CESifo
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03
2017

Autumn
Vol. 18

FOCUS

Innovation Strategies

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CESifo

CESifo Forum
ISSN 1615-245X (print version)
ISSN 2190-717X (electronic version)

A quarterly journal on European economic issues
Publisher and distributor: ifo Institute, Poschingerstr. 5, D-81679 Munich, Germany
Telephone ++49 89 9224-0, Telefax ++49 89 9224-98 53 69, e-mail ifo@ifo.de
Annual subscription rate: €50.00
Single subscription rate: €15.00
Shipping not included
Editors: John Whalley (jwhalley@uwo.ca) and Chang Woon Nam (nam@ifo.de)
Indexed in EconLit

www.cesifo-group.de

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VOLUME 18, NUMBER 3, Autumn 2017

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Innovation Strategies

Georg Schütte

Integrating Academia and Business: Teaming Up to Boost Innovation[1]

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of Education and
Research, Germany

The ifo Institute's 68th Annual Meeting, held in the Ludwig-Maximilians-Universität München (LMU Munich), symbolises how important exchanges and links are in academia. The ifo Institute enjoys close links with the LMU. The Directors of ifo's Centers also hold a chair at the economics faculty of the LMU. This highlights the significance of close links between non-university research – here that of a Leibniz institute – with university research. Nationwide and international scientific exchanges are equally as important. Together with CESifo, the ifo Institute and the LMU drive international networking. In June 2017 the ifo Institute co-founded the European research network EconPol Europe. These represent key features of a lively and successful research landscape.

At the ifo's Annual Meetings academia, business and civil society come together. If the title of this article were: 'Integrating Academia, Business and Society: Teaming Up to *Think* Innovatively', then it would be a little like taking coals to Newcastle. However, this contribution focuses on how the framework conditions can be improved so that business and academia can *innovate* together in the future. The ifo Annual Meeting is also a forum for illustrating economic analyses and offering orientation in a swiftly changing world. Politics needs such advice to handle the multitude of questions that we are facing.

Germany has emerged stronger from the global crises and challenges of recent years. It is currently in a good position. The ifo Business Climate Index shows that economic sentiment is good. In June 2017 the index reached its highest level since 1991.[2] In other words, companies assess their current business situation favourably and are positive about the future. The ifo Institute has upwardly revised its economic forecast significantly and expects a GDP growth rate of two percent in 2018.[3] Employment is at a record level and quality of life is high. We have a stable democracy and a balanced budget. This is all possible because Germany is one of Europe's leading innovators. A study by the European Commission (2017) shows that around two thirds of European economic growth is driven by investment in research and development (R&D). High innovative drive is the cornerstone for prosperity, quality of living and opportunities in Germany.

The German government has done a lot to ensure that the situation stays this way:

- Germany is currently investing double the amount in R&D than it did a decade ago. The German government alone increased its R&D expenditure by almost two thirds between 2006 and 2015. Government expenditure hit a record of 15 billion euros in 2015.[4]
- Since 2006 the federal government has bundled its R&D policy in a cross policy area research and innovation strategy. A wide range of research and innovation policy initiatives were launched under the umbrella of the High-Tech Strategy (HTS).
- On this basis, the government and business together have practically achieved the goal of investing three percent of gross domestic product in research and development. In 2015 over 600,000 people were employed in R&D in universities, companies and research institutes. This marked an increase of 34 percent, or a good 160,000 researchers *versus* the launch of HTS in 2006.[5]
- These efforts are reflected in results: Germany is one of the world's international leaders in terms of scientific output. It also ranks fifth in terms of the number of academic publications that are among the world's top ten percent most cited (excellence rate) – see Schmoch *et al.* (2016).

[1] This article is an English translation of the keynote speech given by Georg Schütte, State Secretary at the Federal Ministry of Education and Research, at the 68th Annual Meeting of the ifo Institute, which was held in Munich on 28 June 2017.
[2] ifo Konjunkturumfragen, June 2017.
[3] ifo Konjunkturprognose 2017/2018.
[4] Federal Ministry of Education and Research Data Portal: Table 1.1.4., http://www.datenportal.bmbf.de/portal/de/index.html.
[5] See Federal Statistical Office, *Stifterverband, Wissenschaftsstatistik,* https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/BildungForschungKultur/ForschungEntwicklung/Tabellen/PersonalForschungEntwicklung.html.

– We have a sustainably high world market share of technology products.[6] In the past Germany has repeatedly succeeded in linking the most modern technologies with the traditional strengths of the German economy in chemicals, electrical technology and car manufacturing.

At the same time there is the question of whether Germany's success model is sustainable in the future: are the challenges that we see ahead growing too fast for us to keep up? In addition to digitalisation, modern life sciences are delivering ground-breaking insights at a breath-taking speed. The interplay of biotechnology, nanotechnology and digitalisation are creating new tools and methods for exploiting these insights. This opens up far-reaching perspectives for all areas of our economy. Biological systems, principles and processes are being adopted in a growing number of branches from the pharma and chemicals industry to car manufacturing. Germany is in international competition for ground-breaking ideas, creative talent and attractive location conditions for young start-ups and ambitious companies.

At the same time – and this is a paradox – the growth rate of labour productivity has been falling in advanced economies for several years.[7] This is also the case in Germany. There are various scientific approaches to explain this phenomenon. Economists assume that ongoing digitalisation can no longer be measured using the traditional economic indicators. This means that part of productivity gains are not included in the growth measured. Let us take music streaming services, for example. In the past every record or CD had to be purchased individually. Now consumers can access a huge music library for a relatively small flat rate. How is such innovation reflected in productivity measurement? Does it lead to less 'value' creation and thus mean that working is less productive? Or can the value not be measured properly? Is this shown by the different rates of productivity growth that is increasingly dividing the world into innovation leaders and losers? Which place will Germany take in a new platform economy driven by digital technologies? Are we equipped to tackle the challenge?

In terms of digitalisation in particular Germany is facing major challenges. This is clear from looking at just one figure: in China there are 25 so-called 'unicorns', or internet start-ups that are now already worth over a billion dollars. They are growing dynamically. In Germany there is not one single such organisation. We need to respond to these challenges with a new research and innovation strategy. This strategy will have to set far more ambitious targets than in the past. Research and innovation policy has to reflect shorter innovation cycles and increasingly tough competition in terms of locations. Four aspects of this strategy are described here in greater detail.

[6] German Federal Report on Research and Innovation 2016, http://www.datenportal.bmbf.de/portal/en/bufi.html.
[7] OECD database.

OUTSTANDING, INDEPENDENT RESEARCH IS THE FOUNDATION FOR INNOVATION

Higher education institutions make an indispensable contribution to innovation, to supplying highly-qualified staff, to boosting economic growth and improving the employment situation. According to estimates by the Federal Ministry for Economic Affairs and Energy, investments in higher education result in a fiscal rate of return of nine percent (see Krebs and Scheffel 2016). To empower institutes of higher education, the Federal Ministry of Education and Research and the *Länder (Federal States)* therefore approved a strategic comprehensive package in summer 2016. The package features the Excellence Strategy (`Exzellenzstrategie´) for top university research and an initiative to promote the strategic development of knowledge transfer and cooperation between University, industry and social actors (`Innovative Hochschule´).

As of 2018 the annual sum of over half a billion euros will be spent on the continued pursuit of the Excellence Strategy, which is geared towards the long term. The LMU was particularly successful in the second round of the Excellence Competition in 2012 with four graduate schools, four excellence clusters as well as its LMU excellent concept for the future enjoyed. The continued pursuit of the excellence will make outstanding research conducted in Germany even more competitive internationally.

In addition to the primary and secondary missions of higher education, namely research and teaching, the German federal government also offers long-term support for their tertiary mission, namely transfer and innovation. To this end a tender for 'Innovative Hochschule' funding was issued at the end of 2016 and 29 applications involving a total of 48 applied science universities and traditional universities were selected in a first round. Transfer activities are too often bound to certain individuals. If a person leaves the higher education institution, it loses its competences in a given area. The `Innovative Hochschule´ initiative follows a systematic approach by supporting smaller, individual transfer projects. Higher education institutes had to focus far more on a coherent transfer strategy and present a convincing concept for implementing this strategy. The Ministry and *Länder* have pledged a total of 550 million euros in funding for this initiative over a 10-year period.

Another key approach to improving the German knowledge system is promoting 'Open Access'. A comprehensive and unrestricted access to knowledge is essential to building networks and knowledge transfer. Scientific insights should be easier to access and research results should be more transparent. The direct and timely exchange of knowledge, data and information across borders and institutions is a prerequisite for keeping up with the current pace of the innovation dynamic. As a result, the Federal Ministry of Research is systematically implementing the Open Access Strategy and is developing it further into a national strategy.

CREATING AN OPEN AND PARTICIPATIVE INNOVATION CULTURE

The Federal Ministry of Education and Research is planning to create new free and experimental spaces, which should go far further than conventional forms of networking activities. The aim is to support and establish new forms of cooperation and to offer scope for development for the knowledge and commitment of citizens and the know-how of experts by giving them their rightful place. Corporate risk-taking should be rewarded, the courage to implement new, ground-breaking ideas should be promoted and assuming social responsibility should be acknowledged. Academia, business and society should work together across disciplines. Users, providers and producers, as well as large and small players should come together and innovate.

New forms of cooperation can unleash creative potential. Measures and programmes that create diversity and enable new solutions need to be supported as a result. Research results that have the potential to trigger ground-breaking innovations and promise a huge amount of added value for our quality of life should be checked for their relevance in other areas. A new initiative to promote validation should support the transition to market and application maturity. The initiative must be geared towards business and science and needs to involve players from society.

The Federal Ministry of Research plans to initiate a new Leading-Edge Cluster Competition (`Spitzencluster-Wettbewerb´), which addresses emerging research and innovation fields. The focus should also be on new interdisciplinary models of cooperation for research institutes, companies and start-ups working on disruptive technologies. Open innovation campuses should support the targeted and strategic launch of innovation processes by implementing the demonstration projects of universities, research institutes, companies, experts and users. These processes should take two directions: applications *and* development in open innovation laboratories. The government is planning to bundle its initiatives related to the transfer of ideas, knowledge and technology in an excellence programme for cooperation and exchange between academia, business and society. This should generate synergies between individual measures and professionalise the structures for promoting cooperation.

Start-ups are tomorrow's market leaders and an important source of innovative business ideas, creative processes and new products. People, young and old, men and women, should be encouraged to take on entrepreneurial responsibility themselves. Excellent research can be a cornerstone for the emergence and success of innovative business ideas. In science and research we need to be more successful in paving the way for start-ups as a means of exploiting research results. That is why the Federal Ministry of Education and Research is expanding its support of founding activities.

New approaches to developing entrepreneurial independence and the ability to exploit from research: this should contribute to a stronger culture of start-ups and exploiting results in science. The Ministry is planning to extend its research funding programme with modules on supporting start-ups and to integrate young start-ups more intensively in promoting clusters. It also aims to simplify access to the federal government's existing open funding programmes for company founders and should be more specifically customised to meet the needs of young entrepreneurs. At the same time the Ministry also supports further improvements to the tax framework conditions for risk capital. This will close gaps in the government's start-up funding to date.

It is primarily Germany's small and medium-sized enterprises (SMEs) that introduce new ideas into the markets and partly determine our economic and innovative power. That is why those SMEs that were not particularly innovative in recent years need to be activated. At the same time, SMEs that are strong in research need to be steered along innovation paths that are important for Germany. The Ministry of Education and Research is expanding its ten-point programme 'Vorfahrt für den Mittelstand' (Making SMEs a Priority) in order to strengthen SMEs. The joint development of core competences in areas like digitalisation by politics and business should support SMEs in key sectors of Germany's economy. The Ministry of Education and Research will also help to ensure that enough qualified staff is available. Universities and public research institutes should become more open to cooperation with SMEs as key research and innovation partners as part of a new research and innovation pact (`Pakt für Forschung und Innovation´), for example. Funding procedures need to be simplified. More specifically, the Federal Ministry for Economic Affairs' overarching technology initiatives should ensure a consistent and transparent architecture for promoting R&D funding for SMEs.

The Ministry for Research's understanding of innovation is based on a comprehensive innovation concept that attaches equal importance to both technological and social innovation. New business models, organisational practices or new forms of learning, working and living together can have a greater impact than individual technologies. In many cases they reinforce each other. That is why specialist research funding programmes should increasingly be opened up to social innovation and geared towards key social targets, as is currently the case in nursing, for example. To this end the Ministry of Education and Research is planning to create experimental spaces for social innovation in which innovators, as well as potential users come together. Here forms of the sharing economy, institutional instruments, new financing models and exploitation channels and citizen involvement can be tried out. Field tests should also be conducted to see how technological and social innovation can be implemented under realistic conditions. The Ministry of Education and

Research also intends to expand its 'Citizen Science' research programme.

