaration of platform workers. Another important issue (with many implications, among others in the area of taxation) is finding an

⁴ See Tyilo (2017) for a review of e-learning in higher education, and O’Byrne and Pytash (2015) for details on blended learning (or hybrid learning).

appropriate approach to the profit allocation of online or virtual companies.

The platform economy involves a transfer of risk to individual workers. As online firms and virtual companies usually do not consider themselves as employers, but only as platforms, networks, marketplaces or intermediaries, their workers are formally self-employed, with all the associated risks like accidents or sickness, and costs such as for pensions, unemployment or long-term care (Eichhorst *et al.* 2017). New challenges for social policy arise from this transfer of risks.

However, it should also be noted that the platform economy has only just begun to unfold its potential. Current empirical evidence indicates that its actual importance is still small. For instance, even in the United States, which plays a leading role in this context, the proportion of the employed persons who offer their services through online platforms is estimated at only 0.5 percent in 2015 (Katz and Krueger 2016). At the same time, available data suggest that in most cases these are secondary jobs, and that income from these jobs usually supplements other types of household income. Hence, online platform work can still be viewed as being predominantly a source of additional earnings (on top of offline activities).

But the growth potential of the platform economy is undoubtedly immense. It has the potential to develop very dynamically and expand to cover a wide range of services. The task of social policy is therefore to engage early enough with its associated challenges, armed in particular with a framework for creating a level playing field between different types of suppliers. A first approach is to trace the conventional distinction between dependent employment and self-employment. Borders between these forms of employment are becoming increasingly blurred, implying that traditional classifications and schemes are no longer applicable. Hence, the introduction of a third category of workers, next to self-employed and dependent employees, is heavily debated, for example, in the form of ‘dependent contractors’ or ‘independent workers’ (Aloisi 2016; Maselli 2016). In the United States, the introduction of a new category of ‘independent worker’ is discussed – specifically to harmonize the social security system with the requirements of the platform economy and to bring it into the digital world of work (Harris and Krueger 2015).⁵ A slightly different proposal is to include platform workers in the scope of the general rules applicable to self-employment. Goudin (2016), for example, views this option as preferable to other options.

A second approach would be to extend employment-related social security to employment forms that

are currently not included, and especially to self-employment, both in the case of online and offline freelancing, and both for main and secondary activities. This particularly applies to social insurance for old age and disability, but also to unemployment (Eichhorst *et al.* 2017). For example, in Germany only certain groups of ‘employee-like’ self-employed individuals are currently required to pay into the statutory pension insurance scheme (e.g. teachers, nurses). Other groups have access to different or occupation-specific models (e.g. artists and journalists, doctors, architects, lawyers). A major advantage of a more universal social security insurance system lies in the fact that the problem of identifying the currently important distinctions between different employment forms, and even occupations, will be substantially mitigated.

Against this background, it seems plausible to bring self-employed workers of all types into the social security system, rather than providing them with a rather generous ‘opt-out’ clause. For example, it may be reasonable to require all self-employed workers to pay at least a minimum amount of contributions into the statutory system. Of course, this would require the self-employed to take taxes and contributions into account when setting their prices. The contributions of the self-employed workers themselves could also be supplemented by compulsory contributions from the customers or the intermediaries and platforms, which are the equivalent of an employer in the platform economy. These could be paid directly or could be claimed by the self-employed person when invoicing for their services. The German model of social security for artists (*Künstlersozialkasse*) is an existing example in which the liability for one part of the contributions is with the users. In addition, a certain percentage of tax financing could be considered – which would, of course, also be generated from tax revenue of platform-based entrepreneurial activities.

Another more general challenge, which absolutely requires stronger international cooperation and coordination, is to implement tax liability in the virtual and global platform economy. Tax rules also have to adapt to a changing business environment in the digital economy. Two concepts in particular are hardly applicable for virtual and global firms with intangible assets (Becker and Englisch 2017a). The first concept is the so-called permanent establishment. Here it appears necessary to find a practicable way to also include virtual establishments. The second concept is the so-called arm’s length principle for transfer prices. As platform firms or digital companies often create their own markets, it is indeed very hard – if not impossible – to find an appropriate comparison to value their goods, services and intangible assets like very unique patents. While in this context the introduction of a destination-based cash flow tax is proposed in the United States (Becker and Englisch 2017b), the introduction of an equalization tax is discussed in the European Union (BMF 2017).

⁵ Austria introduced the construct of a ‘free service contract’ already some time ago. This form of employment supplements traditional service contracts, as it is based on hourly-wage payroll accounting and also includes full social security contributions. However, specific difficulties arise with privileges and benefits that are per definition linked to working time or hourly wages (such as overtime rules and minimum wage provisions).

In any case, one issue appears to be a key in the ongoing debates over social security, taxes and the welfare state. It is precisely the question of if and how virtual value creation can still be located in the real world. Current social security and tax concepts rely on the physical presence of workers and firms in a precisely defined location. When value-added chains become increasingly complex and diffuse, and the role of firms as employers blur, it could be reasonable to consider the perspective of consumers in this context. They will continue to be precisely located in the real world (at least from today's perspective), so shifting the perspective towards consumers in the areas of social security and taxation could mitigate at least some of the 'digital challenges'. Consumers may serve as the much needed anchor point and channel through which (employers') social security obligations and taxes can still be determined and collected in the digital economy, for example, via consumption taxes – if intelligent ways can be found to shift their incidence from firms to consumers, which also depends on both the demand elasticity and supply elasticity.

CONCLUSIONS

Digitalization does indeed have the potential to fundamentally change the functioning of our economies, labour markets and welfare states as we currently know them. However, the full dimension of the digital transformation is only just emerging, and scenarios of massive upheaval and disruptions are not (yet) matched with the evidence at hand. Nevertheless, from a policy perspective, this situation of a gradual transformation offers a window of opportunity to redesign established institutional solutions, particularly in terms of skill formation, social protection and taxation.

There are two main risks or challenges involved. The first is to avoid, or at least limit, a further divide in and polarization of the labour market due changing labour demand. Skill upgrading for the labour force, not only in terms of initial general and vocational education, but also over the entire employment career, will be crucial to safeguarding employability for a broad segment of the population in the future. The second issue that needs to be addressed is to make social insurance more inclusive and sustainable in a situation where we can expect to see more self-employed or freelance activities and a more global, highly mobile and fluid way of working, delivering and using services. This raises fundamental issues regarding the funding of social policies, but also public service provision more generally. In this respect, finding innovative ways to establish feasible solutions to the problem of how to tax internationally mobile market actors – platforms, firms or workers – is high on the agenda.

Policy solutions in these two fields are necessary, and they should be designed and implemented while the window of opportunity is still open. Otherwise we run the risk of major economic and societal distortions.

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Mårten Blix

The Effects of Digitalisation on Labour Market Polarisation and Tax Revenue¹

INTRODUCTION

Digitalization is sometimes described as the third industrial revolution. What insights can be gained from comparing the present situation to the state of society at the outset of the first industrial revolution some two-and-half centuries ago? From the late 18th century onwards, it led to an upheaval in work and livelihoods at a time when there were few social safety nets. The rapid transformation of economies and societies triggered a drive to create new social and political institutions to manage and reduce the social costs of change. Universal education, social security and pension systems were introduced. Spurred by hazardous and difficult work conditions, as well as excessively low pay, labour organised into trade unions to become a counterweight to employers and owners of firms. Societies developed methods to handle change and devised ways to resolve conflict through rules and negotiations, rather than through force.

There is no need to reinvent the institutions and safety nets thus established. Indeed, the modern welfare state has shown a remarkable resilience over the years. But digitalization is now affecting some of its fundamental building blocks and, unless institutions are reformed, the social contract holding society together could be damaged.

For the welfare state, providing protection against a potentially destructive change and promoting innovation has been a central task and a delicate balancing act from the outset. On the one hand, heavy regulation of the economy can dent productivity growth and undermine rising prosperity. On the other, strained social cohesion can erode the legitimacy of institutions.

The modern welfare state has managed change, but some countries have at times veered off course. Take the example of Sweden. Its welfare state expanded rapidly during the 1970s and 1980s, but high marginal tax rates dented incentives to work and fiscal profligacy gradually created an untenable economic situation. Interest payments on public debt began to squeeze out social spending. Trust in the stability of the Swedish economy declined and reached an absolute low in the autumn of 1992, when the *Riksbank* (the Swedish central bank) unsuccessfully defended the

krona by raising the interest rate to 500 percent. The deep crisis spurred structural reforms and set the stage for welfare state reforms during the 1990s.

The effects of digitalization are not dramatic in the short run, compared to a fiscal or financial crisis when GDP can fall abruptly and many jobs may be lost. Indeed, there is no compelling evidence to date that employment levels in OECD countries are declining. One reason for this is that the modern labour market has a great capacity for change and continuously creates new jobs, especially in services, as old ones are shed. In Sweden, for example, about 17 percent of all jobs were destroyed and created during the period 1990–2009 – see Heyman *et al.* (2013). In OECD countries as a whole, employment levels have not fallen, although unemployment – and especially youth unemployment – is a major concern after the fallout of the financial crisis.

Yet, although the modern welfare state does not face an imminent crisis, over the medium to long term the changes due to digitalization will put a strain on existing institutions and labour market arrangements. In addition, the welfare state has to cope with unprecedentedly high levels of immigration. The labour market is changing to such an extent that the social contract could begin to crack (Blix 2017).

The legitimacy of the welfare state stands on several pillars that include:

- Comprehensive social welfare spending (health care, education and care of the elderly) financed by taxes
- Social inclusion through universal education, progressive tax systems and transfer payments to reduce income inequality
- A balance of power between trade unions and employers through rules to manage and resolve conflicts and a trade union policy to increase low wages.

Digitalization affects all of these pillars both directly and indirectly. Most will acknowledge that consumption behaviour has changed due to digitalization, but the biggest changes are those that affect the labour market.

The changes to the labour market tend to occur more gradually than in consumption, depending on the rate at which young people are entering the market, older persons are retiring and others are switching jobs. The impact of technology and digitalization on the labour market comes from the accumulated changes of such dynamics. The main impact of technological change and digitalization has been an increase in polarization, which has affected middle-level workers the most (Goos *et al.* 2014). Income has become more volatile and uncertainty in the labour market has grown.

With gradual changes, in principle, there should be ample time to adjust and reform. In practice, the reforms necessary to accommodate changes may be



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¹ I am grateful to Marianna Blix Grimaldi for comments.

made too slow – or not made at all. Firstly, the political system often has difficulties managing reform when the political costs of action tend to be up-front and the potential economic benefits come much later. Secondly, the reform of existing institutions often meets with resistance from special interest groups, employer organizations, the professions and regulatory bodies. Changes typically imply a shift in power, resulting in winners and losers.

The risk of not responding to rising labour market uncertainty and income volatility is that disenfranchisement will continue to rise. Institutional legitimacy may be damaged and, indeed, in some OECD countries the rise of populist parties may be seen as a sign of declining trust in the establishment and the institutions that represent it.

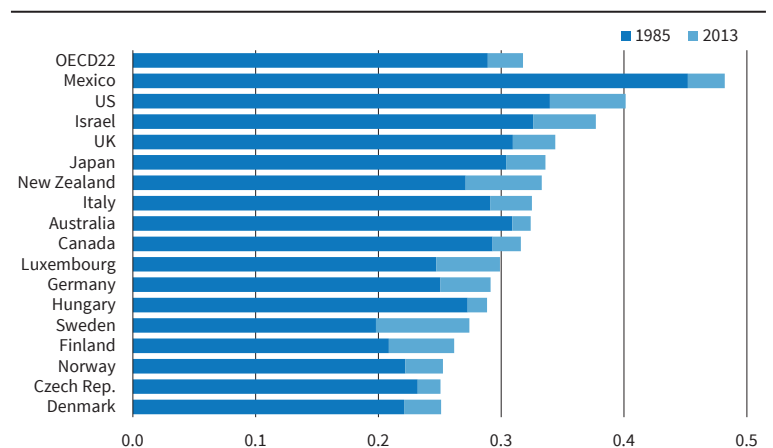
RISING INEQUALITY IN THE WELFARE STATE

A common measure of income inequality is the so-called Gini coefficient. As can be seen from Figure 1, the Gini coefficients have been trending upwards in many OECD countries since the 1980s. Although it is a fairly common measure of income inequality, the Gini coefficient measure has some well-known drawbacks. For instance, in the aftermath of the financial crisis, the fairly modest changes in relative incomes could mask more problematic absolute changes in low level incomes.² In addition, the Gini coefficient does not account for publicly-provided welfare services. For a country like Sweden with comprehensive benefits, this makes some – but not a huge – difference. Other measures like the share of individuals earning below 60 percent of median incomes or measures of risk of absolute poverty may be better at capturing income inequality. However, notwithstanding the measure used, it is unequivocal that inequality has increased in most OECD countries.

Despite increases in income inequality, the Nordics and much of northern Europe (excluding Anglo-Saxon countries) remain in the lower half in terms of Gini coefficients. But not all welfare states have fared the same. It is worth highlighting that Sweden has experienced the largest increase in Gini coefficient since the 1980s. However, this is an increase from a suppressed low level that turned out to be unsustainable. In particular, the 1970s and 1980s was a period of economic stagnation in Sweden with a long-lasting decline in GDP per capita growth rates compared to other OECD countries.

² One way to address this measurement issue is to consider so called anchored poverty rates relative to a base year – see e.g. Blix (2017).

Figure 1
Gini Coefficients in Selected OECD Countries



Note: The Gini coefficient is zero when everybody has identical incomes, and one when one individual has all income. Source: OECD. © ifo Institute

Trade and globalization has probably led to lower income inequality in the world as a whole, but most arguments indicate that income inequality within countries will continue to rise. Rapidly ageing populations will accelerate changes and new technologies will compete with humans in many new areas, notably also in advanced services. Countries need to find ways to address these changes or risk seeing further deterioration in their institutional legitimacy.

A very simple way of summarising different models of growth and social inclusion is presented in Sapir (2005). In Table 1, some countries and regions are divided into combinations of low-high equity and efficiency. A useful way to think about the different country models is to give the labels a broad interpretation. Efficiency can be thought of as productivity growth, per capita growth or capacity for innovation; equity can be thought of as measuring income inequality or, better still, equality of opportunity.

The characterisation is not meant to imply that there is a growth-equity trade-off. Ostry *et al.* (2014) argue that no such pattern is supported by data. Also, OECD (2017a) emphasises that there are several policy levers that support both equity and growth (like the promotion of product market competition, for example). Instead, a country may find it hard for political economy reasons to pursue the reforms that would lead to improvements in either productivity growth or equity.

Most of Table 1 capturing the state of affairs in 2005 stands the test of time, but not all of it. Several

Table 1
Combination of Efficiency and Equity

		Efficiency	
		Low	High
Equity	Low	Southern Europe	US, UK
	High	Northern Europe	Scandinavia

Source: Sapir (2005).

countries have been experiencing declining productivity growth. For Britain the decline began before the financial crisis. Despite rising inequality, Sweden remains a country with one of the most favourable combinations of equity and growth. Will the Swedish welfare state prove better at coping with technological change than other systems?

THE IMPLICIT SOCIAL CONTRACT IN WELFARE STATES IS THREATENED

The welfare state can be seen as a particular type of social contract between different groups: the young and the old; workers and owners of capital; cities and regions. Those in work and in good health pay fairly large shares of their income in tax in order to receive social support when they are old or fall sick. Those living in rural areas are often subsidised by more prosperous regions.

The challenge for all countries is that large relative changes in fortune for some groups or areas can lead to discontent and undermine the willingness to take part in intergenerational transfers or in geographical redistribution. Arguably, political events during 2016/17 could be a sign of such developments. These events include the election of President Donald Trump in the United States, the referendum outcome in favour of Brexit in Britain, and Catalonia's declaration of independence from Spain. Welfare states are by no means immune to this danger, as illustrated by the recent upsurge of populism in prosperous countries with medium-to-low inequality like Germany and Sweden.

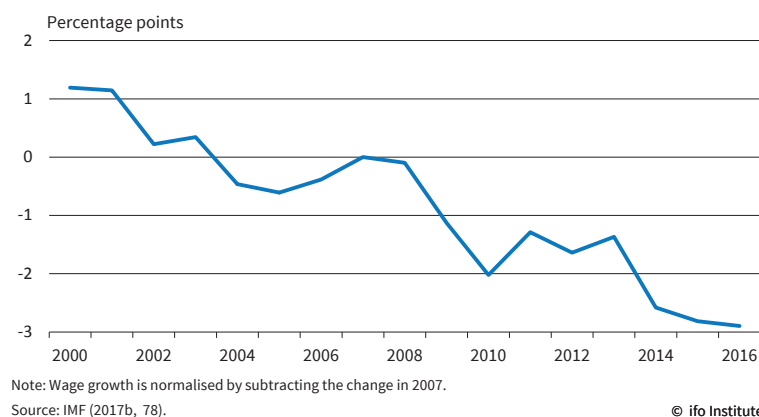
Resentment against the elites that are seen to benefit from changes can, in turn, undermine the social contract that holds the welfare state together, especially in countries with ageing populations and large immigration flows. Stagnant wages may also fuel disenfranchisement.

THE LABOUR MARKET AND STAGNANT WAGES

The labour market is a key to the welfare state. Without a well-functioning labour market that delivers improvements in goods and services, prosperity cannot increase and support for the social contract may wane. One reason for concern in recent years is that wage growth has been stagnant in many advanced economies.

Productivity growth and slack in labour markets are traditional explanations for understanding how wages develop. According to the IMF (2017b), these factors may account for a large share of the recent

Figure 2
Nominal Wage Growth in Advanced Economies Compared to the Level of Wage Growth 2007



stagnant wages.³ As can be seen from Figure 2, wages in advanced economies have been in gradual decline recently, but this process started well before the financial crisis.

Although low productivity growth and the ready availability of workers can go some way towards partly explaining stagnant wages, they cannot fully explain the slow-down. Other explanations include advances in technology and automation that result in stronger competition between humans and machines (OECD 2017b). Even if past technological advances have had a far-reaching influence on work, advances in digitalization are being implemented faster than before (see e.g. Comin and Mestieri Ferrer 2013).

An overall effect of digitalization on the labour market is to reduce the bargaining power of workers. In many professions, the 'middle man' is a function that is under pressure from robots. Such pressures are in evidence in banking, insurance and retail, just to name a few sectors. In banking, for example, the continued fallout from the financial crisis combined with technological advances is leading many banks to reduce staff and automate a range of services. In Sweden, the Financial Supervisory Authority has granted licenses to financial institutions that provide automated advice. Other banks are testing so-called 'robo-branches', which are essentially local bank branches largely unmanned by professional staff.

As emphasised above, at the aggregate level jobs are not disappearing. Instead, technology is creating additional downward pressure on wage growth. Other parts of the economy are also set to be affected. High-street retail, for example, has long been in competition with e-commerce and semi-autonomous check-outs are fairly common. Notably, with automated check-out, the need for cashiers is gradually diminished. Such technology is now close to being rolled out by Amazon.

Such advances in technology have reignited fears that automation will destroy jobs. Frey and Osborne

³ Why productivity growth is low is a big puzzle, but lies beyond the scope of this paper.

(2013), for example, argue that about half-of US jobs may be automated within the next two decades. Arntz *et al.* (2016) use a different methodology and produce lower estimates. More generally, evidence for EU countries continues to point to the labour market’s ability to adapt. Gregory *et al.* (2016) show that job losses are compensated for by demand spill-overs in other areas, meaning that the net effect is mostly stable employment levels. Overall, there is no support for the notion that human work is disappearing.

But there is ample evidence for the notion that the *content* of work is changing – see the general overview in Acemoglu and Autor (2011). Improvement in technology has led to a process favouring those with high-skills in terms of cognitive or social abilities, so-called skilled-biased technological change. For such workers, wage developments have been positive and the share of such work has increased in the economy (Figure 3). By contrast, routine work has been in decline. The overall result has been growing polarisation of the labour market that has been steadily occurring over a long period of time (Goos *et al.* 2014).

The polarisation of work has occurred in most OECD countries. The automation of work can be expected to exert further pressure on wages for those with middle level skills. The tools and technology that are now available could accelerate polarisation compared to previous periods. There is a risk that those who are slow to upgrade their skills will experience further wage stagnation.

