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# Public Sector Economics

## I/2017

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# Public sector economics – introduction to the inaugural issue

KATARINA OTT, Ph.D.  
DUBRAVKO MIHALJEK, Ph.D.

Editors' introduction  
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## BACKGROUND

In 2016, the journal *Financial Theory and Practice* celebrated its 40th anniversary. Born in 1976 under the name *Financijska praksa* and published in Croatian, the journal came of age in 1995, when it was renamed *Financijska teorija i praksa*. From 2005, it was published in both Croatian and English, and since 2010, it has appeared only in English, as *Financial Theory and Practice*. At the ripe old age of forty, the journal is now ready for a new venture – hence the new profile and name, *Public Sector Economics*; a brand new digital publication platform; and a refreshed Editorial Board.

To launch this inaugural issue, the Institute of Public Finance together with Friedrich Ebert Stiftung organised a conference in Zagreb on 14-15 October 2016. The call for papers invited contributions on the future role and functioning of the public sector, including effective and equitable ways to finance public expenditure, and the potential of public investment to foster growth and development. We received some sixty submissions from around the world, and selected around half of them for the conference programme.

The topics of around two dozen papers that were presented covered a wide range of issues. These included macro fiscal policy, fiscal sustainability and the interplay of fiscal and external stabilisation; the design and impact of tax reforms, including on income distribution; the impact of demographic changes on tax revenues; decentralisation and local government budget openness; the impact of EU institutions and governance on growth and domestic policies; and social protection, education, sport, culture and infrastructure. This first issue of *Public Sector Economics* contains a selection of speeches and papers from that conference.

## A LOOK BACK

The contents of our journal have evolved in line with the Croatian political and economic context and the extent to which Croatian researchers were integrated in the worldwide academic community. In 1976, when the first issue of *Financijska praksa* appeared, the global economy was still reeling from the two major shocks of the early 1970s – the collapse of the Bretton-Woods system of fixed exchange rates, and the 1973 oil crisis – that profoundly changed the post-war international economic order.

The economy of former Yugoslavia, which naturally formed the backdrop for the new journal, was already at that time closely integrated with and dependent on the economies of Western Europe. It felt the impact of these shocks intensely: the economy was highly dependent on imports of oil, and general government deficits – a term not yet in use – were financed with an inflation tax and, to an important degree, loans from foreign commercial banks to the federal government. The year 1976, when the first issue of *Financijska praksa* appeared, was in fact a year of one-off good macroeconomic performance. Output expanded by around 6% in real terms; inflation was brought down to 9% from over 25% a year before; the external

current account was almost in balance; and public finances showed no major imbalances. However, by the end of the 1970s, the Yugoslav economy was fully immersed in high inflation and an external debt crisis. In that respect, Yugoslavia was quite similar to the highly indebted Latin American economies of the 1980s.

Against this backdrop, the journal in its early years focused on technical issues related to unsettled public finances in a highly decentralised tax and public expenditure system of the day. Our readership was spread throughout the former federal state and included members of academia and public servants in the then numerous republics, regions and municipalities.

After the collapse of Yugoslavia and the establishment of the Republic of Croatia, the journal adapted to the new circumstances of the early 1990s, in particular the transition from the socialist to a more market-oriented system. Reflecting the circumstances, papers on a wider variety of topics began to be published. Most were still largely from the field of public sector economics, notably the introduction of market-based tax and expenditure systems, but many also addressed different aspects of transition to a market economy, such as economic growth and development, restructuring of the banking system, and the role of institutions and governance in the economy and public finances. Articles were related, but not limited, to the experience of countries in Central, Eastern and Southeastern Europe (CESEE). With the growing interest of the academic community in transition issues, more and more readers came from international academia and less and less from the domestic public administration.

From the early 2000s on, many papers started to focus on the process of EU integration, which was seen as the next – some even thought the final – stage in the development of transition economies. There was much enthusiasm at the time for the single European market for goods, services, labour and capital, not to mention European monetary integration. The private sector took the lead in economic and financial integration, pouring significant amounts of foreign direct investment and cross-border bank credit to the CESEE region, and helping to bring about the much-needed modernisation of industry and financial services. Accordingly, many papers examined how far or close different countries were from membership in the EU and EMU, and what European integration meant for the public sector and development of local economies. The authorship of articles and the readership of *Financial Theory and Practice* expanded further in both geographical and institutional terms, as the interest in the European project expanded. In the past few years, articles related to the global financial crisis have given another boost to this expansion.

### AND A LOOK FORWARD

Forty years of continuous publication is no small feat for a periodical in a field of inquiry as broad as public finance. All-round economic journals are increasingly becoming an endangered species in today's academic publishing landscape, characterised by the blossoming of outlets for highly specialised research. Another

frequently overlooked feature in that landscape is the growing concentration of academic journals in a handful of global scientific publishers. This has enhanced efficiency in the reviewing and publication processes, as well as dissemination of scientific research. However, we feel that it has also resulted in some loss of variety and original thinking, manifested in shifting academic “fashions” concerning research questions, theoretical and empirical models, data, estimation techniques and robustness tests. Before the global financial crisis, for instance, it would have been very difficult to publish a paper on a sovereign debt crisis in the euro area. Likewise, since the crisis it has become very difficult to defend in published research the benefits of international financial liberalisation.

Being mindful of these trends in academic publishing, we have chosen to remain an independent outlet, and to encourage and publish high-quality research on a broad range of topics within the field of public economics, thereby helping to raise the professional profile of this field of inquiry. Rather than focusing on a narrow set of topics, we seek theoretical, empirical and policy-oriented contributions analysing the role and functioning of the public sector at macroeconomic, sectoral and microeconomic levels, in both advanced and emerging market economies. We also aim to provide a professional forum for the discussion of contemporary public policy issues and actively seek survey papers, appraisals of current policy debates, shorter notes and book reviews.

These aims are reflected in yet another change of the name of the journal, to *Public Sector Economics*. While our articles are mainly aimed at the international academic community, as in the past we would also like to attract professionals engaged with public administration and public institutions, in both advanced and emerging market economies, international organisations, and various professional associations. Under its new name, the journal is committed to diverse and rigorous scholarship and encourages a writing style understandable to a wide professional audience. The qualities looked for in submissions are, in particular, analytical rigour and creativity. We use a double-blind peer review process, drawing referees from a wide pool of experts and follow the highest ethical standards. The journal is published quarterly. The editorial and production processes, which have been moved to a digital platform, ensure a quick turnaround of submissions and publication of accepted papers.

To encourage the discussion of contemporary public policy issues and to enable gatherings of both academics and professionals, the Institute of Public Finance intends to organise annual conferences on Public Sector Economics, which should serve as an additional source of relevant articles for the journal.

Finally, we would like to welcome the new members of our Editorial Board and thank all the members of previous boards. We would also like to announce that in addition to the long-term Editor, Katarina Ott, the journal now has also a Co-editor, Dubravko Mihaljek.

## WHAT IS IN THIS ISSUE?

This inaugural issue of *Public Sector Economics* contains a selection of keynote speeches, introductory notes and papers presented at the Institute of Public Finance conference held in Zagreb in October 2016, and a recent book review.

The keynote by Debora Revoltella, Chief Economist of the European Investment Bank (EIB), reviews the causes of weak recovery in investment in Europe since the crisis, and policies needed to restart, particularly, innovation-related investment in intangibles. The EIB is involved in the financing of riskier projects unable to secure market funding, and in adopting, through a guarantee scheme, a junior position with respect to private co-financiers. This is a fine example of how European institutions can help overcome a market failure – the credit constraints facing European young innovative firms – and contribute to better allocation of resources.

Zrinka Živković Matijević, Head of the Research Department of Raiffeisenbank Austria in Croatia, reviews Croatian fiscal policy and how it was affected by the crisis. She emphasises that the sources of sustainable growth are currently missing in Croatia, and can only be created through further structural reforms in the pension, health and educational systems, the removal of administrative barriers, and the creation of an adequate and efficient public administration more appropriate to the small size of the country.

Manica Hauptman, Economic Counsellor and European Semester Officer representing the European Commission in Croatia, provides an update on economic governance in the European Union, its 2017 governance cycle, and the main tools for coordination of economic and fiscal policies of the 28 member states. She highlights a number of features of the European Commission's surveillance mechanisms, and suggests how the European Semester could address not only the economic but also the political and democratic challenges facing the EU.

Zdravko Marić, Minister of Finance of the Republic of Croatia, summarises the economic challenges and opportunities facing the Croatian economy. He outlines the way in which the Government has been addressing structural vulnerabilities by trying to improve fiscal sustainability and economic growth, and at the same time working to reduce government budget deficits and public debt. He sees a permanent reduction of the debt burden and the improvement of credit rating as the key priorities of the Government's current economic policy.

Rilind Kabashi, from the National Bank of the Republic of Macedonia, studies the near and medium-term fiscal multipliers – i.e. the effects of fiscal policy on output and other macroeconomic variables – in EU countries between 1995 and 2012. He finds that expansionary spending shocks have a positive but relatively small effect on output, which is higher in new member states and countries with low public debt and low trade openness. In old member states, by contrast, spending shocks are smaller and typically followed by rising debt levels.

Martin Beznoska and Tobias Hentze, both from the Cologne Institute for Economic Research (IW), use a microsimulation model to assess the impact of expected demographic changes in Germany on future income tax revenue. Their model suggests that the tax revenue could decrease by 7% within the next 20 years, since pensioners pay on average lower taxes than employees do, and because population ageing will probably outweigh net immigration. In their view, no more than two election periods will be available to upgrade the tax system in such a way that it can address these challenges of demographic change.

Šime Smolić, from the University of Zagreb, Faculty of Economics and Business, studies the self-assessed health of people aged 50 years and over in Croatia, based on the data from an EU-wide survey of health, ageing and retirement. He finds that females are more likely than males to assess their health as better, and that higher educational level is a statistically significant predictor of higher self-assessed health, when controlling for other variables.

Marijana Bađun, from the Institute of Public Finance, explores in her paper why roughly one quarter of Croatia's retired population receives a pension based on disability. It turns out that, in addition to health and war related factors, inadequate institutional reforms had a strong impact on the number of disability pension beneficiaries, while the granting of disability pensions was often plagued by corruption.

These articles present just the first selection of papers presented at the Conference; several more will appear in subsequent issues of the Journal.

The issue ends – quite appropriately for this journal – with a review of the book on the multi-level finance and the euro crisis edited by Ehtisham Ahmad, Massimo Bordignon and Giorgio Brosio.



# EU challenges, investment in the EU and the role of the European Investment Group

DEBORA REVOLTELLA, Ph.D.\*

Conference keynote\*\*

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\* This keynote speech largely relies on the publication of EIB (2016) and Revoltella (2016).

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## THE CHALLENGES FACING THE EU

Since the financial crisis, Europe has made tremendous progress. Countries have adjusted macroeconomic policies and implemented structural reforms, while economic policy co-ordination has been strengthened. A modest economic recovery is underway, but uncertainty is high and productivity growth and competitiveness are still weak, affecting the medium-term growth outlook.

Following the recession triggered by the sovereign debt crisis, the recovery began in most EU member states in early 2013. It started as an export-driven upswing but has been increasingly supported by domestic demand, particularly consumption. Growth of domestic demand has been sustained by falling oil prices and overall inflation, as well as by a very accommodating monetary policy and the phasing-out of fiscal retrenchment.

Against this backdrop, and when compared with past recoveries, this rally is disappointing. It also appears vulnerable given the downside risks and limited policy space. While monetary policy is close to the limits of what it can achieve, consensus on a more active fiscal policy is still lacking.

Indeed, on the political front, Europe stands at something of a crossroads, facing growing social, economic and political challenges. Efforts are now focused on pragmatically advancing on key common priorities. The urgency and ambition with which this cooperation proceeds will be critical to success.

### FROM INVESTMENT CRISIS TO SUB-OPTIMAL INVESTMENT RECOVERY?

The recovery of investment has been even slower than that of overall output. EU investment growth in the last three years has been 3.1% per year, slightly below the pre-crisis average rate of 3.4% and well below historical rates of investment growth during recoveries from financial crises.

There are also large differences in regional and sectoral investment performance. By mid-2016, investment in the less crisis-hit “old” member states (hereafter “core countries”) had reached the pre-crisis level. However, investment in the mostly “new” member states or “cohesion countries” was still 9% below, and in the most crisis-hit “vulnerable countries” still 27% below the pre-crisis level.