BUILDING COMPETENCE ADVANTAGES IN KEY AREAS OF TECHNOLOGICAL CHANGE

Germany's federal government has shown foresight in terms of Industry 4.0, which was developed and supported as part of its High-Tech Strategy and research union of the time. That is why Germany enjoys an advantage in terms of Industry 4.0. That is what we want to achieve in other areas too. The Ministry of Education and Research would like to drive the following four examples of 'missions'.

- 'Learning systems': systems are now in a position to evaluate data from their environment independently, to analyse them and autonomously deduct rules that nobody has programmed them to. Self-driving cars that can navigate complex traffic situations are a prominent example of this. Only vehicles that learn how to deal with different traffic situations can be autonomous. There is great and diverse potential for leaning systems. They offer huge advantages for the health sector by, for example, quickly analysing large quantities of X-rays in mammography and identifying suspicious cases for specialists. Learning systems are also used in IT security for they recognise patterns in large volumes of data that no human could possibly recognise and can report attack tactics early. In this area there are still many open research questions, which is why the Ministry of Education and Research has launched a future-oriented project called 'learning systems'.
- 'Security research cluster': in view of the growing risk of terror, providing security in an open, globally connected society is more challenging than ever. Science can be seen as a trustworthy authority in this instance. The Ministry of Education and Research has already proven that with its IT security centres. As a next step national security research clusters will be built up that benefit experts and practitioners from science, business and even emergency personnel like, for example, the fire brigade and technical relief. The central component of a new security research programme should be competence clusters.
- 'National active agent initiative': infectious diseases are becoming a growing threat due to a lack of active agents and increasingly widespread resistance to antibiotics. Many pharmaceutical companies have withdrawn from research into active agents for infectious diseases due to cost-intensive research and excessively narrow profit margins. The Ministry of Education and Research will offer support in this key area with a national active agent initiative.
- 'Energy turnaround': as far as the energy turnaround is concerned, the Ministry of Research supports research geared towards long-term targets with its 'Copernicus Projects'. One Copernicus project, for example, has set itself the target of saving excess renewable energy by transforming it into other energy carriers. Funding for these projects is granted for ten years and follows a systematic approach from the very outset. All players in the innovation process are involved and transfer from basic research to its application is taken into consideration from the very beginning.

DIGITALISATION AS A CENTRAL CROSS SECTIONAL TASK

We are on the threshold of a data-driven economy and ecology. Developing competences, instruments and methods for collecting, storing and analysing large data volumes; and gaining new insights and aids to decision-making from them will become a key competence. The Federal Ministry of Education and Research sees digitalisation as a cross-sectional task. Accordingly, nearly all education and research questions are directly or indirectly affected by digitalisation. The thematic spectrum ranges from digital education at our schools to information infrastructures in science to the next industrial revolution based on 'intelligent machines'. A clever education and research policy should help Germany to shape up for the digital living worlds of the future.

The Federal Ministry of Education and Research wants to support and drive the new potential for interdisciplinary data analysis and therefore offers advice on a national research data infrastructure: the Council for Information Infrastructures set up by the Federal Government and the *Länder*, has proposed a distributed infrastructure, which can serve as a future backbone for research data management in Germany. A supra-institutional and regional structured and sustainable Council for Information Infrastructures will open up new research opportunities due to broader and better access to data and research results for academia, business and society. Good infrastructure and research data management must go hand in hand. That is why Germany requires a new generation of data scientists, which, in turn, calls for new and/or more specialist courses of study, as well as additional further training courses.

Digitalisation accordingly creates a new educational mandate for schools. Digitalisation is changing both society and the world of work. The education mandate of schools consists of preparing students for an autonomous life in society. This means meeting the requirements of a working world shaped by digitalisation. The key conditions for good digital education are relevant pedagogical concepts, well-trained teachers and high-performance digital infrastructure in schools. This was the substance of the 'Education Offensive for the digital knowledge society' strategy published in October 2016 by the Ministry of Education and Rese-

arch. To this end, the Federal Minister of Education and Research Johanna Wanka proposed the 'DigitalPact' for schools to promote the set-up of digital infrastructure and the implementation of digital education in all German schools. With this in mind, the relevant dialogues between the Federal Government and the *Länder* began in January of this year. The Federal Government and the *Länder* intend to present a finalised agreement on a 'Digital Pact for Schools' by the end of 2017.

Digitalisation, health, security and energy are the areas in which our country has outstanding opportunities; and this list could be extended. To seize these opportunities, we need to invest in our country's major future projects. That is why the Ministry of Education and Research wishes to increase the R&D rate to 3.5 percent of GDP by 2025. Two thirds of additional R&D investments will also have to come from business in the future. A policy that boosts public investment, but negatively impacts the framework conditions for private investment at the same time, would marginalise our country. Germany therefore needs a learning strategy for research and innovation policy that lives up to these new challenges. This strategy must be geared towards the central fields of action presented in this article.

The basis for the Ministry's current and future programme was to closely accompany the HTS through independent councils from academia, business and society. The German federal government has repeatedly heeded the recommendations of the Commission of Experts for Research and Innovation, the High-Tech Forum and the Innovation Dialogue between the Federal Government, business and science and has developed corresponding measures. Politics needs scientifically-grounded evidence of which measures function and which do not. Progress towards digitalisation makes it possible to empirically test theories very thoroughly. Policy measures can thus be evaluated on a timely basis and can improve the effectiveness and precision of policies as a result. The new opportunities presented by big data and growing computer capacities have created considerable scope for analysing problems in academia. More specifically, the new data volumes have naturally revolutionised the research potential in economics and social sciences.

To this end, the Ministry of Education and Research granted research funding aimed at providing new stimuli in the field of measuring innovation.[8] The term innovation should be made broader and be measured empirically. The aim in the future is also to be able to access indicators of social innovation, business model innovation and other new forms of innovation. The Ministry of Education and Research depends on research *via* evidence-based policy advisory work. Economics research institutes like the ifo Institute make a significant contribution to assessing policy results and ensuring that better strategies can be formulated based on them. The Ministry will also use these research results to implement a successful innovation policy for the citizens of our country in the future.

[8] See Bundesanzeiger, Official Section of 20.01.2017, B4: *Richtlinie zur Förderung von Forschungsvorhaben zur Weiterentwicklung der Indikatorik für Forschung und Innovation*, Federal Ministry of Education and Research, https://www.bmbf.de/foerderungen/bekanntmachung-1302.html.

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Matthias Kleiner

Joint Research as an Innovation Strategy[1]

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The political and social questions of our time – the euro crisis, Brexit, the refugee crisis and transatlantic relations – can all be addressed with joint efforts. Indeed, there is nothing optional about the 'joint' in this context. Our political and social issues call for interdisciplinary and cross-sectoral cooperation. With all the jitteriness around and in times of growing populism – which is perhaps sometimes a little 'conjured up' – we need a diverse range of scientific expertise, as well as clear analyses.

The ifo Institute has been looking at such issues and finding answers to them for years – and offering its findings to a far wider public than a narrow circle of scientific experts. Today ifo's annual meeting offers us the opportunity to reflect on how scientific research is organised, especially in terms of cooperative formats, to generate innovative solutions at ifo, in the 90 other institutes of the Leibniz Association and in scientific contexts in general, including those that are not primarily scientific.

The great economist and innovation theoretician Joseph Schumpeter sees innovation as 'the result of creative destruction'. I would perhaps prefer to call it 'creative disruption' or 'irritation', but the break with conventional certainties, rigid disciplinary boundaries and the openness to social debates effectively also drive innovation in the field of science.

I am convinced that this driver is particularly powerful if research is carried out within teams and by representatives of various disciplines. The ifo Institute and the Leibniz Association on the whole are excellent proof of this fact. A research institute is essentially composed of people, and innovation can only fully develop in a climate in which staff members feel valued, happy to work together and are given enough scope for individual creativity. Joint research, team work and international networking are a matter of course for our young scientists.

As an association, Leibniz supports cooperative research with various offerings and in different forms that help - to return to the start of my speech – to creatively disrupt/destroy and 'irritate' in order to promote innovation. The Leibniz research alliances, and there are now twelve in total, have become a success model of cooperative science. They 'disregard' the often outdated borders between individual disciplines in a productive and topic-oriented way; while drawing on the diversity of opinions available within the Leibniz Association and beyond, as a creative starting point. In terms of their subject matter these alliances range from health technologies and biodiversity to education potential or the topic of healthy ageing.

Complex social challenges are considered from different perspectives, like, for example, in the Leibniz research alliance 'Crises in a Globalised World': how do crises arise and how can they be tackled?' This is the question raised by the alliance of twenty-two Leibniz institutes, including ifo, as well as by institutes that only do research into marine tropical regions, for example, or into agricultural issues like the cultivation of vegetables and ornamental plants lie. Together these institutes look at financial market and debt crises, food and environmental crises, as well as those of a political nature. They thus gain insights into how crises are linked, how they arise in different fields, how they progress and how they can be tackled.

In this respect this form of cooperation aimed at solving concrete problems makes it possible to overcome the rigid barriers between disciplines. The basis for this innovative, inter-disciplinary approach is the outstanding scientific competence of individual institutes. Thanks to the fact that it crosses borders, cooperative research also has the potential to call into question old certainties in order to find new solutions under changed framework conditions. A good example of a field requiring such an approach is digitalisation, which spans both technical and social innovations.

The Leibniz Association institutions have focused on digitalisation in recent years by examining both its technical and its social and economic phenomena and side-effects across a whole range of disciplines. 'Exploiting, shaping and researching the digital transformation' is our motto. In the health sector Leibniz research alliance, for instance, performs research into how lengthy therapies can be simplified through tele-medicine technologies. Leibniz institutes look at the implications of digitalisation processes in manufacturing for the world of work and on agriculture.

This topic is also a key focus area for Leibniz education research, which observes the effects of digitalisation on education and individual education paths, leading to success stories like the Global Learning Council Summit 2017, which was organised in Europe for the first time this year by the Leibniz Association. Digitalisation has also wrought many changes in research processes themselves: the Science 2.0 Leibniz research alliance looks at its implications for the publication process and scientific communication.

It is the thematic diversity and competence in various disciplines that makes cooperative research so exciting to us at the Leibniz Association. It enables us to examine complex phenomena like digitalisation from different perspectives. In June 2017 the Leibniz College:

[1] This article is an English translation of the introductory speech given by Matthias Kleiner, President of the Leibniz Association, at the 68th Annual General Meeting of the ifo Institute, which was held in Munich on 28 June 2017.

'Digitisation in the Research System' took place, a new concept launched by the Leibniz Association that enables post-docs from all Leibniz institutes to discuss different topics and network. In short, promoting dialogue and enabling cooperative research is a key priority for the Leibniz Association. This is because, in addition to the diversity of perspectives arising from the different disciplines involved, the creative friction between the ideas generated by cooperation drives innovation too.

This creative and constructive friction between ideas also characterises the relationships between the six leading German economics institutes that come under the umbrella of the Leibniz Association. The bi-annual Joint Economic Forecast conducted by ifo in conjunction with four other Leibniz economics research institutes - and whose very quality is ensured by the merging of different strategies - shows how productive this approach can be. There is strong demand for such insights from politics. This is another keyword for creative border crossing in the context of cooperative research, as the findings of our economics research institutes in particular are highly relevant both in social and political terms. Transferring these insights and policy advisory work are crucial tasks of major importance to the Leibniz Association, not least because all dialogue gives rise to new and innovative ideas.

Finally, our dialogue with partners at universities is also very important, with cooperation between individuals at universities and Leibniz institutes also pointing to research across institutional borders. We now run 19 Leibniz *WissenschaftsCampi* (science campuses) that link up regional universities and Leibniz institutes; and enable long-term and strategic cooperation between Leibniz institutes and universities (as well as non-academic partners in some cases) as equals.

In view of the complexity of current social and political challenges, I see the cooperative research mode as a core innovative strategy for the future. 'Germany as a science and innovation base' marks a further step along this path and aims to strengthen cooperative research. I am sure that the Leibniz Association and institutes like ifo will contribute to consolidating Germany's position.

