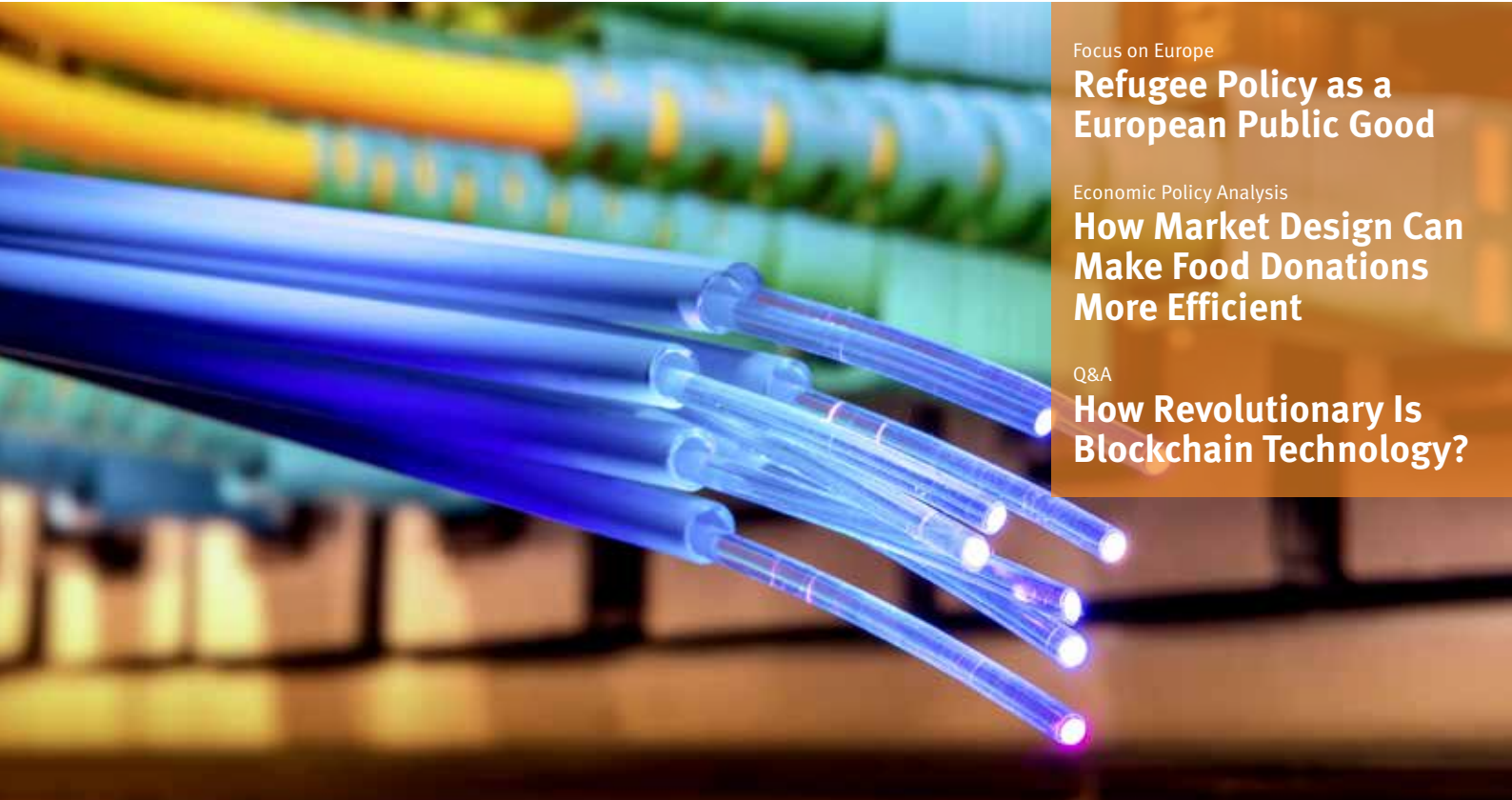


# ZEW NEWS

Research Results · Conferences & Workshops · Publications

July/August 2018



Focus on Europe

**Refugee Policy as a European Public Good**

Economic Policy Analysis

**How Market Design Can Make Food Donations More Efficient**

Q&A

**How Revolutionary Is Blockchain Technology?**

Utilising a comprehensive panel dataset of EU27 Member States, a ZEW analysis has investigated the potential effects of providing various types of broadband connection on GDP.

Photo: © iStockphoto/kynny

## Public Welfare Is Highest When Different Broadband Technologies Are Combined

Over recent years, both the EU and the German government have made considerable investments in the roll-out of high-speed broadband internet connections for all their citizens. However, a recent ZEW study has shown that the public welfare gain for citizens is highest if different broadband access technologies are combined.

Electric communication markets are currently undergoing a transformation, with massive investments in infrastructure intended to advance the roll-out of fast and ultra-fast broadband internet using fibre-optic cables, as well as in 5G, the next generation of mobile communications technology which should pave the way for the internet of things. These future-ready technologies support data connections of varying bandwidths, ranging from a minimum of 50 Mbit/s to several gigabits a second. In its “Gigabit society strategy” the EU Commission recently set

out three ambitious targets: by the year 2025, all schools, transport hubs, public service providers and digital intensive firms should have access to a gigabit connection; all metropolitan areas and main travel routes should have uninterrupted access to 5G; and all European households should have access to an internet connection with a speed of at least 100 Mbit/s.

Advocates of high-speed internet predict that demand will not be driven solely by consumers, who, among other things, hope for better online entertainment services such as video streaming, but also by business applications such as cloud computing services. Entirely new developments like driverless cars and electronic health services, which are dependent on fast data connections, are also likely to drive up demand in the future. However, the roll-out of broadband connections with speeds of over 50 Mbit/s comes with high costs which are much higher than

the costs of providing basic (several Mbit/s) or fast (up to 100 Mbit/s) broadband connections. Deployment costs are even higher if fiber is directly deployed to buildings or individual homes enabling ultra-fast broadband connections (up to several Gbit/s). It is therefore important to weigh up the economic costs and benefits of this roll-out.