In terms of asset composition, expenditure on machinery and equipment and intellectual property is leading the investment recovery, with gaps versus pre-crisis real investment levels still visible in cohesion and vulnerable countries. Construction, both residential and non-residential, remains depressed overall: investment in new construction exceeds pre-crisis levels in only five member states, while in 15 it is more than 15% below pre-crisis levels.

The gradual recovery of investment is good news, but there are downside risks. Falling productivity growth, comparatively low levels of investment in intangible

capital and falling investment in infrastructure pose a threat to future growth. Financing conditions for firms have improved, but the risk of systemic market failures has not disappeared.

In particular, revised data show that infrastructure investment is falling. The introduction of the ESA 2010 national accounting categories has enabled a much more accurate estimation of infrastructure investment in Europe. We now see that infrastructure investment, previously thought to have been quite resilient, has fallen by about one quarter, from 2.3% to 1.7% of GDP, since 2009. By 2015 it was well under 2005 levels, with no sign of a turnaround.

While corporate infrastructure investment fell at the start of the crisis, public infrastructure investment accounts for most of the decline since then. As mentioned, fiscal consolidation has been the main driver. While the ratio of government investment to GDP is close to its long-term average, this is not true for government investment in infrastructure: in this case the gap remains. It is clear that fiscal consolidation has played a restraining role, particularly in vulnerable countries, and most EU governments did not plan increases in government investment in 2016 and 2017.

At the EU level, corporate investment has been the main driver of the slow investment recovery. It has reached the pre-crisis peak in core countries, but not in the vulnerable or cohesion group, with low investment in buildings and structures providing the main drag. The ratio of corporate investment to GDP in 2015 is below its 1999-2005 average, and accounts for a quarter of the decline in the total investment to GDP ratio since that period. Thus, while corporate investment is indeed driving the mild investment recovery, it remains weak by historical comparison.

Our estimations show that the average realised internal rate of return of firms has been in decline since the beginning of the financial crisis, across countries, sectors and firm sizes. Such a decline is to be expected after a crisis, but after eight years this explanation becomes less plausible, and it becomes increasingly likely that the decline is driven by falling rates of productivity growth. While easy monetary policy may have cushioned this trend, its continuation would obviously have serious implications for investment and potential growth.

Productivity-enhancing investment in intangible capital has been resilient, but lags global peers. In the EU, investment in intellectual property rights, a large part of which is accounted for by R&D expenditures, has fared better than investment in tangible capital, with levels now higher than those before the crisis (Greece, Latvia and Romania are notable exceptions). Yet global comparisons are not so flattering. The ratio of R&D expenditures to GDP in the EU remains nearly 1 percentage point below the US level, and is more and more lagging behind the rapid growth in China, Japan and South Korea. EU investment in the broader category of intangible assets has proved resilient, but is significantly lower than in

the US, with growth too slow to close the gap. Investment in intangibles is positively correlated with greater labour market flexibility and government investment in R&D.

Financial conditions for firms have improved, but there remains room for further action. The ECB and other European central banks have reacted to the crisis with an extraordinary package of monetary easing, including lowering interest rates to their effective lower bound and introducing unconventional measures such as asset purchase programmes. At the same time, the banking union aims to improve the resilience of the banking sector. These measures have gone a long way towards normalising financial conditions for investment by firms. Notably, the process of financial market fragmentation is gradually being reversed, particularly in the sense that spreads in bond yields and corporate lending rates between core and vulnerable countries have narrowed. In addition, bank lending is gradually increasing and access to external finance in general is improving, supported by an extremely accommodative monetary policy. So far, this has considerably compensated for the falling returns on investment in the post-crisis period.

However, many firms still face financing constraints, and given the possibility of a continued low interest rate environment with declining productivity growth and limited scope for further monetary easing, some areas of weakness are troubling. First, despite the positive results of the 2016 European Banking Association stress tests and the magnitude of the regulatory adjustment achieved, there has been no confidence rally, and European banks continue to suffer from very low valuations. Full recovery may require structural changes in the business model of some banks. Second, despite the monetary policy-driven compression of bond yield spreads within the euro area, cross-border capital flows, particularly to cohesion countries, remain well below their pre-crisis levels, and such capital flows have been one of the key drivers of convergence in the EU. Third, SMEs continue to face higher lending rates and are more likely to perceive their financial situation as constrained. Access to equity for SMEs remains difficult, with private equity volumes still well below pre-crisis levels and the venture capital segment still very dependent on government support.

The impact of the crisis on the financial system has had knock-on effects on firm productivity growth. Our analysis shows that the crisis has reduced the ability of the EU financial system to allocate resources efficiently to support the most productive firms, thereby contributing to slowing productivity growth overall. Firms in the EU have been particularly exposed to the effects of the crisis because of their heavy reliance on bank lending and lack of opportunities to turn to capital markets. We find that firms that use more equity, retained earnings and trade credit have tended to achieve improved investment and sales, both before and after the crisis, whereas highly leveraged firms have tended to experience the opposite. The credit-supply shock generated by the financial crisis has also meant that the allocation of bank credit between firms has been determined to a lesser extent by their

productivity and growth potential, and more by their size or the balance sheet health of their main bank. Credit supply to smaller firms fell more, and these firms had more difficulties compensating for reduced external financing with other sources of finance. Our research suggests that firms in sectors with a high growth potential have been particularly adversely affected.

Against this backdrop, public policies to address market failures and frictions and to enhance productivity growth remain critical. Avoiding investment stagnation requires continued action on at least three fronts: structural reforms focused on market flexibility to support innovation and productivity growth; financial sector reforms to further improve banking sector resilience and develop capital markets as an alternative source of finance; and public support for investment, making the best use of available EU and national financing capacities to address investment gaps in infrastructure and innovation, and to help alleviate the financial constraints faced by smaller firms.

A remaining competitiveness gap suggests room for policy action on investment. Years of underinvestment, exacerbated by the crisis, mean that many infrastructure assets are reaching the end of their economic life, creating an investment backlog. At the same time, infrastructure needs to be upgraded to meet the demands of the future, such as the need to ensure the security and sustainability of energy supply, to ensure efficient and sustainable mobility and logistics, to meet demand for digital services and to remain resilient to the effects of climate change and resource scarcity. Annual investment shortfalls include:

- EUR 100 billion to upgrade energy networks in a way that would allow the integration of renewable energy sources, and thereby improve efficiency and ensure security of supply;
- EUR 80 billion to upgrade transport networks with the aim of reducing congestion costs and trade bottlenecks;
- EUR 65 billion to reach the EU's Digital Agenda standards in broadband, data centre capacity, and cyber security;
- EUR 10 billion for state-of-the-art education facilities, in addition to EUR 90 billion in increased operational spending, so as to reach US standards, mostly in higher education;
- EUR 90 billion to rehabilitate environmental services and ensure water security in the face of climate change;
- EUR 130 billion a year in R&D to meet the EU target of 3% of GDP.

### **ROLE OF THE EUROPEAN INVESTMENT BANK**

Against this backdrop, the EIB has a unique role to play in supporting investment in Europe. In particular, the EIB plays an important catalytic role in promoting sound investment projects in support of EU policy goals in Europe and beyond. As a bank, it raises money from international capital markets, using its AAA credit rating (graph 1). As a public institution owned by the 28 member states of the EU, it lends them funds to finance investment projects that address systemic

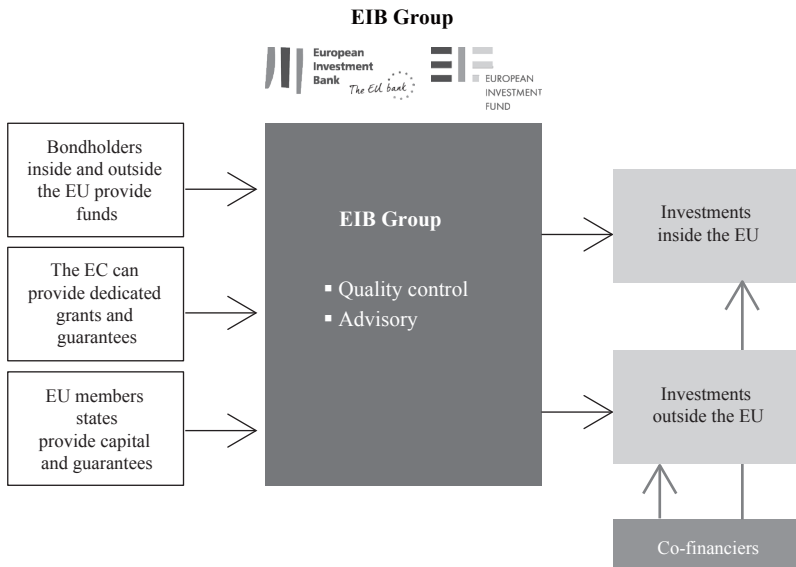
market failures or financial frictions, targeting four priority areas in support of growth and job creation: innovation and skills, SMEs, climate action and strategic infrastructure.

In 2015, the EIB provided EUR 77.5 billion in long-term finance to support private and public productive investment, of which the European Investment Fund (EIF) provided EUR 7 billion. At a first estimate, this helped realise investment projects worth roughly EUR 230 billion and EUR 27 billion, respectively. All the projects the EIB finances must not only be guaranteed to bring a profit but also to comply with strict economic, technical, environmental and social standards in order to yield tangible results in improving people's lives.

Alongside lending, the EIB's "blending" activities can help leverage available funding by, for example, helping transform EU resources under the European Structural and Investment Funds (ESIF) into financial products such as loans, guarantees, equity and other risk-bearing mechanisms. Advisory activities and technical assistance can help projects to get off the ground and maximise the value-for-money of investments.

EIB lending has a big impact: during the last capital increase period (2013-2015) EIB total lending supported EUR 372 billion of investment. Our preliminary estimates suggest that this may increase the EU's GDP by around 1.1% by 2030, adding about 1.4 million jobs.

**GRAPH 1**  
*The role of the EIB Group*



The Investment Plan for Europe (the so-called “Juncker Plan”), undertaken by the European Commission and the EIB, further enhances the EU policy response to re-launch investment and restore EU competitiveness. It consists of three main pillars: finance through the European Fund for Strategic Investments (EFSI) to enhance the EIB Group’s capacity to address market failures in risk-taking that hold back investment; the European Investment Advisory Hub (EIAH) to provide comprehensive technical assistance in the sourcing, preparation and development of investment projects; and support for regulatory and structural reform to remove bottlenecks and ensure an investment-friendly environment. As of mid-October 2016, 362 EFSI transactions were approved, potentially leveraging 44% of the full EUR 315 billion envisaged.

## CONCLUSION

Investment in the EU has started to recover, but this recovery is weak by historical comparison and uneven across countries and sectors. Declining investment in infrastructure is a major concern, with implications for Europe’s long-term competitiveness and potential growth. Slow recovery of corporate investment is equally disturbing, particularly given the extraordinary monetary stimulus provided by the ECB and other European central banks. The persistent decline in rates of return on corporate investment suggests that action is needed to raise productivity growth. Yet innovation-related investment in intangibles remains low by international standards, and binding financial constraints and other market failures have reduced the efficiency of resource allocation. Against this backdrop, the EIB is in a unique position to help overcome these market failures and help restart the investment cycle in Europe. In 2015 alone, the EIB provided close to EUR 80 billion in long-term finance to support private and public investment worth an estimated EUR 260 billion. This catalytic role of the EIB may be often underappreciated by the general public, but is well-known among official EU and member country institutions, and is likely to increase further with implementation of the Investment Plan for Europe.

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# Every year the budget story starts all over again – will this one be any different?

ZRINKA ŽIVKOVIĆ MATIJEVIĆ, MSc\*

Conference introductory note\*\*  
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The great economic and fiscal crisis at the beginning of this century has left a legacy of high public debt burden in many countries and upon many generations thus reducing the growth potential and in general social well-being of future generations. This is particularly important for countries such as Croatia which is, in addition to the old problems of the sub-optimal allocation of resources and internal structural weaknesses, facing contemporary demographic problems and the challenges of building a sustainable fiscal system.

As public debt by its definition represents the accumulation of past deficits, it is clear it is often a consequence of inappropriate past economic measures. So, in order to provide adequate solutions and to be able to face up to contemporary challenges it is necessary to obviate the causes of such a situation.

The moment we really understand how and why we find ourselves in the current situation, things may begin to change. Otherwise, mistakes tend to be repeated with the same or similar outcomes, attended by very often suboptimal results. The reason is very simple: the time in which liabilities are assumed and the consequences of an economic (political) decision, essential for sustainable growth, are often mismatched. It can take a decade before the consequences are seen. Accordingly, decision-makers are prone to quick solutions, whose time horizon almost always extends only to the next election.