Jan Fagerberg, Staffan Laestadius and Ben R. Martin

The Role of Innovation Policy in Simultaneously Addressing Economic, Environmental and Governance Challenges

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INTRODUCTION[1]

Europe today faces fundamental changes in its external environment as well as internally, giving rise to several daunting policy challenges. Firstly, there is the economic challenge manifest in slow growth or even stagnation in many European countries. Secondly, there is the challenge posed by the climate crisis, which calls for nothing less than a fundamental transformation from carbon-based growth to a new, sustainable economy. A third challenge concerns the governance and policy crisis currently facing Europe and the difficulties that this poses for policy making and implementation. This paper demonstrates how these challenges are closely inter-related, and discusses how they can be dealt with more effectively in order to arrive at an economically secure, environmentally sustainable and well-governed Europe. In particular, a return to classic economic growth cannot come at the expense of a greater risk of irreversible climate change. Instead, what is required is a fundamental transformation of the economy to a new 'green' trajectory based on the rapidly diminishing emission of greenhouse gases. Innovation policy, we argue, must play a key role in this transformation. Following this path would mean turning Europe into a veritable laboratory for sustainable growth, environmentally as well as socially.

THE ECONOMIC CHALLENGES FOR EUROPE

Over the longer term, European economic integration has delivered substantial benefits to Europe's citizens. During the first decades of integration efforts in (Western) Europe, the economy grew very fast, and the gap in productivity and income *vis-à-vis* the world technological and economic leader, the United States, was considerably reduced (Abramovitz 1994). The European Union (and its predecessor institutions) has also been highly successful in supporting transitions from authoritarian regimes to democracy in many parts of Europe, firstly from the mid-1970s onwards when the fascist dictatorships in Southern Europe were swept away, and later – on a larger scale – in the 1990s onwards following the disintegration of the former Soviet Union. The gradual integration of Eastern European countries, followed by substantial inflows of investment from the rest of Europe, led to very rapid growth in the new member countries, markedly reducing differences in productivity and income across Europe as a whole (Fagerberg and Verspagen 2015).

Around the turn of the millennium, several European initiatives were launched to sustain the positive dynamics of previous decades in the expectation that this would lead to a further narrowing of the gap in GDP per capita between the United States and Europe. At EU summits in Lisbon and Barcelona in 2000 and 2002, member states agreed on the goal of making Europe "the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion" by, among other things, increasing R&D investments (as a share of GDP) to a level above that of the United States by 2010.[2] Moreover, a common European currency, the euro, was introduced in 2002 as part of the strategy to further deepen European integration and spur economic growth.

To what extent did European policy makers succeed in their aims? Figure 1 traces the development of GDP per capita from the mid-1990s onwards for three groups of European countries and the EU as whole compared to the United States. Here, there is little evidence of Europe catching up with the US during this period. In fact, in 2015 GDP per capita in the EU was two thirds of the US level, or exactly the same as twenty years earlier. Among European countries, only new members from the East managed to substantially reduce the gap with respect to US productivity, rising from 32 percent to 46 percent of the US level between 2000 and 2008, after which the catch-up by Eastern Europe came to an abrupt halt. In Southern Europe the average GDP per capita relative to the United States was roughly constant and equal to the EU average until the financial crisis. However, between 2008 and 2015 it dropped from 66 percent to 56 percent of the US level. Thus, instead of the convergence in GDP per capita that characterized Europe during the previous decade, the years after 2007/8 witnessed a process of *divergence*, with several countries, particularly in the South, falling behind economically.

Should we be concerned about these developments? Yes – and to see why, consider Figure 2, which shows the change in unemployment rates for young adults aged 20–24 in Europe since the onset of the crisis. Apart from a few countries (and especially Germany), youth unemployment has been on the increase everywhere. The situation is especially severe in Southern Europe (where the level of youth unemployment has more than doubled compared to the situation before the financial crisis) and in parts of Eastern Europe. If this situation is not reversed, large numbers of young

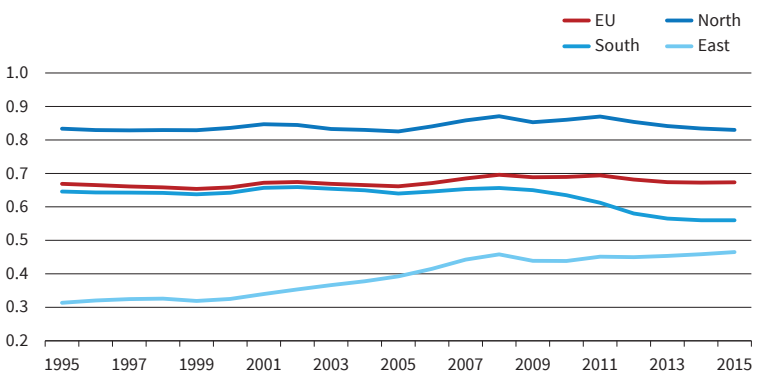
[1] This paper draws heavily on a book edited by the authors (Fagerberg *et al.* 2015) and two earlier articles summarising the message from that volume (Fagerberg *et al.* 2016 and 2017). The authors are grateful to the contributors to the 2015 book, and to various reviewers for their helpful comments.

[2] See http://ec.europa.eu/invest-in-research/action/history_en.htma.

Figure 1

Europe's GDP per Capita Relative to the US, 1995–2015

Expressed at constant US Dollars (PPP)



Note: GDP per capita measured in terms of constant US$ (PPP-adjusted) at 2011 price levels; EU includes all member countries, NORTH consists of Denmark, Sweden, Finland, Germany, the Netherlands and Austria; SOUTH comprises Greece, Italy, Portugal and Spain; while EAST includes the 11 previously socialist countries in the East of Europe (that became members after the collapse of the Soviet Union).

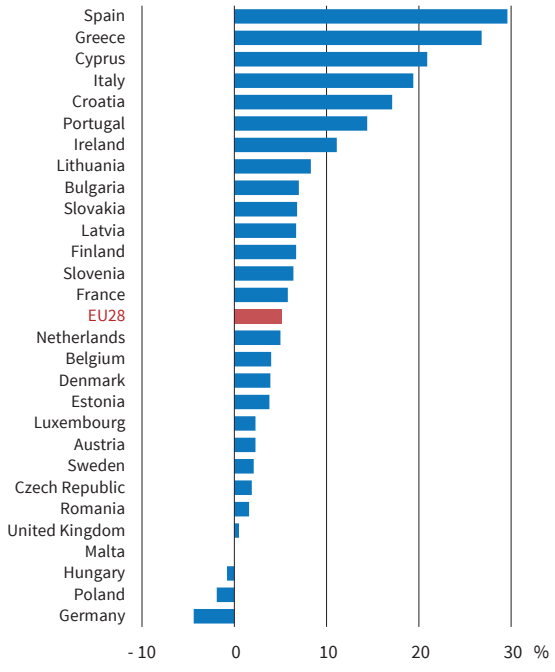
Source: World Bank Database; authors' calculation.

people in Europe risk being permanently marginalised, the social, economic and political consequences of which are likely to be highly detrimental to Europe's future.

Why is Europe's performance so disappointing? The economic changes that have taken place in the continent during recent decades occurred within an international context characterised by globalization. The gradual inclusion of China in the global capitalist economy, adding hundreds of millions of lower-paid manufacturing workers to the global labour pool, provided a substantial boost to this process, with similar but less spectacular developments taking place in other developing nations. This process also poses a challenge, however, because it tends to undermine the competitive position of established industries throughout the developed world, especially in low skill, labour-intensive manufacturing sectors. The evidence (see e.g. Fagerberg and Verspagen 2015; Landesmann 2015) suggests that the effects of globalization on the growth performance of different parts of Europe have been very uneven. While the advanced economies in the North of Europe have to some extent adapted to the changing competitive conditions by selling advanced products to customers in emerging markets (substantially increasing their exports as a percentage of GDP), countries in Southern Europe (and some in the East) have generally failed to do so.

Figure 2

Changes in Youth Unemployment Rates in Europe, 2007–2015 20–24 years



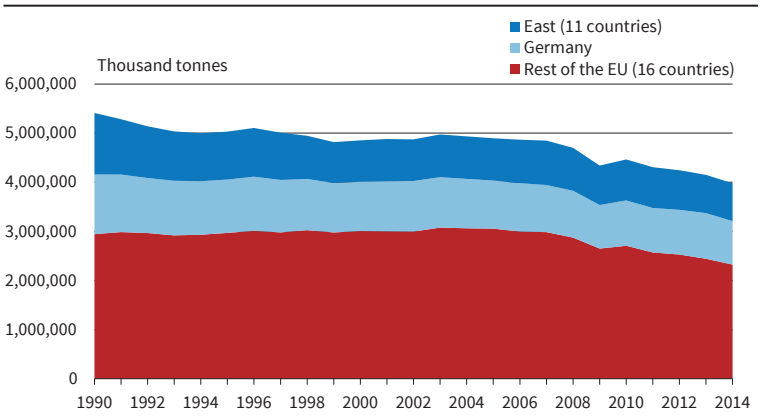
Source: Eurostat (2017).

However, European integration and EU policies have also had an impact. The introduction of the euro in 2002 made the Eurozone economies more interdependent. A natural consequence of this may have been the greater coordination of economic policies among participating countries, but instead those countries continued to pursue economic policies based largely on domestic considerations, effectively disregarding the consequences for other countries and for the wider Eurozone. Germany, for example, following its costly re-unification with former East Germany, decided to restrain growth in wages and domestic demand in order to boost the competitiveness of its industry and to run a trade surplus with the rest of the world. However, this policy implied that other, less competitive members of the Eurozone, with far less scope for export-based growth, also needed to practice austerity if increased trade deficits were to be avoided. Initially, several Southern countries shied away from austerity, leading to rising deficits and foreign indebtedness (Fagerberg and Verspagen 2015; Landesmann 2015), a situation which was clearly unsustainable. Eventually the financial crisis brought governments in different parts of Europe together under the umbrella of austerity, leading to slow growth, rising unemployment (especially in the South) and increasing divergence in the Union as whole.

EUROPE FACING THE CLIMATE CHALLENGE

There is near-consensus among climate analysts that the globe is currently heading towards a substantially warmer Earth than a century ago, and that this global warming is primarily caused by greenhouse gas (GHG)

Figure 3
GHG Emissions in the EU28, 1990–2014



Source: Eurostat; authors' calculation. © ifo Institute

emissions from human activities (IPCC 2012; 2013a; 2013b and 2014; World Bank 2012 and 2013). In order to confine temperature rises to less than 2°C, global GHG emissions have to be reduced substantially by 2050, and almost completely eliminated by the end of the century (IPCC 2014). These demanding goals are equivalent to a reduction in GHG emissions by at least 3–4 percent annually for the rest of this century (see Smil 2010).

European politicians pride themselves on having already substantially reduced greenhouse-gas emissions; and hence for being on broadly the right track (European Council 2014). But is this really the case? To explore this, Figure 3 traces the development of European GHG emissions from 1990 onwards for three country groups: Eastern Europe, Germany (including the former GDR) and the rest of Europe.[3]

What the figure shows is that, for Europe as a whole, there was a reduction in emissions in the early 1990s, but this can be almost entirely explained by the rapid changes that took place (including the closure of inefficient plants) in the previously socialist countries in the East. For the rest of Europe, emissions were essentially stable until the outbreak of the financial crisis. This raises the question of whether the more recent decline in GHG emissions represents a shift towards a new, more sustainable path, or whether it is mainly a consequence of the financial crisis, and hence is likely to be reversed should the economy recover.

To investigate this, Figure 4 includes data on GHG emissions and growth of GDP for the EU as a whole between 1995 and 2014. The GHG intensity (i.e. GHG emissions per unit of output) has declined steadily, as in the United States (Nordhaus 2013). But until shortly before the financial crisis, this decline was not enough to reduce Europe's overall emissions. Moreover, as the figure shows, had growth continued at the same pace as before the crisis, emissions would probably have stayed roughly constant. Thus, the recent decline in emissions does not reflect a fundamental change towards a more sustainable path for the European economy, but is mainly a reflection of continuing economic stagnation.

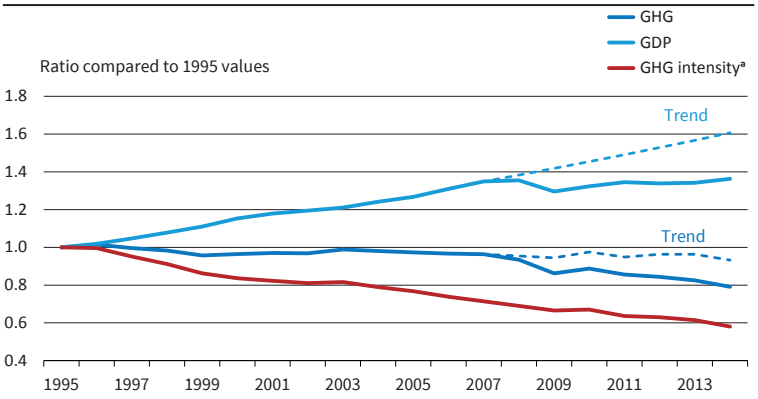
This raises serious questions about Europe's ability to cope with the challenges discussed in this paper. A revival of the economy, which is required to reduce unemployment and increase welfare, appears to be in direct conflict with the need to combat climate change. To realize both objectives, the European economy has to shift to a completely new trajectory when it comes to the emission of greenhouse gases. This is a truly formidable challenge, requiring a fundamental transformation of European economic activities and, arguably, a completely new policy stance.