At the overall level, a combination of developments could lead to a decline in the wage bargaining power of labour. In addition to technology, both demographics and more flexible employment legislation serve to accelerate changes in the labour market. Ageing populations imply fewer young people compared to the old and so, in principle, the young could fill the jobs of those retiring. With large cohorts leaving the labour market, some areas will even experience a scarcity of workers. In practice, young workers can only seldom directly replace older workers, especially not in positions where on-the-job experience is

important. This means the incentive to automate work will gather strength due to ageing populations, as firms find it hard to find workers with the right skills.

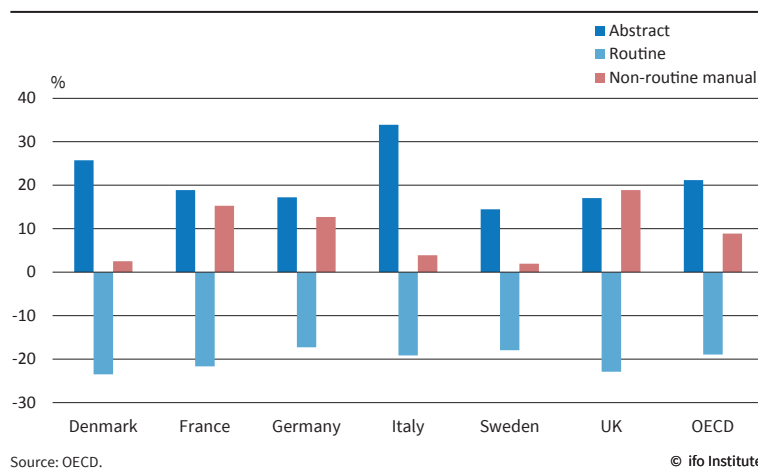
Technology is, of course, not the only factor affecting that bargaining power of labour; for an overview (OECD 2017b). In many OECD countries, protection for temporary or fixed term contracts has been in decline since the 1990s. By contrast, permanent positions have remained largely unchanged. As a result, the duality of labour markets has increased and especially so in Sweden (see e.g. Cahuc 2010). Young people are overrepresented among temporary workers and their share has increased. The OECD calculates that in 2015 around 40 million youths, or 15 percent of those in the 15–24 year age group will be neither in education nor in employment, but will instead be the so-called NEETs (see also OECD 2016).

Technology is not only changing the landscape of work through automation and robots. With the so-called platform based labour market, *non-standard work* is on the rise. Platform-based work has been given many names, including the sharing economy or *gig work*. In what follows, I will use the term *gig work* to denote a situation whereby a worker performs tasks organized through the conduit of a digital platform, and whereby the platform owner does not take employer responsibilities, such as paying payroll taxes and value added tax (VAT).

Gig work has always existed, notably in entertainment, such as in music, art or television. Non-standard work without employment protection is also common in journalism (for an overview of how non-standard work contributes to rising inequality, see OECD (2015)). For example, the self-employed enjoy fewer benefits in social security. In addition, the self-employed are also excluded from additional benefits in collective wage bargaining agreements, such as topped-up pensions, parental leave and sick leave.

Gig work is increasing on broad fronts (Sundararajan 2017). A common misconception is that gig work is only about simple tasks like driving taxis (e.g. Uber) or household services like *TaskRabbit*. The services are much wider and range from medical to legal professions. While gig work has increased strongly in recent years, it remains small in terms of the overall share of employment. Despite its limited size, it could be said to affect the labour market in fundamental ways. Creating a situation whereby a worker is on a permanent standby, 24 hours a day, 7 days a week, lessens the need for permanent workers. One of the largest platforms is *Upwork* which has over 12 million workers worldwide, who perform tasks ranging from web-design to data analysis.

Figure 3
Changing Employment Shares 1995–2010



Consider the thought experiment that today's digital gig platforms had existed for as long as there have been firms. In such a world, would firms have hired workers to the same extent as today's medium and large size enterprises? Probably not. Ronald Coase argued that the existence of the firm supercedes the price mechanism of hiring individual workers on an atomistic market. When the cost of individual contracts is higher than organising work into employment, the existence of the firm can be explained. With gig platforms, the cost of hiring temporary staff on a needs-only basis is much smaller than in the past. Hence, it is likely that the number of permanent workers looks set to drop.

What are the possible implications? The main channel of change is through the normal churn of the labour market: older workers retire, new workers are hired, and there are changes in voluntary and involuntary employment. These changes occur slowly and mostly without drama. In countries with collective wage agreements, bargaining over wages and benefits may occur over various yearly intervals. In Sweden, for example, some wage agreements cover two-to-three years.

Gig markets pose a direct threat to the Swedish labour market model where the trade unions and the employer organisations are responsible for setting wages. Gig contracts *completely bypass* collective wage bargaining agreements. The transaction occurs in the cloud. Moreover, the buyer and seller of services can be in different countries. This means that the traditional trade union threat of boycott is more difficult to use compared to a shop or a factory. The non-payment of taxes is also an issue for the government. A tilted playing field in tax can lead to unfair competition, where tax and regulatory differences play an outsized role in success compared to the efficiency of services.

So far changes have occurred gradually. But most of the incentives point to an unequivocal change in direction towards work and jobs becoming more loosely tied to a single employer and with a shrinking share of permanent employment. Exactly how far this process will continue is hard to say. It will, *inter alia*, depend on the policy responses of governments, employers and trade unions.

For the welfare state, it means both more flexible labour markets, but also that security through work will be lower than in the past. In Sweden, collective wage bargaining agreements cover about 90 percent of the present labour market. A system of collective wage bargaining can probably survive a small share of

gig work in the economy, but begins to lose its legitimacy if gig work becomes very popular.

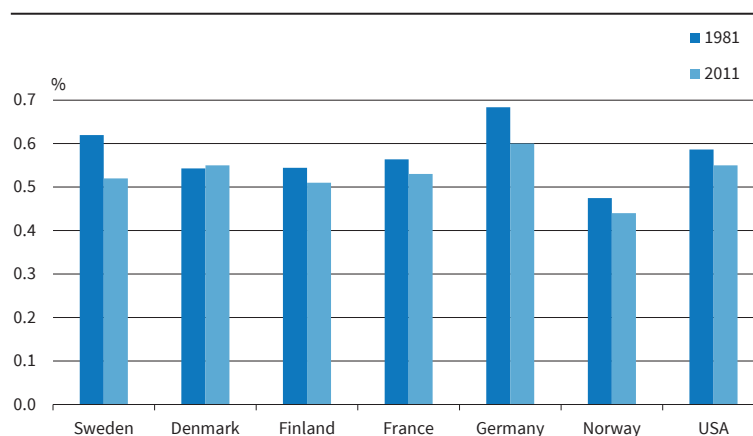
FINANCING THE SOCIAL WELFARE STATE: TAX BASE ON LABOUR BECOMING MORE MOBILE

The mobility of capital has been a feature of world economies for a long time. Of course, workers have a longstanding tradition of switching jobs, even if not as readily as capital. However, as outlined in the previous section, technology is now increasing the mobility of labour in ways that were not previously possible. Technology makes it easy to outsource work with a simple press of a button to global gig markets. Moreover, the expanding possibilities of automating all forms of services from simple to advanced will make it easier for firms to replace human labour with machines. This will have implications for government revenues, as tax on labour is one of the largest tax bases: on average, about 50 percent of government revenue stems from tax on labour in OECD countries. The implications may be even more significant in countries with high tax rates on human work, and notably, of course, with welfare states. It is not that governments will not be able to collect revenue. Rather, the challenge is that the distortions of high tax on labour may become more significant, which poses risks to productivity growth.

The threat to government revenue and the advent of rising distortions are not immediate. Instead, labour markets are likely to change over many years, but there are already some indications that the relation between machines and humans have shifted. Karabarbounis and Neiman (2014) show that the wage share of national income has fallen in most industrialised countries over the last three decades (see Figure 4). This means that as GDP is expanding, humans are no longer keeping the same share of the pie.

IMF (2017a) calculates that around half of the decline in the wage share of labour can be attributed to technology. Notably, this development has been observed years before smartphones became ubiquitous and

Figure 4
Wage Share of National Income



Source: Karabarbounis and Neiman (2014).

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before the so-called frightful five digital behemoths (Amazon, Apple, Facebook, Google and Microsoft) gained dominance in global markets. Since the capacity of software has expanded greatly, it stands to reason that the wage share of labour is set to fall further. This could induce an even more significant shift away from human labour to machines. Evidence from other areas shows that high tax rates can give rise to big shifts. For example, Davis and Henrekson (2005) show that high tax rates can lead to a sizeable substitution between legal and shadow economy, as well as between unpaid household production and market production. The effects from automation could be even larger.

CONCLUSION

As labour markets are becoming more polarised, inequality increases and income uncertainty becomes more pronounced. What happens to the legitimacy of institutions when a large number of persons get less of the benefits of growth and when the share of labour market outsiders grows?

Welfare states may be more resilient to these changes than other countries. Notably, they have more well-developed and inclusive social safety nets. They are geared towards providing social security and support workers to find new jobs through retraining and education.

But the welfare state also has some weaknesses: the high levels of taxes required to support welfare spending create even stronger incentives for firms to automate work or to buy services on global *gig* markets, thus bypassing the high taxes and collective wage agreements that are the key pillars of Nordic labour markets.

The ultimate impact on the welfare state depends on the policy responses of governments, trade unions and employer organisations. Trade unions that adapt and provide new forms of support and safety to their members could remain relevant to workers and partially offset the increase in income uncertainty. By the same token, governments may try to broaden tax bases to support welfare ambitions, especially for the self-employed.

It is hard to say how likely institutions are to rise to the challenge. One political difficulty is that the changes tend to be gradual; and it may be tempting to postpone reforms rather than address the hard choices early on. Institutional reform may also be hampered by special interest groups and lobbyists that act to protect the *status quo*.

Low inequality is crucial to the welfare state, yet it is set to rise further in the future. Without judicious reform, the welfare state will not be immune from cracks in the social contract. One way or another, the outcome for the welfare states hangs in the balance in the years ahead. Will the welfare state be able to reinvent itself once again?

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What about Welfare 4.0?

INTRODUCTION

Internet of Things and Work 4.0, E-Health and E-Government: increasing digitalisation is about to enter all areas of the economy, society and politics. This is triggering changes in many areas, which will naturally also affect welfare states. Digitalisation is changing not only production and consumption, but also how participation in politics and society is organised; how states and governments provide social services; how participation in the labour market works; how healthcare services are delivered and so on (Buhr *et al.* 2016). While a lot of studies in this area initially focused on the opportunities for productivity and economic growth, others predominantly address the risks of digitalisation for the labour market and predict an ‘end of work’ (see Frey and Osborne 2013; Brynjolfsson and McAfee 2014). Besides this debate, there is currently little in-depth research available into the consequences of digitalisation in and for contemporary welfare states and their adjustment towards Welfare 4.0.

However, a number of fundamental questions need to be answered. What effects might digitalisation have on health-care systems, economy and the labour market? How far have developments in individual welfare states progressed? What further developments can we expect? And how will policymakers in the relevant policy areas react to these changes?

This paper will discuss these questions. The analysis is based on a study design by Claudia Christ, Marie-Christine Fregin, Rolf Frankenberger, Markus Trämer, Josef Schmid and myself (Buhr *et al.* 2016) and focuses on a comparison of seven welfare states: Britain, Estonia, France, Germany, Italy, Spain and Sweden. One objective of this study is to compare the development of, as we call it, external and internal modernisation in different welfare states. It will provide an insight into comparative welfare state research, which forms the basis for selecting the seven countries under examination.

DIGITALISATION OF THE WELFARE STATE

With the increasing digitalisation and interconnectedness of business and society in the twenty-first century, the capitalist production regimes of contemporary

industrial societies are changing fundamentally. More specifically, the technical and social innovations of these developments – that are often framed as Industry 4.0 – are a key challenge for contemporary societies. On the one hand, these innovations create new opportunities for cooperation and production, while, on the other hand, they force these societies to adapt. This requires people to have special knowledge, skills and abilities so that they can function in the ‘new digital world’. A growing number of (routine) tasks are being performed by machines and new tasks for people are emerging that demand new skills.

In short, what is often referred to as the fourth industrial revolution not only influences production regimes and individuals, but also has a far-reaching impact on society as a whole and on social protection systems. If the production regime changes, this generates specific problems, difficulties and needs that need to be compensated for by the state and society. This usually takes place *via* welfare systems because capitalism and welfare state are two sides of one and the same coin (Offe 1972). Both systems – the industrial production system and the welfare state redistribution system of social protection – are subject to digital change.

However, whereas production systems change and adapt rapidly, the redistribution systems of welfare states are path-dependent and persistent. As a result, existing welfare state structures are coming under pressure and have to be adjusted. Here digitalisation essentially has two different impacts on the welfare state. Firstly, digital transformation is creating a new age of industrial production, ‘Industry 4.0’. This can be termed an external modernisation effect on welfare states. By altering production and disseminating information and communication technologies and automation, new demands arise for labour in general and for employees in particular (Autor 2015; Arntz *et al.* 2016). The processing of these changes and challenges needs to be supported by the welfare state.

Secondly, the digitalisation of the welfare state is causing internal modernisation effects. They are related, on the one hand, to the digitalised administration of welfare and the technical environment, such as the proliferation of internet connections and broadband expansion. On the other hand, internal modernisation involves developing the individual skills and abilities that digitalisation requires with regard to information processing, in order, for example, to take part in the community and the labour market. The question of how the welfare state handles (new) social inequalities – known as the ‘digital divide’ – and what solutions might be found to counter the effects of digitalisation goes hand in hand with this. If external and internal modernisation is in equilibrium, social innovation could also arise from technical innovation. This not only drives Industry 4.0, but also transforms the welfare state in the direction of Welfare 4.0.



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COMPARING WELFARE STATES

In comparative welfare state research, a distinction is made between different types of welfare state (Buhr and Stoy 2015). They reflect the relevant experiences of each state’s national political and social history, as well as the political balance of power (Schmid 2010). Here the emphasis is on the classic schema proposed by Danish sociologist Gøsta Esping-Andersen (1990), which resonated widely and is still of great significance today. His ‘three worlds of welfare capitalism’ categorise states as either ‘liberal’, ‘conservative’ or ‘social democratic’. Each of these types follows a historically evolved development path and has its own logic with regard to the organisation of social policies, pattern of social stratification and inequality (in particular in the employment system), and forms of social integration or exclusion (Schmid 2010). Esping-Andersen (1990) defines three dimensions that have different effects on the different welfare types: decommodification, stratification and residualism.

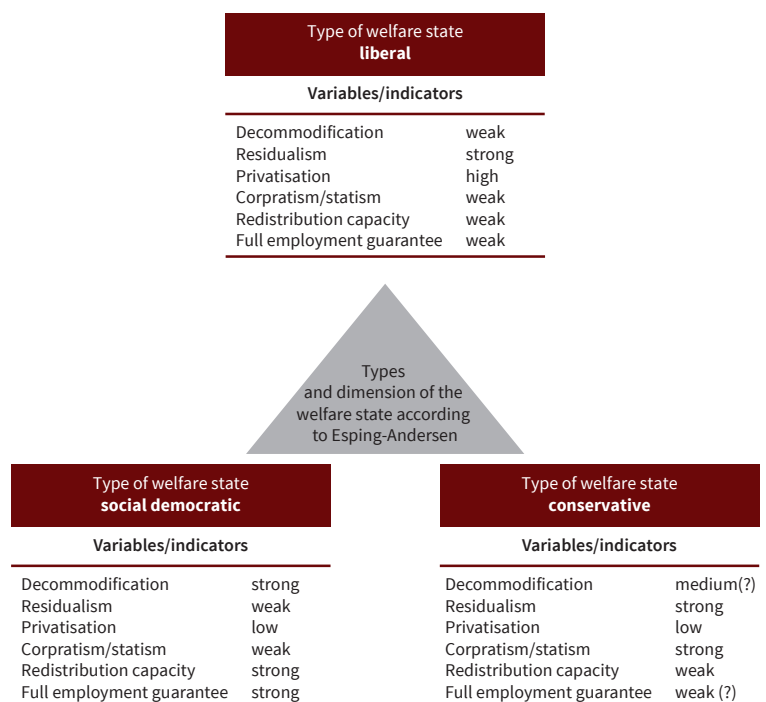
Decommodification refers to the relative independence of the social security of the individual from the pressures and risks of commercially oriented (‘market’) policy and decision-making. In other words, the higher the level of decommodification, the lower the individual’s dependence on selling work as a commodity in order to secure their own survival. This is achieved by the type and amount of social security benefits. Stratification refers to the vertical and horizontal economic and social segmentation of society. This involves describing social inequality in terms of income and social status. By providing social security systems and benefits, the welfare state is an instrument of redistribution “to influence and, where applicable, correct the social inequality structure” (Esping-Andersen 1998, 39). At the same time, different types of welfare state themselves generate a specific form of stratification. Residualism is understood as the specific interplay between market, state and family with regard to individuals’ social security and therefore the extent to which the state intervenes in this mixed relationship between private and public provision. Esping-Andersen (1990) used the above dimensions to develop three ideal-types, which will be discussed below.

The emphasis in a liberal (or Anglo-Saxon) welfare state model is on a hands-off state social policy that focuses on those deemed most in need, supports the welfare production functions of the

commercial sector and leaves other welfare production to private providers and the family (Schmid 2004). The overall decommodification effect is weak, with social entitlements set at a low level and means-tested on a case-by-case basis. There is a stigma attached to applying for such entitlements (Schmid 2010). One example of this type is Britain. Others include Canada, the United States and Australia. The conservative (or continental European) welfare states are based on strong state social policy which emphasizes insured individuals maintaining their status. Such states are characterised by a Bismarck-style social insurance model in which the socio-political role of commercial interests is usually low, while that of the family is prioritised in accordance with the principle of subsidiarity (Schmid 2004). Associated with the principle of subsidiarity is the influential role of the churches, which also play a key role in ensuring that traditional family forms are preserved (Esping-Andersen 1998). In contrast to the liberal model, the decommodification effect is more strongly developed and the state intervenes more strongly. Social rights are linked to class and status, which leads to the maintenance of status and group differences (Schmid 2010). Examples of this welfare type include Germany, France and Austria.

Social democratic (or Scandinavian) welfare states are based on a social policy characterised by universalism, strong decommodification and ambitious ideas of equality and full employment. The aim here is to minimise dependence on commercial interests and family (Schmid 2004). Decommodification effects are most strongly felt in such states. Examples of this type are

Figure 1
Types and Dimensions of Welfare States According to Esping-Andersen



Source: Schmid (2010).

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the Scandinavian countries of Sweden, Norway, Denmark and Finland.

Figure 1 summarises the key features of the three types of welfare state systematically compared in triangular form. This clearly shows Esping-Andersen's ideal categorisation and indicates the mixed forms that actually exist.

In the meantime, Esping-Andersen's approach has been extended to include two additional welfare state types: firstly, the rudimentary or 'Mediterranean' welfare state type, which expressly includes the countries of southern Europe (Spain, Portugal, Greece, and to some extent Italy), and secondly, the 'post-socialist' welfare state type found in the transitional political systems of central and eastern Europe. The Mediterranean welfare state is characterised by the stronger role of the family and the lower level of social benefits (Leibfried 1990; Lessenich 1995). Social security systems in this group of countries are typically only partly developed and welfare entitlement has no legal basis. In this context, it should also be noted that this group consists of less industrialised, structurally weak and poorer countries in which only relatively low incomes are generated commercially (Schmid 2010). One specific feature of this type is the high degree of employment protection (Karamessini 2007). The collapse of the Soviet Union and the transformation of its former member states have resulted in a further welfare model being added (Götting and Lessenich 1998): the post-socialist welfare state. It is described as an authoritarian remodelling of the social democratic welfare type. Its transformation towards a welfare system in accordance with the western European model is a gradual one and encompasses both old and new characteristics, which makes it to an institutional hybrid.

To answer the core research questions of this study, a comparative design was selected. This process specifically examines the development paths and responses of various welfare states to the challenges and opportunities of digitalisation. Based on the five worlds of welfare capitalism cited above, seven countries were chosen and individual case studies were initially conducted on each of them. Germany and France represent the conservative welfare state type, Sweden the social democratic welfare model and Britain the liberal welfare state. Estonia is primarily considered to be a post-socialist welfare state given its collectivist welfare structures in many areas, even if the country today exhibits a number of liberal characteristics following the comprehensive economic and social state reforms that took place after independence: a very low proportion of social spending (14.8 percent of GDP), above-average income inequality, a very low level of organisation of workers and only a very weak institutionalisation of labour market relationships. Spain and Italy are included here as examples of the Mediterranean welfare state. While Spain is a classic representative of this type, Italy may also be considered as a conservative welfare state, given the dominant role of

social insurance and, at the same time, the fairly passive role of the state. There is, however, disagreement among researchers over this classification. According to Ferrera (1996) and Lynch (2014), Italy belongs to the group of Mediterranean welfare states, but the latest social state reforms point towards a gradual departure from this in the direction of the conservative model.