**Panel data from 27 EU countries included**

A ZEW analysis has investigated the potential effects of providing various types of broadband connection on GDP in the hope of offering some recommendations for what the roll-out strategies should look like. In particular, the study attempted to answer the following questions: Does society as a whole experience a welfare loss if the transition to fast and ultra-fast broadband internet is carried out at a slower rate? Is there any justification for public interventions in the market that are likely to result from the EU favouring ultra-fast broadband and not leaving the decision over the “right” kind of technology up to the market?

For the analysis, researchers used panel data from 27 EU countries for the years 2003 to 2015. Data sources included the Penn World Table, the database of the FTTH Council Europe as well as the EU’s “Progress Report on the Single European Electronic Communications Market” and “Digital Agenda Scoreboard”.

Taking a look at the numbers, it becomes apparent that in the EU there are far more fast and ultra-fast internet connections avail-

able than citizens actually use. In 2015, in the 27 EU countries observed in the study there were a total of 218.07 million households, of which 187.03 had access to fast internet and 59.16 million had access to ultra-fast internet. The overprovision of high-speed internet is the result of fibre-optic infrastructure being provided simultaneously by several different suppliers, in particular, in urban areas. However, only 38.51 million households use a fast internet connection and only 15.33 million use an ultra-fast connection. This is equivalent to a usage rate (actual usage in relation to access) of 20.6 per cent for fast connections and 25.9 per cent for ultra-fast connections. The study also found that the gap between provision and actual usage grew considerably between 2005 and 2015 (see figure below).

At the same time, the share of households subscribing to a basic broadband connection increased steadily over the observation period, with the EU average in 2015 being at around 70 per cent. Therefore, it seems important that the majority of households have access to a standard broadband connection. Only a (albeit growing) minority actually require access to fast or ultra-fast internet connections on the demand side. The latter is currently either (still) too expensive and/or the advantage it brings is (still) not significant or transparent enough.

**Principle of “technological neutrality” supported**

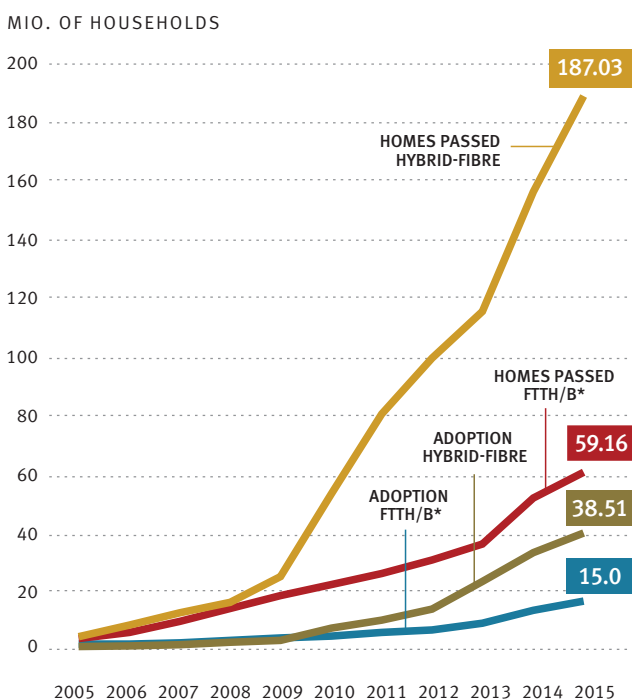
The ZEW study looks at the causal relationship between relevant types of broadband connection and GDP and, in a second step, conducts a cost-benefits analysis for each type. The econometric analysis indicates that broadband internet has a positive and statistically significant impact on GDP, with a one per cent increase in the usage of basic broadband internet leading to an increase in GDP of 0.015 per cent. The effect of fast and ultra-fast internet on GDP is far weaker, at 0.002 to 0.005 per cent depending on the regression.

In the cost-benefit analysis, the authors used the highest value from the usage rates for fast and high-speed internet for the year 2015 (20.6 and 25.9 per cent, respectively). The analysis shows that, at a target coverage rate of 100 per cent, in the case of both fast and ultra-fast broadband connections the estimated benefit is lower than the estimated costs of the roll-out. Only at a target coverage rate of 50 per cent did the costs and benefits of high-speed internet balance out.

The needs of consumers and business users are highly heterogeneous, so a combination of different available technologies seems like the best way to address this heterogeneity. This is supported by the principle of “technological neutrality”, which states that, of the various technologies available, none should be given preferential treatment ahead of time. Instead, it should be left up to market forces to determine the most suitable technology over the course of time. In addition, the ZEW study did not find a noticeably higher benefit for ultra-fast internet compared to fast internet.

The study can be downloaded at: [www.zew.de/PU79926-1](http://www.zew.de/PU79926-1)

AVAILABILITY AND ADOPTION OF (ULTRA-)FAST BROADBAND IN EU27 (MIO. OF HOUSEHOLDS)



\*FTTH/B = Fibre to the home/Fibre to the building

Source: ZEW

# How Market Design Can Make Food Donations More Efficient

Food banks are charitable aid organisations which provide free food for those in need. In Germany, for instance, food banks have become one of the most prominent social movements, with more than 50,000 volunteers providing food to around 1.5 million people a year. However, many food banks are frequently experiencing supply shortages. An example from the US illustrates how a simple measure can not only make the allocation of food donations more efficient, but also lead to an increase in total donations.

The fact that food banks in Germany frequently have to deal with supply shortages is partially due to the fact that demand is continually increasing – in part due to the recent influx of refugees –, but also as a result of a reduction in donations as supermarkets are able to calculate with increasing accuracy how much fresh food they need on daily basis.