THE GOVERNANCE CHALLENGE FACING EUROPE

Here, we examine the governance challenge faced by Europe with regard to developing the necessary policies for economic recovery and transformation and for confronting issues related to climate change and sustainability.

A first issue concerns the increasingly global nature of the problems confronting governments, requiring internationally coordinated, multilateral efforts that are hard to bring about, as shown by the failure, at

Figure 4
Development of GDP and GHG Emissions in the EU28, 1995–2015



Note: Trend-GDP is a continuation of the 1995–2007 trend for GDP, while Trend-GHG is what the emissions would have been in that case (with actual GHG intensity).
[a] GHG emissions per unit of output.
Source: Eurostat; authors' calculation. © ifo Institute

[3] The reason for focusing on these three groups is that prior to the early 1990s, when our analysis starts, there were substantial differences in industrial productivity and energy efficiency between the capitalist west and the socialist east, which influenced subsequent developments.

least until the Paris climate conference in December 2015, to come up with a comprehensive international agreement on how to deal with climate change. Nevertheless, as pointed out by Laestadius (2015), Schmitz and Lema (2015) and Smith (2017), there may be other possibilities for international cooperation related to climate change , such as alliances of like-minded countries (with Europe taking the lead) pioneering new solutions and encouraging others to follow.

Secondly, not only are the current problems large-scale, but they are also more likely to cross-cut organisational boundaries, particularly within governments (Bauer *et al*. 2012) and to interact in an increasingly complex manner. Energy policy, for instance, must give careful consideration to a range of issues, including security, for example (Geels 2015). Therefore, effective policies for transforming the economy towards sustainability may require the development of new forms of governance, characterised by a holistic perspective and close coordination between different parts of government (Fagerberg 2017).

A third issue relates to the increasing involvement of non-government players, not least in Europe (Biermann 2007; Biermann and Pattberg 2008; Biermann and Gupta 2011; Bauer *et al.* 2012). However, while making governance more complex, the involvement of non-governmental actors may also introduce a much needed new dynamics into policy-making, as shown, for example, by the German *Energiewende* – literally energy transition – which had its roots in the environmental and anti-nuclear movements of the 1970s and 1980s. The results of this policy are truly remarkable. Between 1998 and 2015, the share of renewables in German energy consumption increased from below five percent to over 30 percent (Fagerberg *et al.* 2017). At the same time, the cost of producing renewable energy steadily declined, making renewables much more competitive and attractive worldwide. A substantial German capital-goods industry also developed (Lauber and Jacobsson 2015).

Fourthly, there is a heightened sensitivity to risk and uncertainty (Biermann 2007). The fundamentally uncertain nature of technological advance means that policies for transformation should place the emphasis on pursuing a broad portfolio of different energy technologies and on not getting locked into a specific development path that may appear more cost-effective or promising at a given time. The German *Energiewende* is an excellent example of how this can be achieved (Lauber and Jacobsson 2015). The scheme required utilities to purchase renewable power from private sources at a fixed rate (a so-called 'feed-in tariff'). The feed-in tariff was set at different levels for different technologies (e.g. solar, bio, on-shore wind, off-shore wind etc.) depending on how far these technologies had progressed with respect to becoming commercially viable, allowing different technologies time to deliver on their promise, thus avoiding premature lock-in to a specific technology.

A fifth factor adding to the governance challenges facing the EU is the growing number and diversity of member states. Now with 28 member states, EU countries are quite different in terms of economic, industrial and institutional characteristics, and policies based on the philosophy of 'one size fits all' appear less appropriate than ever.

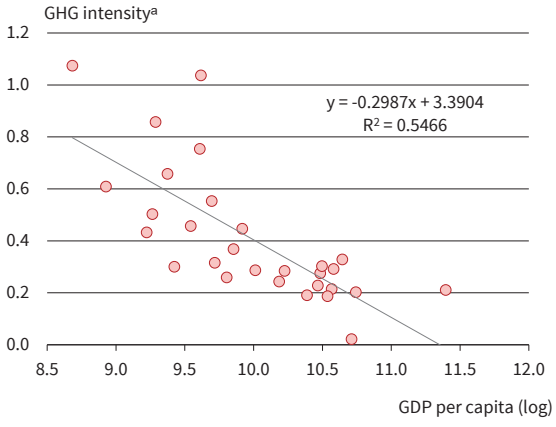
Lastly, and again a factor specific to the governance challenge faced by the EU, is the fact that the scale of resources at the disposal of the EU is, in most cases, very limited compared to those allocated by national governments (Begg 2015). Hence, the ability to influence and coordinate national governments becomes essential.

The declining trust in (and diminishing popular support for) European institutions (Begg 2015) indicates that the failure of EU politicians to deal effectively with the challenges now facing Europe faces is coming back to haunt the entire European project. This underscores the need for a new policy stance (Mowery *et al.* 2010). As noted above, simply pumping up demand would quickly come into conflict with climate concerns and hence prove unsustainable. A policy targeting higher economic growth and reduced unemployment must therefore simultaneously speed up the transformation to a sustainable economy. The best way to achieve this, we argue, is to target innovation, the diffusion of new technology and transformative investments in areas such as energy supply and distribution, increased energy efficiency, public transport, and infrastructure for cars driven by electricity and fuel cells. Many of these investments, in the energy sector for example, will be necessary anyway (ECF 2013), but undertaking them sooner rather than later (and using reduced GHG emissions as a yardstick in the selection process) may accelerate the transformation while simultaneously reviving growth.

As pointed out above, such a policy stance must take into account the fact that the economies of Europe

Figure 5

Relationship between GHG Intensity and GDP per Capita in the EU28, 2014



[a] GHG emissions per unit of output.

Source: Eurostat; authors' calculation.

are very different, so there is no point in just mimicking the same policy (whether patterned on German experience or that of some other country) everywhere. While such transformative investments are needed in all member countries, it is natural to place the emphasis on countries that have further to go with respect to achieving sustainability. As Figure 5 shows, the countries most in need of transforming their economies in the direction of sustainability are poorer member states. Thus, a programme for transformative investment based on these principles would not only be good for climate change and economic growth generally, but would also deliver growth where it is most needed, thereby contributing to improved social cohesion in the Union as a whole.

CONCLUSIONS

Europe (like many parts of the world, but perhaps even more so) is confronted by an intimidating triple challenge comprising of economic stagnation, climate change, and a governance crisis. This paper shows how these three challenges are closely inter-related. In particular, a return to economic growth cannot come at the expense of the increased risk of irreversible climate change. Instead, what is required is a fundamental transformation of the economy to a new 'green' trajectory based on the rapidly diminishing emission of greenhouse gases.

Boosting Europe's economy and its transition to a sustainable 'green' economy through transformative investments should be seen as a core element of European policy for innovation and growth (Mazzucato and Perez 2015). Innovation is not primarily about scientific breakthroughs, although these are often very important, but more about continuous experimentation, learning, gradual improvements, cost reductions and increasing the performance of technologies that are, in most cases, already on the table (Mathews 2014). Policymakers can exert a major influence over innovative activities by emphasizing the most pressing challenges or problems that need to be addressed. This type of innovation policy, which provides a sense of direction to the collective innovation journey and rallies potential contributors behind it, would be relevant for a wide range of activities essential for the transition to a sustainable economy, such as energy production, distribution and use, as well as transport and construction. In order to be effective, such a policy will have to link and coordinate different policy arenas (energy, transport, regional development, research, innovation etc.). Thus, sustainable growth requires more than technological innovation; new – innovative – forms of governance and institutions are also required.

The dominant policy approach to dealing with climate change in Europe to date has tended to focus on getting 'the prices right', with the Emissions Trading Scheme (ETS) as the central instrument (Begg 2015). Yet this has proven far from successful. The reason is not that there is something inherently wrong with getting 'the prices right', but rather that gaining political support for the necessary adjustments in prices (through increasing taxes or cutting quotas or in other ways) has proven very difficult. Moreover, timing is crucial here. Arguably, acquiring the necessary momentum in the transformation process is critically dependent on mobilising broad segments of society by advocating and experimenting with new solutions. It is significant that successful transformation policies, such as the German *Energiewende*, were not created through top-down initiatives by political leaders, but by pressure from below from green movements and environmental activists, which gradually garnered increasing support for these policies as they acquired momentum.

Some of these initiatives (the German *Energiewende*, for instance) are examples of what economists often call 'second best policy' (they reserve the term 'first best' for 'getting the prices right'). Yet it is fallacious (even from an economic theory point of view) to criticize these policies on the argument that they are more expensive than 'first best' policies when it is quite obviously illusory to assume the latter will deliver the required outcomes in time. Moreover, if combatting climate change requires considerable innovation, as almost everybody seems to agree, then it is not only the costs of particular policies here and now that matter, but also the effects on innovation.

As pointed out earlier, other parts of the world are also facing varying forms of the triple challenge. Given the global character of the problem, and the many players involved at different levels all round the world who may have a say in what happens, the ability to influence actors in other countries becomes centrally important. One way to achieve this – one for which Europe seems eminently well placed – would be to lead by example, providing solutions for how the climate challenge can be effectively dealt with. Taking the lead may, of course, incur significant costs. Nevertheless, doing nothing will undoubtedly have a major detrimental impact in the years ahead in many areas of life. By taking the lead in addressing the triple challenge, Europe may not only attract followers, thereby ensuring that climate change is kept within manageable bounds; it may also lead to considerable benefits in the longer term in the form of strengthened industrial competitiveness, enhanced exports and new jobs. Moreover, addressing the triple challenge may provide Europe and its citizens with a (much needed) new sense of purpose, revitalizing the EU, 'the European project' and Europe's role in the world over the decades to come.

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Jürgen Matthes

A European Monetary Fund – Considerations of Design, Politics and a Preliminary Evaluation

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INTRODUCTION[1]

The creation of an EMF could potentially form the basis of a Franco-German political compromise to reform EMU governance and to strengthen fiscal integration.[2] As treaty changes are not likely in the near future, establishing an EMF on the basis of the intergovernmental ESM might be a viable option, as suggested by the German finance minister and as included in the election programme of the German CDU/CSU. However, it is an illusion to believe that such an initiative would only employ the EMF to strengthen the rules-based EMU framework and financial market discipline – aspects that are favoured by Germany and northern EMU countries. To make it politically viable, the EMF would also very likely include some of the risk sharing and fiscal integration features that the French government and southern EMU countries favour.

In this paper, the idea of creating an EMF and its possible instruments are evaluated. As there is no clear concept of what tasks an EMF would be set, the author has to rely on assumptions about its objectives and tools.

POTENTIAL INSTRUMENTS TO STRENGTHEN RULES ENFORCEMENT AND MARKET DISCIPLINE

Replacing the IMF (and the EU Commission) in Crisis Programmes

In rescue and reform programmes, the EMF could, in principle, replace the IMF as well as the other institutions that, together, were formerly known as the Troika (the IMF, the EU Commission and the European Central Bank, ECB). This proposal would have several advantages. The coordination costs and conflicts between the institutions would vanish. Moreover, if the EMF was sufficiently autonomous, the conditionality principle would be strengthened because the politically influenced EU Commission would no longer be involved. Sufficient accountability could be provided by requiring the EMF to report to a consultative euro area sub-formation of the European Parliament.

Yet this construction would also have potential disadvantages, because sufficient technical expertise and staff would have to be provided to the EMF. Finding experts with similar expertise to that required by the IMF will be difficult, however, because only the IMF has had such a depth of experience in dealing with crisis programmes. Moreover, the EMF experts would remain idle if none of the member states had a crisis. So the question arises as to whether the EMF – like the IMF – should also be tasked with the continuous monitoring of EMU countries in non-crisis times in order to keep its staff busy and relevant. However, this would create considerable redundancies and additional costs because the IMF, the Organisation for Economic Co-operation and Development (OECD), the EU Commission, and also to some extent the ECB, already perform this task.