Table 1 gives an overview of the core indicators of each country's political system, economic performance, status of digitalisation and level of spending in individual policy areas compared with the EU28. Here considerable differences become apparent, not only with regard to the status of digitalisation, but also in terms of state organisation, economic output, spending on labour, innovation and social matters, and other parameters that provide the framework for the digitalisation of the welfare state.

DIFFERENT PATHS TO WELFARE 4.0 – LABOUR AND HEALTH

The increasing digitalisation of value-added networks and the greater use of new technologies, flexible production processes and new work forms are leading to changes in welfare state architectures (Schmid 2010). It tackles various policy fields, starting with the labour market, over to education, science and innovation up to health and social care.

Labour

As the central location for distributing life opportunities and social security in contemporary capitalist market societies, the labour market is affected by digitalisation and automatisisation in two ways: firstly, and as mentioned before, these technological developments are drivers of structural change; and secondly, these developments enable new ways to organize work that could lead to a growing number of short hirings, zero-hour contracts and other forms of labour-on-demand.

The rise of digitalization and automation, artificial intelligence and robots triggers a downsizing of a variety of routine tasks traditionally performed by humans. Famous claims have been made that half of all jobs in industrialised countries are so susceptible to automation that they will disappear in the next two decades (Frey and Osborne 2013). However, automation will affect certain tasks, not whole occupations. In many occupations, tasks that can be automated through new technology are bundled with tasks that are inherently difficult to automate. With this approach, the share of jobs threatened by new technology more closely resembles the pace of structural change we are used to. Furthermore, we must not underestimate human creativity, nor the human ability to find new desires that needs to be fulfilled. Jobs will disappear, but new jobs, occupations and companies will emerge on the same time. Therefore, labour market policies will have to be even more far-sighted, since real employment security

Table 1
Status of Digitalisation and Level of Spending in Individual Policy Areas (2016)

	Germany	Estonia	France	Italy	Sweden	Spain	UK	EU28
State form	Federal democratic republic	Democratic republic	Semi-presidential republic	Parliamentary republic	Constitutional monarchy	Constitutional monarchy	Constitutional monarchy	
State organisation	Federal	Unitary	Unitary	Unitary	Unitary	Federal	Federal	
Party system	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple	
Election system	Personalised proportional representation	Proportional representation	Majority voting system	Majority voting system & proportional representation	Proportional representation	Proportional representation	Majority voting system	
EU member since	1 Jan. 1958	1 May 2004	1 Jan. 1958	1 Jan. 1958	1 Jan. 1995	1 Jan. 1986	1 Jan. 1973	
Inhabitant per km ²	226.6	30.3	104.5	201.2	23.8	92.5	266.4	116.7
Urbanisation (% of population)	75	68	80	69	86	80	83	74
Welfare regime	Conservative	Liberal/post-socialist	Conservative	Mediterranean	Social democratic	Mediterranean	Liberal	
Interpersonal trust index ^{a)}	5.5	5.8	5.0	5.7	6.9	6.3	6.1	5.9
Income inequality (distribution quintile)	5.1	6.2	4.3	5.8	3.8	6.9	5.2	5.2
Spending on social security (% of GDP)	29.0	14.8	33.7	29.8	30.0	25.7	28.1	28.6
GDP per capita (in PPP, EU=100)	125	74	106	95	123	92	110	100
Real GDP growth rate (%)	1.7	1.4	1.3	0.7	4.1	3.2	2.2	2.2
Budget deficit/surplus (% of GDP)	0.7	0.4	-3.5	-2.6	0.0	-5.1	-4.4	-2.4
Productivity nominal per worker (EU=100)	106.6	69.7	114.4	106.5	113.2	102.6	102.6	100
Harmonised unemployment rate (%)	4.2	6.8	10.5	11.4	7.2	19.5	4.8	8.6
Trade union organization degree (0-100)	18.13	5.65	7.72	37.29	67.26	16.88	25.14	
R&D overall expenditure (% of GDP)	2.87	1.44	2.26	1.29	3.16	1.23	1.70	2.03
Share of 20-24-year-olds with secondary level II as a minimum	77.1	83.4	87.2	80.1	87.3	68.5	85.7	82.7
Tertiary degrees in MINT subjects (per 1.000 graduates)	16.2	13.2	22.9	13.2	15.9	15.6	19.8	17.1
DESI index (0-1; 1=digital society)	0.57	0.59	0.51	0.40	0.67	0.52	0.61	0.52
Share of regular internet users (16-74 years. %)	84	86	81	63	89	75	90	76
Internet access density (% of households)	90	88	83	75	91	79	91	83
Share of households with broadband connection (%)	88	87	76	74	83	78	90	80
Share of companies with broadband connection (%)	96	97	96	94	97	98	96	95

Note: ^{a)} 0 = no trust. 10 = complete trust.

Source: Buhr *et al.* (2016) based on various data bases including Eurostat, World Bank and OECD.

will not lie in the job you have, but in the jobs you can get. And here, some people (highly-skilled) are much better prepared for this than others (low-skilled), which could lead to growing inequalities.

The welfare state is supposed to counteract inequalities by redistribution and protecting against certain risks. At the same time, the welfare state itself is based on social stratification, which more or less privileges gainful employment. Digitalisation results in new challenges. Particularly stratified welfare states (i.e. Germany, France, Italy) are more likely to produce a digital divide between those who have the necessary skills to find their way around the digital environment and those who do not have those skills and are therefore more exposed to the dangers of work casualisation (see SBTC). Digitalisation in this situation does not alter

the demand for work equally across all skills levels, but tends to have a polarising effect instead. While demand rises in highly-skilled areas, it falls for non-manual routine work (Arntz *et al.* 2016). This is because “new production technologies, in particular information-processing technologies [caused by digitalization] make, on one hand, many unskilled tasks unnecessary but require, on the other hand, corresponding knowledge and skills to apply those technologies” (Groß 2015, 217).

One central requirement in all the countries examined is to acquire the skills necessary for Work 4.0 in a digital economy. This means that the interfaces between the labour market and education, in particular, become relevant and one of the crucial fields of future welfare state action. In knowledge societies and high-tech industries in particular, education is not only cru-

cial for the innovation potential of a society, but also important for social inclusion. This applies increasingly to countries such as Spain, Italy and France that are affected by constantly high youth unemployment.

Most governments in Europe are addressing the situation with reform programmes aimed mainly at attaining more flexibility and less regulation, but also activation and skills measures. In all the countries examined there is evidence of an increase in ‘atypical’ employment relationships. These often go hand in hand with precarious employment careers and restrictions on integrating into social security systems. Here ways must be found to include new work models (for instance, crowd and click-workers working as self-employed individuals) in existing security systems.

Digitalisation has the potential to increase productivity and could therefore boost demand and create new professions and activities. If appropriate investment is made, this can even result in employment growth. Rising demand for workers, however, is to be expected mainly in areas that require greater skills. Decent jobs need inclusive growth. Given that professions and activities can be automated in different ways, all the welfare states examined here require solutions for all those who lose out in the digitalisation process. This requires greater investment in professional development and life-long learning for low-skilled workers, as well as for older workers.

Digitalisation brings new opportunities, but also entails risks. Societies that want people to take professional risks therefore require social security systems that are able to cushion such risks. In short, working is becoming more mobile, more flexible and less contained. This can be positive, for instance in achieving a better work-life balance, but also negative if the boundaries between work and leisure become blurred. Because new social risks require new ideas to ensure a social security net, the long-term question that needs to be asked is whether and how we might design a social security net that is decoupled from work and how we might arrive at EU-wide regulations.

Health and Social Care

Digitalisation also changes the health and social care systems, which are already one of the largest employers in most of the welfare states. Digital services are entering the market and starting to monitor our behaviour: apps count our steps, wearables measure our blood pressure. Customised and personalised medicine offers the opportunity to provide optimal support, but is a concern if this data are made available to employers, for instance. For that reason, the data must be owned by the patient, but this is only the case in very few welfare states in reality, although the same applies in the analogue world. For the most part, patient data involve ownership without possession (that is, the data, including analogue data, lie with i.e. doctors) or possession without ownership (lots of data lie with lots

of doctors, care organisations and hospitals). With the growing risk of cyber crimes, however, topics like data safety and security will probably enter the political agenda in a growing number of states in the near future.

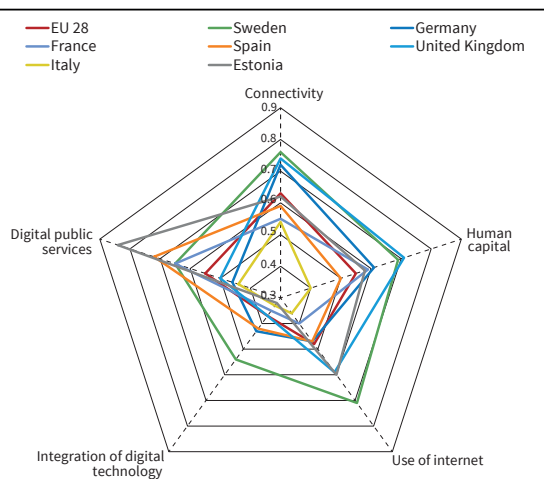
This is one side of digitalisation. The other is better quality of life due to improved and more convenient medical and care services, including in rural and sparsely populated areas, if they are equipped with the appropriate digital infrastructure, like for instance in Denmark, Finland, Sweden, Estonia or Scotland. This is because the digitalisation of health care offers huge opportunities. It could e.g. make it possible to avoid multiple examinations, cumbersome documentation and bureaucracy, and therefore lead to cost savings. In addition, it could improve diagnosis, prevention, treatment and medication; it could connect and dovetail formal with informal care-givers in order to improve and reduce the burden of social care; and it could lead to more efficient processes, shorter waiting times and approaches, and thereby more time for people and person-centered services.

Using digital technologies requires digital literacy, in other words, basic skills that enable people to draw the greatest benefit from these new technologies. For citizens to be interested in these technologies, however, they need to recognise what the benefit is for them or how these innovations could specifically improve their day-to-day life. If citizens are less prepared for digitalisation and do not have the basic skills required, digitalisation will not be able to achieve its full potential, whether through the use of internet connections in general to health services in particular. Here, Italy and Estonia represent two contrasting case studies. It is striking that those countries that have strong administration units and have tried to manage digitalisation top down in large-scale projects are those in which the debate about small-scale innovations is more prominent. Here, the problems experienced in Germany and Britain with health cards, the disappearance of patient data and records, and general data protection problems in the NHS with care-data provide particularly noteworthy examples. On the other hand, decentralised states struggle with translation problems and fragmentation when implementing digitalisation, as seen in Spain and Italy. It seems that a mix of centrally determined requirements and operational autonomy at a regional and local level is indeed conducive to achieving objectives.

DIGITALISATION AND WELFARE STATES – EQUAL OR UNEQUAL?

Digitalisation is giving rise to challenges of varying intensities in the different welfare state models. Firstly, as Figure 2 shows, the countries examined occasionally differ widely in terms of the degree of digitalisation in economy and society that they have already achieved, from setting up and expanding digital infrastructure to building digital human capital, integrating digital tech-

Figure 2
Comparison of the Digital Economy and Society Index 2017



Source: EC DESI (2017). © ifoInstitute

nologies into the economy and driving digital public services. Irrespective of the type of welfare state, then, the key aim must initially be to establish high-speed networks across all states and to promote human capital. Secondly, depending on the type of welfare state, there are also different challenges in terms of content. Measures which are comparatively easy to integrate for one welfare state may have a centripetal effect in others. For instance, the issue of employment protection in a period of decentralised, flexible and digital work in liberal, conservative, Mediterranean and social democratic states will require different solutions. Applying dimensions of internal versus external modernisation, on the one hand, and social inequality, on the other, we can construct a model that systematically shows the interactions between digitalisation and the welfare state; and in which we can position the states that have been examined (see Table 2).

Comparison reveals that Sweden has the lowest level of social inequality due to the high redistributive capacity of its social democratic welfare state. It is also proactively and consistently modernising its welfare state internally. Sweden can therefore be considered a pioneer of Welfare 4.0. Similarly, Estonia and Britain, with their relatively good levels of network coverage and progress in digital public services, are taking the

Table 2
Modernisation and Social Inequality
Comparison of interactions

		Modernisation	
		External	Internal
Social inequality	Low		Sweden
	Medium	Germany France	UK
	High	Italy Spain	Estonia

Source: Buhr et al. (2016).

route of internal modernisation and benefiting greatly from this in the areas of connectivity and digital public services. However, it is also becoming apparent that the much stronger stratifying effect of post-socialist (Estonia) or liberal (Britain) social security systems does not cancel itself out. In fact, it is actually accentuated if it is not accompanied by targeted welfare state measures. Estonia, in particular, is struggling with the effects of a strongly dualised labour market and the social inequality that this entails.

By contrast, the conservative welfare states of Germany and France are more strongly driven by external modernisation effects. The welfare state subsequently adjusts to the external challenges of Industry 4.0. Here, the question of recalibrating society’s internal redistribution of labour and welfare benefits becomes one of the key issues. The Mediterranean welfare states of Italy and Spain face the biggest challenges. On the one hand, social inequality is high and exacerbated by the effects of the economic and financial crisis, particularly in Spain. On the other hand, external modernisation effects, especially on the labour market, are leading to the further stratification of these societies. At the same time, the systematic digitalisation of the welfare state offers great development potential, especially with regard to integrating digital technologies into industry, building human capital and driving digital public services. Spain, for instance, is taking the route of digitalising public services as a possible strategy for coping with the consequences of the economic crisis and with latent modernisation problems. It is now slowly catching up.

CONCLUSION

Can digitalisation bring about economic and social progress as well as equality? Perhaps it could, but not to the same extent in each and every welfare state setting. The Scandinavian welfare states (Sweden, Denmark, Finland, Norway) seem to be in a beneficial position since the internal modernisation of these welfare states is already on a higher level than in most of the liberal, Mediterranean, post-socialist and conservative welfare states. It may therefore be wise for governments and public administrations to focus more on these internal modernisation effects, by using digitilisation to modernise the health, care and education system, for instance, and to foster equal access to these services throughout society, for people that live in cities as well as in rural areas.

This requires, however, in some of these welfare states to shift away from strict financial and austerity policies in order to allow policy makers to become more active again and invest, for example, in innovation, research and education, in social as well as digital infrastructure.

This could perhaps be the vision of Welfare 4.0: enhancing our welfare states in such a way that they absorb the risks of growing flexibilisation on the one

hand, and offer us new ways of harnessing the opportunities of working without space and time constraints on the other, which could be an important prerequisite for social progress too, enabling as many people as possible to lead an independent and self-determined, active and healthy life.

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Enzo Weber*

Employment and the Welfare State in the Era of Digitalisation



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Everyone has been talking about digitalisation and 'Industry 4.0' for several years now. Although some of this discussion is hype, profound changes in the labour market can be expected thanks to intelligent, interconnected digitalisation. After previous industrial revolutions, this ongoing process now involves interconnecting the virtual-digital and physical worlds, as well as machine learning in production. The aim is that the value chain can be controlled entirely by digital means, or that it can control itself in a self-organised way, within and beyond company borders. The result is supposed to be a more efficient, flexible, and individual production chain.

From a business point of view, two main concerns can be identified: on the one hand, a new way of organising and dividing labour in production, as well as between humans and machines. On the other hand, however, digitalisation is also about developing new ideas and creating new value by tapping the digital potential that can be harnessed from large amounts of data. This all amounts to new business models on the market side of companies.

For the labour market and the welfare state, two major issues arise: firstly, what is the future of employment; and secondly how can public institutions handle this profound technological change?

STRENGTHS AND WEAKNESSES OF GERMANY 4.0

What is the outlook of a continental economy like Germany, particularly in the light of digitalisation? On the one hand, Germany is economically well-equipped; on the other hand, however, a range of completely novel challenges awaits, as Weber (2016) argues. German companies are particularly well-represented in interconnected mechanical and plant engineering, as well as sensor technology. Those sectors play to the typical strengths of the investment goods and export industry. In cloud technology and big data, however, there are other leaders; primarily based in the United States. It is these latter fields, however, that could form the core of intelligent control and communication. In this respect, Germany could quickly find itself in the position of an extended workbench of a modern digital economy if there is an excessive focus on traditional strengths like mechanical engineering. Germany's undisputed strength in the export of

high-end industrial goods, particularly over the last decade, could no longer be guaranteed under such circumstances.

Its second strength, which could also turn into a weakness, lies in the structure of the German economy. While the news is dominated by major corporations, the vast majority of workers in Germany are employed by small and medium-sized companies (SMEs). In the past, there was no need to worry about the innovation capacity of German SMEs. However, 4.0 Digitalisation is happening on a whole new level of abstraction, complexity, and interconnection; and handling it is no mean task within the limited structures of smaller companies.

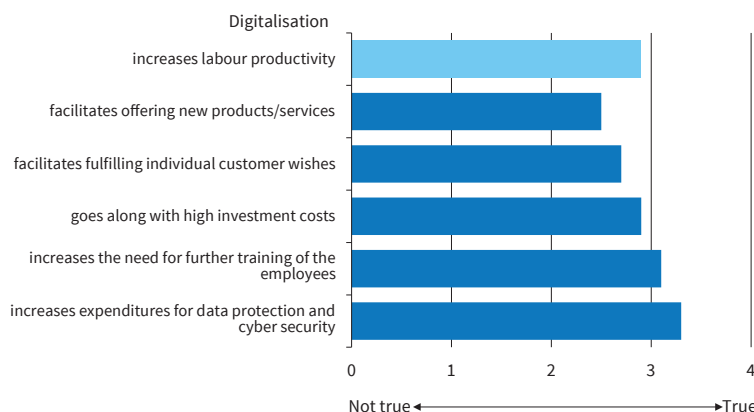
Moreover, the German system is also facing a number of internal challenges too. Production, knowledge, sales and development activities are growing ever closer together. This means that the typical German dividing line between tasks is blurring. At the same time, hierarchies are becoming flatter. The importance of formal authority is increasingly being replaced by topic-specific networks and streams of information. The strengths of many German companies, oriented towards productivity and quality, must be developed further towards flexibility. Particular emphasis should be placed on reconciling companies' need for flexibility with that of their employees. Demands are growing, especially with regard to short and long-term working hour arrangements, and partly also due to a shift in the perception of social roles. In some areas, this means that entirely new technical possibilities will arise for such a connection, but the organisational implementation remains a challenge.

EMPLOYMENT: NO DECLINE, BUT MAJOR CHANGES

Even if 4.0 Digitalisation is heavily implemented in Germany, its effects on the labour market in particular will be ambivalent. When observing digitalisation from a technological perspective, the typical result is a high degree of substitution of human work by machines. From the perspective of the welfare state, this has led to intense discussions over an unconditional basic income: while productivity would rise, a substantial drop in the number of jobs would call into question the income distribution mechanism that our working societies are currently built on.

The actual effects of digitalisation on the labour market, however, require a comprehensive economic assessment while taking into account a variety of effects: jobs disappear, new jobs are created, demands and activities change, production becomes more efficient, new products are created, income is generated and introduced into the economic cycle, labour supply and demand as well as wages and prices are adapted. The results of current assessments differ immensely, as shown by discussions in Frey and Osborne (2013) or Autor (2015). On the one hand, there are fears of massive job losses as contemporary occupations are rendered superfluous by robots, and on the other, there

Figure 1
Corporate Assessments of the Effects of Digitalisation
 Levels of agreement



Source: IAB/ZEW Business Survey 'Working World 4.0', 2016.

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are hopes of large-scale employment and innovation gains.

This ambivalence is also reflected in company survey results. Figure 1 shows, for example, that respondents believe that digitalisation will increase labour productivity. This means that the same value can be created with less labour. However, companies also expect additional effects on new products, investments, further education, and data privacy, among others. If all of these services were performed, this would generate additional employment.