In the US, the third biggest charitable organisation in the country, Feeding America (FA), receives large donations in the form of trucks filled with products from large retailers and food manufacturers and distributes these to around 210 regional food banks. However, these large donations only make up a fraction of total donations. FA distributes these large donations without knowing how much has been donated from local bakeries and supermarkets. As a result, the actual needs of the individual food banks are not taken sufficiently into account, since this information is usually only available to the food bank itself. Due to this information asymmetry, it was difficult for FA, firstly, to avoid wasting food and, secondly, to prevent donations from having to be thrown away, which is a particular concern for large donors.

## Play money is introduced to establish food prices

In order to solve this information problem, FA set up a working group that brought together the heads of regional food banks and economists from the University of Chicago. The economists suggested using a specific market mechanism, namely giving

food banks play money which they could use to bid for donated food at auction. Prices from these auctions help to solve the information problem by indicating how much food banks value various food products. In order to ensure that the food banks most in need and with the largest catchment areas receive the most food, these banks receive a higher amount of play money as calculated using a distribution key based on catchment area size and the local poverty rate.

## Online auctions help to allocate donations in a more targeted way

As part of their new procedure for donations, FA set up an online platform. Every day, more than 200 food banks across North America log on to the platform where lots of food donations are published on a daily basis – on average 30 to 40 lots a day. Each bank can participate in up to two auctions using their play money, which is distributed every morning and redistributed at midnight according to the same distribution key. By observing these artificial prices, FA is able to glean information on what types of donation are in particularly high demand (cereal, pasta and rice) and which are not needed so much (fruit and vegetables, dairy products and soft drinks). These prices often differ greatly from the prices one might find for the same products in a supermarket. For example, a kilogram of fruit at the supermarket costs several times as much as a kilogram of pasta. However, pasta has a higher nutritional value, has a longer shelf-life, and is therefore less likely to be donated by local businesses. This information was crucial in helping FA acquire new donations in a more targeted way.

Following the introduction of the new system, total donations rose from 125 to 175 million kilograms a year. This new method of distributing food donations is just one example of how advances in technology, science and research have helped to improve and individualise markets, which is the goal of successful market design.

Dr. Thilo Klein, [thilo.klein@zew.de](mailto:thilo.klein@zew.de)

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## Q&A: How Revolutionary Is Blockchain Technology?

# “It’s Reminiscent of the Gold Rush in the American West”

Triumphalism and harsh criticism seem to go hand in hand in any discussion of blockchain technology. For instance, while the EU’s digital commissioner Mariya Gabriel sees great opportunity for more efficient public administration through blockchain, the head of the International Monetary Fund (IMF), Christine Lagarde, has raised concerns over the technology’s use in money laundering and in financing terrorist groups. This discussion has largely been motivated by a recent boom in investment in blockchain technology, with private investors getting involved alongside professional venture capitalists. ZEW researcher Dr. Dominik Rehse casts a sceptical eye over the recent hype around this new technology.

### What exactly is blockchain technology?

Blockchain technology is a family of technologies that can be used to run distributed computer systems and uses computer cryptography. In the case of Bitcoin, for example, this involves running a shared ledger in which almost entirely anonymous users can use the specially created currency Bitcoin for wire transfers. Other blockchains can be used as the basis for running increasingly complex programmes such as betting platforms. These systems differ from conventional dispersed computer systems in that they involve sophisticated incentive systems to ensure that no individual party has control over the entire system. Blockchains can be run on private networks or public networks, most commonly on the Internet.

### How is this technology already being applied?

This technology can be sensibly applied in cases where the functions usually carried out by a trusted third party – and which are generally easily automated – are either taken over or entirely new functions are created. In the case of Bitcoin, blockchain assumes the function of financial intermediaries in payment transactions. Pilot projects involving blockchain are, among other things, attempting to make food delivery chains more transparent or to further decentralise the energy market. However, the technology is currently most actively being used as an alternative means of processing payments outside of the existing financial system.

### If its practical applications have been limited so far, then why all the hype now?

Public blockchains, in order for the incentive system to function and to ensure interaction between operators and users, regularly emit so-called “coins” or “tokens”, which are what is driving the current investment boom. The market capitalisation of Bitcoin at the end of May 2018 was around 130 billion US dollars, roughly equivalent to the stock market value of software firm SAP. A year ago this figure stood at around only 36 billion US dollars. Developments in the price of Bitcoin and other cryptocurrencies or tokens are driven by price speculation and the

expectation that the coins or tokens in question are going to have a high usage value in the future. The calculation of their actual usage value may also include their use for illicit purposes. The first ever issue of coins and tokens through so-called “Initial Coin Offerings” (ICOs) has brought in around ten billion US dollars for the issuers since the start of 2018, with a mixture of both promising and highly dubious offers. It’s reminiscent of the gold rush in the American West.

### Where is the capital being invested and exchanged for these blockchain tokens coming from?

This is something we can thus far only guess at. Investigations of illegal online markets do, however, suggest that a considerable proportion of transactions via blockchains and the buying and selling of coins and tokens are involved in illegal payments or the circumnavigation of capital flow restrictions and other financial regulations. As part of an ongoing research project carried out at ZEW, we are trying to estimate the extent of cross-border payment transfers being made using the Bitcoin blockchain.

### What legislation is there currently to regulate this new technology?

Almost all the financial market authorities of the G9 have already issued consumer warnings regarding coins and tokens, including the Federal Financial Supervisory Authority (BaFin) in Germany. At the same time, blockchain is increasingly being viewed as a key technology for the future and is being promoted by both the EU and a number of central bank projects. We still have a lot to do in the search for a constructive way to deal with the current developments and challenges involving blockchain technology.

The German federal government also seems to have recognised the potential and possibly also the dangers of blockchain technology and – according to the coalition agreement – intends to develop a “blockchain strategy”.