To avoid this drawback, the EMF would have to rely on a small team of staff in non-crisis times. However, the question arises as to how the EMF could be adequately staffed in crisis times. There are no straightforward solutions to this trade-off:

- One option would be to continue the involvement of IMF expert staff, but on a much smaller and less political scale, i.e. with only minimal financial contribution by the IMF. This solution would require the consent of the IMF and contradict the basic intention that Europe should be able to solve its problems on its own, but this may be deemed acceptable eventually.
- Another option would be for the EMF to borrow staff from the EU Commission or the ECB when a crisis arises. This staff could work under the clear leadership of the EMF staff in order to guarantee sufficient independence. However, the expertise on crisis resolution in these institutions is still limited and would have to be further developed.

Strengthening Fiscal and Macroeconomic Surveillance and Rules

The EMF could be tasked with improving adherence to European rules (provided it was equipped with sufficient staff to continuously monitor EMU countries). However, it appears hardly imaginable that an EMF could take over formal powers from the EU Commission because this would very likely require treaty changes. But EMF analyses could possibly increase the pressure on the Commission to enforce fiscal and macroeconomic rules more strictly.

However, this idea would not work without certain changes to the rules. Currently, for example, the ECB publishes critical evaluations of the Commission's

[1] This article is an abridged and revised version of Matthes (2017).
[2] For a critical view on the allegedly indispensable need for more fiscal integration in the euro area, see Matthes and Iara (2016); Matthes *et al.* (2016).

fiscal and macroeconomic surveillance, but this does not seem to influence the Commission to any sufficient degree. Moreover, the Commission also established the new European Fiscal Board in a way that does not significantly restrict its own leeway. Therefore, the Commission's guidelines would have to be changed so that it must take into account the EMF's reports. The question is whether this could be done by adjusting secondary legislation and without treaty change.

Establishing a Sovereign Debt Restructuring Mechanism at the EMF

The EMF could provide the platform for a sovereign debt restructuring mechanism, as suggested by Matthes and Schuster (2015) for the ESM. This reform aims to strengthen financial market discipline and the no-bailout clause. Under current rules, before an ESM programme is established, a debt sustainability analysis has to be carried out by the ECB and the Commission in liaison with the IMF. This task and additional competences could be conveyed to the EMF as part of this reform. In the case of unsustainable government debt, a sovereign debt restructuring would be initiated. The EMF would provide the framework rules for the negotiations between the debtor state and its creditors, and would also – in a staged process – be provided with consultative and potentially also interfering rights in order to guarantee an effective and reliable outcome – see Matthes and Schuster (2015) for more details.

Moreover, if an EMF support programme was required, it could be made obligatory that this step would automatically lead to a compulsory extension of the maturities of all outstanding sovereign debt securities of the respective crisis country for the period of the programme duration, while interest payments would have to be continued (for this proposal see Deutsche Bundesbank (2011) and Matthes *et al.* (2016)). In formal terms, this would involve an automatic sovereign debt default, but with only a small reduction of the present value of outstanding debts. A debt restructuring with a haircut would not be needed, meaning that possible disruptions in the financial market should remain contained. In case of a run for exit by investors, an EMF programme would have to be activated very quickly, based on the established emergency procedures of the ESM.

There must be no illusions: introducing a sovereign debt restructuring mechanism to reinforce the no-bailout rule will make financial market actors apply more scrutiny and will likely lead to higher risk premiums for sovereign debt, particularly for countries with high public debts and deficits. In the longer run, this is not a drawback but an advantage of this reform, because strengthening the no-bailout rule would support market discipline. However, in order to limit financial market turbulences, the introduction of a sovereign debt restructuring mechanism needs to be very well prepared and carefully handled.

POTENTIAL INSTRUMENTS TO INCREASE RISK SHARING AND DEBT MUTUALISATION

Apart from employing an EMF to strengthen rules and market discipline, other suggestions for new instruments to fight future crises have been brought forward, most of which would imply more risk sharing or debt mutualisation. In the following sections, a selection of proposals is presented and briefly evaluated. As pointed out above, it cannot be expected that only the German (northern European) view will prevail when setting up an EMF with broad competences.

Rendering Financial Support Programmes More Effective

Flanking automatic stabilisers in recessions in stressed countries

Due to the lasting impact of the euro debt crisis, public debt ratios of several formerly stressed EMU countries will remain elevated for a longer period. Thus, it cannot be taken for granted that these countries will be sufficiently able to fight future recessions. Instead, the financial markets could potentially become jittery and raise risk premiums by a wide margin if public deficits rose as a result of these countries attempting to let automatic stabilisers work.

As proposed for the ESM (Matthes *et al.* 2016), a new form of financial support (and reform) programme could be designed for the EMF, which would resemble a full programme, but would not require strict fiscal consolidation and instead would allow for the working of automatic stabilisers. However, in order to avoid disincentives, such an EMF programme would have to have some special features:

- It should be based on an *ex ante* qualification criteria and should only be available to countries that adhere to the SGP rules.
- Moreover, it would have to be strictly based on the conditionality principle, including a memorandum of understanding. Required reforms would not focus on austerity, but on structural reforms. These reforms should focus on product (and labour) markets in order to strengthen economic growth and employment – thus aiming at regaining confidence with financial market actors. Growth-enhancing reforms should also target other areas such as, for example, a rebalancing of government spending and taxation towards more inclusive growth.

Enlarging the financial capacity of the ESM

With its current financial resources, the ESM would hardly be able to finance a traditional 3-year-programme for several countries (including a larger one) at the same time or, as an example, for Italy alone. With the current free forward commitment capacity of 375 billion euros (ESM 2017), the ESM (EMF) could not

cover the large refinancing needs of Italy, which has a total public debt burden of over 2,200 billion euros and with an average maturity of around 6.5 years (Dipartemento di Tresoro 2017a). In fact, at the end of 2016, sovereign bonds amounting to over 320 billion euros had to be retired in 2017 (Dipartemento di Tresoro 2017b). In addition, the figure was around 180 billion euros for 2018 and 2019, respectively.

Thus, it does not come as a surprise that an extension of the ESM's lending capacity has been discussed (EP 2017) in connection to the creation of a budgetary capacity for the euro area. However, if the ESM (EMF) was provided with the ability to finance a 3-year-programme for Italy, for example, the refinancing needs alone would have amounted to over 680 billion euros (Dipartemento di Tresoro 2017b) between 2017 and 2019 (this is excluding the financial needs to cover any fiscal deficits). A debt mutualisation of this size could endanger the creditworthiness of the best-rated EMU countries, which are crucial for the high credit rating of the ESM – and thus for its low refinancing costs. Therefore, the EMF's lending capacity should only be extended to a limited degree.

Another reform step would be much more effective in enlarging the reach of ESM (EMF). As mentioned above, at the start of a full-blown EMF programme an automatic extension of the maturities of all outstanding sovereign debt securities should be made obligatory (while interest payments would be continued). This would imply that the EMF would have to provide loans only to finance the current fiscal deficit of the stressed country, and not to refinance the retirement of maturing government bonds. Taking again the example of Italy, the fiscal deficit amounted to 41 billion euros (or 2.4 percent of GDP) in 2016 (EU Commission 2017). Even if the fiscal deficit were to reach 5 percent of GDP during the 3-year programme period, the financial needs to be covered by the EMF would amount to far less than 300 billion euros. Thus, this reform would significantly reduce the need to enlarge the financial power of the EMF.

Providing a Fiscal Backstop for the Banking Union

The Banking Union is currently still incomplete – for good reasons. EMU-wide mechanisms for banking supervision and resolution are up and running. However, there is still a significant lack of risk reduction, which impedes an increase of risk sharing tools of the Banking Union, i.e. a common European Deposit Insurance Scheme (EDIS) and a common fiscal backstop for the Single Resolution Fund (SRF). The lack of risk reduction in the euro area banking system concerns mainly large amounts of non-performing loans (incurred during the crisis) and a lack of initiative to sever the sovereign-bank nexus. This nexus arises because a sovereign debt crisis would spill over to national banks, as they often hold a large amount of their national government's sovereign bonds in their portfolio. They do so mainly because of regulatory privileges for the sovereign bonds of euro area countries – mainly zero risk weights and no exposure limits. According to the political decision of the Ecofin (2016) from June 2016, in the near future progress on EDIS and on the SRF backstop will only be possible if significant risk reduction measures have been successfully implemented.

Provided that risks are sufficiently reduced, the EMF (built on the ESM) could potentially be used as a common backstop for the SRF. However, compared to the key support tools of the EMF (mainly loans and the purchase of their national sovereign bonds), such a backstop function would imply a higher degree of risk sharing. The probability of losses would be far greater, because the EMF could probably be required to give guarantees to or acquire shares in troubled banks, or it could participate in the ownership of bad banks. Therefore, it is appropriate that the Ecofin (2016, 8) states that "the SRF backstop will be fiscally neutral over the medium term". This needs to be achieved by requiring the SRF (which is financed by contributions from banks) to pay back any financial support received from the EMF over a certain time period. In addition, an upper limit for the fiscal backstop should be considered.

As a more general note of caution, the potential disincentives of increasing fiscal risk sharing for the banking system have to be considered. While a reliable deposit insurance scheme may be helpful to avoid bank runs, there is evidence that banks with insured deposits tend to take greater risks (Calomiris and Jaremski 2016).[3]

Establishing a 'Fiscal Capacity' in the Euro Area

The EMF could possibly also become a vehicle to implement a 'fiscal capacity' in the euro area without treaty changes. Several of the proposals currently discussed for an EMU budget could be theoretically envisaged for an EMF, be it a common fiscal mechanism to support EMU countries hit by idiosyncratic shocks, or an investment scheme on top of the European Fund for Strategic Investments (EFSI) to limit the investment gap in several EMU countries. Moreover, the EMF's resource could be used to establish an appropriate fiscal stance of the euro area in case the national fiscal policies were unable or unwilling to achieve this goal. In addition, the EMF could use its budget to support EMU countries implementing structural reforms.

Obviously, these instruments would be very far-reaching and would thus have to be based on a sound argument justifying their necessity. There are several reasons why the author holds the opinion that more fiscal integration is not indispensable to make EMU sustainable (Matthes and Iara 2016; Matthes *et al.* 2016).

[3] As far as the expansion of the US deposit insurance in the early 20th century is concerned, the authors show that insured banks with higher risk profiles were able to attract deposits away from uninsured banks with lower risk profiles. They also state that the expansion of liability insurance has been associated with more unstable banking systems.

In a nutshell, this conjecture is based on the following arguments:

- The euro debt crisis was too exceptional and its legacy problems too temporary to justify new fiscal integration tools of a permanent nature.
- The root causes of the crisis (mainly a financial boom leading to excessive private debt) have been tackled by reforms already taken and a limited set of reforms still needed, mainly in the financial sector.
- The problematic real-interest-rate effect and the one-size-does-not-fit-all problems of single monetary policy, which can lead to economic divergence among EMU countries, can be tackled by country-specific macro-prudential instruments supported by the strong role of the Single Supervisory Mechanism (SSM).
- The functioning of EMU in the context of the optimum currency area theory is considerably better than often perceived and has been further improved by structural reforms, particularly in southern EMU countries.
- The introduction of a fiscal integration mechanism could tend to induce disincentives for reform and unwarranted permanent transfers.

In view of these economic considerations and of the diverging positions of EMU countries, it is questionable whether there would be the political will to create an EMF with such far-reaching instruments, as highlighted at the beginning of this chapter. However, if a political decision were to be taken to significantly increase the fiscal integration in the euro area despite these caveats, important features of such a 'fiscal capacity' would have to be decided upon on. In this respect, several recommendations are provided in the following:

- The occasions on which a country can receive financial support of the 'fiscal capacity' should be defined conservatively. Normal recessions should be dealt with at the national level by means of automatic stabilisers and existing flexibilities. Only major downswings should be covered by means of a 'rainy day' fund.
- The EMF's fiscal support should not be paid out as a grant, but in the form of an interest-free loan, which would have to be paid back over a longer time period. It is true that a grant would enable better macroeconomic stabilisation properties in case of idiosyncratic shocks. However, it would amount to a transfer and would thus put much more strain on the EMF's resources. Moreover, the degree of risk sharing in the euro area would be substantially increased. Even if the grants are intended to avoid permanent net transfers to individual countries, the question arises as to whether this can be ensured in the longer run. Therefore, interest-free loans should be chosen. Both the financial burden on the EMF and the risk of ending up in a transfer union would be smaller. This option would have the additional advantage of making national fiscal policies more countercyclical because countries would have to repay loans in good times when their fiscal policy tends to be pro-cyclical.
- A decision over the financial resources of the EMF is also needed. The ESM currently finances its administrative spending largely by the small interest rate margin earned on the loans provided to crisis countries. An EMF would need a larger financial basis for several reasons. Even the new tool of interest-free loans would eliminate the interest rate margin as a key financing source. Even more financial resources would be needed if EMF support were to come in the form of grants and/or if the EMF was to be provided with sufficient staff to monitor EMU member states. Several options are possible to cover larger financial needs: member states' contributions, delegated own resources like in the EU budget; or even permission for the debt financing of non-crisis-loan spending:
  - Contributions are the preferable option. They keep member states much more involved in controlling the 'fiscal capacity'. Moreover, in order to strengthen automatic stabilisers of national fiscal policy, a direct connection to the national public budgets is useful. This option is also more likely to be achievable on an intergovernmental basis.
  - Delegating own resources would make the EMF less dependent on the member states, but it might be politically challenging to divert a part of EU member states' tax income to an intergovernmental organisation. Moreover, this financing option could imply the danger of a continual enlargement of the 'fiscal capacity' function.
  - The debt financing option for expenditure (apart from loans in the course of an ESM programme) is not recommended. It would require even greater financial resources in order to service and repay the incurred debts. This option could also significantly increase the extent of debt mutualisation.