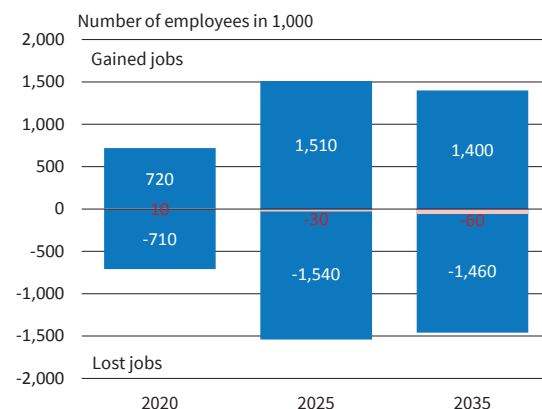
A study comprehensively analysing the effects of 4.0 Digitalisation on the economy and the labour market was recently presented by the Institute for Employment Research (IAB), the Federal Institute for Vocational Training, and the Institute of Economic Structures Research (Wolter *et al.* 2016). Compared to the predecessor study, 'Industry 4.0' (Wolter *et al.* 2015), the perspective is broadened and the implementation of 'Economy 4.0' including digitalisation in the services sector is considered. While the keyword for Industry 4.0 is often a 'factory devoid of humans', the services include, among other things, 'autonomous driving' or fully automated logistics.

The study takes the current labour market projection from the *QuBe project* as the 'basic scenario' and compares it to an 'Economy 4.0 scenario'. The latter is specified along the lines of a comprehensive set of assumptions that cover the implementation of 4.0 Digitalisation in Germany. This scenario shows an increase in value creation by approximately 80 billion euros (almost 3 percent of current GDP) within the span of ten years beyond the basic scenario. In the light of increasing productivity and higher demands made of employees, this results in higher wage sums on the one hand and higher profits on the other, given more efficiency and revenue for new products. The employment level does not show any significant changes. The whole scenario therefore reflects neither the fear of high job losses nor the hope of high job gains. Behind

that, however, there are considerable changes: a large-scale introduction of Economy 4.0 in the year 2025 would result in the loss of approximately 1.5 million jobs, which were still there in the basic scenario, but also in the creation of 1.5 million additional jobs in other areas (see Figure 2). The trend shown by these results is confirmed by Warning and Weber (2017), who examine the present employment dynamics subject to company-level digitalisation trends. No overall negative employment effects can be identified, but companies with a trend towards digitalisation show a higher rate of both hiring and dismissal rates.

In particular typical professions in the manufacturing are like machine and facility-controlling and maintenance professions are in decline. Dampening effects can also be found in electronics, chemical, and synthetic materials professions, as well as office and commercial services professions. The strongest repercussions are felt in the occupational areas of finance, accounting and book-keeping. By contrast, IT, scientific and teaching professions (which benefit from the need for further training) are on the rise. In terms of requirement levels, the demand for complex and highly complex activities is growing by approximately 800,000, while it is declining for unskilled (- 60,000) and particularly specialist activities (- 770,000) (see Figure 3). Expressed in qualification stages, this is reflected in gains in the academic area, as well as losses in the vocational and unskilled area. This shows that the development towards Economy 4.0 will also affect the medium-skill range of the labour market, which is particularly strong in Germany. But one must not interpret these effects as a mechanical process: speci-

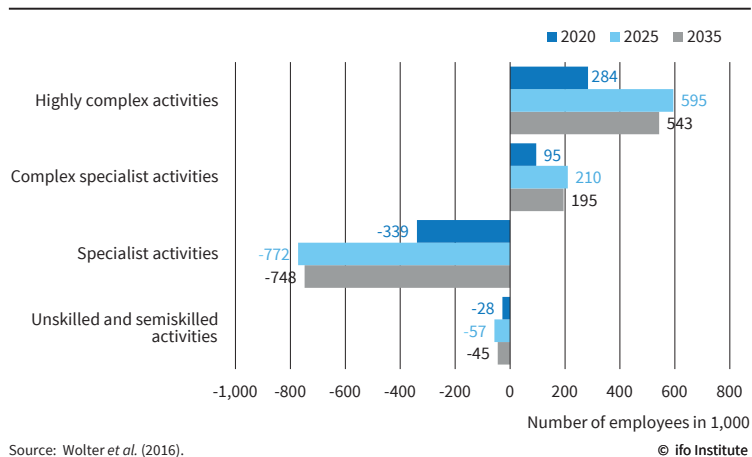
Figure 2
Jobs Lost and Gained as Compared to the Basic Projection
 Yearly average



Note: Balances red colored.
 Source: Wolter *et al.* (2016).

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Figure 3
Employees by Requirement Level Compared to the Basic Projection



alists may also benefit from a rise in complex activities if they develop their own competences accordingly. Even today, many employees with vocational training do not work at the specialist level, but at the complex specialist level. Many others, however, hold jobs in the unskilled area.

When looking at industries, we can see that the effect on employment in the manufacturing sector is particularly negative, despite sales increases. The industries that benefit most from that scenario are information and communication, education, and activities of households as employers of domestic staff. While the positive effects on the two former industries can be explained by a greater need for consultation and further education as a side effect of digitalisation, the increase in employment in the households sector is less obvious. Here we see the effects of a rising income and demand level, whereas the jobs in question can be automated to only a relatively limited extent. 4.0 Digitalisation therefore also creates jobs in areas that are not even directly connected to it. That is a general characteristic of employment reactions to technological change, and its overall effects can therefore only be illustrated in a comprehensive approach.

Overall, the effects of Economy 4.0 may even lead to some kind of compensation of the emerging imbalances, mitigating shortages in medium-skill jobs based on vocational training. By contrast, additional demand is generated for the sharply increased supply of labour in the academic field. An effects analysis of labour market developments therefore also needs to consider changes in the labour supply in addition to the changes in labour demand that currently dominate the debate.

DIGITALISATION DOES NOT ONLY AFFECT LOW SKILLED JOBS

However, this seemingly elegant result does not constitute an all-clear. According to the results, the difficult labour market situation of low-qualified persons is on a downwards trend and will deteriorate further in the future. Even although impulses are possible in this area

like, for example, the use of assistance systems such as data goggles and mental/ergonomic relief through human-machine collaboration, the way humans process information in the concrete working environment must be taken into consideration. Therefore, even with digital support, the most important factors will still be transparency, task-oriented design, openness towards human intervention, and qualification. Moreover, tasks could come up for low-skilled workers if structural changes emerge in jobs at the medium-skill level, leading to

a redistribution of individual, hard-to-automate tasks like short cleaning or maintenance activities, which have hitherto been covered in these jobs. As regards the welfare state, it is nevertheless conceivable that labour market policy measures for improvements in the low-skill sector will become even more important. The overall macroeconomic effects of the phenomenon of Economy 4.0 entail major challenges on a political and company level in view of the major shifts and changes in workplaces foreseeable in the future.

VOCATIONAL TRAINING FOR A DIGITALISED ECONOMY

Education and further education play an important role. To what extent Economy 4.0 will push back, or even eliminate, entire professions remains to be seen – the automation of tasks does not equal the automation of entire jobs, which combine tasks with interaction, flexibility, problem solving, adaptability, and common knowledge. In any case, professional requirements will change, and the effect strongly depends on the areas in which this change is best received.

The Economy 4.0 process, which creates new task profiles through digitalisation, must be addressed according to one's own strengths in international competition. As right as it may be to place an obvious emphasis on university training, the clear specific strengths of the German system lie in the vocational training system and its interlocking of theory and practice. Then again, vocational training content is often oriented towards rather narrowly-defined job profiles and a specific working environment, which can limit one's capacity to adapt and evolve in professional life, as Hanushek *et al.* (2017) show. Moreover, Dengler and Matthes (2015) demonstrated that there are a high number of routine activities, especially in many jobs at the vocational training level, which are comparatively easily to programme.

Policy must therefore be active rather than simply reactive, and should focus on the further development of strengths in order to train people who have the

potential to shape the implementation of Economy 4.0. As production, knowledge, and development activities grow closer together and hierarchic control is recedes, creative leeway is created that may even extend to the vocational training area. In the context of the implementation of 4.0 Digitalisation, high-quality employment becomes a business model precisely when staff is available who can take on new and responsible tasks. It stands to reason that digital content should be integrated more strongly into vocational training. But it is at least as important to teach competences such as conceptual and creative thinking, as well as abstraction and communication skills, so that these new possibilities can be used in the most effective way. In the German system, the (secondary) master craftsman qualification provides a corresponding starting point. A ‘master tenure track’ system, i.e. an integrated master craftsman qualification, might be a good idea to make this vocational training path more attractive. This qualification could be strengthened with other competences, including value creation-oriented process understanding, innovative thinking, and basic skills in the handling of scientific results.

FURTHER EDUCATION SHOULD BE ON PAR WITH INITIAL TRAINING

Due to changing and growing requirements, further training after initial training will become decisive to continuously further developing competences. Based on the IAB Job Vacancy Survey, Warning and Weber (2017) find, for example, that companies with a trend towards digitalisation in particular increasingly expect new staff to possess additional skills acquired through courses. The findings of the IAB and ZEW business survey ‘Working World 4.0’ also indicate a significant increase in demand for further training with regard to digitalisation (see Figure 1). Educational policy is mainly concerned with initial training; and labour market policy with the unemployed. But technological change must be mastered by those currently in employment. This calls for a policy of further training – which represents a major amendment to the future welfare state.

In this respect, we need to adjust to new developments. The risk of dismissal is currently at an all-time low in Germany, which is particularly conducive to a booming labour market. According to the above-mentioned scenario results, however, labour market dynamics will gather impetus significantly, which also means increased inflows into unemployment. If the pace of structural and occupational change accelerates, consulting in the fields of further and new qualification will become essential. Sound and early decisions need to be taken as to whether placement in the current field of action, further development, or reorientation is the right way. On a cautionary note, however, it is worth remembering that during the structural change in and after the 1970s, which marked a departure from

conventional factory work, the labour market failed to prevent the build-up and hysteresis of unemployment of low-skilled workers in particular.

Against this background, Weber (2017) argues that a labour market policy awaiting job losses and inflows into unemployment is unlikely to be able to master the critical effects of digital change on its own. After all, as soon as unemployment occurs, labour market policy has to deal with it singlehandedly (plus the collaboration of the unemployed), i.e. policy can only draw on its own resources and measures. Looking upstream, however, there are cooperation options in terms of further corporate training initiatives. Companies have information on their concrete needs from a production and market perspective, which makes them central players on the further training stage.

Public politics, however, should undertake the support and funding of further training activities in the form of qualification consulting for companies and employees or a share in the costs of measures and work loss. After all, further training not only helps employees and their company, it is also an important macroeconomic factor: investments in further training help them to master digital change, i.e. to develop high-quality employment on a broad base as the core of a digital business model.

In order to achieve this, further training must be on a par with initial training. This also means that the advantages of formal qualification, highly visible in Germany, are combined with the flexible acquisition of skills. The establishment of further training could be strengthened by a legal system on an institutional level where universal (and digital) competence standards are developed and additional qualifying achievements are formally recognised under those standards. With the right modularisation, this could even lead to fully valid qualifications, as explained by Kruppe (2012). General competence standards would improve information and orientation, make quality assurance easier, and increase the relevance of further training for professional development in the labour market, especially if formally recognised.

The traditional strengths of the German *Mittelstand* could be endangered, should individual companies’ capacity for conquering new digital business models prove insufficient. The same applies to further training, a field where particularly small companies should receive political support – also and especially in the form of consultation competence and network creation. Further training policy is not only labour market policy, but also serves a second goal: strengthening companies’ ability to adapt and evolve.

It must be borne in mind, however, that political activity should not hamper companies’ commitment to further training. It is all about support and collaboration, not taking over. Financial aid from the public sector is especially advisable for further training, which nurtures general knowledge and skills and not so much for specific measures tailored to individual

companies with specific activities. Appropriate certification should be a prerequisite, as this would facilitate the recognition of qualifications and achievements at the same time.

A purely personal further training policy involving, for example, personalised education accounts would run the risk of creating staff availability uncertainty for companies and of depriving them of some of their own competence and responsibility for human resources development. It is precisely this further training competence, however, which must be effectively used on the policy side. Yet, not all companies and groups have the same further training options. The same is true for shorter employment relationships. Similarly, the need for professional reorientation regularly goes beyond the current job. So if the existing further training options are not sufficient, or if the desired measures are not situated at the corporate level in a way that makes sense, support should also be provided independently from the corporate context. That way, the advantages of cooperation with corporate further training initiative could be combined with individual development support.

FLEXIBILITY AND LABOUR MARKET INSTITUTIONS

Digital tasks can typically be completed in a flexible manner. Using 4.0 technologies, activities that used to be location or environment-specific can also be switched to a digital basis. This opens up new activity options outside of the usual standard employment relationships for self-employed individuals, for example. Here too, however, assessments need to remain realistic: Economy 4.0 not only brings new possibilities, but also new complexities and makes higher demands of staff. In order to meet those demands, companies will also require a very well-qualified core workforce with company-specific knowledge. And even if jobs do not become fully flexible, social security for a labour force working more flexible hours must be refined. After all, they are equally in need of security in case of unemployment, old age, and nursing care dependency as if they worked in a traditional employment relationship subject to social security contributions. By the same token, steps must be taken to ensure that it is not tax payers who end up acting as de-facto insurers, covering costs incurred. Extending compulsory social security contributions to include all forms of employment – and notably self-employment – is recommended as the logical consequence; the rules of on-demand compulsory insurance would have to be adapted. This will surely require a special unbureaucratic – and digital – procedure for small and short-term jobs. In addition to the question of social security, the market for flexible digital services will have to take organisational shape, which will also involve setting standards or establishing employee special interest groups.

Moreover, it is becoming increasingly essential to reconcile the growing flexibility needs of both compa-

nies and employees. Warning and Weber (2017) find that newly hired personnel in companies with a trend towards digitalisation more often face varied work content, but sometimes also have to deal with tight schedules, overtime, and changing working hours. Faster product life cycles and globally connected economic activities are opposed to changed family lifestyles and individualised employee requirements. While new digital technology can adapt to the latter, there is also the risk of professional requirements seeping into private life. Legal protection from overloading must remain in place, but great importance should also be placed on coordination processes both at a company level and among social partners to ensure that the multitude of possible constellations can be adequately catered for. Flexibility and protection can be agreed under the principle that employees' concessions have to be balanced by the employer's side. Thus, it could be guaranteed to make appropriate comprehensive packages in terms of worker protection in case of increased flexibility; packages that may also include holiday provisions, release from duty for further training, or corporate health management measures. In general, such policy options show the value of building and maintaining strong industrial relations, not only in the case of Germany.

CONCLUSION

The advent of smart, interconnected digitalisation is accompanied by major challenges. The welfare state will not have to adapt to an economy largely operating without jobs. On the contrary, the world is full of undone work. The effects on the labour market will mainly take place in the well-known field of tension of economic adaptability to technological change and structural problems.

Importantly, the institutions of the welfare state face enormous challenges. There is a pressing need for measures in economic, educational and labour market policy that will support and advance a digital economic and labour market model. Further developing vocational training, designing a policy of comprehensive further training, and organising social security and corporate flexibility are key steps forward in this endeavour.

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Quantifying Trump: The Costs of a Protectionist US

ing trading nations strived to conclude new regional trade agreements (RTA) to advance progress in global trade liberalization in individual regions. These agreements included the Transatlantic Trade and Investment Partnership (TTIP), aimed at improving economic relations between the EU and the United States, and the transpacific trade agreement between the United States and a multitude of Pacific-Pacific countries (Trans-Pacific Partnership – TPP). Prevailing literature suggests that free trade agreements lead to a reduction of tariffs and non-tariff barriers (such as the mutual recognition of product standards) – see e.g. Bergstrand *et al.* (2015). In the mid-1990s, 30 trade agreements were ratified each year. This rate fell to 26 during the financial crisis, and since 2011 the average amount of ratified FTAs has fallen to 10. At this point, it is important to mention that these new agreements are deeper and farther reaching than their predecessors and include, for example, public procurement, services and regulatory chapters.

The ratification of free trade agreements can help to foster growth through structural reforms, for example, which are needed in times when the competitiveness of the industrial countries is eroded, especially compared to that of advanced developing countries like China or India. Thwarting such initiatives may not be a good idea. The relative gridlock of the ratification of new trade agreements certainly cannot be compared to the rise of the protectionist era; but the data shows that the global trend towards explicit protectionist measures has been growing for several years. Trade protection measures, such as anti-dumping tariffs, tariffs, quotas, or other protective duties implemented for a certain number of product lines is a good indication. Admittedly, these measures are regulated through international trade laws and might even be justified, but they still occur in terms of protectionist aspirations. The share of product lines affected by such protective measures increased from approximately 0.5 percent in 1990 to 2.5 percent in 2015; in other words it more than doubled.



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INTRODUCTION

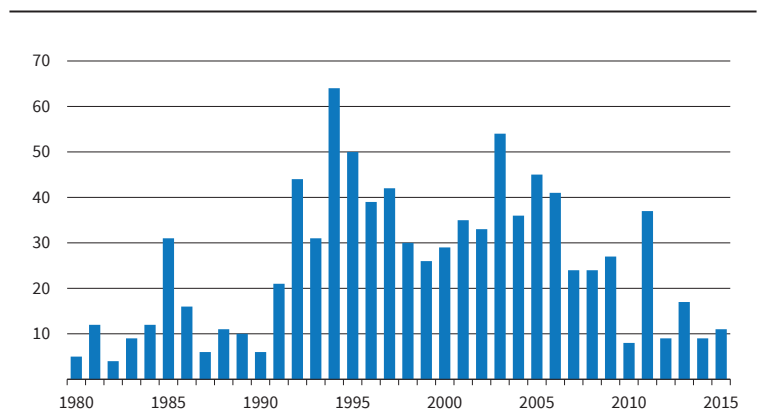
With the inauguration of the new US-president protectionism in the world of international trade reached a new level. The United States of America is currently the world's largest single market, in which the US citizens earn one of the highest worldwide per capita incomes of 58,000 US dollars. Due to its economic size, economic policy measures, in particular trade policies, have a far-reaching impact on global economic developments. The consequences of a protectionist US trade policy may not only be limited to economic dimensions, but can also have important political and social implications.

Against this background, this article quantifies the economic consequences of US protectionist trade aspirations. Our analysis focuses on trade policy scenarios, which have been communicated by the current US administration as potential new trade policies to date. We draw on the results of a recent study of the ifo Institute conducted on behalf of the Bertelsmann Foundation.¹ In the first simulation, a retraction from the North American Free Trade Agreement (NAFTA) is considered. The study then illustrates the potential consequences of a 'Border Tax Adjustment' (BTA) policy. Finally, further measures to protect the US market are simulated by presuming an increase in American duties. The study presents the robust quantitative results that can be expected if an increasingly protectionist US trade policy were to be implemented. The results are intended to contribute to decision-makers' and stakeholders' ability to critically assess the risks that such policies entail.

GROWING PROTECTIONISM

In the wake of the global financial crisis in 2008/09 and the resulting economic stagnation in the Post-Doha round within the World Trade Organisation (WTO), lead-

Figure 1
Number of FTAs Ratified since 1980

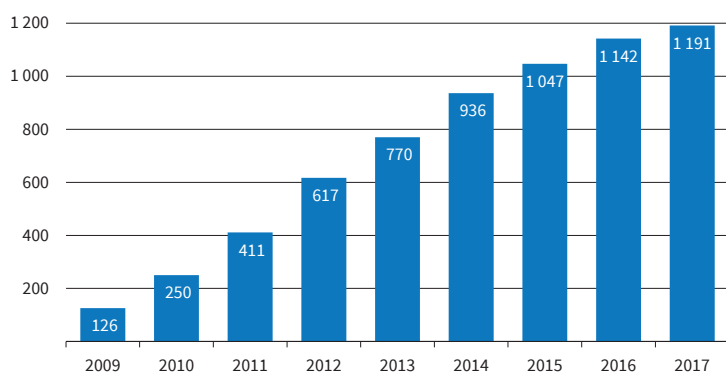


Source: WTO Regional Trade Agreements database.

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¹ Yalcin *et al.* (2017).

Figure 2
Number of US Discriminatory Measures since 2009



Source: Global Trade Alert Data.