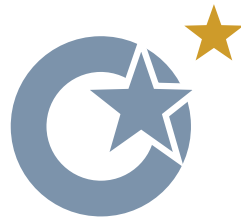


**Dr. Dominik Rehse**

is a senior researcher and an advisor to the board at ZEW. Previously, he worked in ZEW’s Research Department “International Finance and Financial Management” and held various positions in academia and practice. One of the current focuses of his research is on changes in economic interaction due to blockchain technology.

dominik.rehse@zew.de





## FOCUS ON EUROPE

# Refugee Policy as a European Public Good – Unilateral Action Does More Harm than Good

One of the main questions at the centre of the ongoing debate in Germany and across Europe over the “right” kind of refugee and asylum policy is whether the Member States should make autonomous policy decisions regarding the acceptance of refugees or whether a comprehensive authority should be created at the European level.

From a financial and economic point of view, the question is whether an EU-level or national-level strategy is more likely to result in the optimal level of refugee intake. In order to determine what this optimal level is, we need to weigh up the costs and benefits. The costs of accepting refugees arise from admitting them in the first place, from running the process of granting asylum and from the integration policies necessary to protect those seeking asylum. Also worth considering are the political costs resulting from possible strong misgivings on the part of national voters regarding the arrival of refugees.

### **Taking in refugees brings economic and moral benefits**

The benefits of taking in refugees come from two very different angles. On the one hand, taking these people in is in Europe’s foreign-policy interests. For example, it will help to stabilise countries such as Jordan and Lebanon that are undeniably currently overwhelmed by refugees. Stabilising these countries is invaluable to Europe both politically and economically. On the other hand, a further benefit is that the reception of refugees is in accordance with the Union’s founding moral principles. All Member States committed themselves to these principles in the Treaty of the European Union. From the perspective of those who share these beliefs, a policy that prevents people being killed in the war in Syria or drowning in the Mediterranean is of great benefit.

The fundamental problem in trying to solve this issue efficiently when refugee policy is left up to the individual nations is that under the current system the costs are largely internalised and shouldered by the countries taking refugees in, while benefits are external since all Member States get to share them. Helping to stabilise the situation in the Middle East does not

benefit Hungary with its closed borders any less than it does Sweden with its open door policy. Similarly, saving the life of a fellow human being should elicit no less joy in Poland than it does in Denmark.

### **The free-rider problem presents a threat to the European public good of taking in refugees**

This results in a classic free-rider problem. From the perspective of individual EU countries, it makes sense to shift the costs of accepting refugees onto their neighbours in the short term by closing their borders. This reduces costs, while also not reducing the benefit experienced by the country and its citizens significantly. Over time, the incentives to engage in “free-riding” become self-reinforcing and spread from one country to another. This ultimately leads to a “race to the bottom” in terms of national asylum standards and a “race to the top” in terms of setting up new entry barriers. The European public good of taking in refugees would therefore no longer be provided. This type of chain reaction characterises the development of national refugee policy in the EU since 2015, including its increasingly tough restrictions. National governments pursuing their own individual policies is therefore inefficient and harms the foreign policy, economic and moral interests of all Member States. This ends up putting countries in a strategic situation reminiscent of the well-known “prisoner’s dilemma”. Without any centralised co-ordination, the countries of the EU will not be able to reap the net benefits of accepting refugees.

From this perspective, the conclusion is clear. Taking in a certain, significant number of refugees is in its very nature a European public good. Leaving the responsibility for refugee policy at the national level leads to an inefficiently low level of provision of this public good. Ultimately, therefore, it is not altruism but rather countries’ self-interest that will point the way towards a solution at the EU level.

A ZEW policy brief on this topic is available to download at: <https://www.zew.de/PU76943-1>

Prof. Dr. Friedrich Heinemann, [friedrich.heinemann@zew.de](mailto:friedrich.heinemann@zew.de)

# Information Economy – German Companies Slow to Comply with GDPR

The new General Data Protection Regulation (GDPR), which aims to protect personal data within the European Union and safeguard the free movement of data within the EU Single Market, has been in force in all EU Member States as of the end of May 2018. Companies in Germany's information economy had plenty of work to do before the new law came into effect given that at the end of last year only around half of all companies in this sector of the economy had already begun dealing with the challenges of becoming GDPR compliant. Meanwhile, only a fraction of companies could claim at that time that they had fully implemented the changes required by the new law. Despite this, many companies were still optimistic – perhaps too optimistic – that they would be compliant by the end of May 2018.

Following years of negotiations, the Europe-wide GDPR, which standardises rules on the use of personal data by private companies and public authorities in all EU Member States, was approved in April 2016.

## Firms put off dealing with GDPR compliance

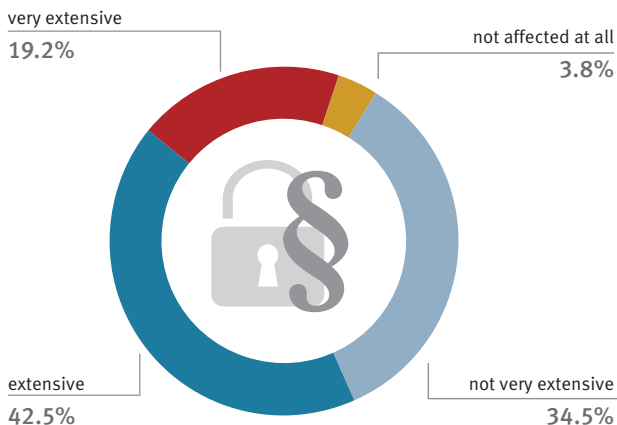
The GDPR aims to protect personal data within the European Union and safeguard free data movement within the EU Single Market. As of the end of May 2018, all firms and public author-

ities must be compliant with the new rules. Breaking the new rules now incurs much higher fines than before, running to as much as 20 million euros or four per cent of the company's global annual turnover.

Despite the fairly long adjustment period, many companies in the German information economy – which includes information and communication technologies (ICT sector) and media and knowledge-intensive service providers – left it rather late to start dealing with the challenges of becoming GDPR compliant. According to the results of a representative survey among approximately 700 companies in the German information economy with five or more employees, conducted by ZEW in December 2017, just under half (47.5 per cent) of companies in the information economy had not even begun to prepare themselves for the new regulation. An additional 12.5 per cent of companies claimed to not even have heard of the GDPR. Among companies that work intensively with personal data at least, a much higher share – just under two thirds – had already made efforts to ensure they were GDPR compliant.