The aim of this text is to provide a brief sketch of Croatian fiscal policy in the past decade in order once again to highlight the inadequacy of the measures adopted.

### **CROATIAN FISCAL POLICY**

Since 2004 fiscal adjustment (consolidation) has been, at least normatively, an important feature within Croatian economic policy. Up until the beginning of the crisis it was reflected in a constant lowering of the budget deficit, the decrease mostly, however, being due to the growth in budget revenues. Stronger inflows into the government budget, due to more efficient tax collection, resulted largely from rather strong economic growth. However, the problem was in the growth model, which was based on foreign capital inflows (borrowing). Therefore, the decrease in the deficit in the state treasury over the pre-crisis years was accompanied with a historically record high vulnerability<sup>1</sup>. Thus, in the years of economic upswing, the budget deficit was mostly a consequence of increased public expenditure (salary totals, infrastructure projects, high social transfers and fees and so on), by new borrowing the government financed current consumption and big infrastructural projects of questionable usefulness. Procyclical actions thus gnawed at the flexibility of state finances and considerably shrank the future range within which fiscal policy measures could act. Fundamentally, observing this over the course of time, during the last decade few things have changed. The cost of unpro-

<sup>1</sup> In 2008 the current account deficit of the balance of payments reached nearly 9% of GDP, whereas throughout the period strong nominal growth in gross external debt of Croatia was recorded.

ductive expenses, such as interest, swelled, thus crippling growth potentials and reflecting total lack of care for future generations. Simultaneously, fiscal transparency has remained rather restricted even to this day, when it is actually at a lower level than in the year 2008 (IBP, 2015).

Any long-term fiscal policy should include the capacity occasionally to produce a surplus in the entry phases of the business cycle. However, a deficit has been a constant in Croatian fiscal policy. Along with the fact that over the said period there were no structural changes in public expenditure, it is evident that in the pre-crisis period Croatia did not run a sustainable long-term fiscal policy. It has to be borne in mind that, due to the absence of any political or general public consensus, the key reforms (such as the reform of the pension, health and/or educational system, and of the labour market) were either delayed or only just initiated. Maintaining the *status quo* fed the appetites of various interest groups, which reflected adversely on competitiveness as well as on the resilience and stability of the overall economy (especially in the terms of a downward cycle). The system in which the government directly or indirectly participates in the economy with around 50%, and in which 70% of the state budget expenditures are social welfare expenditures and expenses for employees (with low possibilities of changes in the already acquired rights) paired with a high tax burden, can be considered as the key causes of poor competitiveness, inadequate private investment, a weak labour market, and of the ever more significant lagging of Croatia.

### THE IMPACT OF THE CRISIS

This is the system that ushered us into the crisis. In a mere three years general government deficit soared from 3% of GDP (in 2008) to over 7% of GDP (in 2011), and year-on-year public debt rose by over 55% thus burdening the government budget with a 70% higher bill for debt servicing. In the course we went from being a state with a relatively low debt (below 40% of GDP), to a state with the highest public debt among CEE countries (excluding Hungary). Furthermore, the bulk of contingent liabilities soon became overdue and needed to be settled by the central government.

At the beginning of the crisis most of the European states used government spending to mitigate the severity of the global crisis, consciously increasing their deficits and public debt at the same time. Stimulating government spending in a recession environment is a classic instrument of economic policy, used to substitute for personal consumption, which usually plummets in economic downturns, causing also a fall in inventories, production, and finally a spike in unemployment. Government spending, stimulation of consumer optimism and a generally expansive fiscal as well as monetary policy are classic instruments of countercyclical action in developed market economies, because an aggregate increase in saving in a recession environment leads to the so-called paradox of thrift, i.e. a fall in production and employment. Leaving the situation to develop along the lines of the free market, or a further fall in consumption, can also cause general deflation, which

ultimately intensifies the crisis. Therefore, in a recession the well-tested cure for economy resuscitation in the form of stimulating spending, consumer optimism and investments is applied. Therefore, a huge number of economic stimulation programs in the USA and in the euro zone are moves expected from economic policy agents.

On the other hand, the economic crisis also impacted the taxation systems of the European Union countries strongly. In general, most governments decided to effect crisis mitigation through their taxation policy by decreasing the tax burden, primarily by lowering income tax rates and increasing tax categories. However, the exceptionally hard fiscal situation and the questionable viability of public finance in several countries them (Latvia, Lithuania, Ireland, Hungary) to raise the tax pressure by increasing particular tax rates.

### **INABILITY OF FISCAL POLICY DURING CRISIS**

At the very beginning of the crisis it was doubtful whether Croatia would fit into the classic Keynesian recipe oriented towards demand. Moreover, at the time of the crisis any countercyclical actions of fiscal policy were thwarted by past burdens, or by delays in implementing reforms. Further, public expenditure expansion over the pre-crisis years had not yielded the expected multiplication impact of increasing production due to the relatively high marginal bias of the economy towards imports, and thus such a policy had not resulted in increased domestic production, imports being financed through new borrowing.

Further, the ability to implement the policy of stimulating demand was curbed also by the inadequate structure of government expenditures, as the structure is pervaded dominantly by current expenditures consisting mostly of social welfare expenditures, transfers and costs of government administration and employees. The very rigidity and restricted quality of government budget expenditures became prominent during the crisis, when a strong decrease of revenues at the beginning of the crisis concurrent with maintenance of the same consumption level forced the very fiscal policy creators to undertake procyclical measures as well (such as implementation of the crisis tax), in order to patch up the gaping holes in the budget. Another restriction to countercyclical measures within the fiscal policy framework came from the direction of the European Commission, which put Croatia into the Excessive Deficit Procedure (EDP). Moreover, Croatia was pushed under the watchful eye of the Commission within the framework of the Macroeconomic Imbalances Procedures (MIP), which aims at removing any macroeconomic imbalances detected.

### **...AND AGAIN INSUFFICIENT MEASURES**

That is, throughout the period the changes that occurred in the area of public finances were directed dominantly at the budget revenue side, and often the taxation system was modified without proper overall analyses, which further stirred up uncertainty thus negatively impacting the business climate and the economy. The

2017 year also started with a comprehensive tax reform. The aim was to create a stable, simple and sustainable taxation system and to alleviate the tax burden of entrepreneurs and households at the same time. Along with the lowered tax burden, a positive impact should also come from growth in potential GDP. However, experience has shown that fiscal adjustment should by no means be primarily oriented to revenue (tax) reform, which implies a necessarily higher focus on public expenditures. Active fiscal policy management is the more relevant when we know that the automatic fiscal policy stabilizers have a rather weak impact in Croatia. Fiscal policy should take a proactive role in lowering overall public consumption, and, which is more important, in effectuating structural changes in this area. Naturally, throughout the process it is essential to ensure performance optimization. Otherwise fiscal policy will remain a millstone around the neck of sustainable economic growth and development.

### CONCLUSION

Thus the story is right at the beginning again, on the expenditure side of the budget, which requires changes in the normative framework of protected interest groups, the implementation of reforms in the pension, health and/or educational systems, the removal of administrative barriers and the creation of an adequate and efficient public administration corresponding to a country the size of Croatia. Only then can the sources of sustainable growth, which are currently missing, be created. The key to the story lies in the fact that the level of national prosperity is not increased through fast-achieved but through sustainable economic growth. However, reaching that point requires further structural reforms. Opportunities are out there, they just need to be seized.

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# European economic governance and the 2017 European Semester cycle

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*The purpose of this note is to present economic governance in the European Union, its 2017 cycle and its main tools for the coordination of economic and fiscal policies of the 28 member states through a list of parallel procedures and processes.*

The 2008 economic and financial crisis exposed the weaknesses of EU economic governance and resulted in a debate on how to find a balance between intergovernmental and community methods, also questioning further the use of soft intergovernmental methods. The answer came in a wide range of measures resulting in an integrated system of coordination and surveillance of EU economic policies, in the form of an annual cycle called the “European Semester”. It is based on two legislative packages strengthening fiscal rules and introducing new rules on macroeconomic imbalances, known also as “six-pack”, and “two-pack”, the latter for the Euro area countries. Additionally, the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union commonly referred to as the “Fiscal Compact Treaty” was signed and ratified by most of the EU member states.

### **EUROPEAN SEMESTER**

From the start the main objective of the European Semester has been to ensure sound public finances, prevent excessive economic imbalances, boost investments and support structural reforms for jobs and growth. It can be seen from the results that our policies are beginning to pay off and that the economic recovery is happening in all member states. According to the European Commission (2016a), investments have started to pick up, and so has the employment rate, with 8 million new jobs created since 2013. The average EU unemployment rate stood at 8.6% in September 2016, reaching its lowest level since 2009. At the same time, the employment rate in the 20-64 age group is for the first time above that observed in 2008, at 71.1% in the 2<sup>nd</sup> quarter of 2016. Such an upward employment trend means that the 75% employment rate target set for the EU as a whole by 2020 may be within reach. With respect to public finances, the average EU government deficit has been declining, with several countries exiting the Excessive Deficit Procedure in recent years. The levels of government debt have also stabilized across the EU (ibid, 3).

The currently ongoing 2017 European Semester cycle was launched towards the end of last year with the release of the “autumn package”, which includes the EU Annual Growth Survey (AGS) 2017 as a policy document outlining the economic and social priorities for the EU. As the European Semester remains the main instrument for the integrated annual coordination of national fiscal and macroeconomic policies in the EU, the AGS represents only one of its tools. In general, we are speaking about the surveillance tools available for EU economic policy coordination, which can be roughly split into three categories: surveillance of macroeconomic imbalances, surveillance of public finances and surveillance of Europe 2020 targets.



## SURVEILLANCE OF MACROECONOMIC IMBALANCES

The first one is the annual cycle of the Macroeconomic Imbalance Procedure (MIP), which starts each year with the release of the Alert Mechanism Report (AMR), published alongside the AGS by the European Commission for all EU member states. The AMR uses a scoreboard of selected indicators to screen EU countries for potential economic imbalances requiring policy action. The assessment also draws on other relevant economic, social and financial indicators not included in the main scoreboard. On this basis the AMR identifies countries that require further in-depth reviews, screening for vulnerabilities and macroeconomic risks. At the end of the review, the European Commission determines the presence or absence of imbalances as well as their extent.

The results of such in-depth reviews for identified countries form part of the European Semester “winter package”, published each February, together with a detailed country report for each of the member states. In the 2017 cycle, 13 countries (Bulgaria, Croatia, Cyprus, Finland, France, Germany, Ireland, Italy, the Netherlands, Portugal, Slovenia, Spain and Sweden) were identified in the AMR as in need of an in-depth review, and are currently being assessed with respect to unwinding, persisting or aggravating (excessive) imbalances. In the second half of February 2017, the outcome of this assessment will be released together with the country reports (European Commission, 2016b).

Every country where imbalances or excessive imbalances were identified within the previous European Semester cycle is monitored throughout the year. This has also been the case for Croatia, where a detailed monitoring report on macroeconomic imbalances was presented to the working groups of the Council of the European Union in December last year, indicating the unwinding of internal and external imbalances, but also stressing that vulnerabilities still persist (European Commission, 2016c). The report emphasised that a number of structural reforms are yet to be implemented, such as the modernisation of public administration, pension and social protection systems reform, and the reform of regulated professions and services markets.

Structural reforms remain at the core of the European Semester process. They relate to all areas of public policy, including the more particular ones such as sustainable finance, the aim of which is to generate more innovative resource- and environment-friendly investments. We have just formed a high level expert group on the subject, which goes hand in hand with our work on the Capital Markets Union, creating a single market for capital in the EU (European Commission, 2016d).

Structural reforms in the more traditional policy areas such as more efficient public administration, fiscal stability, business climate, social protection, labor markets, education system and skills remain at center stage of the European Semester and are being closely monitored in all member states and at the level of the EU as a whole.

The second category of tools within the European Semester is surveillance of public finances, implemented in line with the rules of the Stability and Growth Pact (SGP), through either its preventive or corrective arm, the latter being much better known due to the Excessive Deficit Procedure (EDP). The Council of the EU opened the procedure for Croatia at the end of January 2014 and recommended correction of the excessive deficit by 2016. The recommendation includes headline deficit targets as well as matching annual improvements in the structural balance with expected consolidation measures. Next to deficit targets and in line with the Treaties and applicable legislation, the ratio of the government debt to GDP should be approaching the reference value at a satisfactory pace. The debt is considered to be sufficiently diminishing if the differential with respect to the reference value has decreased over the previous three years at an average rate of one twentieth per year as a benchmark, based on changes over the last three years for which data are available. The requirement under the debt criterion will be considered fulfilled if the European Commission's forecast indicates the required reduction in the differential over the three-year period encompassing the two years following the final year for which the data is available (EU Regulation 1177/2011). Croatia is expected to report on effective action taken to comply with the EDP in line with the commitments of the SGP in its 2017 convergence program expected to be released in April. Apart from Croatia, five other countries (France, Greece, Portugal, UK and Spain) have ongoing EDP procedures.