CONCLUSION

A French-German accord after the elections in France and Germany could lead to greater fiscal integration in the euro area. The proposal to establish a European Monetary Fund (EMF) based on the European Stability Mechanism (ESM), which would probably be possible without treaty changes, is evaluated in this paper. Potential EMF instruments are divided into two categories. The first category relates to reinforcing rules and market discipline:

- To strengthen the rules-based EMU framework the EMF could not only replace the IMF in crisis programmes, but could also monitor the implementa-

tion of EMU rules by the EU Commission. However, problematic implementation issues could arise.

– Moreover, in order to strengthen financial market discipline, the EMF could become both platform and agent for an effective and reliable sovereign debt restructuring mechanism. However, as this idea will meet with considerable political resistance, it could probably be only a part of a larger political compromise.

Therefore, the EMF would, secondly, also be very likely to include features that raise risk sharing and debt mutualisation – even although the author is sceptical about several of the following instruments:

– Generally, it would make sense to establish a new type of EMF crisis programme in order to allow stressed countries to let automatic stabilisers work under strict structural reform conditionality.
– Another proposal is related to the lack of the ESM's resources to finance a 3-year programme for a large EMU country. This problem could largely be solved by automatically extending the maturities of all outstanding sovereign debt of the stressed country for three years in case of a crisis programme. This would significantly reduce the financing needs of the EMF. The alternative solution, to considerably increase the EMF's finances, could endanger the creditworthiness of the EMF.
– There may also be proposals to use the EMF as a common fiscal backstop for the Banking Union. However, backing up banking resolutions would imply a large increase in risk taking compared to loans in a normal EMF programme. Thus, the bank-financed Single Resolution Fund (SRF) would have to be required to repay the EMF in due course, as is broadly envisaged already. Moreover, exposure limits for the EMF would be needed in this respect.
– Finally, if a kind of 'fiscal capacity' was established at the EMF, it should become relevant only in deep recessions as a 'rainy day' fund, it should be financed by contributions from EMU countries; and it should not be allowed to raise debt. Stressed countries should only receive interest-free loans with a longer repayment period and no transfers. This would reduce the EMF's financial exposure and would make national fiscal policies more countercyclical in good times.

If new risk-sharing instruments were created at the EMF under relatively strict rules, the question arises as to whether these rules will be adhered to, or whether they will be bent in times of crisis (a problem of time consistency). It is therefore essential to choose a sufficiently reliable governance framework for the EMF. Basing the EMF on the ESM appears to be the superior choice compared to the creation of a completely new institution that is unlikely to be similarly robust. In fact, the ESM has a strong governance framework with large majority requirements for decisions involving financial support measures. Moreover, as a sufficient independence is a precondition to uphold the conditionality principle, a new institution might be more prone to political influences than the ESM.

However, the creation of an EMF would still be a considerable venture and leaves open important questions:

– Could the mechanisms for better rule enforcement and financial market discipline be made sufficiently robust?
– Would new instruments for risk sharing and debt mutualisation remain within the initial limits, or would they lead to permanent transfers and serious disincentives for fiscal and economic policy over time?

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Christa Hainz, Artem Marjenko and Susanne Wildgruber

How the ECB's Low-Interest Policy Impacts Firms: Results of the ifo Business Survey on the Effects of Negative Interest Rates for Bank Deposits

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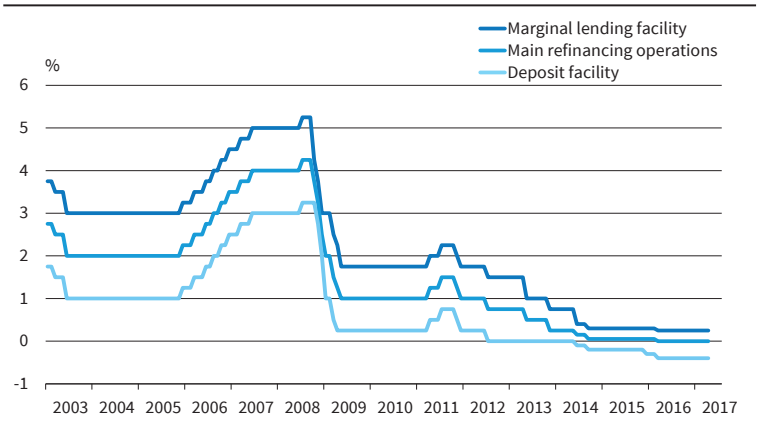
It is now almost ten years since the financial crisis started. As part of the response to the crisis, the ECB loosened its monetary policy and introduced several exceptional measures. The interest rate on the deposit facility was lowered to a negative level for the first time in June 2014 (see Figure 1). The background to this extraordinary monetary measure was the persistently low inflation in the Eurozone and the stagnation of lending by banks to companies. The introduction of negative interest rates imposed costs on banks depositing excess cash with central banks. This measure, combined with the lower interest income being generated from lending, has impacted the profitability of banks.

Figure 1
Interest Rates of the European Central Bank



Source: Deutsche Bundesbank.

Some banks are passing the cost of the negative interest rates incurred on deposits with the ECB onto business customers. This is shown by the development of the effective interest rate on deposits at banks by non-financial corporations in Germany. Figure 2 shows that the effective interest rate for deposits with an agreed maturity of less than one year fell below zero last year for the first time. Currently (as of May 2017) this interest rate lies at – 0.05 percent. This figure also shows the development of the effective interest rate for overnight deposits, which is currently negative at – 0.01 percent. Rates for fixed-term deposits are also at historically low levels, with an effective interest rate of currently 0.3 percent.

SPECIAL QUESTION ON NEGATIVE INTEREST RATES IN THE IFO BUSINESS SURVEY

In June 2017, as part the ifo Business Survey, firms were asked whether they were confronted with negative interest rates on their bank deposits and, if so, which measures they were taking in response (see Box 1). The special question was part of the online version of the ifo Business Survey and approximately 4,000 companies in manufacturing, construction, distribution and other services sectors responded.

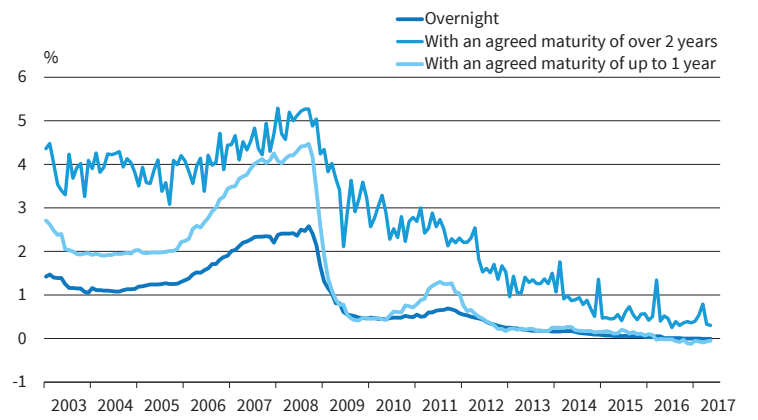
Almost one in five of the companies (18.9 percent) had been confronted with negative interest rates by at least one of their banks. The survey did not contain a question on the size of the negative interest rate. A figure often quoted in the media is – 0.4 percent. Assuming a fifth of all companies are paying negative interest rates on their bank deposits and the other companies are not receiving interest on their bank deposits, then an average interest rate on new deposits by companies of – 0.05 percent (as published by the Bundesbank) would mean that the negative interest rate for new deposits would average – 0.25 percent.

The most frequent response by firms confronted with negative interest rates was to negotiate with their bank. Almost half of the affected companies (48 percent) responded in this manner. A total of 36 percent of affected firms responded by switching to other banks that do not (yet) charge negative interest rates. Partially switching deposits to other banks also enabled companies to avoid paying negative interest rates by lowering the amount of deposits at one bank below the threshold that incurs negative interest rates. 30 percent and 29 percent of firms, respectively, switched funds to other financial assets and repaid loans or moved funds within the corporation. 11 percent of firms also reported investing more and/or earlier. This implies that policies

Figure 2

Effective Interest Rates on Non-financial Corporations Deposits

New business over time



Source: Deutsche Bundesbank. © ifo Institute

do are not merely have monetary implications but are also impacting the real economy. Eight percent of firms accepted negative interest rate charges. Very few companies reported increasing cash holdings (4 percent), while 7 percent of firms answered that they resorted to other measures beyond those given as answer options in the survey (Figure 3).

Most companies have undertaken multiple measures to address the situation. Almost a third of firms that negotiated with a bank also switched banks, suggesting that in these cases negotiations did not yield a mutually acceptable compromise.

DIFFERENCES BETWEEN GERMAN FEDERAL STATES AND FIRM SIZES

On average, almost 19 percent of survey participants were confronted with negative interest rates by their banks. Figure 4 shows the share of impacted companies categorised by the German federal states in which they are located. In Hamburg, North Rhine-Westphalia, Bavaria, Mecklenburg-West Pomerania, Saxony and Thuringia, the number of affected companies lies above the average share. In Saxony, for example, almost 30 percent of the surveyed firms reported being affected by negative interest rates.

Furthermore, the impact of negative interest rates varied by company size. Of the firms surveyed, only 10 percent of small companies (with less than 50 employees) had been confronted with negative interest

Box 1

Special Survey Questions on Negative Interest Rates

a) Has your firm been confronted with negative interest rates on deposits by at least one of your banks?
- Yes
- No (continue with d.)

If so:

b) What measures have you undertaken to avoid paying negative interest rates? (Multiple choices possible)
- ☐ No action – accepted negative interest
- ☐ Negotiated with the bank
- ☐ Changed to another bank that does not (yet) charge negative interest
- ☐ Increased cash holdings
- ☐ Switched to other financial assets and/or paid back loans
- ☐ Moved funds within the divisions of the firm
- ☐ Increased investments or moved them up in time
- ☐ Other, please specify: .....

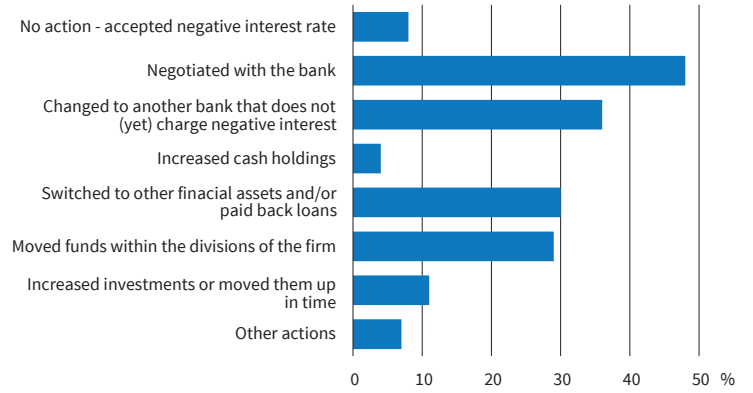
c) All in all, negative interest rates affect our earning position
- Strongly
- Less strongly
- Minimal or no impact

d) How many banks do you refer to as main bank(s)?
- 0
- 1
- 2
- 3
- 4
- More than 4

Note: Question d) is used as a control variable for research purposes and does not relate to the negative interest rate issue.

Figure 3

Firms' Measures to Avoid Negative Interest Rate



Note: Multiple responses possible.
Source: ifo Business Climate Index Survey June 2017.