However, in the survey only around five per cent of companies could claim to have fully complied with the requirements of the General Data Protection Regulation by the end of the year 2017. In addition, just over a quarter of companies had by this point at least complied with certain aspects of the new regulation.

HOW EXTENSIVE WERE THE CHANGES RESULTING FROM THE NEW GENERAL DATA PROTECTION REGULATION (GDPR) FOR COMPANIES IN THE INFORMATION ECONOMY?



Reading aid: Among the companies in the information economy that had already begun to comply with the requirements of the GDPR (as of December 2017), 42.5 per cent claimed that complying with the new regulation involved "extensive changes" on their part. An additional 19.2 per cent attested to "very extensive changes". Source: ZEW Business Survey in the Information Economy 2017.

## GDPR presents companies with organisational and staff-related challenges

The GDPR has brought far-reaching changes to German data protection law. Among the companies in the information economy that had already begun to comply with the requirements of the GDPR, 42.5 per cent claimed that complying with the new regulation involved "extensive changes" on their part. An additional 19.2 per cent attested to "very extensive changes". Knowledge-intensive service providers, especially advertising service providers (85.2 per cent), as well as legal consultants, tax advisors and accountants (67.3 per cent), were most strongly impacted by these changes.

The introduction of the EU-wide GDPR is mainly perceived by companies in the information economy as an organisational and personnel challenge. More than half of companies expect the introduction of the new regulation to lead to increased costs to train employees and a higher workload. Only a small minority of the surveyed companies expect the GDPR to have a positive effect on the competitiveness of EU companies on international markets (10.1 per cent), or on their own business development (5.0 per cent).



# European Industry Set to Profit from International Climate and Energy Policy

The climate and energy policy framework defined by the European Commission up to the year 2030 is set to play an important role in keeping European industry competitive. The majority of Europe's industrial sectors will be able to profit from the European Commission's energy policy package in the context of global climate agreements, with multilateral policies proving more profitable than unilateral measures within the European Union. Recent ambitious global climate goals will lead to lower energy prices, causing the EU's industrial sectors to increase their gross output and gain a greater share of the global market. This is the main finding of a ZEW report conducted for the Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs at the European Commission.

For the purposes of the report, ZEW researchers studied the effects of the Commission's climate and energy policy framework up to the year 2030 on Europe's various industrial sectors. Ratified by leaders of the European Union in October 2014, the framework builds on the Commission's 2020 climate and energy package and has three main targets: reducing greenhouse gas emissions by at least 40 per cent (compared to 1990 levels), increasing the share of energy generated from renewable sources to at least 27 per cent and increasing energy efficiency by at least 27 per cent.

In addition, the ZEW analysis also took into account recent international agreements on climate protection, which are oriented towards the achievement of the climate pledges laid out in the Paris Agreement of 2015. Specifically, researchers looked at the fixed contributions for each country according to the Paris Agreement, which not only apply to the European Economic Area as a whole, but also have varying effects on the individual EU Member States and their industrial sectors.

## Multilateral agreements lead to lower prices for fossil fuels and electricity

Based on this current political reality, the report examines several different scenarios. First, unilateral action on climate and energy policy in the individual EU Member States is compared to multilateral policies based on the goals set out in the Paris Agreement from the year 2020 onwards. Secondly, the report examines two potential uses for the proceeds from auctioning credits in the EU Emissions Trading Scheme (EU ETS) – as lump-sum transfers to private households or as subsidies for renewables. In each scenario, the researchers were interested in the network effects with regard to the competitiveness of individual industrial sectors in Europe.

The results of the analysis show that multilateral climate protection efforts initiated on the basis of the Paris Agreement, depending on the size of national contributions, lead to a reduc-



Photo: ©istockphoto.com/Clint Hild

Proceeds from auctions in the EU Emissions Trading Scheme are helping to increase the demand for electricity from alternative energy sources.

tion in the cost of fossil fuels and electricity. This is because, in comparison to unilateral climate efforts within the European Union, these multilateral, reciprocal commitments at the global level lead demand for fossil fuels to decrease. This is to the benefit of all sectors involved in the EU ETS in terms of both gross output and global market share, with the exception of the electricity sectors.

Even those energy-intensive sectors that are not involved in the EU ETS, such as the inland transport sector, experience efficiency gains thanks to reduced energy prices. Finally, compared to unilateral national policies, multilateral climate efforts have a positive effect on the gross domestic product of EU Member States. In addition, the report shows that the proceeds from EU ETS auctions help to increase demand for electricity generated from renewable energy sources.

The report is available to download at:

<https://publications.europa.eu/en/publication-detail/-/publication/7f887aeb-2739-11e8-ac73-01aa75ed71a1/language-en>

Claire Gavard, PhD, [claire.gavard@zew.de](mailto:claire.gavard@zew.de)  
Dr. Sebastian Voigt, [sebastian.voigt@zew.de](mailto:sebastian.voigt@zew.de)

# A European Digital Tax Would Be an Unnecessary Additional Burden on Firms

Early this year, the European Commission presented its proposed guidelines for a “digital service tax” along with a recommendation to extend the concept of a permanent establishment to include a digital presence for firms. The tax is directed at digital companies located in non-EU countries and – to ensure equal treatment – in EU Member States generating total revenue of over 750 million euros, 50 million of which are made in Europe. European law-makers hope to generate long-term tax revenue amounting to around five billion euros through this new digital tax. However, the guidelines set by the Commission are a step in the wrong direction for the European Economic Area, and a dangerous one at that.

The European Commission’s proposed digital services tax is aimed at two different types of enterprise. The first are online platform operators who generate advertising revenue via B2B sales. The other group are companies who run online platforms on which providers and customers can find each other and carry out transactions, for which they pay a fee to the platform operator. E-commerce involving the buying and selling of physical goods is exempt from the new tax. The distribution of the resulting tax revenue is to be divided proportionally among the EU Member States according to the number of users of these services in each country, which can be tracked using IP addresses. This may sound like a fairly simple distribution mechanism, but it is in fact highly complex. Even the proposal put forward by the Commission does not include any examples of how this would be calculated.