The objective of the preventive arm of the SGP is to ensure fiscal health. All countries are expected to reach their medium-term budgetary objective (MTO) (EU Regulation 1175/2011) or to be heading towards it by adjusting their structural budgetary positions at a rate of 0.5% of GDP per year as a benchmark. The countries should do more in favorable economic conditions, leaving room for flexibility when times get tough. Budgetary balance is defined in structural terms, taking into account the business cycle, disregarding the effects of one-off and other temporary measures as well as interest payments. MTO is complemented by the expenditure benchmark, which ensures sustainable growth in the net expenditure of a country.

The 2017 European Semester cycle introduced a novelty in the field of public finances in the European Commission Communication towards a positive fiscal stance of the euro area (European Commission, 2016e). In the absence of a fiscal stabilisation function, there is no built-in mechanism at the EU level to deliver a fiscal stance, which is appropriate for the euro area as a whole while being well balanced at the level of member states. The design of a positive fiscal stance is thus essentially a matter for the collective responsibility of the euro area member states. Our Communication calls for a moderately expansionary fiscal stance for the euro area, against the background of a resilient but modest economic recovery at this point in time. A fiscal expansion of up to 0.5% of GDP at the level of the euro area as a whole is considered desirable for 2017, which is more expan-

sionary than the intentions of the euro area member states, as noted in the submitted draft budgets (ibid:6).

### **SURVEILLANCE OF EUROPE 2020 TARGETS**

The third category of the European Semester surveillance tools relate to Europe 2020, the EU strategy for smart, sustainable and inclusive growth (European Commission, 2010). It consists of a set of targets to be achieved by the EU as a whole and also by each member state with the objective of improving EU competitiveness while maintaining its model of social market economy and significantly improving its resource efficiency. Each member state sets its own national targets to be fulfilled by 2020 and the performance is easily measurable at the national as well as at the European level. The targets remain only politically binding, but they are an integral part of the stock-taking exercise of the European Semester every year. The targets act as policy anchors in the areas of employment, R&D spending, reduction of greenhouse gas emissions, social inclusion and education.

### **WHERE DO WE STAND TODAY?**

Chronologically, the winter package of the 2017 European Semester cycle will be followed by the member states' publication of the National Reform Programs, outlining structural reforms in April 2017. At the same time, countries will also release their Stability (euro area) or Convergence (non-euro area) Programs, setting out their medium-term fiscal policies. Taking into account the evaluation of both documents, the European Commission will publish its final documents of the 2017 cycle in its "spring package" in May. Its main document will be the Country Specific Recommendations (CSRs), which will include a review of the public finances in light of the submitted Stability/Convergence Programmes, taking into account the consolidated Eurostat data for the previous year. The CSRs will then be discussed (and endorsed) by the European Council in June and adopted by the Council (ECOFIN) in July 2017, when the 2017 European Semester will come to an end and the national implementation of reforms and budgetary drafting in member states will continue.

Policy design and its implementation in the framework of the European Semester is financially supported through several instruments, from EU Funds to other financial instruments such as the European Fund for Strategic Investment (EFSI) as well as the new Structural Reform Support Service (SRSS), which has been established within the European Commission to provide and financially support technical assistance for the implementation of the European Semester reforms.

The institutional and policy environment at the EU and the national level for the European Semester and its set of tools keeps changing. Most recently, the European Fiscal Board (Commission Decision 2015/1937) was established as an independent advisory board to the European Commission on fiscal matters. The Board will, among other things, evaluate the implementation of EU fiscal rules, advise on the fiscal stance appropriate for the euro area and cooperate with member

states' national fiscal councils. The Council of the EU has endorsed the establishment of new National Productivity Boards – another tool to strengthen EU competitiveness. Banking union will hopefully soon reach its completion and the work on the Capital Markets Union has started. All of this and more will also be part of the European Commission's White Paper on the future of the EU, including on the Economic and Monetary Union, to be published in March 2017, coinciding with the 60<sup>th</sup> anniversary of the Treaty of Rome.

For the past few years, we have been pursuing the “virtuous triangle” of structural reforms, responsible public finances and investments to deliver prosperity and social justice, and the EU has finally returned to moderate growth. Alongside positive signs of recovery, there is a pressing need to strengthen fairness and the social dimension of the single market in order to ensure that the weaker parts of societies also benefit from economic growth and to create a more inclusive society. Ensuring a promising economic future for all and safeguarding our way of life are priorities not only for the European Commission, but for all the EU member states as included in the “Bratislava roadmap” endorsed by 27 heads of state or governments in September 2016. To ensure more concrete steps in this direction, the European Commission has just concluded the consultation on the proposal for the European Pillar of Social Rights, which is all about guaranteeing a European social model that is fair and sustainable. By modernising the current EU legislation we want to support upward convergence through better education, skills and fair working conditions.

### CONCLUSION

Over time the EU has strengthened economic governance by improving economic policy coordination and focusing European Semester instruments such as CSRs on their priority and scope. Although the European Commission remains responsible for many of the European Semester tools and documents, it is the EU member states that remain at the steering wheel when designing and implementing reforms and national budgets. What we wish to provide is guidance and assistance to countries that are not performing to a sufficient level. On the other hand, we also seek to recognise the best performing countries in certain policy areas through presentation of best practices.

There are many challenges facing the European Union today. The European Semester addresses not only the economic ones, but with its mechanisms and tools of surveillance and coordination often also touches upon political and democratic challenges. In this context, it is especially important to keep in mind that national specificities have to be taken into account in all areas of policy design and reforms; however, we firmly believe that only an integrated EU strategy for growth and jobs can result in a prosperous, fair and inclusive European Union for all.

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# Public finance in the Republic of Croatia: current state and outlook

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At the moment Croatia is facing a number of economic challenges as well as numerous opportunities. The challenges are for the most part related to the consequences of the economic crisis that began six years ago and the need to reduce budgetary and macroeconomic imbalances. The importance of this line of action in economic policy is further reflected in European Commission findings which point to the vulnerabilities of the Croatian economy and the consequential assessment of the possibility to introduce corrective measures that could ultimately result in the freezing of EU funds. Moreover, fiscal vulnerabilities have resulted in excessive deficit procedure being launched in January 2014, whereby Croatia was obliged, in accordance with Council recommendations, to reduce the deficit to 2.7% of GDP by the end of 2016 and ensure sustainable trajectory of public debt.

On the other hand, a number of indicators point to favourable economic trends, notably high-frequency macroeconomic indicators including industrial production, the number of tourists' overnight stays, real turnover in retail trade and construction works show an upward trend, while exports and employment rates are increasing. The forecasted GDP growth rate for 2016 will thus significantly exceed initial expectations. Over the medium term the positive trends are expected to continue, with a gradual increase in economic activity. In 2017 and 2018 GDP is projected to increase by 3.2%, this increase rising to 3.3% in 2019. It should be noted that projected general government deficit in 2016 will be significantly lower than initially forecasted. Moreover, the debt-to-GDP ratio is declining for the first time since 2007 and is projected to reach 83.9% at the end of 2016, which is almost 3 pp below the ratio registered at the end of 2015.

### **ADDRESSING STRUCTURAL VULNERABILITIES**

The Government thus has the responsibility to strongly address the structural vulnerabilities and give additional impetus to favourable economic trends, thus steering the Croatian economy towards sustained and stable growth that will lead to a higher standard of living for Croatian citizens. In order to achieve these goals, comprehensive and decisive reform measures are called for, both on the revenue and expenditure sides of the budget.

In that regard, a comprehensive tax reform, which came into effect at the beginning of 2017, will play a key role. The reform package encompasses 15 acts, seven of which are new, aiming at a simpler, more stable and fairer tax system while reducing the total tax burden and making it more competitive. Shifting the tax burden away from entrepreneurs and citizens and having a simpler and more stable tax framework will facilitate economic growth as well as employment rate growth, improve the competitiveness of the economy, social fairness and demographic renewal, prevent highly educated individuals from leaving the country, and foster entrepreneurship, trades, and agriculture. Available fiscal options were taken into consideration in the course of the reform drafting process, as were the sustainability of public finance and the sustainability of financing local and regional self-government units.



The total reduction of the tax burden during its first year of application is projected to amount to 0.7% of GDP and will be based primarily on a reduction of the direct taxation of income and profits, resulting in an increase in personal spending and investment. It should be noted that, according to recent OECD and ECB studies, a 1 percentage point reduction of the tax-to-GDP ratio translates into a long-term growth rate increase of between 0.25% and 1%, and the reduction of direct taxation has a more significant positive impact on long-term growth than the reduction of indirect taxation. We expect those measures to result in a 0.3-0.5 pp difference in the mid-term rate of potential GDP growth.

However, the tax reform is but one segment of the comprehensive consolidation of public finance by way of structural reforms which must first of all aim at efficient public funds management when it comes to health care and the pension and social system. Moreover, the justice and administrative system reforms are of special importance since legal certainty, together with a stable tax system, is essential to achieving overall economic stability, which is in turn one of the key requirements for economic growth.

### **FISCAL SUSTAINABILITY AND ENHANCING ECONOMIC GROWTH**

Key efforts in the upcoming period will be focused on the continuation of fiscal sustainability while stimulating economic growth. Special attention should be paid to areas showing significant growth potential, especially agriculture, where emphasis should be put on alimentary independence and security and the modernization of rural facilities. Another important sector is tourism, where additional investments need to be made into accommodation capacities as well as into domestic tourist spending by introducing the Cro Card tourist voucher. Steps are also being taken to reduce administrative and regulatory burden, aiming at enhancing the effects of the tax reform in order to boost entrepreneurial activities. Making a better use of EU funds will give an additional boost to and increase the funds available for development and infrastructure projects, as well as for research and innovation. EU funds are, moreover, a key instrument for the strengthening of development capacities in different parts of Croatia.

Apart from the economy, another key challenge, as well as a key potential of a country, are its people. Negative demographic trends along with increased emigration and global migration in general are a clear warning that swift action is called for while having in mind development over the medium term and over the long term. Focus should be put on of demographic sustainability. For this reason child allowances and allowances for dependents have already gone up this year and there are plans to introduce a subsidy scheme on loans for first-time home buyers under 45. Allowances for additional maternity leave are to be increased as well. It should also be noted that social justice and inclusion will be taken into account in the process of shaping and managing economic policies so as to ensure protection and solidarity to vulnerable groups.

Apart from the above mentioned development efforts, focus must be placed on fiscal sustainability since long-term public finance stability is the foundation of overall economic stability and a precondition for sustainable growth. In that sense, expenditure growth, shaped by development requirements and social responsiveness, will be strongly focused on the continuation of fiscal consolidation, among other things increasing budgetary planning efficiency and the fiscal responsibility of budgetary beneficiaries.

### DECREASING DEFICITS AND DEBTS

The above fiscal efforts, on both the revenue and the expenditure side of the budget, will result in general government deficit amounting to 1.6 % of GDP in 2017, 1% in 2018 and 0.6% of GDP in 2019 according to ESA 2010, thus meeting the criteria for the abrogation of the excessive deficit procedure in the upcoming period and helping reduce the debt-to-GDP ratio.

Indeed, high public debt, reaching 289.6 billion HRK or 86.7% of GDP at the end of 2015, places a great burden on overall economic policy while the related risks increase public finance vulnerability. Cyclical disturbances and structural rigidities demonstrated the scale and expansion rate of government debt in the period between 2008 and 2015, which increased by 152 billion HRK or from 39.6% of GDP to the aforementioned 86.7% of GDP in that period.

Economic recovery after several years of economic downturn spurred fiscal consolidation efforts and effects, resulting in curbing the years-long excessive annual debt-to-GDP rate growth. The existing macroeconomic projections suggest a reduction of refinancing risk over the short term and a reversal of this negative trend. However, due to the high level of government debt, a comprehensive and proactive approach will have to be adopted in order to strengthen long-term debt sustainability and mitigate the effect of debt-related risks. To that end, the Government has developed the 2017-2019 Government Debt Management Strategy which defines the manner of meeting budget financing needs and designs the debt structure by selecting markets, instruments, and debt issuance date.