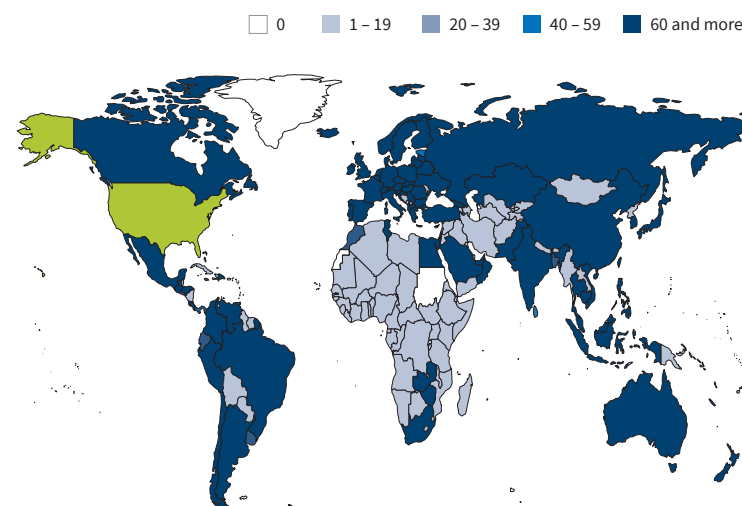
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With the appointment of Donald Trump as the new US president, this ‘America first’ attitude reached new dimensions. In terms of its global tariff rates, the United States can be considered a very open economy due to its relatively low tariffs. This country has reduced tariffs both within NAFTA and within the WTO to a relatively low level compared to its respective trading partners. If non-tariff barriers are taken into consideration, however, this statement needs to be qualified. Examining non-tariff trade protection, however, the United States proves to be an increasingly protectionist country – especially in recent years. In the last two years, the number of regulatory trade barriers, on the US import side, has increased considerably. Figure 2 shows the development of an increasingly protectionist attitude on the part of the United States; especially in the recent past. In 2009, only 126 protectionist measures were evident. In 2017 the number rose to almost 1,200 discriminatory measures.

Compared to the remaining G20 countries, the United States is by far the most protectionist country, as

it implements the highest number of non-tariff barriers (see Figure 3). The darker the shaded area, the higher the number of US protectionist measures against the respective region. Empirical studies showed that it is not an increase in tariffs, but an increase in non-tariff barriers that is responsible for creating welfare losses. The protectionist measures adopted by the United States may therefore have serious consequences. The increasingly diffident US attitude towards international trade might have consequences that go beyond the economy to impact for politics and society across the globe. More specifically, the United States has put the already very advanced trade agreements negotiated with both the EU and the trans-pacific countries on hold: TTIP and TPP are not being implemented for the time being. Official papers on the foreign trade strategy of the US president suggest renegotiating old agreements if goals like lowering the trade deficit, are not achieved. The United States has announced a renegotiation of the North American Free Trade Agreement, and in addition to NAFTA the Korean agreement and the conditions for China’s WTO membership are also candidates for US protectionism. The main goals of this protectionism include new job creation, lowering the trade deficit and an economic upswing. But this ‘Hire American, Buy American’ approach misjudges the fact that the trade balance is more dependent on the saving and investment decisions made by US citizens than on trade policy. The US attention is particularly focused on Germany and China.

Figure 3
Number of US Protectionist Measures per Country (in Force)



Source: Own illustration; World Economic Outlook, IMF, 2016.

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In recent years, China has played a particularly important role in US trade relations with the rest of world. After China joined the WTO 2001 in particular, US trade with the country surged dramatically. This development was the driving force behind the steadily growing US trade deficit with China. US import value from China now exceeds 3.5 times that of US exports to China. Over the years a persistent US trade deficit has not only existed with China. The United States is currently running a sizeable trade deficit with eight out of its ten most important trading partners. These partners include Japan and Germany, which export twice as much to the United States as they import. Wit-

hin the EU, trade relations with the United States are predominantly characterised by trade surpluses.

The US administration is currently examining trade relations with all foreign countries and is evaluating whether the trade practices are 'fair' from a US perspective. If trade practices by foreign countries are classified as non-competitive or unfair, the US administration plans to restrict their access to the US market. Specifically, the taxation of goods in America is to be reformed to the disadvantage of imported, foreign value-added. This is to be achieved by, among other things, a so-called Border Tax Adjustment (BTA). The fact that the United States in particular is showing an increasingly reserved attitude towards international trade weighs particularly heavy.

On the one hand, the United States is a relatively open economy with regard to tariffs, both within NAFTA and with the rest of the world; while, on the other hand, it is highly protectionist in form of non-tariff barriers. Although the US service sector is increasingly moving into trade surpluses, political dissatisfaction with long-run adjustments is understandable. High trade deficits in goods trade, coupled with high import volumes from China and Europe, raise the question of how these developments are compatible with the low level of job creation in traditional industries in the mid-Western United States. Thus, the call for a correction of these imbalances *via* a protectionist trade policy is initially understandable. Nevertheless, a protectionist trade policy is very unlikely to address these economic imbalances. The threats of worldwide counteractive protectionist measures will not only harm key US trading partners, but will predominantly threaten the stability of global economy.

QUANTITATIVE ANALYSIS – IFO TRADE MODEL

The essential objective in the following analysis is to quantify all of the trade effects that take place. Firstly, the direct response of trade flows to an increase in tariffs; and secondly, general equilibrium effects, such as price adjustments for consumers and the indirect increase in production costs. Trade protectionism can certainly benefit individual stakeholders, while being to the advantage of a majority of economic agents. The quantification of general equilibrium welfare effects is therefore of particular interest to avoid any political misguidance.

The underlying ifo Trade Model, described in detail in Aichele *et al.* (2014) and Aichele *et al.* (2016) is a static, general equilibrium model of international trade. It is used to analyse different political scenarios. Data for the value-added linkages are derived from a global input-output database (WIOD 2017), covering over 90 percent of global value added as a result. The trade policy scenarios simulate different, counterfactual scenarios in which the United States introduces a protectionist trade policy in the world, observed today by reintroducing tariffs and establishing non-ta-

riff trade barriers. It provides quantitative information on the resulting changes in gross household income, trade flows, and sectoral production structures in this alternative world. The base year for the simulations is 2014 and the model encompasses 43 countries, as well as the rest of the world and a detailed structure for 50 goods sectors, making a heterogeneous sector analysis viable. The WIOD database used provides the latest available data in a harmonised form for goods and services transactions, and is compatible with the input-output tables of different countries. The database provides value-added information and production values on a sectoral level, and bilateral intermediate and final goods trade flows with producer and consumer prices (incl. services). Bilateral input-output tables and value-added levels can be constructed. Data on bilateral tariffs is retrieved from the World Integrated Trade Solutions (WITS TRAINS), as well as the integrated database (IDB) of the WTO. The estimated demand elasticities are based on the results obtained by Felbermayr *et al.* (2017). One has to note that, unlike in macroeconomic models, the static CGE model does not take any dynamic effects like capital accumulation, savings and investment behaviour over time, into account and neither a monetary aspect nor exchange rate policies are simulated here. The potential dynamic effects of trade like the innovation activities of firms or the diffusion of technologies are also beyond the scope of this analysis. The contribution of the ifo Trade Model is to quantify structural adjustments, which in turn provides insights into the implications for production structures within sectors and across trading partners.

SCENARIOS

This subsection presents the actively communicated US trade policies that may potentially be implemented by the current US administration. Additionally, an isolation of the US market – as far as possible under the WTO agreement – is simulated. Due to uncertainties in the potential design of a US protectionist policy, it is necessary to quantify different scenarios. A detailed analysis and description of counterfactual policies can be retrieved from the recent ifo study on the consequences of Trump's protectionist aspirations.

Scenario No. 1: Withdrawal from NAFTA

The first scenario considers the expected economic consequences of a partial reintroduction of US trade barriers with NAFTA countries. To this end, it considers possible tariff adjustments and non-tariff barriers between the NAFTA countries. Countries like Germany could be indirectly affected due to the weakening of demand from NAFTA members due to protectionism. Sectors heavily reliant on this region's trade in particular may face negative consequences. However, third countries may also stand to profit from

a decrease in trade between NAFTA members through trade diversion effects. The German automotive industry could, for example, act as a substitute for initial US demand from Mexico or Canada in this scenario.

Scenario No. 2: Protectionist US Trade Policy with Respect to the Rest of the World

In principle, it is possible for the United States to introduce an even stronger protectionist trade policy by systematically raising tariffs on all traded goods of all WTO trading partners. The first sub-scenario assumes a one-sided US tariff increase of 20 percentage points. Simultaneously, WTO members increase their tariffs towards the United States, thus simulating tariff retaliation in response to the increased US import duties. In addition to the tariff increases of the previous scenario, the second sub-scenario includes a simultaneous 20 percent increase in non-tariff barriers against all US trading partners and *vice versa*.

Scenario No.3: Introduction of Border Tax Adjustment

In 2016, the US representatives Paul Ryan and Kevin Brady introduced a new tax reform. They suggested a decrease in the federal tax on corporate profits from today's 35 percent to 20 percent, enabling investments to become completely deductible and making international revenues subject to the Border Tax Adjustment. Concrete, exports are tax deductible, while imports have to be added. Consequently, the system would tax consumption more heavily than production, making it equivalent to the European system of value added taxes. It thereby offsets the disadvantage of (non-deductible) equity as opposed to deductible foreign capital. The US administration wants to tax domestic consumption instead of domestic production by increasing tariffs on imports and dispensing exports from taxation. Implicitly, such a tax policy means that US imports are subject to a protective tariff. The introduction of such a trade policy could not only affect foreign suppliers, but also US citizens. It is therefore of general interest that such a tax policy is evaluated quantitatively. This quantitative analysis shows which countries stand to

Table 1

Change in Bilateral US Exports with Top-10 Trading Partners

Rank	Importing country	Value of initial US exports (million US dollars)	Change in exports (%)			
			NAFTA	WTO (only tariff change)	WTO (tariff and NTB change)	BTA
			with retaliation			
1	Canada	289,808	-11.4	-48.6	-73.7	-6.1
2	Mexico	176,284	-9.8	-55.6	-77.8	-6.9
3	China	110,369	-1.2	-48.0	-76.9	-7.5
4	Germany	79,446	-0.8	-34.7	-73.8	-7.5
5	UK	73,643	-1.3	-41.6	-76.0	-4.1
6	Japan	63,598	-1.2	-48.7	-75.3	-5.4
7	Ireland	60,924	-0.1	-12.5	-61.9	-6.2
8	France	57,650	-2.0	-38.4	-76.4	-5.3
9	Netherlands	47,883	-1.3	-30.4	-72.1	-7.0
10	Korea	43,853	-1.1	-45.0	-75.0	-7.1
	Total	1,917,773	-3.52	-38.54	-73.45	-5.87

Source: ifo Trade Model.

gain from this trade policy and which will lose out. By assuming a flexible exchange rate, the US trade balance can be expected to remain largely unchanged, and any changes will be confined to welfare parameters, like changes in tax revenues and terms-of-trade conditions. Effects can nevertheless be expected across sectors and trading partners.

RESULTS

As already described, the ifo Trade Model is able to show the trade diversion and creation effects arising due to a counterfactual change in trade policies. Table 1 shows the top-10 US exporting destinations and the respective initial value of exports in million US dollars. Furthermore, the table shows the resulting percentage changes of US exports for each of the scenarios. Table 2 is built similarly as Table 1 and shows the US import side.

As a result of the protectionist US policies implemented against the other NAFTA members, exports from the NAFTA members decrease the most (-21 percent

Table 2

Change in Bilateral US Imports with Top-10 Trading Partners

Rank	Exporting country	Value of initial US imports (million US dollars)	Change in imports (%)			
			NAFTA	WTO (only tariff change)	WTO (tariff and NTB change)	BTA
			with retaliation			
1	Canada	348,576	-21.2	-34.0	-57.0	-5.8
2	China	344,939	1.5	-37.3	-59.3	-6.7
3	Mexico	265,531	-13.7	-37.4	-58.6	-6.7
4	Germany	134,374	3.2	-32.4	-62.0	-5.0
5	Japan	120,174	4.1	-38.5	-60.8	-6.1
6	UK	85,289	2.1	-17.2	-61.3	-0.5
7	Korea	77,881	3.5	-34.0	-61.3	-5.4
8	France	49,168	1.6	-21.5	-61.1	-1.6
9	Italy	44,966	2.0	-33.4	-59.4	-5.1
10	India	36,474	2.2	-32.1	-55.0	-5.0
	Total	2,395,728	-2.82	-30.85	-58.80	-4.70

Source: ifo Trade Model.

of exports from Canada and – 14 percent of exports from Mexico). Exports from the other most important US-export destinations increase slightly between 1.5 and 3.5 percent (see Table 2, NAFTA scenario). On aggregate, however, US exports decrease by 3.5 percent, meaning that the positive trade diversion effect towards third countries like Germany or France cannot compensate for the decrease in trade with Canada and Mexico (see Table 1, NAFTA scenario). This picture looks quite similar for the import side, because trade diversion effects resulting from the resolution of NAFTA induce an increase in US imports from non-NAFTA members, mainly from China, Japan and Germany. At the same time, however, imports from NAFTA countries decrease by 21 percent (Canada) and 14 percent (Mexico), as already mentioned above. Overall, US imports decrease, which shows that the negative effects dominate (see Table 2, NAFTA scenario).

A protectionist US trade policy with respect to the rest of the world, as simulated in the next two depicted scenarios (WTO scenarios, only tariff change and tariff plus NTB change), would have larger effects on the US trade structure than the NAFTA scenario. This outcome is reasonable, because a protectionist trade policy would not only affect the trade structure with NAFTA members, it would also influence trade relations with all other remaining WTO members. Overall, US exports would decrease by 73.5 percent in the case of higher tariffs and non-tariff barriers (Table 1). The change in bilateral exports is relatively homogeneous across all top-10

US export destinations. Only exports to Ireland are less negatively impacted than those to other countries, which can be ascribed to the high rate of service trade (e.g. financial transfers) between the United States and Ireland. The effects on US imports look fairly similar, although the percentage changes are a little bit smaller. In total, US imports would decrease by 58.8 percent (NTB plus tariff change, WTO scenario), as shown in Table 2. When only tariffs are treated and not NTBs, US imports decrease by 30.85 percent.

Table 3
Change in Sectoral Value Added of US Manufacturing and Agricultural Sectors

	Initial value added million USD	Share of value added %	Change of sectoral value added, different scenarios							
			NAFTA		WTO		tariffs and NTBs		BTA	
			%	million USD	%	million USD	%	million USD	%	million USD
Crop and animal production, etc.	177,155	1.02	-0.1	-195	-5.64	-9993	-7.28	-12,890	-2.12	-3,760
Forestry and logging	23,752	0.14	-1.9	-444	-0.12	-29	4.10	973	-2.13	-507
Fishing and aquaculture	14,505	0.08	-5.9	-852	-0.43	-63	3.52	510	-1.99	-289
Mining and quarrying	455,588	2.62	5.3	24,299	0.62	2,824	5.48	24,946	-0.88	-4,006
Food, beverages and tobacco	243,253	1.40	-0.2	-406	-2.54	-6,172	-3.93	-9,550	-1.74	-4,244
Textiles, wearing apparel and leather	27,698	0.16	-1.3	-349	11.47	3,177	31.76	8,796	-3.21	-890
Wood and products of wood and cork	28,805	0.17	0.9	255	-0.57	-165	0.95	274	-1.31	-377
Paper	55,730	0.32	-0.2	-135	4.68	-2,609	-4.88	-2,721	-1.99	-1,111
Printing and reproduction of recorded media	38,301	0.22	1.0	365	-2.92	-1,118	-5.24	-2,007	-0.96	-369
Coke, refined petroleum	182,719	1.05	-2.8	-5,134	-6.94	-12,672	-8.75	-15,988	-2.39	-4,373
Chemicals and chemical products	267,111	1.54	-0.3	-873	-4.91	-13,108	-3.21	-8,570	-3.18	-8,493
Basic pharmaceutical products and preparations	95,467	0.55	-1.4	-1,361	-2.25	-2,150	1.87	1,785	-3.11	-2,966
Rubber and plastics	75,501	0.43	0.5	405	-2.79	-2,105	-1.17	-886	-2.21	-1,671
Other non-metallic mineral	46,791	0.27	-0.4	-169	-2.04	-953	-1.37	-642	-1.79	-840
Basic metals	60,861	0.35	-0.2	-127	-0.82	-497	8.21	4,998	-1.39	-845
Fabricated metal	147,060	0.85	0.1	202	-3.83	-5,630	-2.81	-4,127	-1.67	-2,459
Computer, electronic and optical products	269,400	1.55	-0.8	-2,213	5.30	14,275	21.32	57,433	-4.81	-12,971
Electrical equipment	54,138	0.31	1.7	918	6.77	3,663	24.02	13,002	-4.19	-2,267
Machinery and equipment; repair and installation	175,012	1.01	-1.7	-2,932	-3.49	-6,100	0.98	1,708	-4.07	-7,124
Motor vehicles, trailers and semi-trailers	141,160	0.81	2.0	2,820	2.53	3,575	10.19	14,390	-3.16	-4,463
Other transport equipment	127,798	0.74	-0.2	-292	-20.43	-26,105	-27.12	-34,657	-5.73	-7,321
Furniture and other manufacturing	105,839	0.61	-2.8	-2,956	0.84	887	4.61	4,879	-3.04	-3,213

Source: ifo Trade Model.

Table 4
Change in Sectoral Value Added of US Services Sectors

	Initial value added million USD	Share of value added %	Change of sectoral value added, different scenarios							
			NAFTA		WTO		BTA			
			million USD	%	million USD	%	million USD	%		
Electricity, etc.	272,719	1.57	0.2	574	-1.10	-2,991	-2.09	-5,691	-0.35	-948
Water collection, treatment and supply	9,317	0.05	0.2	18	-1.38	-128	-0.80	-75	-0.15	-14
Sewerage, waste collection, etc.	43,150	0.25	-0.1	-39	-4.43	-1,910	-9.19	-3,965	5.37	2,315
Construction	665,785	3.83	0.3	1,880	-0.47	-3,131	-2.29	-15,269	-0.59	-3,904
Wholesale etc. of motor vehicles and motorcycles	254,916	1.47	0.8	2,073	-0.81	-2,076	-0.92	-2,339	-0.31	-783
Wholesale trade (except motor vehicles & motorcycles)	1,044,655	6.01	0.2	2,186	-2.70	-28,246	-8.86	-92,604	-2.00	-20,843
Retail trade (except motor vehicles & motorcycles)	815,874	4.69	0.4	3,017	-0.57	-4,648	-2.03	-16,533	-0.58	-4,737
Land transports and transport via pipelines	240,382	1.38	0.1	278	-3.05	-7,335	-7.54	-18,126	-1.47	-3,527
Water transport	18,593	0.11	0.1	13	-4.85	-902	-20.46	-3,805	-4.33	-806
Air transport	84,344	0.49	-0.3	-219	-5.88	-4,957	-11.16	-9,409	-3.33	-2,807
Warehousing and support activities for transportation	106,151	0.61	0.1	125	-3.05	-3,243	-9.76	-10,364	-0.81	-856
Postal and courier	57,439	0.33	0.1	42	-3.51	-2,017	-12.87	-7,393	-1.09	-624
Accommodation and food	487,443	2.80	0.0	158	-0.77	-3,747	-2.33	-11,363	-0.46	-2,244
Publishing	210,656	1.21	0.2	472	-1.85	-3,893	-9.10	-19,168	-1.93	-4,070
Motion picture, video and television	200,183	1.15	0.1	248	-1.81	-3,616	-7.09	-14,193	-1.41	-2,816
Telecommunications	326,912	1.88	0.2	800	-1.25	-4,084	-4.82	-15,747	-0.80	-2,603
IT services, etc.	338,229	1.95	0.2	838	-1.93	-6,543	-3.01	-10,192	-0.57	-1,914
Financial services	488,092	2.81	0.2	1,143	-1.98	-9,650	-8.12	-39,616	-1.41	-6,875
Insurance, etc.	734,910	4.23	0.2	1,741	-1.59	-11,710	-3.92	-28,789	-0.65	-4,772
Real estate	2,059,168	11.85	0.3	5,559	-0.56	-11,598	-2.66	-54,805	-0.54	-11,056
Legal and accounting	693,747	3.99	0.2	1,160	-2.12	-14,717	-3.74	-25,935	-0.28	-1,961
Architecture and engineering, etc.	448,150	2.58	0.3	1,361	-2.47	-11,075	-4.56	-20,456	-0.92	-4,105
Scientific research and development	140,414	0.81	0.2	275	-2.23	-3,131	-5.37	-7,543	-1.06	-1,490
Administration and support services	672,085	3.87	0.1	866	-3.07	-20,612	-1.56	-10,483	-0.26	-1,766
Public administration and defence, etc.	2,277,285	13.10	0.3	5,895	-0.52	-11,794	-2.69	-61,351	-0.66	-15,097
Education	192,773	1.11	0.2	446	-0.76	-1,465	-2.70	-5,206	-0.72	-1,389
Human health and social work	1,227,402	7.06	0.3	3,587	-0.35	-4,344	-2.27	-27,805	-0.66	-8,076
Other services	458,561	2.64	0.2	1,136	-0.76	-3,494	-2.63	-12,052	-0.50	-2,301

Source: ifo Trade Model.