One of the reasons behind this proposal from the Commission is the assumption that digital companies pay less tax than traditional businesses. This is, however, simply not true. There are a number of reasons why a special tax is not appropriate here. First of all, it is generally not possible to distinguish digital from

non-digital companies. For instance, this tax would not just affect internet companies, but also media enterprises whose revenue exceeds the set limit. Secondly, such a tax on revenue would lead to severe cases of double taxation, since profits would still be subject to full taxation as well as the new digital tax.

The Commission is currently considering a digital services tax of three per cent on gross revenue generated from the provision of digital services within the EU. The actual burden of the digital tax in terms of company profits, however, depends on the profit margin of the company in question. For companies with a ten per cent profit margin, a three per cent digital services tax is equivalent to a 30 per cent tax on profits. On top of this, companies are faced with the standard profit tax in the country where the head office of the group or company is located, at which level profit is calculated for tax purposes. This leads to a considerable overall tax burden. Companies are not even able to offset the digital tax against corporation tax in their home country.

## Special rules for digital companies achieve little

If we continue with the example of the media enterprise, as well as the digital tax, the company is also subject to German profit taxes – corporation and trade tax – of around 30 per cent, leading to a total tax of 60 per cent. Digital companies located in high-tax EU countries would be at a huge disadvantage if this tax is introduced, and may consider relocating their main offices.

One of the Commission’s long-held ideas for taxing the digital economy, the creation of digital presences for companies, must also be fundamentally overhauled. What needs to be done instead is to adapt the current concept of a permanent establishment to existing digital business models, similarly to what has already happened with e-commerce. We should also bear in mind that even internet companies have a physical presence in their market states, where they can be taxed. In terms of profit allocation, a profit split method combining capital and human resources as well as turnover, would be a more sensible approach.

What is clear is that special tax schemes for digital companies make little sense. The basis for taxation is and has always been company profit, regardless of whether the company in question is a digital enterprise or not. Moreover, it is impossible to make a clear-cut distinction between digital and non-digital companies. In fact, in the future a number of sectors such as the automotive industry as well as the pharmaceutical and chemical industries are set to become increasingly digitalised, which will make separating the digital from the non-digital even more difficult.

*This piece initially appeared in the journal “Der Betrieb” on 13 April 2018.*

Prof. Dr. Christoph Spengel, [spengel@uni-mannheim.de](mailto:spengel@uni-mannheim.de)



Foto: ©istockphoto.com/VanderWolf-Images





In her lecture at ZEW, Claudia Nemat from Deutsche Telekom provided a fascinating, practical insight into the opportunities and risks associated with artificial intelligence.

Photo: © Erich Dichiser EDC

# Artificial Intelligence on the Rise: Time for Europe to Wake up

The development and application of artificial intelligence (AI) are highly relevant current issues that affect the economy, science, politics and society in equal measure. ZEW made its own contribution to the debate surrounding the opportunities and risks associated with this new technology by inviting Claudia Nemat, executive board member at Deutsche Telekom, to deliver a speech on “Artificial Intelligence: A Wake-up Call for Europe”. The lecture held as part of the series “First-Hand Information on Economic Policy” provided a fascinating, practical insight into the topic from the perspective of the biggest telecommunications firm in Europe.

Claudia Nemat opened her speech in front of the 130 guests in attendance with the bold statement that AI is set to fundamentally change the way we work and think. That being said, AI is still far from being the “holy grail” that can solve all our problems. According to Nemat, this is because, up to this point, the only type of AI being implemented in practice is so-called “weak AI”, which develops algorithms based on previously supplied data. “The performance of algorithms, such as those used to recognise patterns, can only be as good as the data it has previously been fed,” Nemat pointed out.

One issue that has provoked heated discussion in this context is the procurement of personal data. According to Nemat, we need to find a way to make anonymised collected data accessible to companies whilst being transparent with consumers with regards to what is happening with their data. “Currently, AI is not self-aware, but is still very powerful in ways both good and bad. It is now up to us to learn how to shape AI,” said Nemat. There are currently many potential applications for this technology, particularly in the medical field, where it is already being used for the early identification of cancer cells and the diagnosis of rare diseases.

Compared to other countries, however, Germany lags far behind when it comes to further development of AI. With a total budget of five billion euros earmarked for AI research, the EU trails far behind Asia and the US. With this in mind, Nemat

warned that Europe and Germany risk not only being at a great competitive disadvantage, but also of becoming dependent on other countries.

In order to make both Germany and Europe more attractive as a business location and also to acquire more international expertise, Nemat called for Europe’s industries to work in closer collaboration with one another in the future. “AI is not a single machine; rather, it consists of countless different projects both big and small. The implementation of AI therefore requires a critical mass of people – and in addition we need a talent pool with a strong network of knowledge,” explained Nemat. She concluded her speech with a call for a European global market leader in the creation of industrialised algorithms.

Nemat’s speech was followed by a panel discussion, in which ZEW President Professor Achim Wambach pointed out that, while Europe has no problem with conducting basic research, the application of new technologies often proves more difficult. He therefore called for greater investment in application-oriented research, so that potential new applications for AI can be identified early and made accessible. Nemat agreed with Wambach’s recommendation that more investment in research and development needs to come from companies themselves, though she also believed governments have a role to play.

Questions from the audience included what changes the digital transformation will bring to the job market. “The amount of work out there is definitely not going to decrease,” reassured Nemat. What will be most challenging for workers, however, is to provide workers with further training to prepare them for the challenges of the future labour market. The Q&A session showed that the topic of AI also needs to be approached via a debate over its many possibilities – how to identify its potential applications early on and implement them effectively if Germany and Europe want to compete internationally in this arena.