The basic goal of borrowing and debt management is to ensure that the government's financing needs and its payment obligations are met at the lowest possible cost over the medium and long term, while at the same time taking prudent approach to risk constraints. Therefore, the Government's main strategic goal and a national priority is to reduce the debt-to-GDP ratio by more than 10 percentage points by the end of 2020, which requires coordinated and consistent economic policy measures based on three key pillars: fostering economic growth, continuing fiscal consolidation and the privatization of state-owned assets. These efforts will result in a further reduction of the debt-to-GDP ratio from 81.5% in 2017 to 78.6% in 2018 and 75.3% in 2019. In the medium term, short-term debt ratio should fall from the current 13.2% to 11.9% in 2019. Moreover, debt maturity is expected to be slightly extended. Even though approximately three quarters of the

debt are denominated in foreign currencies – mostly in EUR – either directly or by way of currency clauses, the related currency risk is partially mitigated by favourable conditions on the domestic capital market. A further mild increase of the debt component denominated in HRK is projected. As to currency risk, approximately 87% of the debt carries a fixed interest rate while the remaining 13% carries a variable interest rate; in the refinancing of the debt over the short term the price of new borrowing and the refinancing of existing debt at a lower nominal interest rate will be of primary concern. Over the medium term this risk will be reduced by means of consistently sustainable fiscal policy and, consequentially, improving the credit rating and thus reducing the current higher risk premium.

The aforementioned measures will result in improving government debt sustainability and reducing debt-related risk. Such measures, along with the abrogation of the excessive deficit procedure within the shortest time frame possible, will enable the continuation of sustainable, reasonable and balanced fiscal policy, thus ensuring the realisation of the key priorities of the Government's economic policy: the permanent reduction of the debt burden and the improvement of the credit rating.





# In Memoriam: Professor Emeritus Božidar Jelčić

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When I was an assistant professor, I had just finished examining my students and was leaving the office. On the other end of our small hallway I noticed that one of my students, whom I had failed before, was leaving Professor Jelčić's office. I asked: "How did it go?" "I passed," he said. I said: "You see, it wasn't that bad." And he replied "True, but when you gave the exam, it was stressful; with professor Jelčić, it was like having a conversation."

Professor emeritus Božidar Jelčić (1930-2017) has passed away at the age of 87. His entire career right up to his retirement – almost forty five years – were spent at the Faculty of Law of the Zagreb University, at the Department of Financial Law and Financial Science, and he devoted most of his work to the Faculty. At forty, he was the youngest full professor at the Zagreb University. For almost two decades he served as the chair of the Department of Financial Law and Financial Science; he was the dean of the Faculty of Law and served two terms as the vice-rector of the University of Zagreb, where he was a fervent promoter of publishing and was dedicated to allocating grants for University publications and resolving University staff's housing issues.

He was not only dedicated to the Faculty – he was the founder and first director of the University Institute of Public Finance, which later became the Institute of Public Finance and still exists as an internationally renowned institution pursuing a number of diverse projects. He took part in the establishing of this journal and was member of the Editing Board for many years, publishing papers of his own and reviewing papers by other authors.

Professor Jelčić first graduated from the Divulje Navy Military Academy. Following graduation, he fell seriously ill for two years and then graduated in less than four years and at the top of his class from the Faculty of Law in Zagreb, where he started working and where he remained until retirement.

Professor Jelčić's scientific research was intensive and productive. He received a Humboldt fellowship and earned his doctorate under the tutelage of Professor Fritz Neumark, one of the most prominent experts in public finance, having written his thesis on turnover tax. He continued to work in this field and remained a leading expert, and his papers continue to be a fundamental source for all who research any type of turnover tax. He spent several long periods abroad and would always come back full of new impressions, not only professional but those gathered in his free time as well, and his stories were always interesting and funny.

His scientific interest was also devoted to the complex topic of education financing, which was the subject matter of several papers and the books "Education Financing" and "Organization and Financing of Education in the USA". He was the author of the first comprehensive textbook "Finance as a Science and Financial Law", in which he incorporated the scientific aspect of public finance and public finance law. Later he periodically updated and expanded the textbook and published it under the title "Financial Law and Finance as a Science".

Professor Jelčić's opus is more than impressive: he wrote 25 books and more than 260 papers and was the author of various scientific and professional studies. This was the result of his exceptional self-discipline and work habits acquired during his years at the Navy Military Academy.

Let us mention only some of the many acknowledgments he received: honorary doctorate from the Taras Shevchenko National University in Kiev; national award "Ivan Filipović" for scientific contribution to the study of the economic aspects of education; national award for scientific work "Božidar Adžija"; he was elected associate member of the Croatian Academy of Sciences and Arts, received the Croatian Academy of Sciences and Arts award for his book "Financial Law and Finance as a Science", and was named Professor Emeritus by the University of Zagreb.

Professor Jelčić always showed the greatest consideration for teaching and for relations with his colleagues and students. Some of the most memorable lessons and pieces of advice I received from him were about how it was necessary to remain absolutely professional when it came to all manners of teaching and all kinds of relations with students and colleagues. He was a favourite teacher among his students, as both the above anecdote and excellent student reviews show. He was patient and considerate towards all students, never having shown a slightest sign of excessive strictness or arrogance. He can serve as role model to many younger colleagues; without any doubt, he was one to me.

Professor Jelčić's role as one of the founders of the postgraduate course "Fiscal System and Fiscal Policy", which is one of the doctoral and specialist postgraduate courses available at the Faculty of Law, established in 1998 and still in existence, is most noteworthy. He was also one of the founders and first members of the Croatian Academy of Legal Sciences, where his enthusiasm was an inspiration for all.

Professor Jelčić was always profoundly interested in the practical side of the functioning of the tax system. This interest inevitably led him to researching the relationship between the tax administration and the taxpayer. As a result of that research, he co-founded the Croatian Taxpayer's Association in 1992 and, for years to come, served as its president. The Association actively promoted taxpayers' interests, reacting to Government's tax reform proposals and initiating proposals to facilitate better understanding of the sides in that, sometimes troublesome, relationship.

Professor Jelčić had a profound impact on me. He was my master's thesis mentor and my doctoral thesis mentor as well. He was an unobtrusive mentor (of a kind which is perhaps rarer than one would think) – he was always there and ready to help when I didn't know how to go on or if I had a question regarding the writing of the thesis, discreetly encouraging me when I wouldn't come to him for advice for a while. He would never insist and require that I present results immediately. Owing to his balanced approach, the writing of these comprehensive works was as stress-free as possible, with just the right amount of positive stress that prevented me from becoming too relaxed and unproductive.

Professor Jelčić was good company and easy to get along with. He would always find a conversation topic, he showed genuine interest in the other person's situation and found it easy to switch from professional to private topics; beyond doubt, all Department members and Faculty staff who were in contact with him shared the same sense of ease and non-existence of any inappropriate tensions. One of the Professor's traits was his highly developed, but refined sense of humour, far from ever being personally offensive or aggressive. Some of his remarks, especially those regarding taxes, tax reforms and persons involved in taxation make me laugh to this very day. This is something I will miss immensely.

But I will miss talking about professional topics as well. Department members would turn to such topics whenever they would spend more than a few minutes together and Professor Jelčić was the one who would somehow naturally take the role of moderator, since public finance and all its aspects – legal, economic, sociological and psychological – was his true professional passion. Anyone with a slightest knowledge of public finance could count on having an interesting and up-to-date discussion with the Professor and learning a thing or two.

Regarding his private life, family was a high priority for Professor Jelčić, a place where he found the strength and encouragement for his dedicated day-to-day scientific research and teaching.

For him, retirement was but a fact pertaining to labour law or, to put it in legal Latin terms, *res inter alios acta*. Professor Jelčić was an energetic researcher and teacher and the fact that he continued his work at the Libertas University was not surprising. This was an excellent chance to continue to do what he did best. He also served as the rector of the Libertas University and always enthusiastically talked about his work there. Given the fact that the University was extremely happy to have him, it was truly a win-win situation. But this was typical of Professor Jelčić; for him, any unnecessary energy-wasting or time-consuming conflicts were simply unacceptable.

Only in the last several conversations that we had would I hear a faintest trace of resignation in his voice, but this would never last: in the very next sentence we would return to talking about tax rates, taxpayers, justified or unjustified tax exemptions, and the ubiquitous topic of tax fairness. This is how I will remember the Professor – immersed in both professional and mundane topics and discussions, with a hint of contempt for the ephemerality of human life.

A lot more could be said about Professor Jelčić and about what he wrote and said, whether as a public figure, a university professor, or a private person. When I first came to the Department, I met the Professor; through my work and, I am proud to say, cooperation with Professor Jelčić, almost imperceptibly, I got to know the man. To bid farewell to him as a man is much, much harder.

Professor Jelčić, may you rest in peace. You will always be remembered.



# Macroeconomic effects of fiscal policy in the European Union, with particular reference to transition countries

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Article\*\*

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## Abstract

*This study empirically investigates the short- to medium-term effects of fiscal policy on output and other macroeconomic variables in European Union countries between 1995 and 2012, with particular reference to transition countries. It applies Panel Vector Auto Regression with recursive identification of government spending shocks as the most appropriate method for the aim of the study and the sample used. The main results indicate that expansionary spending shocks have a positive, but a relatively low effect on output, with the fiscal multiplier around one in the year of the shock and the following year, and lower thereafter. There are indications that this result is driven by the recent crisis, as multipliers are considerably lower in the pre-crisis period. Effects of fiscal policy are strongly dependent on country structural characteristics. Fiscal multipliers are higher in new European Union member states, in countries with low public debt and low trade openness. Further, spending shocks are followed by rising debt levels in old member states, which could be related well to the recent European debt crisis. Finally, the analysis of the transmission mechanism of fiscal policy yields results that are consistent with both extended Real Business Cycle models and extended New Keynesian models.*

*Keywords: fiscal policy, panel VAR, European Union, transition countries*

## 1 INTRODUCTION

The aim of this paper is to analyse the effects of fiscal policy in European Union (EU) countries, with a particular focus on transition countries. The empirical investigation therefore focuses on four key questions of academic and policy importance: (i) what is the short- to medium-run effect of fiscal policy on output, i.e. what is the size and sign of fiscal multipliers? (ii) what are the short- to medium-run effects of fiscal policy on other key macroeconomic variables? (iii) how do main country structural characteristics affect the size and sign of fiscal multipliers? (iv) what is the transmission mechanism of fiscal policy, i.e. is it more closely related to neo-classical or to New Keynesian predictions?

In order to investigate these issues, this paper uses Panel Vector Auto Regression with recursive identification of government spending shocks, with annual data between 1995 and 2012. The main result of the study is that higher spending does result in higher GDP in the entire sample, but the size of the fiscal multiplier is around one, implying that the effects of fiscal policy are relatively limited. There are indications that this result is driven by the recent crisis, as multipliers are considerably lower in the pre-crisis period. The analysis of sub-samples according to country characteristics also yields some important insights. In particular, fiscal multipliers are higher in new European Union member states, in countries with low public debt and low trade openness. Further, spending shocks are followed by rising debt levels in old member states, which could well be related to the recent European debt crisis. Last but not least, the analysis of the transmission mechanism of fiscal policy suggests that spending shocks cause rises in both private

investment and consumption, with the latter being supported by higher real wages and higher employment. This is in line with findings in most other empirical studies, and also consistent with predictions from extensions of both Real Business Cycle and New Keynesian models.

This paper builds upon and extends the extensive body of literature on the effects of fiscal policy in several important aspects. First, unlike the vast majority of studies, which focus on a single country (mostly the US) or a few developed countries, our study focuses on 27 EU member states as of 2012. Related to this, the study includes most European transition countries, which is an important extension bearing on mind the relative scarcity of empirical studies on the effects of fiscal policy in transition countries. In order to study fiscal policy in a group of countries, we use panel VAR, which combines the advantages of panel and VAR methods. Second, the study provides an extensive investigation of the possible influence of country structural characteristics on the effects of fiscal policy. Third, the study provides additional details on the transmission mechanism of fiscal policy. Finally, based on the results of the extensive investigation, the study provides recommendations that should be useful to policymakers when designing and implementing fiscal policy.

This study proceeds as follows. The relevant theoretical and empirical literature is briefly reviewed in the next section. Section 3 presents the methodology of investigation, data and model specification. Section 4 analyses the effects of fiscal policy in the overall sample and in several sub-samples. Section 5 modifies the baseline specification in order to investigate the transmission mechanism in more detail. The final section concludes and offers some policy recommendations.