The aggregate effect of the BTA causes a small decline in total US exports (-5.87 percent in Table 1) and imports (-4.7 percent in Table 2). In relative terms, US trade declines homogeneously across all partner countries.

Changing trade patterns through protectionism do not solely affect the import and export structure, but also impacts the sectoral output of a country. On that account, the next two tables illustrate the changes in US sectoral value added. The percentage change featured in these tables gives an indication

of the amount of pressure a sector is exposed to in times of the rising protectionism. Table 3 shows the initial US value added for all goods in millions of US dollars, its initial share, the percentage changes and the change in million US dollars that occur in the counterfactual scenarios. The US mining industry (5.3 percent), wood and wood products (0.9 percent), print and reproductive media (1 percent), rubber and plastic (0.5 percent), processed metals (0.1 percent), and electrical machinery (1.7 percent) increase their sectoral value added in the case of the end of NAFTA.

Nonetheless, this does not compensate for the losses in the remaining sectors. Among others, the US agricultural sectors suffer from the potential termination of the NAFTA: crops decreases its sectoral value added by 0.1 percent, food and beverages by 0.2 percent and the fishery sector loses 5.9 percent. Similarly to the trade picture, the WTO protectionist scenarios influence the United States to a larger extent than is the case in the NAFTA scenario.

For most US sectors the strongest decrease occurs when WTO member countries retaliate against the protectionist measures of the United States. The sectoral value added changes increase with the growing extent of protectionism (WTO scenario increase of tariffs and/or NTBs). The vehicles sector 'other means of transport' faces a decrease of 27.1 percent, followed by the 'water transport' sectors (-20.5 percent). In nominal terms, the sectoral value added in wholesaling (excluding vehicles) only drops by 8.86 percent; yet this decline amounts nominally to 93 billion US dollars, which represents the greatest absolute sectoral contraction in the United States (see Table 4). But there are also sectors like the computer and electrical machinery sectors that can expect an increase in sectoral value added (Table 3). The last scenario, the adjustment of the Border Tax shows a relatively homogeneous decrease in value

added across all manufacturing and agricultural sectors. Most US service providers gain homogeneously between 0.1 percent and 0.8 percent in value added in the case of the dissolution of the NAFTA. Only a few sectors such as air transport (-0.3 percent) are confronted with a decrease in their value added (Table 4). In general, the value added changes for services changes less heterogeneously across sectors than in the goods' sectors.

The revocation of the NAFTA would do considerable economic damage to its member countries: the United States (-0.22 percent), Mexico (-0.96 percent) and Canada (-1.54 percent) as shown in Table 6. With the exception of Luxembourg (0.06 percent in Table 5) and Norway (0.09 percent in Table 6), it would hardly change real income for third countries (see again Tables 5 and 6). The same applies to real wage changes.

In the case of increased protectionism against all WTO-members and *vice versa*, the real income and real wages of the WTO members incur losses from increasing tariffs and non-tariff barriers. Mexico (-3.42 percent) and Canada (-3.85 percent) in particular experience disproportionate declines and the US real income would shrink by 2.32 percent (Table 6). For some countries, retaliation might compensate for the economic losses in the case of unilateral US pro-

Table 5

Real Income and Real Wage Changes for EU28 Countries

	Real income changes (%)				Real wage changes (%)			
	NAFTA	WTO (only tariff change)	WTO (tariff and NTB change) with retaliation	BTA	NAFTA	WTO (only tariff change)	WTO (tariff and NTB change) with retaliation	BTA
Austria	0.01	-0.09	-0.20	-0.15	0.00	-0.12	-0.22	0.03
Belgium	0.02	-0.09	-0.72	0.34	0.01	-0.28	-0.80	0.52
Bulgaria	0.00	-0.04	-0.12	0.78	0.01	-0.07	-0.12	0.67
Cyprus	-0.02	-0.02	0.00	1.02	0.00	-0.05	0.02	0.95
Czech Rep.	0.02	-0.03	-0.13	-0.67	0.01	-0.09	-0.19	-0.16
Germany	0.03	-0.14	-0.40	-0.86	0.00	-0.21	-0.43	-0.22
Denmark	0.02	-0.11	-0.28	-0.50	0.00	-0.13	-0.30	-0.05
Spain	0.02	-0.01	-0.06	0.27	0.02	-0.07	-0.09	0.29
Estonia	0.01	-0.04	-0.14	0.24	0.00	-0.09	-0.17	0.31
Finland	0.00	-0.09	-0.32	0.31	0.00	-0.14	-0.35	0.35
France	0.00	-0.04	-0.25	0.48	0.00	-0.12	-0.29	0.46
UK	0.00	-0.10	-0.43	0.76	0.01	-0.24	-0.50	0.75
Greece	-0.01	-0.01	-0.08	0.88	0.01	-0.02	-0.04	0.84
Croatia	0.00	-0.06	-0.15	0.40	0.00	-0.11	-0.19	0.41
Hungary	0.03	-0.06	-0.32	-0.40	0.01	-0.12	-0.36	0.02
Ireland	0.00	-0.78	-3.60	-0.46	-0.03	-0.76	-3.00	0.70
Italy	0.01	-0.07	-0.19	-0.10	0.00	-0.10	-0.20	0.03
Lithuania	0.04	-0.13	-0.17	-0.43	0.03	-0.16	-0.18	0.02
Luxembourg	0.06	-0.47	-2.31	-1.36	0.00	-0.41	-1.79	0.10
Latvia	-0.01	-0.04	-0.08	0.61	0.00	-0.08	-0.09	0.54
Malta	0.01	-0.09	-0.46	0.71	0.00	-0.17	-0.50	0.66
Netherlands	0.04	-0.05	-0.60	-0.74	0.00	-0.25	-0.70	0.05
Poland	0.01	0.00	-0.09	-0.11	0.00	-0.04	-0.12	0.05
Portugal	0.00	-0.04	-0.10	0.57	0.00	-0.07	-0.10	0.52
Romania	0.01	-0.02	-0.07	0.36	0.00	-0.05	-0.10	0.37
Slovakia	0.02	-0.05	-0.13	-0.38	0.01	-0.11	-0.17	-0.05
Slovenia	0.01	-0.03	-0.04	-0.39	0.00	-0.05	-0.07	-0.02
Sweden	0.01	-0.07	-0.27	-0.02	0.00	-0.11	-0.31	0.22

Source: ifo Trade Model.

Table 6

Real Income and Real Wage Changes for Non-EU28 Countries

	Real income changes (%)				Real wage changes (%)			
	NAFTA	WTO (only tariff change) with retaliation	WTO (tariff and NTB change)	BTA	NAFTA	WTO (only tariff change) with retaliation	WTO (tariff and NTB change)	BTA
Australia	0.01	-0.05	-0.25	0.22	0.00	-0.17	-0.33	0.22
Brazil	0.00	-0.06	-0.24	0.36	0.00	-0.18	-0.29	0.32
Canada	-1.54	-1.20	-3.85	0.70	-1.44	-2.73	-4.73	0.75
Switzerland	0.02	-0.11	-0.50	-0.56	-0.01	-0.16	-0.46	0.04
China	0.01	-0.17	-0.34	-0.60	0.00	-0.19	-0.31	-0.25
Indonesia	0.01	-0.11	-0.23	0.01	0.00	-0.14	-0.24	0.04
India	0.01	-0.06	-0.14	0.24	0.01	-0.10	-0.16	0.24
Japan	0.01	-0.11	-0.29	0.26	0.01	-0.21	-0.34	0.22
Korea	0.05	-0.16	-0.61	-0.73	0.01	-0.33	-0.66	-0.18
Mexico	-0.96	-1.10	-3.42	0.30	-0.90	-2.31	-4.00	0.34
Norway	0.09	-0.10	-0.24	-1.10	0.03	-0.13	-0.29	-0.25
Russia	0.04	-0.08	-0.12	-0.34	0.02	-0.10	-0.14	-0.03
Turkey	0.00	-0.08	-0.24	0.14	0.00	-0.16	-0.28	0.22
Taiwan	0.03	-0.25	-0.74	-1.45	0.00	-0.39	-0.70	-0.50
USA	-0.22	-0.30	-2.32	-0.67	-0.23	-1.43	-2.93	0.04

Source: ifo Trade Model.

tectionist policies. In the case of Germany, this would imply a 0.40 percent loss of GDP (Table 5), while China's GDP would only drop by 0.34 percent (Table 6). But one can see that retaliatory trade policy measures by WTO members against the US do not improve the economic situation in any country; making it a 'lose-lose' scenario. In general, this can be attributed to the strong dependency of domestic economies on the US market. Individual countries can nevertheless reduce their potential losses by taking countervailing measures (like increasing tariffs), but not a single country can fully compensate for the loss of gross household income and real wages incurred. Vengeance should therefore not be a main response to threatened, discriminatory US policies. Instead, a prior containment of protectionist policies is highly advisable.

Contrary to the intentions of the US government, the introduction of the BTA causes a negative US real income change of 0.67 percent (in Table 6). Taiwan (-1.45 percent), Luxembourg (-1.3 percent), Norway (-1.1 percent), Germany (-0.86 percent), the Netherlands (-0.74 percent) and South Korea (-0.73 percent) suffer even greater losses from the BTA than the US itself. On average, Europe experiences an increase in its gross household income of 0.04 percent, as the BTA positively affects gross household income for the majority of EU28 countries. These changes are nevertheless quite small and therefore coincide with the prevailing views expressed in the literature on this topic.

The US real wage is also hardly affected by its implemented BTA (Table 6) and the EU28 effects are quite diverse. There are countries like Austria (0.03 percent), Belgium (0.52 percent), France (0.46 percent) and Britain (0.75 percent) that stand to gain in real wages. Germany (-0.22 percent) and Denmark (-0.05 percent), on the other hand, will suffer from US protectionist policies (Table 5).

CONCLUSION

With the inauguration of Donald Trump, the new US administration initiated a detailed analysis to identify supposedly increasing 'unfair trade practices' by other nations that threaten or destroy 'well-paid American jobs'. Several US trading partners were viewed with growing scepticism as a result. As counterstrategy, the US administration has presented three protectionist trade policies as potential measures for correcting what it perceives to be unfair trade. Based on a recent ifo trade study, this report substantiates the effects of a US protectionist trade policy agenda and offers a comprehensive assessment of the political debate. In all of the scenarios presented, an isolation of the US market would primarily have a negative effect on the US economy itself. A worldwide policy of retaliation against the US protectionism will lead to substantial economic damage; particularly to the United States itself. A protectionist trade policy will not solve the economic challenges facing this country. Seeking for new forms of cooperation between the United States and its main trading partners like China, Germany and the NAFTA partners would be a far more effective strategy.

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Ludwig Dorffmeister

Construction of 1+2 Family Homes in Germany: Is the Golden Age Over?

INTRODUCTION

By historical comparison the construction of 1+2 family homes is currently on the back burner in Germany, despite the fact that financing conditions and the general economic are favourable; as this is offset by far higher (additional) construction costs and land prices. In addition, state subsidies for new construction works differently today and the federal government is providing less funding than it did in the past.

In the long-term demographic aspects in particular can be expected to constrain new construction activities. For the ageing of society is leading to a quantifiable decrease in the potential occupants of 1+2 family homes. At the same time, private households are on average getting smaller, partly because there are fewer families with children. Moreover, the rising number of inheritance-related sales means that a growing volume of 'second-hand' real estate is coming onto the market.

In Europe there are also several (neighbouring) countries in which the number of 1+2 family homes has fallen significantly over the past two decades. Several of the influence factors cited above probably also played a role there too. So demographic ageing is a pan-European phenomenon.

CURRENT SITUATION

Since the millennium the number of dwellings in newly-constructed 1+2 family buildings ('owner-occupied homes') has plunged. In 1999 just under 240,000 new owner-occupied homes were completed, versus around 150,000 residential units in 2005 and around 85,000 units in 2010 (Figure 1). The upturn in the new residential construction sector after the financial and economic crisis as a result of low interest rates, pronounced immigration and internal migration, as well as the rediscovery of

real estate by investors, affected the owner-occupied segment far less strongly than the multi-family segment. A lateral move in the market emerged early in the 1+2 family homes, i.e. completion figures have been fluctuating between 100,000 and 110,000 dwellings for some years. The increase to around 110,000 units forecast for 2017 is related to a special effect following the introduction of stricter energy regulations. This growth generated by a pull-forward effect in completion figures is very likely to be temporary. The fact that a potential, marked increase in the construction costs of owner-occupied homes has only moderately stimulated new construction permits shows the 'modest' upwards potential of this sub-segment.

Despite extremely low long-term mortgage rates for several years and very positive developments in (real) income, the number of newly-completed owner-occupied homes has stagnated at a good 100,000 units for some time. This is an exceptionally low figure by historical comparison. Over the last decade the average annual completion figures has been around 140,000 units, *versus* around 195,000 dwellings in the 1990s. In terms of Germany's previous federal territory (the former Federal Republic of Germany), the corresponding figures for the 1980s are a good 155,000 units, compared to over 230,000 units in the 1970s and almost 240,000 in the 1960s. There are no official statistics on construction activity available in such detail for previous years.

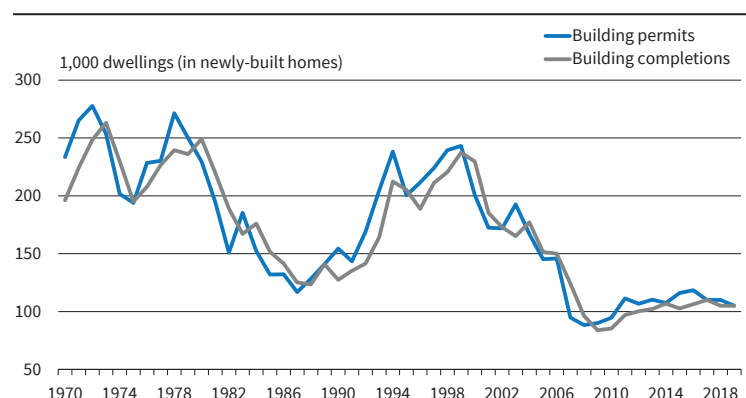
NOT JUST A GERMAN PHENOMENON

New build activities in the 1+2 family homes sector have also sunken to far lower levels than in the last two decades in the rest of Europe (Figure 2). The extreme market correction in 2008 to 2010, however, was largely due to the impact of the financial and economic crisis. In countries like Ireland, Spain and Hungary, new-build construction activity has nevertheless been on the 'back burner' for several years and is only expected to recover moderately by the end of the decade.



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Figure 1
New Construction of 1+2-family Homes in Germany^a

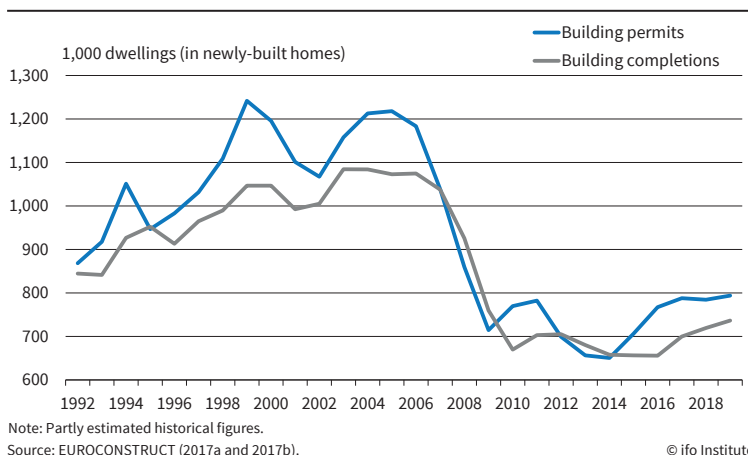


^a Until 1990: territory of the former Federal Republic, as of 1991: unified Germany.

Source: Federal Statistical Office (2017a); ifo Institute.

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Figure 2
New Construction of 1+2-family Homes in the EUROCONSTRUCT Area



The construction of owner-occupied homes during this decade will also be clearly weaker by historical comparison in several countries that were less heavily impacted by the crisis. In addition to Germany, these countries include Belgium, the Netherlands, Norway, Austria and Switzerland. In the first four of these countries, average completion figures for dwellings in new 1+2 family homes in the three decades since the beginning of the 1990s have fallen in clear steps. In the Netherlands, for example, average annual completion figures of owner-occupied homes were around 62,500 units in the nine years between 1992 and 2000, compared to approximately 46,500 units in the decade between 2001 and 2010. A figure of around 35,000 is forecast for the nine years from 2011 to 2019. The decline between the 1990s and the 2000s is around a quarter and between 1990s and the 2010s even 45 percent as a result.

In Norway, Austria and Switzerland the decline over these three decades was less consistent. Switzerland saw a similar number of owner-occupied home completions in the 1990s on annual average than in the decade that followed. The current forecast of newly-constructed apartments in 1+2 family homes in 2010 to 2019, by contrast, is expected to be a third lower than in the 1990s. With its marked decline by almost half of completions over the same time period, Germany is not alone.

Comparing new-build activities in the five major European countries reveals that the Spanish market has hit rock bottom. In Spain only around a quarter of an owner-occupied home per 1,000 inhabitants is completed and/or one owner-occupied home per 4,000 inhabitants (Figure 3). For 2017 only 14,000 apartments are forecast to be completed in new 1+2 family homes, which is a

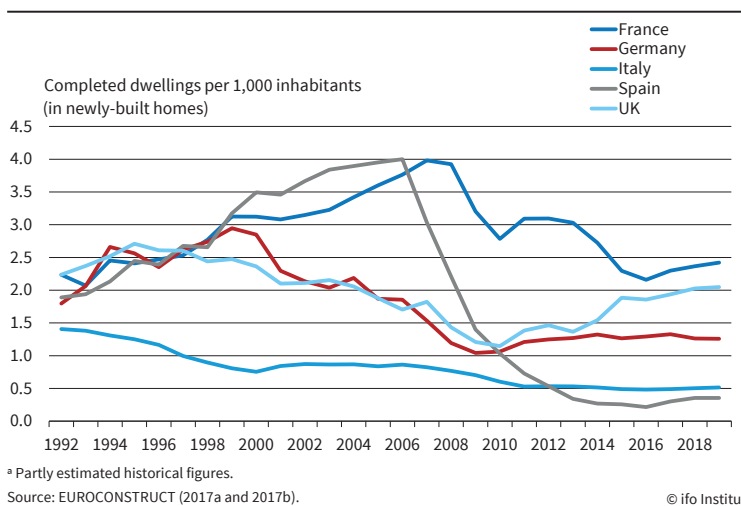
far lower figure than in much smaller countries like Belgium, Austria and Sweden. While the bursting of the real-estate bubble in the wake of the financial crisis led to a dramatic market correction, new-build activities in Italy have been more or less in steady decline since the beginning of the 1990s. This can primarily be attributed to the country's relatively weak economic recovery. The financial and economic crisis has widened the economic gap between Italy and other European countries. In the current environment only very few private households in Italy can

afford a newly-built home. This means that Italy's completion rate of half a residential unit per 1,000 inhabitants is only slightly above that of Spain.

In Britain demand for new construction has picked up considerably since 2010, which is due to the country's gradual emergence from the economic crisis, as well as generous public funding. According to the latest forecast, figures could almost return to the levels seen at the beginning of the 1990s by the end of the decade. Brexit plays a minor role in this instance, since Britain is suffering from an extreme housing shortage in several areas. Although the current completion rate of almost 2 units per 1,000 inhabitants is significantly higher than the German rate of not even 1.5 units, this is primarily due to the British preference for self-owned homes, and a far lower construction volume of multi-family homes. The British market is nevertheless experiencing a clear upturn, whereas in Germany, by contrast, the new construction market is still stagnating and is also far smaller than it was at the end of the 1990s.