You can find pictures as well as a video of the event on our website: [www.zew.de/AM6019-1](http://www.zew.de/AM6019-1)

Annelie Heitmann, [annelie.heitmann@zew.de](mailto:annelie.heitmann@zew.de)

## ZEW hosted its 20<sup>th</sup> Summer Workshop for Young Economists

In July 2018 ZEW hosted its 20<sup>th</sup> Summer Workshop for Young Economists in Mannheim. This year's workshop focused on the use of internet-based data and of modern approaches such as machine learning for economic analyses. Further topics addressed at the event included public and innovation economics, as well as the digital economy. The 2018 Heinz König Young Scholar Award, which aims to promote talented economists in the early stages of their career, was presented during the workshop. This year the research award went to Michael Stiefel from the University of Zurich. The doctoral student was awarded the prize by ZEW for his excellent investigation into the role of the ECB in instilling confidence for government bonds of EU countries such as Spain and Italy during the government debt crisis of 2012. Michael Stiefel's paper constitutes a significant contribution to research on confidence building on the European financial market in times of crisis. The annual award, which is named after the late founding director of ZEW, Professor Heinz König, comes with an endowment of 5,000 euros and includes



The jurors with the award winner (from left): ZEW Director Thomas Kohl, ZEW economists Holger Stichnoth and Irene Bertschek, award winner Michael Stiefel, HIMA representative Steffen Philipp, and ZEW economist Georg Licht.

the opportunity to spend an extended research visit at ZEW. This year, the prize was sponsored by HIMA Paul Hildebrandt GmbH.

## ZEW Workshop on Market Design

How can markets be designed in an efficient way? How should feedback be provided on crowdsourcing platforms so as to achieve the best possible results? In what way can lotteries contribute to equal opportunities and a greater efficiency in the allocation of school places?

These are some of the questions discussed by around 30 international researchers and industry practitioners at a workshop, which also marked the launch of Leibniz project "Market Design for the Public Sector" conducted by the WZB Berlin Social Science Center and ZEW. Among the keynote speakers was Profes-

sor Bettina Klaus from the University of Lausanne, who explained how lotteries can be used in structured procedures so as to ensure a fair allocation of nursery or high school places. In another keynote speech, Professor Damian Beil from the University of Michigan presented recent findings from his research, in which he investigated how the extent of the feedback given on online platforms offering creative and individualised solution affects the quality of the designs. Talks from renowned researchers from the field of market design were supplemented with contributions from members of industry.

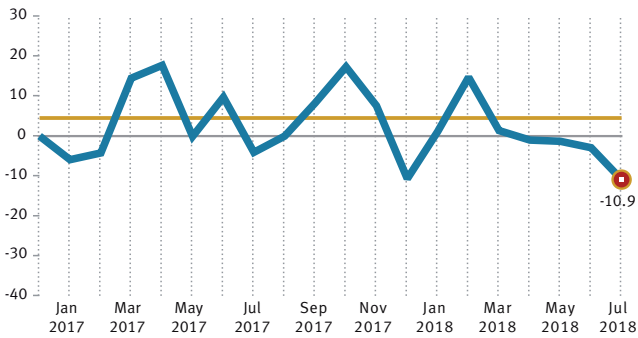
## 16<sup>th</sup> Conference on the Digital Economy

In June 2018, ZEW hosted the 16<sup>th</sup> conference on the "Economics of Information and Communication Technologies", one of the most important scientific conferences in the field of digital economy. In the two-day conference, which attracted around 75 international researchers, special emphasis was placed on the topics of digital data and online platforms. Professor Ginger Zhe Jin from the University of Maryland delivered a keynote speech on the implications of big data, which has created new tasks for consumer protection and competition regulatory bodies. Professor Feng Zhu from Harvard Business School, who presented recent research findings on platform economics, highlighted several factors that play a role in the scalability and sustainability of online platforms. In addition, the conference also featured a great number of high-quality presentations, covering topics such as social media, the sharing economy, the mediation of jobs via online portals, machine learning, user behaviour on the internet and the impact of digitalisation on political mobilisation.



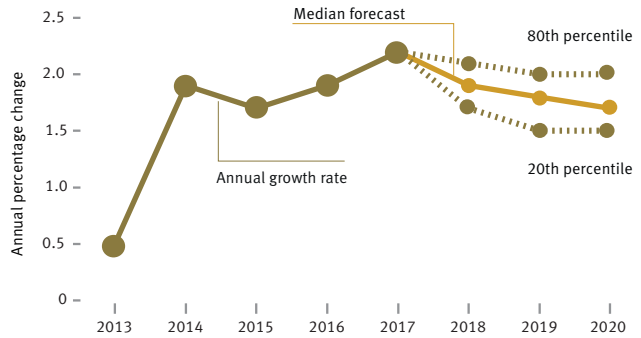
Professor Feng Zhu in his keynote on research on online platforms.

### Trade Dispute Hampers Economic Outlook for China



The CEP Indicator reflects the balance of the symmetrically weighted positive and negative assessments regarding the macroeconomic environment in China over twelve months. Source: ZEW/Fudan University

### Growth Expectations Trimmed Due to International Trade Disputes



The figure shows the forecast of financial market experts regarding the annual growth rate of the German economy. Source: ZEW Financial Market Report August 2018

In the recent survey for July, economic expectations for China once again dropped considerably to a new level of minus 10.9 points (June 2018: minus 2.9 points). This represents the fifth consecutive decrease in the CEP Indicator, which is currently well below the long-term average of 4.5 points. The CEP Indicator reflects the expectations of international financial market experts regarding China’s macroeconomic development over the coming twelve months. At 7.6 points, the assessment of the current economic situation in China was also more negative than the previous month. This constitutes a decrease of as much as 14.4 points compared to the assessment in June. The financial market experts polled in the current survey expect China’s real GDP to grow by 6.5 per cent in 2018 and 6.3 per cent in 2019. Both figures are 0.2 percentage points lower than those from the previous month. Furthermore, China’s share of global trade is also estimated to drop resulting from an expected decline in exports, which currently stand at minus 12 points, 19.9 points lower than in June. One of the reasons behind the worsening economic outlook is the international trade dispute triggered by the US, which could ultimately end up slowing down economic growth worldwide.