## 2 LITERATURE REVIEW

The recent crisis and the zero bound for nominal interest rates highlighted the importance of fiscal policy in fighting the recession. This reignited the interest of the theoretical and empirical literature in the effects of fiscal policy on output (fiscal multipliers) and in other macroeconomic variables. Indeed, as Romer (2011) notes, between 2009 and 2011 there have been more studies on the effects of fiscal policy than in the previous quarter century. However, there is little consensus in the modern theoretical and empirical literature regarding the size of the fiscal multiplier and the transmission mechanism of fiscal policy shocks<sup>1</sup>. Theoretical studies relying on Real Business Cycle (RBC) models, such as Aiyagari, Christiano and Eichenbaum (1992) or Baxter and King (1993), tend to find that fiscal policy has modest effects on output, and that expansionary fiscal policy increases labour supply and lowers private consumption due to the dominance of wealth effects. Baseline New Keynesian models (e.g. Linnemann and Schabert, 2003) also tend to find that wealth effects dominate and that the multiplier is between

<sup>1</sup> A comprehensive review of the extensive theoretical and empirical literature is out of the scope of the current study. Therefore, we only briefly review the main contributions and then proceed with our empirical investigation. For reviews of the theoretical literature see Hebous (2011) and Hemming, Kell and Mahfouz (2002). For meta-regressions of the empirical literature see Rusnak (2011) and Gechert and Will (2012).

zero and one, while expansionary spending shocks result in lower private consumption and higher labour supply.

Various studies have provided extensions of baseline RBC and New Keynesian theoretical models. In most cases, these extensions are aimed at addressing the puzzling finding of lower private consumption in the wake of spending shocks in theoretical models, as opposed to the higher private consumption, which is found in most empirical studies. RBC models are extended by Linnemann (2006) with non-separability in the utility of consumption and leisure and intertemporal consumption elasticity smaller than one, and also by Ravn, Schmitt-Grohe and Uribe (2006) with monopolistic competition and “deep habits” in the personal consumption of individual goods. Further, Galí, López-Salido and Vallés (2007) extend a standard New Keynesian model to allow the existence of Ricardian and non-Ricardian households, with the latter behaving according to a rule of thumb and consuming all their disposable income each period, without borrowing or saving.

Leeper (2010) notes that the one clear message from the vast empirical and theoretical literature is that fiscal multipliers are “all over the map”. Coenen et al. (2012) note that despite numerous advantages of structural economic models, the incomplete consensus on structural features and calibration can have an important effect on results on fiscal multipliers. Old Keynesian models, represented in the IS-LM framework, have fiscal multipliers larger than one. On the other hand, the baseline RBC model of Baxter and King (1993) yields a short-run output multiplier between -2,5 and below 1, depending on whether government shocks are temporary or permanent and whether they are financed by lump-sum or distortionary taxes. In their meta-regression analysis, Gechert and Will (2012) also note that the size of fiscal multipliers in neoclassical models is usually between zero and one. Extensions of the RBC framework also yield multipliers lower than one, which is related to the prevalence of Ricardian effects in the absence of frictions in the economy.

The addition of various frictions is generally not sufficient to bring multipliers above one, as findings from various New Keynesian models point out. For instance, in an estimated New Keynesian model for the euro area, Smets and Wouters (2003) find that output multipliers for government spending are positive, but lower than one, and that this also holds with flexible prices and wages. Cogan et al. (2010) find similar results when using the estimated New Keynesian model by Smets and Wouters (2007) on the US economy. When introducing rule-of-thumb households, they find a slightly higher multiplier, but this extension does not have a significant quantitative impact on results. In addition, in their extension of a standard sticky price New Keynesian model with rule-of-thumb households, Galí, López-Salido and Vallés (2007) find that output multipliers are positive, but they exceed one only if labour markets are non-competitive or the share of rule-of-thumb households significantly exceeds the baseline of 50%. However, there is some agreement in the literature that fiscal multipliers can be large when monetary policy is at the zero-

lower-bound, which is highly relevant in current economic circumstances in advanced countries. Several studies in the New Keynesian framework conclude that, in a deflationary environment and with monetary policy constrained by the zero lower bound of interest rates, higher government spending financed by higher deficits can yield higher inflationary expectations and consequently lower real interest rates and higher growth (e.g. Christiano, Eichenbaum and Rebelo, 2011; or Woodford, 2011). The finding of large fiscal multipliers in circumstances of accommodative monetary policy, which includes the zero-lower-bound, is also confirmed by Coenen et al. (2012) in their detailed comparison of several structural models used in leading national and international policy institutions.

There is also a wide array of results on the size of the fiscal multiplier and the transmission mechanism in the empirical literature, which is dominated by VAR studies. Depending on the manner in which they impose short-run restrictions to identify fiscal policy shocks, the fiscal VAR literature could be classified in five main categories. First, VARs with recursive identification, e.g. Fatás and Mihov (2001), Monacelli, Perotti and Trigari (2010) and Kim and Roubini (2008). Second, Blanchard-Perotti VARs (BP SVARs), which rely on institutional information to identify shocks, and were originally proposed by Blanchard and Perotti (2002), and used by Perotti (2005) and Marcellino (2006). Third, VARs with sign restrictions on impulse responses, e.g. Mountford and Uhlig (2009). Fourth, event-study VARs, which use exogenous events such as military build-ups to identify fiscal policy shocks, e.g. Ramey and Shapiro (1998) and Ramey (2011). Fifth, narrative VARs, which use legislative records to isolate fiscal policy shocks, e.g. Romer and Romer (2010) and Guajardo, Leigh and Pescatori (2011). In addition, a strand of the recent literature employs panel VARs (PVARs<sup>2</sup>), mostly with recursive identification, to study the effects of fiscal policy shocks in several countries together, e.g. Beetsma and Giuliodori (2011), Bénétrix and Lane (2013), Ilzetzki, Mendoza and Végh (2013) and Almunia et al. (2010).

Studies using recursive identification and BP SVARs tend to find results in line with New Keynesian predictions, whereas studies using the event-study approach are mostly in line with neoclassical predictions regarding the effects of government spending. In addition, studies using sign restrictions or the narrative approach tend to find relatively high tax multipliers, resembling traditional Keynesian predictions. However, there is generally little agreement in the empirical literature where this divergence in results comes from, and whether it stems from the particular type of identification restrictions. On the other hand, there appears to be some agreement that country structural characteristics have an important effect on the size of the fiscal multiplier. For instance, the meta-regression analysis of fiscal VARs by Rusnak (2011) finds that high levels of public debt, high trade openness and high average short-term interest rates all decrease the size of the fiscal multiplier.

<sup>2</sup> For an extensive description of PVARs, important methodological issues and their treatment, see Juessen and Linnemann (2010) and Canova and Ciccarelli (2013).

## 3.1 METHODOLOGY AND DATA

Our empirical investigation of the effects of fiscal policy on output and other macroeconomic variables is based on Panel Vector Auto Regression (panel VAR or PVAR), with annual data and recursive identification of policy shocks. An alternative way to study the effects of fiscal policy in European countries, which is dominant in the literature, would be to run country VARs, and then analyse the results in terms of the size of the multiplier or differences by structural characteristics. However, we are unable to use such an approach because of the length and the quality of available fiscal data for European countries, particularly for transition countries. Therefore, we follow the dominant empirical literature in employing the VAR approach, but we pool the countries in one large group (and various sub-samples). This also enables us to utilise one of the main advantages of the panel VAR method, which combines the conventional VAR approach of treating all variables as endogenous with the panel approach, which allows for unobserved country heterogeneity.

We use recursive identification of fiscal policy shocks for two main reasons. First, this is in line with recent studies that use panel VAR to analyse effects of fiscal policy (Beetsma and Giuliadori, 2011; Bénétrix and Lane, 2013; Ilzetzki, Mendoza and Végh, 2013; and Almunia et al., 2010), as well as with the vast majority of studies that use country VARs (Rusnak, 2011; and Gechert and Will, 2012). Second, alternative identification approaches are unfeasible for our aim of study and sample. For instance, the event-study method has been applied only for the US based on defence spending, whereas the narrative method requires the availability of detailed legislative records in order to extract policy shocks. We are also reluctant to use sign restrictions due to drawbacks such as the exclusion of some potentially important features (e.g. “expansionary fiscal contractions”) and difficulties in precisely capturing the timing of the shock (Perotti, 2005). Finally, the BP SVAR method requires institutional information on the elasticity of government spending and revenues to output and inflation, which is not available in sufficient detail for our sample.

In our investigation we use annual instead of the quarterly data prevalent in the literature, particularly in country-by-country VARs. Our choice reflects both data availability and recommendations of the relevant empirical literature. It is often argued that, when using fiscal VARs with quarterly data, one should preferably use data collected on an accrual basis, and also use data that are collected at quarterly frequency, i.e. not interpolated from annual data (Perotti, 2005). However, sufficiently long series of non-interpolated quarterly data on an accrual basis are only available for a few developed countries and are unavailable for the wider group of European countries that we are interested in.

The use of annual data has several important implications regarding the anticipation problem and the identification problem, which are essential features of fiscal

VARs (Alesina and Giavazzi, 2013). While there are discussions on the severity of the consequences of the anticipation problem with quarterly data (e.g. Leeper, Walker and Yang, 2009; and Perotti, 2011), it is often argued that the use of annual data ameliorates the problem, since fiscal policy is less likely to be anticipated one year ahead than one or two quarters ahead (Perotti, 2008). In order to further mitigate the anticipation problem, we also include forward-looking variables such as prices and interest rates in the VAR. This is in line with arguments in the literature (Giannone and Reichlin, 2006; Yang, 2007; and Sims, 2012) that forward-looking variables react contemporaneously to anticipated fiscal policy, implying that they can be used to capture future fiscal policy.

While the use of annual data mitigates the anticipation problem, it might complicate the recursive identification of policy shocks, which relies on decision lags of fiscal policy, as there is usually some delay in the reaction of policymakers to output movements. With recursive identification in a VAR with quarterly data, this is reflected in ordering spending (and sometimes revenues) before output, implying that the former do not react to the latter within the same quarter. While this might be a strong assumption with annual data, there are arguments that support such an approach even with recursive identification (besides data availability reasons). For instance, there is only one important fiscal event in a year (the budget), so policymakers are often constrained from responding quickly to contemporaneous economic movements. Further, Beetsma and Giuliiodori (2011) note that with annual data the recovered shocks are more realistic, since new fiscal impulses typically do not appear at quarterly frequency, but once a year when the budget is adopted (and perhaps in mid-year budget supplements). In addition, Beetsma, Giuliiodori and Klaassen (2006, 2009) provide robustness checks for several countries where non-interpolated quarterly fiscal data are available, and show that recursive identification restrictions for spending shocks in a VAR with annual data are plausible.

The panel VAR specification has several advantages that make it particularly useful for empirical application in macroeconomics. First, it has the advantage of the VAR methodology in treating all the variables as endogenous and interdependent in both a static and a dynamic sense (Canova and Ciccarelli, 2013). It also enables the analysis of a variety of shocks, both endogenous and exogenous. In distinction from time-series VARs, in PVARs a cross-dimensional dimension is added, thus making it possible to exploit the heterogeneous information in cross-section data, but also to increase the sample size in order to eliminate idiosyncratic effects (Gavin and Theodorou, 2005). Related to this, Rebucci (2003) notes that pooling units increases the degrees of freedom and potentially the efficiency of estimates, thus reducing the risk of over-fitting.

While the PVAR combines the features and hence the advantages of VAR and panel methods, it also combines their drawbacks. For instance, it imposes slope homogeneity among units, which could lead to heterogeneity bias and may also



limit the usefulness of these models for policy advice at the unit, i.e. country level (Georgiadis, 2012). Therefore, in order to account for unobserved heterogeneity, we also introduce country fixed effects (as well as a common time trend), thus following the dominant approach in the empirical literature using PVAR estimation. This means that our baseline model is a panel VAR with fixed effects (PVAR FE).

Due to data limitations, we are forced to maintain homogenous slope coefficients, thus imposing the same dynamics across cross-section units. This approach is criticised by Canova and Ciccarelli (2013), who argue that in order to properly account for heterogeneity one should introduce slope coefficients varying across cross-sections, and possibly across time periods as well. However, besides serious data availability and computational issues, there are counter-arguments that a relatively simple model like ours is applicable when one is interested in common aspects in macroeconomic data and not idiosyncratic effects (Gavin and Theodorou, 2005) and that the PVAR FE model is not too restrictive if one is interested in average policy effects (Georgiadis, 2012). Therefore, we maintain homogenous slope coefficients, but address heterogeneity by using cyclically-adjusted revenues in all our specifications, thus accounting for the part of heterogeneity arising from the differences in automatic stabilizers across countries. We also pay additional attention to heterogeneity by splitting our sample across various structural country characteristics in section 4.