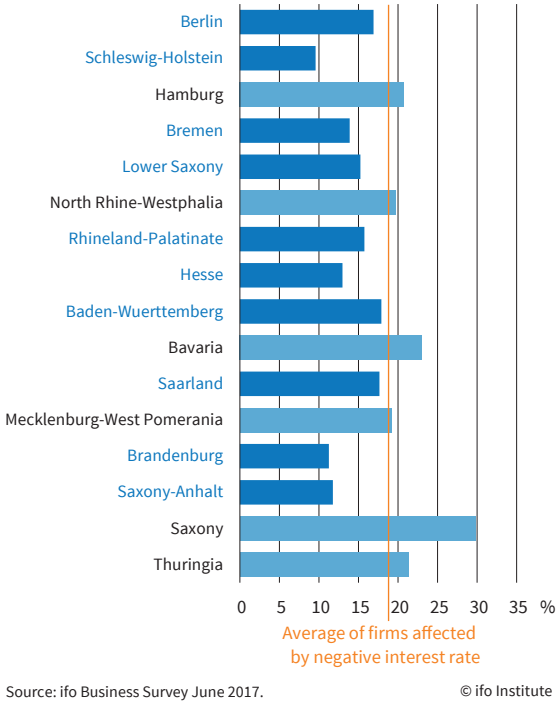
rates. For medium-sized enterprises, it was 26 percent and for large companies (with at least 250 employees) the number was 29 percent (see Figure 5). These results seem plausible as banks only impose negative interest rates on deposits that exceed a specific threshold. Larger and, apparently, medium-sized enterprises are more likely to exceed this threshold than small companies.

IMPACT ON EARNING POSITION

Eight percent of firms affected by negative interest rates reported a strong impact on their earning position. 39 percent of the firms stated that they felt a less strong impact of negative interest rates. For 53 percent of the firms, negative interest rates had minimal or no impact (see Figure 6). Companies that were strongly affected by negative interest rates were more likely to negotiate with their bank (60 percent) and/or move funds within the company. These firms were also more likely to adjust their investment behaviour. Over 20 percent of the firms that reported being strongly affected by negative interest rates invest more and/or earlier. Only 10 percent of companies that reported minimal or no burden on their earnings position undertook similar action. However, 45 percent of these firms still conducted negotiations with their bank, which indicates that a significant number of companies are not willing to accept negative interest rates as a given, even when they experience only minimal or no impact on their earning position.

Figure 4

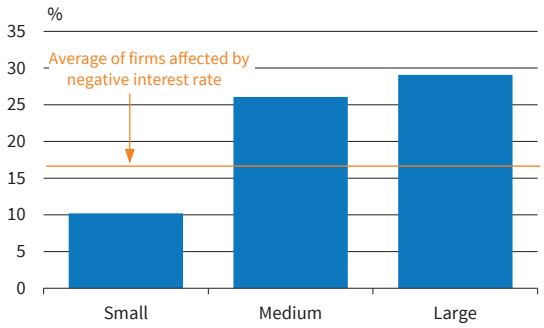
Share of Firms Impacted by Negative Interest Rate Classified into German States



Source: ifo Business Survey June 2017.

Figure 5

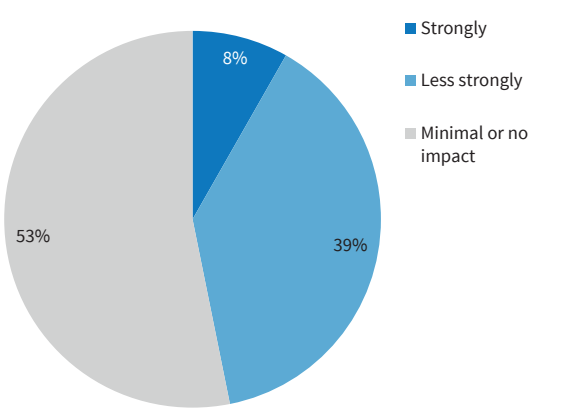
Share of Firms Affected by Negative Interest Rate by Firm Size



Source: ifo Business Survey June 2017.

Figure 6

Burden of Negative Interest Rates on Earning Postion



Source: ifo Business Survey June 2017.

CONCLUSION

Analysing the responses to the special question in the ifo Business Survey shows that one in five companies was confronted with negative interest rates on their bank deposits. If affected, most companies try to avoid negative interest rates. The most common response is to negotiate with the bank, as well as to move deposits to banks that do not (yet) charge negative interest rates. Other responses include shifting funds between financial investments or within the firm, as well as increasing investment activity. Regarding policy implications, the latter response is especially interesting since it indicates that the negative interest rate policy of the ECB does not only have monetary implications, but it also has an impact on the real economy.

*Chang Woon Nam**

R&D and Innovation Promotion in the Context of EU Cohesion Policy: The Case of the Spanish Regions

At present the EU cohesion policy targets 'all' regions and cities in the European Union. It aims to promote job creation and business competitiveness, stimulate economic growth and sustainable development, and, finally enhance inhabitants' quality of life. In order to achieve these goals in all EU regions, an amount of 351.8 billion euros – almost a third of the total EU budget – has been allocated to the cohesion policy for 2014–2020.[1] This policy provides the necessary 'investment framework to achieve the smart, sustainable and inclusive growth in the EU'[2] set out in the Europe 2020 strategy. The five main targets of this strategy include:

1. Employment: 75 percent of the 20–64 year-olds to be employed
2. Research & development: 3 percent of the EU's GDP to be invested in R&D
3. Climate change and energy sustainability: (a) greenhouse gas emissions to be reduced by 20 percent (or even by 30 percent, if the conditions are right); (b) the share of renewable energy in final energy consumption to be increased to 20 percent; and (c) increases in energy efficiency by 20 percent
4. Education: (a) reducing the rates of early school leavers below 10 percent; while (b) increasing the share of the population aged 30–34 having completed tertiary to 40 percent
5. Fighting poverty and social exclusion: at least 20 million fewer people in or at risk of poverty and social exclusion.[3]

* ifo Institute.

[1] In both the EU cohesion policy budget for the periods 2000–2006 and 2007–2013, the concentration of financial supports on the so-called cohesion regions (former objective 1 regions) reached 75 percent of total 234 billion euros and 82 percent of total 347 billion euros, respectively. Yet, for the period 2014–2020, the corresponding share amounts 'only' to 52 percent of total 351.8 billion euros.

[2] http://ec.europa.eu/regional_policy/en/policy/what/investment-policy/.

[3] See https://ec.europa.eu/info/strategy/european-semester_en.

The EU cohesion policy is evolving constantly. In particular, its promotion of R&D and innovation activities has changed from one EU budget period to another. For example, the EU cohesion policy in the budget period of 2007–2013 was restructured and became confluent with the 2000 Lisbon treaty, which aims to make the EU a more competitive and dynamic knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion. This political idea has partly been generated due to the lack of any clear consensus on the impact of 'past redistribution-oriented' EU cohesion policy on the economic growth of EU regions and convergence in the EU. Consequently, compared to the financial support from Structural Funds made in the context of EU budget 2000–2006, which was mainly concentrated on infrastructure and human capital development, the Lisbon strategy's focus on the knowledge economy created new policy orientations for the EU cohesion policy (De Bruijn and Lagendijk 2005).

Let us now take a detailed look at the EU cohesion policy operational programmes officially adopted by the European Commission at the beginning of the budget years. For such programmes, the total cost of regional programmes and the respective EU contribution are reported on the NUTS 2 level.[4] These programmes were prepared by each EU member state and present the weights of financial priorities (e.g. infrastructure, innovation, human capital, environment, etc.) set by the national and regional authorities for the corresponding budget period. Table 1 compares the share of R&D and innovation promotion grants – measured in terms of the national and EU sum of innovation support divided by total cost of the regional programme[5] – for the individual Spanish NUTS 2 regions in different EU budget periods.

Table 1 demonstrates several critical aspects. As already mentioned above, the EU cohesion policy has been continuously revised under the consideration of changing macroeconomic circumstances and the subsequent most immediate economic problems (e.g. the Lisbon treaty as a reaction to the EU's stagnating economic growth; the negative impact of the 2009 financial crisis on the EU regions). Such flexibility in policy design and implementation may certainly be deemed appropriate and necessary. Yet the EU regional policy and its emphasis in different budget periods do not appear to have been coherent in the field of innovation promotion in the Spanish NUT 2 regions considered here.

In addition, the design and implementation of EU cohesion policy should ideally have a stronger regional (i.e. 'bottom-up') dimension, endowed with a multi-level governance structure to accommodate it. By contrast, the Lisbon Agenda and Europe 2020 were imposed

[4] See http://ec.europa.eu/regional_policy/en/atlas/programmes/.

[5] The EU only provides financial means for the regional projects if national authorities also chip in. Such a 'matching co-finance principle' (or the so-called 'additionality principle') aims at ensuring the complementary relationship between the fund providers in the context of the EU cohesion policy (Nam and Wamser 2011).

Table 1

R&D and Innovation Promotion in Spanish Regions in the Context of EU Cohesion Policy

Spanish NUTS 2 regions	Budget year 2000-2006	Budget year 2007-2013	Budget year 2014-2020
	Innovation promotion as a %-share of total public contributions**	Innovation promotion as a %-share of total public contributions**	Innovation promotion as a %-share of total public contributions**
Castile-La Mancha*	1.9	25.7	39.5
Canary Islands*	4.2	16.3	24.2
Castilla y Léon*	2.7	36.3	na
Extremadura*	4.4	23.5	34.0
Murcia*	3.4	30.8	30.6
Asturias*	2.2	35.2	25.3
Ceuta*	0.0	16.9	0.0
Melilla*	0.0	20.3	0.0
La Rioja	26.7	80.0	na
Andalusia*	3.0	27.2	15.0
Valencia*	9.3	41.0	53.0
Galicia*	14.7	24.7	na
Basque Country	32.7	72.0	44.6
Catalonia	29.5	51.6	40.9
Navarre	42.1	90.4	na
Aragon	33.9	81.0	na
Balearic Islands	26.9	56.2	16.0
Madrid	36.9	61.7	na
Cantabria*	6.6	79.8	20.0

Notes: * = Objective 1 regions defined in the framework of the EU Regional Development Programs 2000-2006; ** = EU contribution + national contribution; na = not available.

Source: European Commission; Wamser *et al.* (2013).

top-down on EU members with targets that are more macro- than micro-economic, and therefore have an overriding national dimension – the fact which clearly violates the subsidiarity principle (see also De Propris 2007).

More importantly, while cohesion policy originally aims at enabling poorly performing regions to catch up to core regions in the EU, the R&D and innovation promotion triggered by the Lisbon Agenda and Europe 2020 seems to strengthen the competitiveness of strongly-performing regions in the EU. Innovation efforts to date in the less affluent EU regions with a traditional socio-economic structure have remained in vain, mainly due to the limited vision of firms caused by their concentration on local markets, their weak capacity to absorb new ideas and technologies, limited levels of entrepreneurship, their lack of access to local research and knowledge transfer networks, etc. (Wamser *et al.* 2013).

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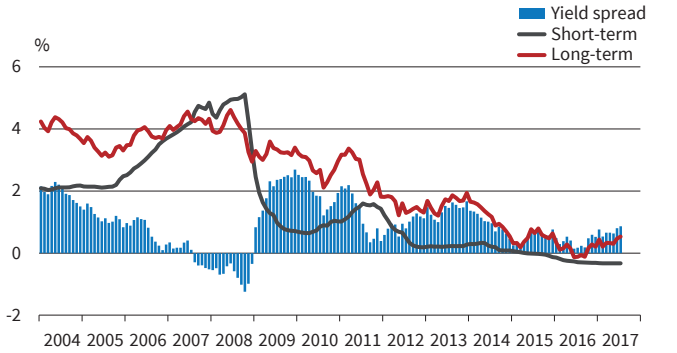
Financial Conditions in the Euro Area

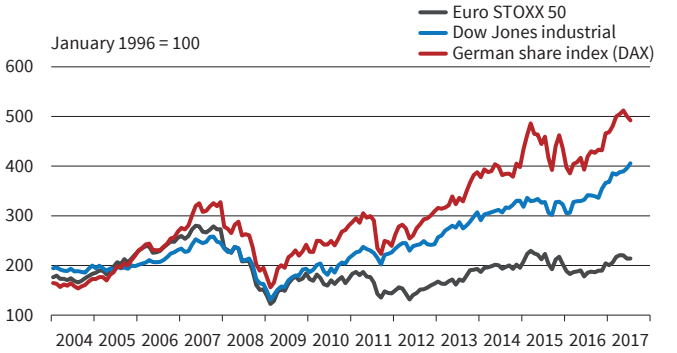
Nominal Interest Rates[a]



[a] Weighted averages (GDP weights).
Source: European Central Bank. © ifo Institute

In the three-month period from May 2017 to July 2017 short-term interest rates remained unchanged: the three-month EURIBOR rate amounted to – 0.33% in May 2017 and also in July 2017. Yet the ten-year bond yields increased from 0.30% to 0.53% in the same period. The yield spread reached 0.86% in July 2017, up from 0.63% in May 2017.