Dr. Michael Schröder, michael.schroeder@zew.de

As part of the Financial Market Test conducted in July, experts were asked for their assessment of German economic growth in the period from 2018 to 2020. For 2018, the median expectation for the growth rate of the German economy is 1.9 per cent. With regard to the forecasts for 2019 and 2020, experts are, however, less optimistic. The reason for this worsened outlook is mainly to be found in the negative developments regarding the trade relations between the United States and its partners, particularly China and Europe. Almost 96 per cent of the survey participants state that international trade conflicts have had a negative or strongly negative impact on their expectations. The USA is an important export market for German companies – in 2017 they exported goods worth around 112 billion euros to the United States. On the other hand, German companies, especially in the automobile sector, operate manufacturing sites in the USA, where they produce goods for other countries which in turn have imposed higher import duties as a countermeasure to US protective tariffs. Growth forecasts for 2020, however, do not appear to have been affected by the current trade dispute since expectations remained unchanged compared to the April survey.

Frank Brückbauer, frank.brueckbauer@zew.de



## Workshop on the Economics of Immigration

ZEW is pleased to announce a workshop on the economics of immigration, which will take place in Mannheim on 25–26 October 2018. The event aims to bring together international scholars from this field in order to discuss recent empirical, theoretical and policy-oriented research looking at the impact of immigration on host countries. We are happy to welcome Professor Herbert Brücker of the Institute for Employment Research (IAB) in Nuremberg and Professor Paolo Pinotti of Bocconi University in Milan as our keynote speakers. Interested researchers have the possibility to register for the event until 14 September. For further information please visit: [www.zew.de/VA2559-1](http://www.zew.de/VA2559-1)

## 2018 Beijing Humboldt Forum

ZEW invites you to participate in the session “Assessing the Economic Impact of Environmental and Innovation Policies in China and Europe” organised by ZEW at this year’s Beijing Humboldt Forum (BHF), which will take place at the University of International Business and Economics (UIBE) in Beijing on 15–17 September 2018. The session will feature various presentations by ZEW researchers. The BHF is a non-governmental and non-profit annual international conference on green economy, technology and culture. The forum is organised jointly by the Alexander von Humboldt Foundation and the UIBE. For further information please visit: [www.zew.de/VA2555-1](http://www.zew.de/VA2555-1)



## Competition in the Digital Age: Google Should “Do the Right Thing”

Google’s parent company Alphabet is an impressive corporation. With a current market value of around 837 billion dollars, it is among the top three most valuable companies in the world.

With the exemption of Amazon, Alphabet spends more money on research and development than any other company. In 2017 this amounted to 14 billion dollars. By comparison, in that same year Volkswagen spent 12 billion dollars on R&D. And while ten years ago top Ivy League graduates would flock to Wall Street to find work, now firms in Silicon Valley – and Google in particular – are at the top of their list of potential employers. Consumers have benefited greatly from the way Google has revolutionised how we search for information online and created a far-reaching, high-performance ecosystem for mobile applications in the form of Android.

In mid-July, the European Commission has once again punished Google with a multi-billion euro fine (4.3 billion euros, to be precise) for abusive conduct. Just last year Google had to pay around 2.4 billion euros for promoting its own comparison shopping service in its search results at the detriment of its competitors. Google is challenging the decision.

This latest fine is related to Google’s mobile ecosystem. The European Commission sees the fact that Google requires manufacturers to pre-install the Google Search app and browser app as a condition for licensing Google’s app store as an abuse of market power. In addition, manufacturers wishing to pre-install Google apps on some mobile devices were prevented from selling mobile devices running on alternative versions of Android without these apps.

While these fines dominate the headlines, it is more important from a competition point of view to consider what measures will be taken to prevent further violations in the future. Google might be required to allow smartphone manufacturers to install important individual apps such as Google Play or YouTube onto smartphones without having to use the entire bundle of Google apps.

Customers might also be automatically asked which of a number of competing apps they prefer. Microsoft had to accept a similar customer’s right to choose back in 2009 after it was accused of abuse for connecting its own browser Internet Explorer to the Windows operating system. In a further step, Google might make its apps available through other app stores rather than only through its own Google Play Store.

Google’s motto has long been “Don’t be evil”. The motto of its new parent company is “Do the right thing”. Neither of these easily coincide with the company’s multiple sanctions for abusive conduct. Its competitors, and ultimately consumers, have been harmed. Rather than just leaping into defence mode once more, the corporation would be well advised to take an active role in the discussion of what the rules of fair treatment should look like in the digital age and to adapt its own behaviour accordingly.

# ZEW

Zentrum für Europäische  
Wirtschaftsforschung GmbH

Centre for European  
Economic Research

ZEWnews English edition – published bimonthly

**Publisher:** Mannheim Centre for European Economic Research (ZEW),  
L 7, 1 · 68161 Mannheim · P.O.Box 10 34 43, 68034 Mannheim · Germany · Internet: [www.zew.de](http://www.zew.de), [www.zew.eu](http://www.zew.eu)  
President: Prof. Achim Wambach, PhD · Director: Thomas Kohl

**Editors:** Gunter Grittmann (V.i.S.d.P) · Phone +49 621 12 35 - 132 · Telefax +49 621 12 35 - 255 · E-mail [gunter.grittmann@zew.de](mailto:gunter.grittmann@zew.de)  
Sarah Tiedemann · Phone +49 621 12 35 - 135 · Telefax +49 621 12 35 - 255 · E-mail [sarah.tiedemann@zew.de](mailto:sarah.tiedemann@zew.de)  
Kathrin Böhmer · Phone +49 621 12 35 - 128 · Telefax +49 621 12 35 - 255 · E-mail [kathrin.boehmer@zew.de](mailto:kathrin.boehmer@zew.de)

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