While the PVAR FE addresses unobserved country heterogeneity, it also leads to the well known problem of biased coefficients in dynamic panels with fixed effects (Nickell, 1981). Nevertheless, the PVAR FE is used in several important studies of fiscal policy with relatively short time dimensions, such as Beetsma, Giuliodori and Klaassen (2006), Beetsma and Giuliodori (2011), Bénétrix and Lane (2013) and Almunia et al. (2010). In addition, the Monte Carlo analysis of various PVAR FE estimators in Juessen and Linnemann (2010) generally supports our choice of this method. Their main results show that the (downward) bias of the PVAR FE coefficients is considerable even when the time dimension is large, whereas GMM estimators perform well in terms of the bias but poorly in terms of the root mean square error, thus leading the authors to recommend the use of bias-corrected PVAR FE. However, using both Monte Carlo analysis and a practical application on a fiscal VAR, Juessen and Linnemann (2010) conclude that although they tend to under-estimate the shock persistence, impulse responses from the PVAR FE are virtually undistinguishable from true impulse responses or from bias-corrected PVAR FE responses at impact and very similar at short horizons<sup>3</sup>. In addition, the Monte Carlo analysis of several estimators by Rebucci (2003), who extends the mean group estimator to the PVAR, shows that slope heterogeneities should be very high in order to justify alternatives to pooled estimators, including PVAR FE, and that the time dimension should be longer than a

<sup>3</sup> Although Juessen and Linnemann (2010) recommend the use of bias-corrected PVAR FE, they also warn that bias-correction methods might not be successful in reducing the bias when the time dimension is small, which certainly covers our case of 18 years.



typical macroeconomic data set in order to justify the use of mean group estimators. In other words, the small sample bias may be more detrimental to the mean group estimator than the slope heterogeneity bias is to the PVAR FE estimator (Towbin and Weber, 2013).

Our analysis uses annual data starting in 1995 and ending in 2012 (18 years) and we include the 27 EU member states as of 2012. In the analysis of differences between groups, the EU member states are split in two: the 10 new member states (NMS10) from the Central and Eastern Europe enlargement cohorts of 2004 and 2007, and the 15 old EU member states plus Cyprus and Malta (labelled EU17 or old member states<sup>4</sup>). We briefly describe the data when specifying our baseline model in the following sub-section, while detailed data definitions and sources are provided in the appendix.

### 3.2 MODEL SPECIFICATION

In line with the literature, in our specification we include five endogenous variables: government spending, government revenues, GDP, prices and interest rates. These five endogenous variables could be considered as the minimal set of macroeconomic variables necessary to capture dynamic effects of fiscal policy shocks (Fatás and Mihov, 2001). We also include country fixed effects in order to deal with unobserved heterogeneity, as well as a common linear time trend.

We use real GDP as an indicator of output and the GDP deflator as an indicator of price movements. For interest rates we use average nominal three-month money market rates, although in the literature there is some divergence on this issue: numerous studies use short-term rates, while others use long-term interest rates, which are argued to be more relevant for private consumption and investment decisions (Perotti, 2005). However, we are reluctant to take such an approach for two reasons. First, short-term interest rates are better suited for quick reflections of anticipated fiscal policy, which is one of the reasons for the inclusion of interest rates in the VAR. Second, sufficiently long series of long-term interest rates are unavailable for some of the countries in our sample.

When constructing the fiscal variables (appendix), we follow arguments and definitions in Alesina et al. (2002), Caldara and Kamps (2008) and particularly Beetsma, Giuliodori and Klaassen (2006) and Beetsma and Giuliodori (2011). Fiscal variables are defined in real terms, thus facilitating direct inference on the fiscal multiplier since GDP is also defined in real terms. Further, in line with the dominant approach in the literature, we define government spending and revenues net of interest payments, as well as net of social benefits and other transfers. Consequently, government spending is defined as the sum of government consumption (approximately the sum of public wages and purchases of goods and services) and

<sup>4</sup> Cyprus and Malta joined EU in 2004 as well, but they are grouped with old EU member states because their economic structure and history makes them much closer to them than to the transition countries of Central and Eastern Europe which joined the EU at the same time or in 2007.

government investment. On the other hand, for revenues we use net-taxes, defined as revenues minus transfers. In particular, we follow the detailed calculations in Beetsma and Giuliadori (2011) and define net-taxes as the sum of indirect taxes, direct taxes, social benefits received and transfers received by the government, minus subsidies, social benefits paid and transfers paid by the government. Further, we follow the arguments and calculations in Beetsma, Giuliadori and Klaassen (2006) and Beetsma and Giuliadori (2011) and cyclically adjust net taxes, while government spending is left unadjusted. We cyclically adjust net taxes by using country elasticities of various components of net taxes to output (EC, 2005) as well as the trend GDP based on Hodrick Prescott filtering.

The structural form of our baseline panel VAR is presented in eq. 1 below. Our analysis covers the period starting in 1995 and ending in 2012 ( $t=1, \dots, 18$ ) and we include the 27 countries that were EU members in 2012 ( $i=1, \dots, 27$ ). The endogenous variables included in the VAR and their ordering is as follows: the log of real government spending ( $g$ ), the log of real cyclically-adjusted net taxes ( $t$ ), the log of real GDP ( $y$ ), the log of the GDP deflator ( $p$ ) and average annual three-month money market interest rates in percent ( $r$ ). We also include country-specific fixed effects ( $c_i$ ) and a common time trend ( $t_t$ ) as exogenous variables. Further, we use 2 lags of each endogenous variable in our VAR. While testing for lag-length in PVARs is not straightforward (Babecký et al., 2012), 2 lags should be sufficient to remove any residual auto-correlation with annual data (and additional checks indicate that baseline results are robust to alternative lag lengths).  $D$ ,  $E$ ,  $P$  and  $H$  capture corresponding coefficients. The vector of orthogonal structural shocks  $\varepsilon_{i,t}$  reflects the shocks to each equation in the VAR, with  $\text{var}(\varepsilon_{i,t}) = \Omega$ . Finally, the first matrix in Eq. 1 captures contemporaneous relations between endogenous variables, with  $\alpha_{nm}$  elements of the matrix representing the estimated contemporaneous reaction of variable  $m$  to shocks in variable  $n$ , and zero elements reflecting the restrictions of the recursive identification on the contemporaneous relations between variables.

The main implication of this specification is that spending shocks are allowed to have a contemporaneous effect on every variable, but spending is not contemporaneously affected by other shocks. Since we focus on spending shocks<sup>5</sup>, the ordering of the other variables does not matter (Christiano, Eichenbaum and Evans, 1999). The drawback of this ordering is that it implies that cyclically-adjusted net taxes do not affect spending within a year. While this might seem like too strong a restriction, we rely on this ordering because it is standard in the literature. Besides, additional checks (available on request) show that our impulse responses are robust to the alternative ordering of spending and revenues. Related to this, Beetsma and Giuliadori (2011) argue that spending is mostly predetermined in the budget, whereas changes to spending within the year tend to be less

<sup>5</sup> This also implies that, when discussing fiscal multipliers, effectively this applies to government spending multipliers.

important, implying that it is reasonable to order spending first. Output is ordered third, implying that it does not contemporaneously affect spending and net taxes. This restriction is justified by the omission of cyclically-sensitive components from our definition of spending, as well as by the cyclical adjustment of net-taxes. Finally, the ordering of prices and interest rates last is common in the literature, and it implies that these variables react to movements in fiscal variables and to output but do not affect them within the year.

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ -\alpha_{gt} & 1 & 0 & 0 & 0 \\ -\alpha_{gy} & -\alpha_{ty} & 1 & 0 & 0 \\ -\alpha_{gp} & -\alpha_{tp} & -\alpha_{yp} & 1 & 0 \\ -\alpha_{gr} & -\alpha_{tr} & -\alpha_{yr} & -\alpha_{pr} & 1 \end{pmatrix} \begin{bmatrix} g_{i,t} \\ t_{i,t} \\ y_{i,t} \\ p_{i,t} \\ r_{i,t} \end{bmatrix} = D \begin{bmatrix} g_{i,t-1} \\ t_{i,t-1} \\ y_{i,t-1} \\ p_{i,t-1} \\ r_{i,t-1} \end{bmatrix} + E \begin{bmatrix} g_{i,t-2} \\ t_{i,t-2} \\ y_{i,t-2} \\ p_{i,t-2} \\ r_{i,t-2} \end{bmatrix} + Pc_i + Ht_i + \begin{bmatrix} \varepsilon_{i,t}^g \\ \varepsilon_{i,t}^t \\ \varepsilon_{i,t}^y \\ \varepsilon_{i,t}^p \\ \varepsilon_{i,t}^r \end{bmatrix} \quad \text{Eq. 1}$$

#### 4 BASELINE RESULTS AND SUB-SAMPLE ANALYSIS<sup>6</sup>

We mostly analyse results via impulse responses (and 95% confidence intervals), as well as impact fiscal multipliers. In order to facilitate the discussion, we standardise the size of the spending shock to be equal to 1% of GDP, so that we can directly interpret the impulse responses of GDP as the fiscal multiplier.

The results of our baseline specification from eq. 1, which includes the entire sample of 27 EU countries between 1995 and 2012, are presented in figure 1. The spending shock is relatively persistent, as it takes around five years for its effects on spending to die out. At the year of the shock, governments increase net taxes, but this response becomes negative from the following year, presumably as they try to reinforce the effects of spending rises by lowering taxes. The response of real GDP to the spending shock is positive and the fiscal multiplier is around one at the year of the shock and in the following year. While this implies that fiscal policy does stimulate output, its effectiveness is relatively limited, since there are no stronger multiplicative effects beyond the approximately one-for-one response of GDP<sup>7</sup>. In addition, the fiscal multiplier is halved three years after the shock, when it also becomes insignificant.

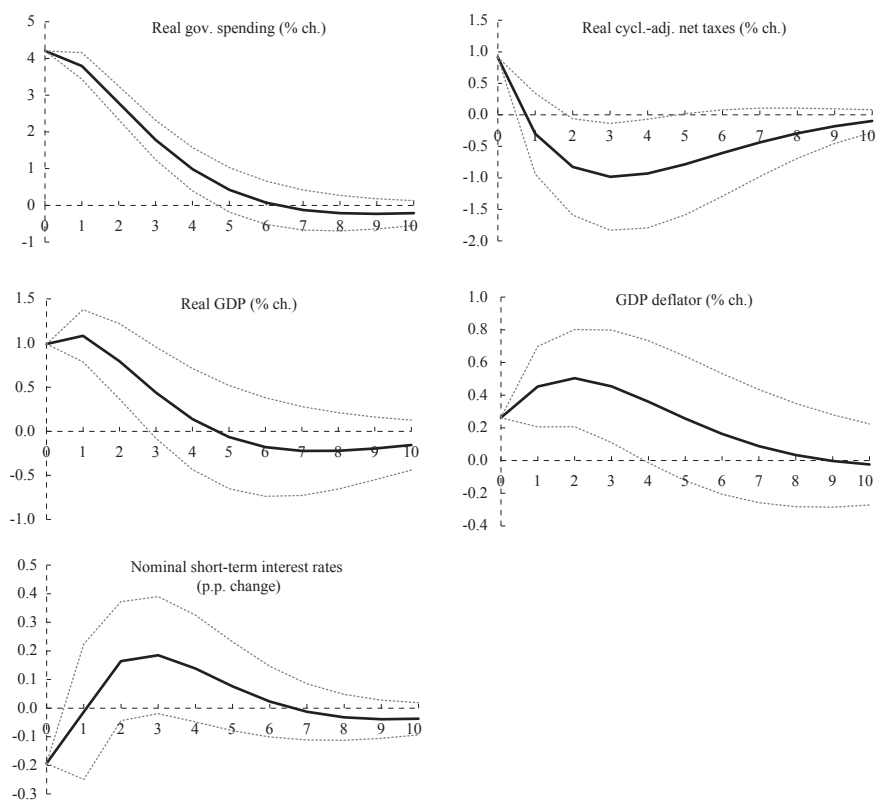
The spending shock and the consequent increase in GDP also result in higher inflation, and the rise is significant for three years after the shock. Finally, interest rates fall on impact, while their direction changes the following year, although the response becomes insignificant. While the initial negative response of interest rates is puzzling, we return to it below.

<sup>6</sup> We estimate our PVARs using the MATLAB code that has been developed and made public by Georgios Georgiadis, to whom we are grateful for the code and additional advice provided in our correspondence. The code is explained in Georgiadis (2012) and can be downloaded from <https://sites.google.com/site/georgios-georgiadis111/research>. It can also estimate Panel Conditional Homogenous VARs.