The only one of the five large European countries in which roughly the same amount of owner-occupied

Figure 3
Completed 1+2-family Homes in the Big 5 European Countries^a



homes is being completed per 1,000 inhabitants as in the 1990s in France. Although demand has also clearly weakened since the outbreak of the financial crisis – with a completion rate of almost 4 dropping to 2.3 residential units at present – the French market apparently was not too strongly overheated and/or driven by speculation in the pre-crisis years. On the other hand, it is worth noting that although the construction of owner-occupied homes in France got off with a black eye, its importance compared to multi-family home construction, has diminished significantly since the crisis.

WAGE DEVELOPMENT VS. CONSTRUCTION COSTS AND LAND PRICES

Let us go back to the situation in Germany. The sharp increase in wages and salaries in recent years should have given fresh impetus to the construction of 1+2 family homes. Over the past seven years average gross wages and salaries earned by German workers have increased by a good 2½ percent annually (Figure 4). As of 2014 the annual increase in consumer prices has slowed down significantly in addition, meaning that gross wages and compensation increased by around 2 percent p.a. in real terms during the period of 2014–2016. Higher levels of real growth were last seen in 1992.

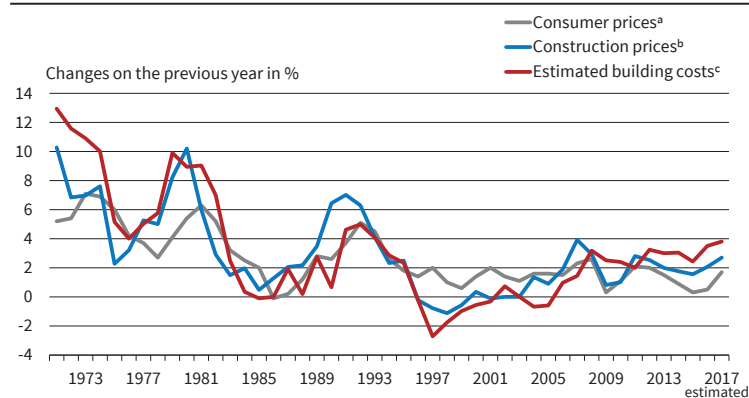
On the other hand, the prices for construction services related to erecting a new residential building have risen more sharply since 2006 than general consumer prices (Figure 5). This particularly applies to the years from 2014 to 2016 and thus relativizes the greater financial scope created by stronger growth in

wages and salaries. Moreover, according to official statistics on building permits, the estimated construction costs of owner-occupied homes per square meter living area has increased by almost 3 percent p.a. since 2008. In the years between 2012 and 2016 the annual pace of growth also picked up somewhat. For the ongoing year the increase in costs even reached a rate of nearly 4 percent, a figure last seen in 1993.

The higher growth rate of estimated construction costs reflects the faster increase in construction costs on the one hand, as contractors can now command higher prices due to brisker demand. On the other hand, stricter – and in most cases more expensive – state regulations (like the tightening up of Energy Savings Order regulations, for example), as well as steadily tougher requirements in terms of quality and furnishings on the part of clients and/or owner occupiers, are also playing a key role.

Moreover, the shortage and increase in land prices particularly in metropolitan areas has already been negatively influencing demand for 1+2 family homes for some time. In addition to the reports of market players, the results of official statistics on the land market point to an insufficient offering of plots suitable for construction (Figure 6). Although the amount of land suitable for construction sold has increased significantly since 2010, this figure remains far below the levels seen at the beginning of the 1990s. Today's demand for residential construction – especially related to multi-family buildings – is similar to back then. The shortage of land, reflected in soaring sales prices per square metre, is causing problems both for multi-storey and owner-occupied dwellings. The

Figure 5
Comparison of Consumer and Construction Prices with Estimated Building Costs in Germany



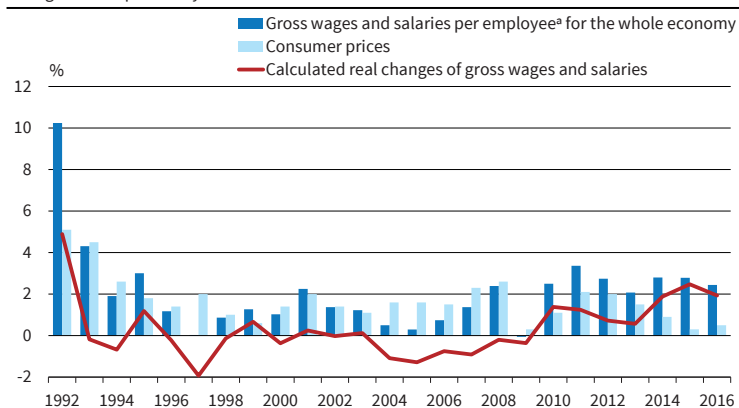
Note: Until 1990: territory of the former Federal Republic, as of 1991: unified Germany.

^a Until 1991: territory of the former Federal Republic. ^b Newly-built residential buildings. Square metre costs for permitted 1+2 family homes.

Source: Federal Statistical Office (2017e, 2017j and 2017k); ifo Institute.

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Figure 4
Wages and Salaries as well as Consumer Prices in Germany
Changes on the previous year

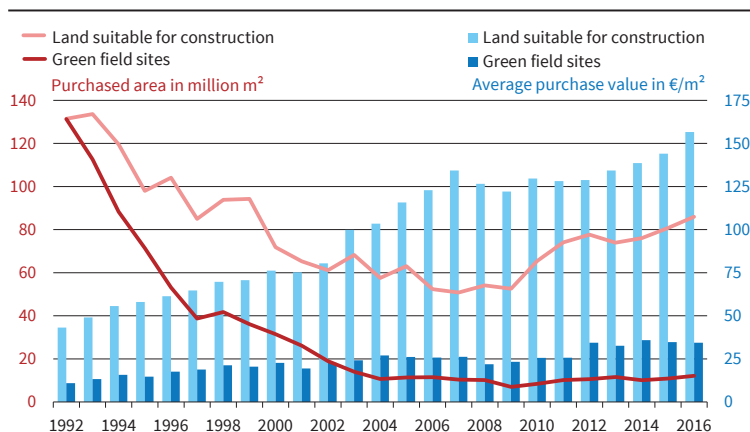


^a Including marginally employed persons.

Source: Federal Statistical Office (2017g and 2017k); ifo Institute.

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Figure 6
Purchase Values for Building Land in Germany



Source: Federal Statistical Office (2017f); ifo Institute.

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very moderate development in the sales of green field sites – which is precursor of the various different types of construction sites, but primarily for land ready for building – suggests that the offering of sites will remain very limited because there is a lack of replacement land in the pipeline. Since 2012 the average sales price for green field sites has been way above that of previous years. Actual demand for land has since increased considerably.

CURRENT STATE SUBSIDIES

Another important reason for the extremely sluggish demand for new construction in recent years is the significant reduction of state subsidies. At the beginning of 2006 – almost ten years after its launch – the home ownership subsidy was finally scrapped. The market for 1+2 family homes benefitted tremendously from this measure, which, unlike its predecessor, no longer consisted of tax breaks. This was primarily due to the high upper income tax ceiling, below which the subsidy was paid, as well as the special subsidy for children. Unlike today, the level of the subsidy was not coupled with the new building's energy-saving features either.

At its peak in 2004 this subsidy cost the German federal government almost 11 billion euros. At that time the average construction costs were over a quarter below the present level and also the land prices were considerably lower. The government now offers funding *via* the state-owned Reconstruction Loan Corporation (KfW) for the creation of owner-occupied property (e.g. the purchase from builders) *via* loans at favourable rates on the one hand; and supports energy-efficient (e.g. independent) new construction *via* cheap loans and redemption subsidies on the other. The latter can be as high as 15,000 euros, but this calls for extremely energy-saving and therefore expensive construction. The current promotion can be described as far less appealing than the funding available in 2004 as a result.

DEMOGRAPHIC EFFECTS AND SUPPLY OF EXISTING HOMES

We have already established that low interest rates and the favourable economic environment – with its rising income levels – are indicative of higher demand for newly-built 1+2 family buildings. At the same time, however, potential home builders are confronted with far higher construction and land costs, as well as higher incidental costs related to land transfer tax. In addition, the government has scaled back its funding significantly. Moreover, other aspects like greater (pro-

fessional) mobility and the growing attractiveness of cities and/or conurbations, where people primarily live in apartment buildings, also have a certain role to play. In the long term, however, digitalisation may lead to slightly more decentralisation and/or fewer mobility requirements.

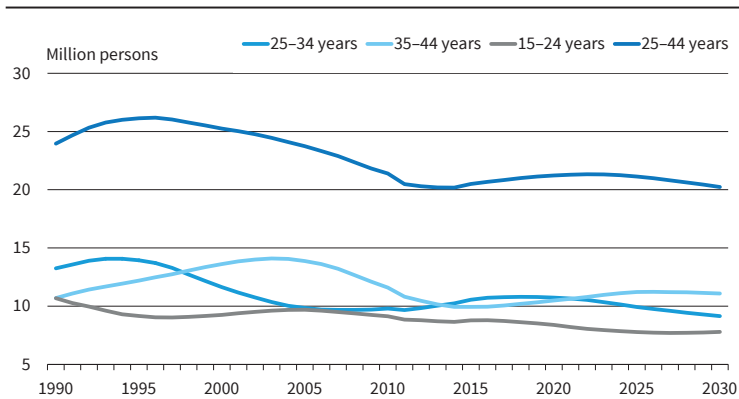
While the interest rate, economic environment and subsidy strategy pursued by politicians may change markedly in the short term in theory, demographic developments and their effects on the market for 1+2 family buildings, for example, are difficult to influence even in the long term. The ageing of society, which is extremely hard to prevent, is leading to a significant reduction in the size of the traditional target group on the one hand; while the rising number of bequests mean that a rising number of existing homes are coming onto the market. The growing supply of 'secondhand' real estate is making new-builds look less attractive since they are far more expensive to buy and involve a great deal more organisational effort if built independently by their owners.

Germany's population has already been ageing for some time and this process will gather impetus significantly in the decades ahead. The old-age dependency ratio, (or the number of at least 65 year-olds per 100 persons aged between 20 and 64 years), for example, was around 35 persons last year. According to a recent study by the Berlin Institute for Population and Development, this figure will be more than 10 persons higher by 2030 and will reach a level of around 55 persons in 2050. In other words, there will then be fewer than twice as many 20 to 64 year-olds as 65+ year-olds. Average demographic developments will be very similar across Europe.

Focusing on the section of the population of potential home builders and/or home buyers shows a decline in Germany as a whole since the mid-1990s – even if an increase can recently be seen in the 25–44 year-old age group (Figure 7). From 1997 to 2014 this group lost 6 million persons, i.e. potential owner-occupiers. The Federal Statistical Office's recently updated popu-

Figure 7

Development of Selected Age Groups in Germany



^a As of 2016: official forward projection.

Source: Federal Statistical Office (2017b and 2017h).

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lation projection, which considers (refugee) immigration to be of considerable importance, only forecasts growth of just 1.2 million persons in the 25–44 year-old group in the period from 2015 to 2022. In the remaining years up to 2030 this figure is forecast to turn negative. In terms of numbers, the group of future home builders – or 15-24 year-olds – will not develop favourably either.

Moreover, the share of households with more than two members has been decreasing steadily for several years from just under 36 percent of all private households in 1991 to just a quarter in 2016. The number of potential families, or households of at least three persons, has therefore dropped significantly over the years. In the 20 years between 1996 and 2016 alone the number of households with married couples and/or partners with children aged under 18 fell by a good 1.5 million to around 6.5 million. According to current official projections released in 2017, the share of households with 3+ members may even drop to just a fifth by 2035. Since it tends to be slightly larger households that want 1+2 family homes – as they require more living space after founding a family and wish to move into their own home – the signs do not look rosy for the future construction of owner-occupied homes.

The progressive ageing of society is also leading to higher mortality rates and more bequests. In many cases real estate and/or 1+2 family homes are already being bequeathed today. It is fairly common for such homes to be sold either because the bequest is to be divided between several people, or because child beneficiaries live elsewhere and/or the property that they have inherited does not meet their living requirements.

According to information from the GEWOS Institute for Metropolitan, Regional and Residential Research, the number of

sales of existing 1+2 family homes has increased sharply since 2007 (Figure 8). At that time, and after the home ownership subsidy was scrapped, the new construction of dwellings in one and two family buildings fell sharply from around 150,000 units in 2006 to just 84,000 units in 2009. The recovery as of 2010 was far weaker then. At the same time, the number of registered purchases has risen significantly since 2007. Furthermore, information from the German Federal Statistical Office shows that a reversal in the death rate trend occurred. The number

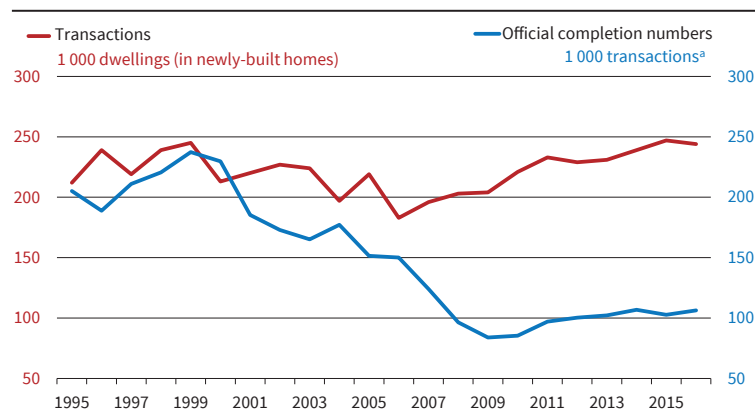
of mortalities had fallen steadily from the mid-1970s to the mid-2000. In the ten years that followed the death rate rose sharply, and therefore more properties should have bequeathed as a result.

Since the GEWOS data covers transactions, it also covers transfers of ownership in the course of property development activities. A look at the official completion statistics shows that corporate builders have completed less than 20,000 new 1+2 family homes since 2008; and even in the previous years up to 2003 they only completed around 30,000 such new buildings. Over the entire period from 1993 to 2016 the number of owner-occupied homes built by companies as a share of all such buildings fluctuated between 15 and 25 percent. The share of private households that were builders, by contracts, fluctuated between around 75 and 85 percent. GEWOS itself assumes that only around 10 percent of the registered purchases can be attributed to property developers. Hence GEWOS total transaction figures should provide a reliable indication of how the purchasing figures of existing homes have developed in recent years.

Also the fact that GEWOS transaction data features purchase events only marginally reduces its informative value. Ownership transfers of entire 2 family

Figure 8

New Construction and Transactions of 1+2-family Homes in Germany



^a 2016: Include sales of new buildings by developers and sales of entire 2-family buildings as well as package sales.

Source: Federal Statistical Office (2017e), GEWOS IMA^a Immobilienmarktanalyse (2017). © ifo Institute

homes, as well as package sales of several 1+2 family homes, only count as one transaction, while in reality several residential units change hands. However, an internal GEWOS analysis, as well as testimonials from land valuation boards, shows that such transactions are very rare and of virtually no importance compared to the total number of purchases. The other case scenario is that the statistics include buildings that are bought and resold very quickly and before anybody moves into them. This would mean that the supply of existing homes deduced from the figures here is overestimated, but this factor is also barely relevant.

As a result, GEWOS data seems very well-suited for finding answers to the question of how sales figures for existing owner-occupied homes have developed over the years. Comparing GEWOS data with official figures on new builds reveals that a large gap between transaction and new build figures has opened up since 2007. This, in turn, indicates that the importance of 'secondhand' real estate compared to new builds has grown significantly in the last ten years. Last year the number of registered transactions exceeded completions by around 150,000 residential units. If the sales figures are adjusted for transactions conducted by property developers, the overhand of existing homes sold annually is still way above the 100,000 unit marker. Ten years ago, by contrast, the overhang was probably only a few thousand units.

The markedly higher market offering of existing homes has already been negatively impacting new construction activity for several years. In view of the rising number of bequests in the future, this trend in demand for new construction is expected to become even more pronounced; and will lower the number of new builds. The real estate market, however, should always be considered regionally/locally. This means that in growing, sought-after cities 1+2 family homes find buyers very quickly. In these areas large numbers of potential owner-occupiers are still contemplating new build projects as a result. Nationwide, however, progressive demographic ageing will have a negative impact on the new build market, even if land prices are still very low in several regions and many households in such areas therefore prefer to build rather than buy an existing home.

CONCLUSION

To sum up, Germany's ageing population can be expected to clearly hamper the construction of new 1+2 family homes in the long term. On the one hand, the number of traditional users such as families, for example, will fall, while the wave of bequests will continue to grow and will significantly boost the supply of existing homes in many areas. In the medium term, there is also little hope of any improvement as far as (additional) building costs, the availability of surface area and state subsidies are concerned. Instead, financing can be expected to become slightly more expensive

in the medium term and economic growth will slow down markedly. As a result, the number of dwellings in newly-built 1+2 family homes could fall permanently below the 100,000 unit marker in the years ahead. The statement that new owner-occupied homes will still be built in the future is, however, little consolation to many market players like firms in main construction industry, the building supply industry and building societies.

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Jana Lippelt* and Lea Mayer**

After the Paris Agreement – What’s Next? Worldwide Implementation

In November 2016, barely a year after the climate conference in Paris, the agreement negotiated there came into effect. Its entry into force required the ratification by at least 55 countries, which together account for 55 percent of global greenhouse gas emissions. By mid-November 2017, 197 countries had joined the agreement, while 170 of them – with a combined emission share of 88 percent – had already ratified (UNFCCC 2017; see also Figure 1a).

RESULTS OF MARRAKECH

In contrast to the Kyoto Protocol, emerging and developing countries in addition to industrialized countries also committed to climate protection measures (in the form of Intended Nationally Determined Contributions – INDC) after signing the Paris Agreement. At the last climate conference in Marrakech (in 2016), an agreement was reached on a regular review of national action plans and the development of transparency plans. In essence, the contracting parties agreed to submit concrete rules to this end by 2018 in order to steadily tighten national climate contributions. The reason for that is the fact that the climate contributions submitted to date by states are not sufficient to reduce global warming to below 2°C, or even to 1.5°C compared to its pre-industrial levels (Hickmann 2017). Let us consider a few examples.

As an association of industrialised countries, the European Union has set common targets under the Paris Agreement. By 2020, greenhouse gas emissions are to be reduced by 20 percent compared to 1990, by 40 percent by 2030 and by 80–95 percent by 2050. Renewables as a share of total energy consumption should reach 20 percent in 2020 and 27 percent in 2030 (European Commission 2017).

In addition to the European Union as a whole and the United States, China and India are among the states with the highest emissions of greenhouse gases worldwide (see Figure 1b). As part of the Paris Agreement, China has set several environmental targets to

be achieved by 2030. CO₂ emissions per unit of GDP, for example, are expected to fall 60–65 percent compared to 2005 levels. By 2030 at the latest, the total CO₂ emissions of China should have peaked and will subsequently decline steadily. In addition, 20 percent of the energy is to be generated by non-fossil energy sources, while the volume of forest land is expected to increase by 4.5 billion cubic meters compared to 2005 at the same time. In order to achieve climate goals even more effectively in future, an emissions trading system was implemented in China. In addition to the pilot projects already running in several cities, the nationwide system is going to be launched at the end of 2017 and fully implemented by 2020 (International Carbon Action Partnership 2017; The Climate Group 2017). India has announced a reduction in emissions per unit of GDP by 33–35 percent compared to 2005 by 2030. Furthermore, 40 percent of energy will be generated from non-fossil fuels and 2.5–3 billion tons CO₂ will be additionally bound by larger forest areas (Government of India 2015).

Another outcome of the conference in Marrakech was the creation of the ‘NDC Partnership’, which aims to help developing countries achieve their climate targets. This network of governments and international institutions aims to exchange knowledge and improve access to technical and financial resources (BMZ 2017). In this context, the industrialised countries also agreed to commit 100 billion US dollars by 2020 in order to secure climate protection in developing and emerging countries, as well as bolster efforts to adapt to climate change.

In addition to decisions on climate financing, Marrakech also focused on achieving the current climate protection targets by 2020 in order to further promote the implementation of the Paris Agreement. Given that current climate contributions are not sufficient to mitigate climate change, concrete cooperation should be stepped up beyond the national level. In this context, the ‘Marrakech Partnership for Global Climate Action’ was launched, among other things, to stimulate and bundle climate protection activities at national, regional and private level in the form of initiatives and networks (UNFCCC 2016). To this end, framework conditions and platforms are to be set up to facilitate meetings among the different players involved, as well as the monitoring and documentation of multiple processes.