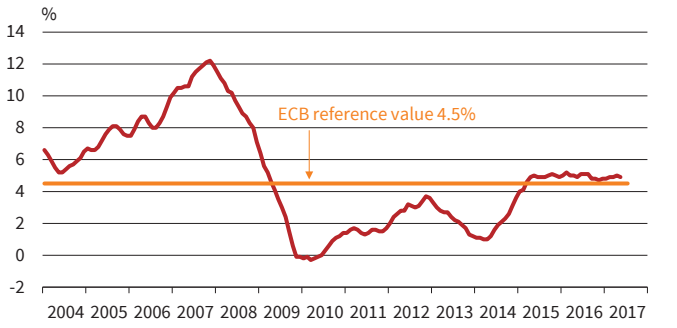
Stock Market Indices



Source: Deutsche Börse; Dow Jones; STOXX; Datastream. © ifo Institute

The German stock index DAX decreased in July 2017, averaging 12,118 points compared to 12,615 points in May 2017. The Euro STOXX also decreased from 3,555 to 3,449 in the same period of time. Yet the Dow Jones International increased, averaging 21,891 points in July 2017, compared to 21,009 points in May 2017.

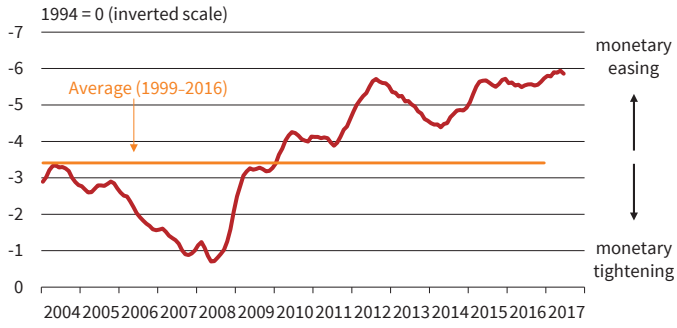
Change in M3[a]



[a] Annual percentage change (3-month moving average).
Source: European Central Bank. © ifo Institute

The annual growth rate of M3 increased to 5.0% in June 2017, from 4.9% in May 2017. The three-month average of the annual growth rate of M3 over the period from April 2017 to June 2017 reached 4.9%.

Monetary Conditions Index



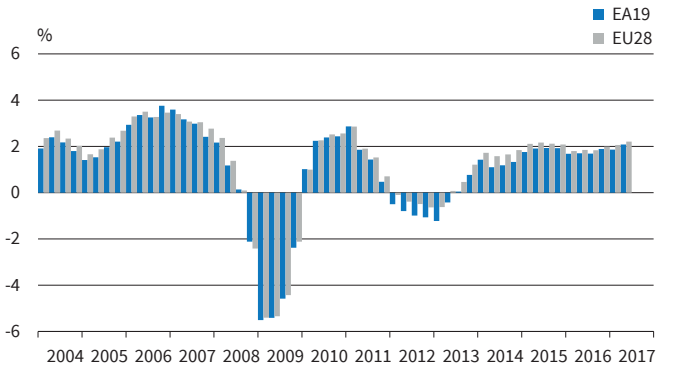
Note: MCI index is calculated as a (smoothed) weighted average of real short-term interest rates (nominal rate minus core inflation rate HCPI) and the real effective exchange rate of the euro.
Source: European Central Bank; calculations by the ifo Institute. © ifo Institute

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.

EU Survey Results

Gross Domestic Product in Constant 2010 Prices

Percentage change over previous year

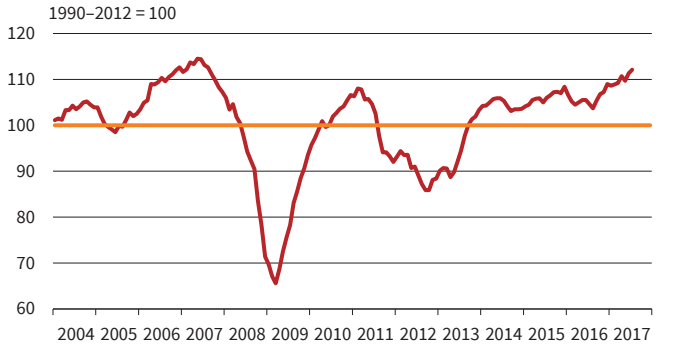


Source: Eurostat. © ifo Institute

According to the Eurostat estimates, GDP grew by 0.6% in both the euro area (EA19) and the EU28 during the second quarter of 2017, compared to the previous quarter. In the first quarter of 2017 the GDP grew by 0.5% in both zones. Compared to the second quarter of 2016, i.e. year over year, seasonally adjusted GDP rose by 2.1% in the EA19 and by 2.2% in the EU28 in the second quarter of 2017.

EU28 Economic Sentiment Indicator

Seasonally adjusted

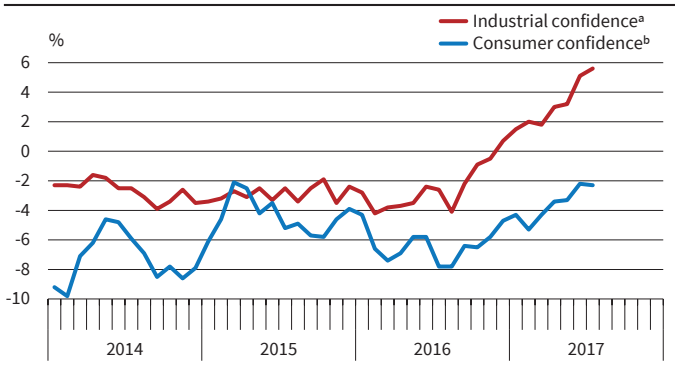


Source: European Commission. © ifo Institute

In July 2017 the Economic Sentiment Indicator (ESI) increased in both the euro area (+ 0.1. points to 111.2) and the EU28 (+ 0.8 points to 112.1). 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



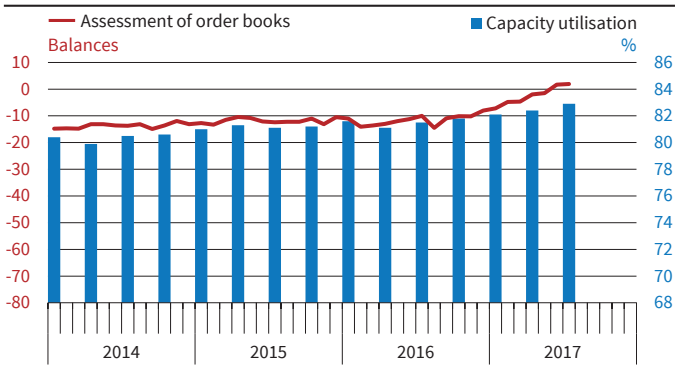
Source: European Commision. © ifo Institute

[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.

In July 2017, the *industrial confidence indicator* increased by 0.5 in the EU28 but remained constant in the euro area (EA19). The *consumer confidence indicator* decreased by – 0.1 in the EU28 and also by – 0.4 in the EA19.

EU28 Capacity Utilisation and Order Books in the Manufacturing Industry

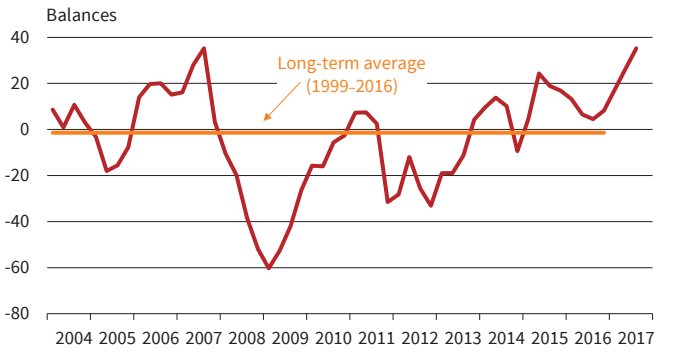


Source: European Commission. © ifo Institute

Managers' assessment of order books reached 1.9 in July 2017, compared to 1.7 in June 2017. In May 2017 the indicator had amounted to – 1.5. Capacity utilisation reached 82.9 in the third quarter of 2017, up from 82.4 in the second quarter of 2017.

Euro Area Indicators

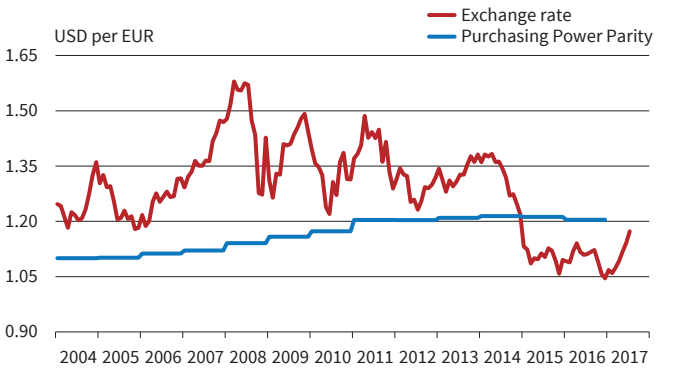
ifo Economic Climate for the Euro Area



Source: ifo World Economic Survey (WES) III/2017. © ifo Institute

The ifo Economic Climate for the euro area (EA19) improved considerably in the third quarter of 2017. The indicator rose from 26.4 to 35.2 balance points, reaching its highest level since autumn 2000. Assessments of the current economic situation were particularly more favourable than last quarter, but the six-month outlook also brightened. Strong growth is expected to continue in the second half of 2017.

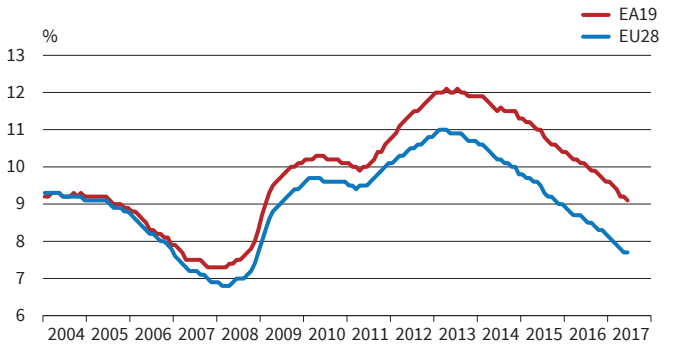
Exchange Rate of the Euro and Purchasing Power Parity



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

The exchange rate of the euro against the US dollar averaged approximately 1.14 $/€ between May 2017 and July 2017. (In April 2017 the rate had amounted to around 1.09 $/€.)

Unemployment Rate

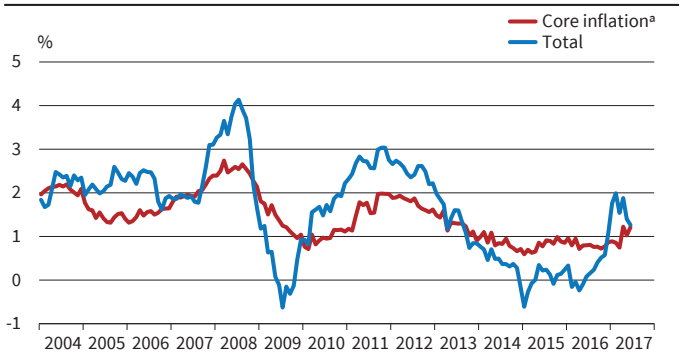


Source: Eurostat. © ifo Institute

Euro area (EA19) unemployment (seasonally adjusted) amounted to 9.1% in June 2017, down from 9.2% in May 2017. EU28 unemployment rate was 7.7% in June 2017, stable compared to May 2017. In June 2017 the lowest unemployment rate was recorded in the Czech Republic (2.9%) and Germany (3.8%), while the rate was highest in Greece (21.7%) and Spain (17.1%).

Inflation Rate (HICP)

Percentage change over previous year



[a] Total excl. energy and unprocessed food.
Source: Eurostat. © ifo Institute

Euro area annual inflation (HICP) was 1.3% in July 2017, stable compared to June 2017. Year-on-year EA19 core inflation (excluding energy and unprocessed foods) amounted to 1.2% in June 2017, up from 1.0% in May 2017.

ifo WORLD ECONOMIC SURVEY

03
2017

August
Vol. 16

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