CLIMATE INITIATIVES WORLDWIDE

In general, the influence of global initiatives at a non-state level has become increasingly important, not least because of the rather sluggish Kyoto process. Numerous examples of regional, national and cross-border cooperation demonstrate the growing resolve of various players to tackle climate change and to further support agreements at the state level. The most well-known city-level associations include,

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Figure 1a
Paris Agreement: Status of Ratification

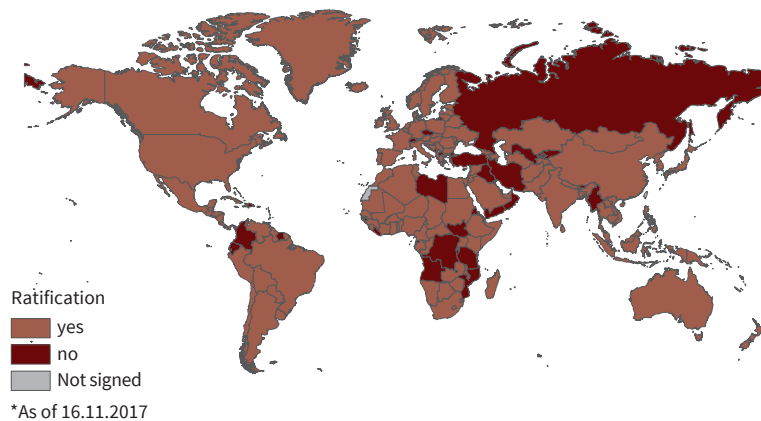
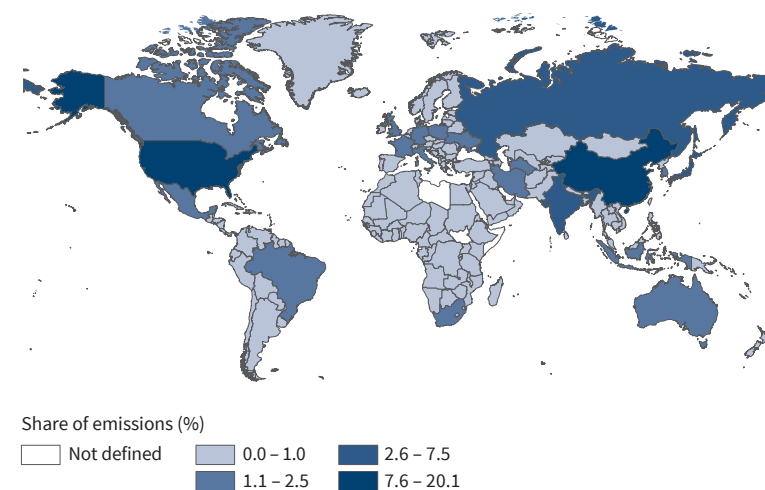


Figure 1b
Global Share of Greenhouse Gas Emissions



Source: PIK Potsdam: Paris Reality Check (2017).

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for example, the EU-level ‘Convent of Mayors for Climate and Energy’ and the ‘C40 Cities Climate Leadership Group’ (Konvent der Bürgermeister 2017; C40 Cities 2017). Furthermore, a whole series of initiatives for companies has been launched in recent years including the WWF’s Climate Savers Initiative. Here companies that achieve particularly ambitious emissions targets are recognised by the WWF as ‘climate savers’. Other enterprise-level networks include 3C – Combatting Climate Change, which have been campaigning for a political change since 2007, as well as the Carbon Disclosure Project (Handelsblatt 2017).

Even against the backdrop of the current political situation in the United States, all-party alliances are becoming increasingly important. In June, US President Donald Trump announced that the United States will exit the Paris Agreement after ordering a move away from the Clean Power Plan under Barack Obama in March (The Guardian 2017; New York Times 2017). He describes the agreement as unfair to the United States, as it would have to take more action than other countries and would have to pay a disproportionate contribution into the climate fund. According to

him, a withdrawal from the agreement is therefore necessary to keep jobs in the United States and to provide the country with enough money (The White House 2017). Hardly any other US politicians agree with the President and this decision. The democratic governors of New York, Washington and California founded the ‘US Climate Alliance’ on the same day. The members have decided to comply with the Paris Agreement, thus continuing the US goal of saving over 26 percent of greenhouse gas emissions from 2005 to 2025, or achieving its own equivalent or higher target. The states of California and New York, for example, aim to reduce CO₂ emissions by 40 percent by 2030 compared to 1990 levels (State of California 2017; New York State 2017). The alliance has no legal ties, but only bundles the states that want to achieve this goal (Brown and Serve 2017). However, 14 states are

already members, including several states with republican governors. The alliance embodies over a third of the American population (US Climate Alliance 2017).

However, these initiatives are not an absolute novelty in the United States. Under the Kyoto Protocol, various states had already joined forces, such as the ‘North America 2050’ or the ‘Pacific Coast Collaborative’, to reduce greenhouse gas emissions by means of energy efficiency measures and improvements in the transport sector. Moreover, regional emissions trading systems such as RGGI (Regional Greenhouse Gas Initiative) and the WCI (Western Climate Initiative) have also been established.

Ultimately, the success of all global efforts crucially depends on how effectively the agreements reached will be implemented in the future. In the forthcoming climate negotiations of Bonn (end of 2017, under the Fiji presidency) and Poland (Katowice in 2018), the focus will be on creating appropriate instruments to implement the Paris Agreement (IWR 2017). The purpose is to create a rulebook specifying the details of the application of the Paris Agreement, which should be adopted at the end of 2018 in Poland.

PERSPECTIVES

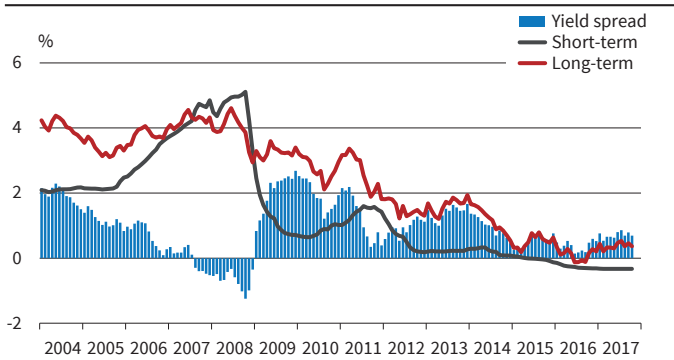
To date, it is still unclear whether and to what extent the US plans to defuse the country's withdrawal. However, it will only continue to abide by the Paris Agreement under conditions that are more favourable to the United States (Zeit Online 2017). The recent Nicaraguan and Syrian declarations on accession to the agreement highlight the global isolation of the United States on this issue.

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Financial Conditions in the Euro Area

Nominal Interest Rates^a



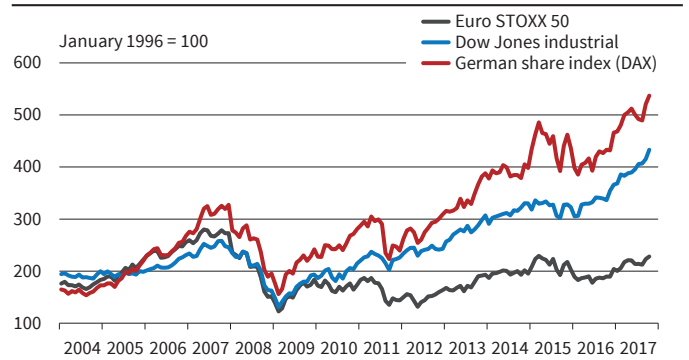
^a Weighted averages (GDP weights).

Source: European Central Bank.

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In the three-month period from August 2017 to October 2017 short-term interest rates remained unchanged: the three-month EURIBOR rate was -0.33% in August 2017 and also in October 2017. In addition the ten-year bond yields reached 0.36% in August 2017 and also remained the same in October 2017, while the yield spread amounted to 0.69% again in both August and October 2017.

Stock Market Indices

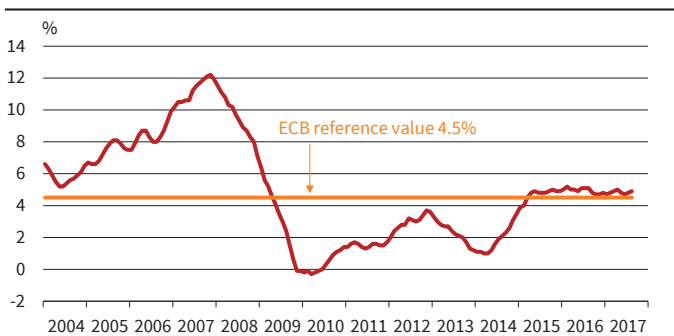


Source: Deutsche Börse; Dow Jones; STOXX.

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The German stock index DAX increased in October 2017, averaging 13,230 points compared to 12,829 points in September 2017. The Euro STOXX also increased from 3,595 to 3,674 in the same period of time. Furthermore the Dow Jones International increased, averaging 23,377 points in October 2017, compared to 22,405 points in September 2017.

Change in M3^a



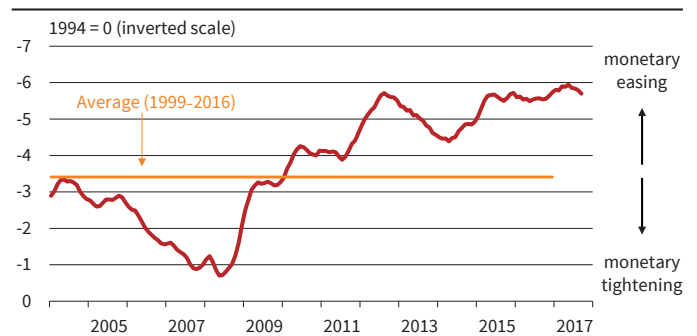
^a Annual percentage change (3-month moving average).

Source: European Central Bank.

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The annual growth rate of M3 decreased to 5.0% in October 2017, from 5.2% in September 2017. The three-month average of the annual growth rate of M3 over the period from August 2017 to October 2017 reached 5.1%.

Monetary Conditions Index



Note: MCI index is calculated as a (smoothed) weighted average of real short-term interest rates (nominal rate minus core inflation rate HCPI) and the real effective exchange rate of the euro.

Source: European Central Bank; calculations by the ifo Institute.

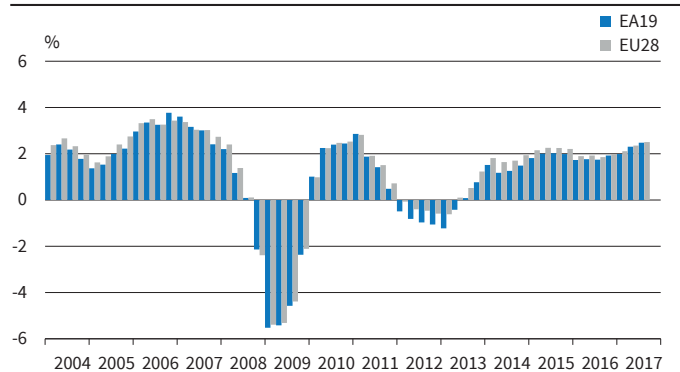
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Between April 2010 and July 2011 the monetary conditions index remained rather stable. This index then continued its fast upward trend since August 2011 and reached its first peak in July 2012, signalling greater monetary easing. In particular, this was the result of decreasing real short-term interest rates. In May 2017 the index reached the highest level in the investigated period since 2004, but its downward trend thereafter continued also in September 2017.

EU Survey Results

Gross Domestic Product in Constant 2010 Prices

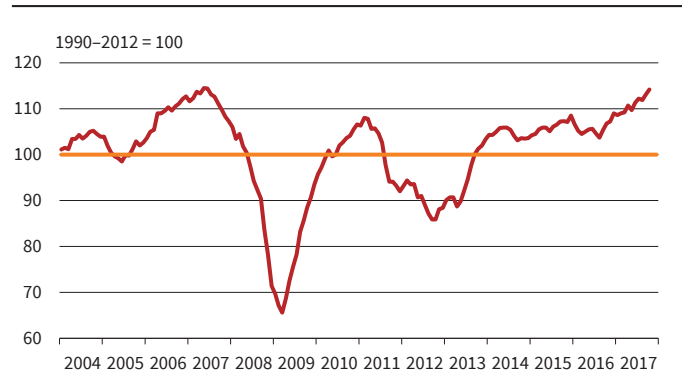
Percentage change over previous year



According to the Eurostat estimates, GDP grew by 0.6% in both the euro area (EA19) and the EU28 during the third quarter of 2017, compared to the previous quarter. In the second quarter of 2017 the GDP grew by 0.7% in both zones. Compared to the third quarter of 2016, i.e. year over year, seasonally adjusted GDP rose by 2.5% in both the EA19 and the EU28 in the third quarter of 2017.

EU28 Economic Sentiment Indicator

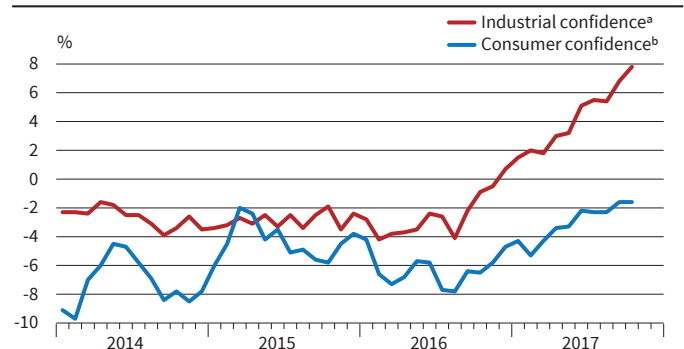
Seasonally adjusted



In October 2017 the Economic Sentiment Indicator (ESI) increased in both the euro area (+ 0.9 points to 114.0) and the EU28 (+ 1.1 points to 114.2). In both the EU28 and the EA19 the ESI stands above its long-term average.

EU28 Industrial and Consumer Confidence Indicators

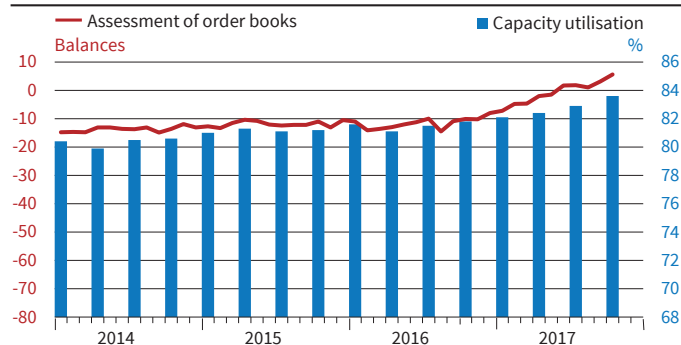
Percentage balances, seasonally adjusted



In October 2017, the *industrial confidence indicator* increased by 1.0 in the EU28 and by 1.2 in the euro area (EA19). The *consumer confidence indicator* remained unchanged in the EU28, while the same indicator increased by 0.2 in the EA19.

- a The industrial confidence indicator is an average of responses (balances) to the questions on production expectations, order-books and stocks (the latter with inverted sign).
- b New consumer confidence indicators, calculated as an arithmetic average of the following questions: financial and general economic situation (over the next 12 months), unemployment expectations (over the next 12 months) and savings (over the next 12 months). Seasonally adjusted data.

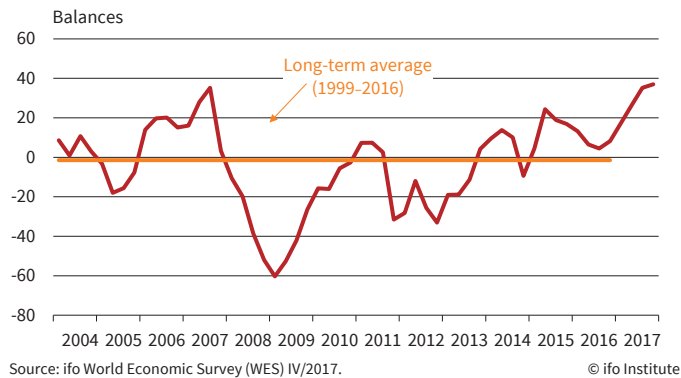
EU28 Capacity Utilisation and Order Books in the Manufacturing Industry



Managers' assessment of *order books* reached 5.6 in October 2017, compared to 3.1 in September 2017. In August 2017 the indicator had amounted to 1.0. *Capacity utilisation* reached 83.6 in the fourth quarter of 2017, up from 82.9 in the third quarter of 2017.

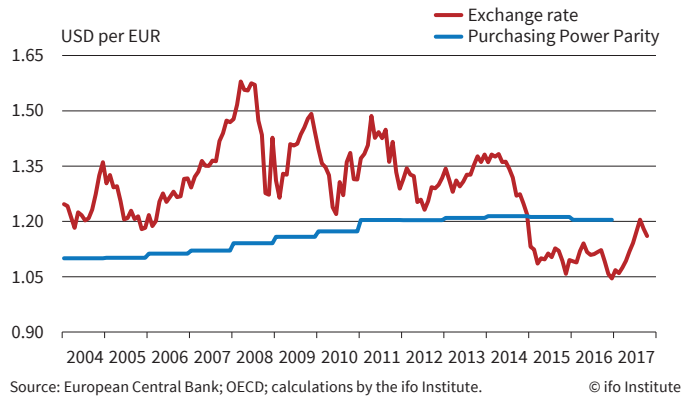
Euro Area Indicators

ifo Economic Climate for the Euro Area



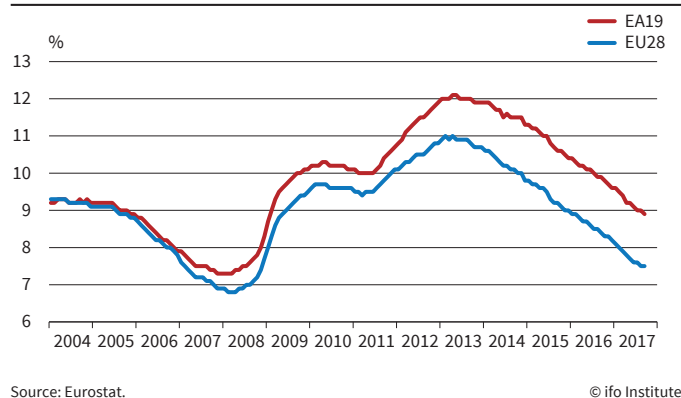
The ifo Economic Climate Indicator for the euro area (EA19) hit a new high this quarter. It rose from 35.2 points to 37.0 balance points in the fourth quarter of 2017, reaching its highest level since autumn 2000. The current economic situation was assessed to be significantly better, whereas the six-month outlook was less brightened. The upturn in the euro area will continue in the months ahead, but is expected to lose impetus somewhat.

Exchange Rate of the Euro and Purchasing Power Parity



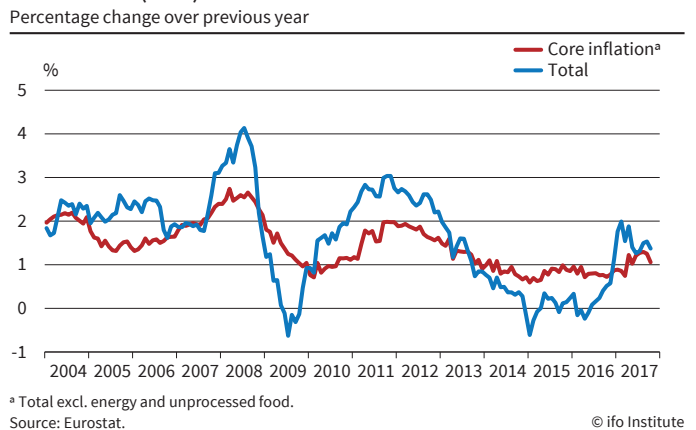
The exchange rate of the euro against the US dollar averaged approximately 1.18 \$/€ between August 2017 and October 2017. (In July 2017 the rate had amounted to around 1.17 \$/€.)

Unemployment Rate



Euro area (EA19) unemployment (seasonally adjusted) amounted to 8.9% in September 2017, down from 9.0% in August 2017. EU28 unemployment rate was 7.5% in September 2017, stable compared to August 2017. In September 2017 the lowest unemployment rate was recorded in the Czech Republic (2.7%) and Germany (3.6%), while the rate was highest in Greece (21.0%) and Spain (16.7%).

Inflation Rate (HICP)



Euro area annual inflation (HICP) was 1.4% in October 2017, down from 1.5% in September 2017. Year-on-year EA19 core inflation (excluding energy and unprocessed foods) amounted to 1.1% in October 2017, down from 1.3% in September 2017.