<sup>7</sup> The one-for-one response means that a unit increase of government spending corresponds to a unit increase of GDP. If there are no stronger multiplicative effects, this is true by definition, since the definition of GDP also includes government spending (government consumption and investment).

FIGURE 1

Impulse responses to a government spending shock of 1% of real GDP – baseline specification



Note: The size of the spending shock in the entire sample and in all sub-samples discussed below equals 1% of GDP, which is equivalent to around 4% of government spending in the entire sample.

Table 1 presents results of the forecast error variance decomposition. The left panel indicates that the forecast error variance of GDP is mostly attributable to GDP shocks. In addition, government spending shocks explain 8.4% of the forecast error variance of GDP on impact, and this effect fades out slowly in the future. On the other hand, the caveats regarding the proper identification of shocks to net taxes notwithstanding, they initially explain only 4.6% of the forecast error variance of GDP, but their importance rises so as to explain up to around a quarter of the GDP error variance 5 years after the shock. Further, the right panel in table 1 shows that a relatively low share of fluctuations of other variables is attributable to spending shocks. Indeed, spending shocks explain the majority of fluctuations of spending itself, as well as some of the forecast error variance of GDP, but do not explain more than around 3% of the forecast error variance of the other three variables.

Several additional robustness checks (available on request) indicate that the baseline results are fairly robust to alternative specifications. For instance, results from the baseline specification, which includes country fixed effects and a common linear

time trend, are robust to the introduction of country-specific linear time trends instead of the common trend, as well as to the omission of the time trend. On the other hand, results between the baseline and the version that omits country fixed effects are considerably different, with the latter responses indicating a permanent level shift of GDP due to a spending shock, which is hardly feasible. This difference compared to the baseline indicates that there is heterogeneity in our sample, so the maintenance of fixed effects is warranted in order to account for unobserved country heterogeneity. Further, baseline results from the second-order PVAR are robust to both a shorter and a longer lag-length by one year, which indicates that there are no severe problems with residual auto-correlation. Finally, we also check the robustness of our results to an alternative ordering of variables: instead of the baseline (spending first, net-taxes second), net-taxes are ordered first and spending second. Despite differences in contemporaneous restrictions arising from the alternative ordering, impulse responses in this case are very similar to the baseline results.

**TABLE 1**

*Forecast error variance decomposition – baseline specification*

<b>Forecast error variance decomposition of GDP</b>				
	<b>At impact</b>	<b>After 1 year</b>	<b>After 3 years</b>	<b>After 5 years</b>
<b>Contributions of shocks to:</b>				
Real gov. spending	8.4	7.8	5.7	4.7
Real cycl.-adj. net taxes	4.6	10.8	20.6	25.7
Real GDP	87.0	78.9	66.1	59.9
GDP deflator	0.0	0.7	1.9	2.1
Nom. short-term int. rates	0.0	1.7	5.7	7.6
	100.0	100.0	100.0	100.0
<b>Contributions of the gov. spending shock</b>				
	<b>At impact</b>	<b>After 1 year</b>	<b>After 3 years</b>	<b>After 5 years</b>
<b>To the FEVD of:</b>				
Real gov. spending	100.0	94.5	72.7	58.6
Real cycl.-adj. net taxes	1.5	0.9	1.9	2.8
Real GDP	8.4	7.8	5.7	4.7
GDP deflator	0.8	1.9	3.1	3.1
Nom. short-term int. rates	0.5	0.4	1.0	1.1

We proceed by applying the baseline specification of the panel VAR on sub-samples defined by country characteristics. This enables us to analyse whether country structural characteristics influence the effects of fiscal policy on macroeconomic variables. In addition, splitting the sample in various ways also enables us to better address country heterogeneity, since sub-samples consist of more homogeneous groups than the entire sample of 27 EU member states.

We first analyse possible differences in fiscal policy effects between the 17 old and 10 new EU member states (EU17 and NMS10 respectively). The comparison in figure 2 shows that the response of spending to its own shock is fairly similar, and it becomes insignificant within 4 to 5 years. On the other hand, there is a completely

opposite reaction of net taxes. In old EU member states, positive spending shocks are accompanied by lower net taxes as governments try to reinforce higher spending by lowering revenues. In addition, this fall in net taxes is significant for a considerable period into the future. On the other hand, spending shocks in transition countries are accompanied by an increase of net taxes on impact, and the positive reaction of net taxes is significant up to 3 years after the shock, indicating that governments in these countries try to pursue a more disciplined fiscal policy than in old EU member states. Further, the effects of spending shocks on GDP are positive in both old and new EU member states, and in both cases responses become insignificant around 3 years after the shock. However, the fiscal multiplier is higher in transition countries both at impact (1.3 in new and 0.6 in old EU member states) and into the future (e.g., 1 in new and 0.6 in old EU member states 3 years after the shock). Finally, although there are some differences in the dynamics, the reactions of prices and interest rates are fairly similar in the two groups of countries.

**FIGURE 2**  
*Comparison of impulse responses to a government spending shock of 1% of real GDP – old and new EU member states*

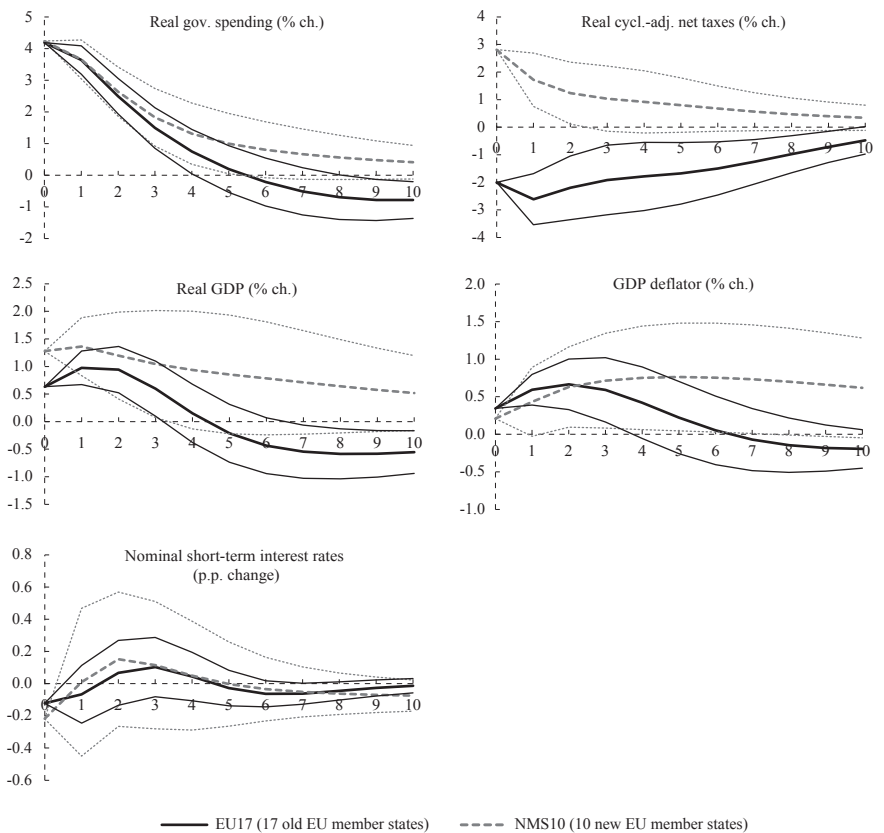
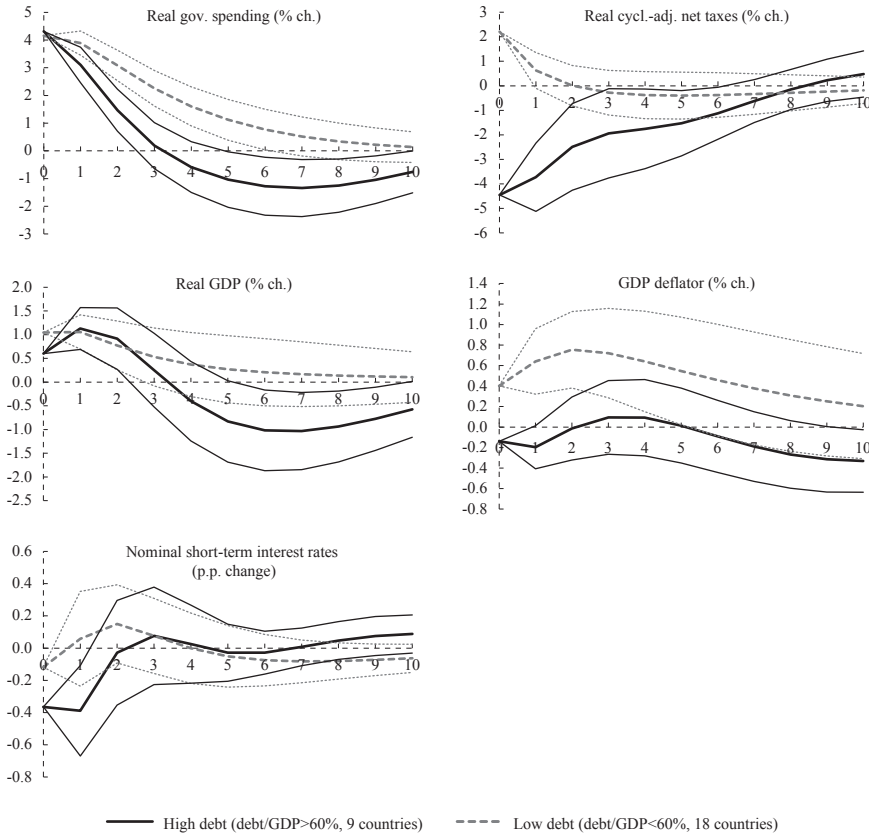


FIGURE 3

Comparison of impulse responses to a government spending shock of 1% of real GDP – high-debt and low-debt countries



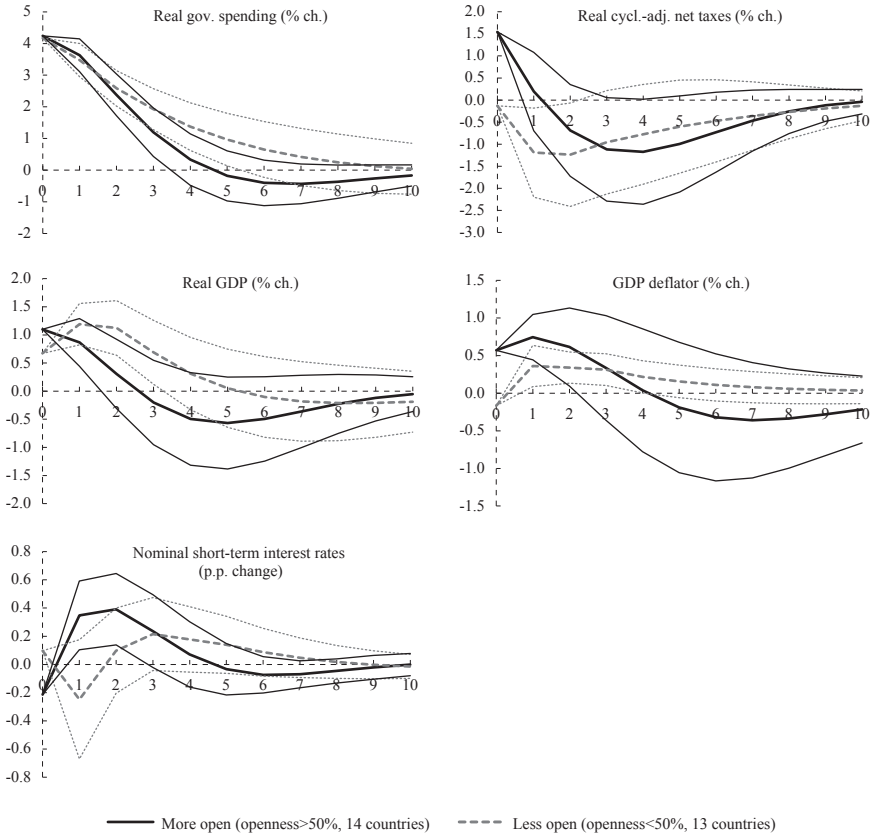
Next we analyse the effects of the level of public debt by using the threshold of the average share of public debt to GDP of 60% between 1995 and 2012 to split the sample into countries with high and low debt<sup>8</sup> (figure 3). Results indicate that there is indeed a different response to spending shocks in the two groups of countries. First, in countries with lower debt levels, positive spending shocks are followed by higher net-taxes, unlike high-debt countries where higher spending is accommodated by lower taxes, thus potentially further increasing deficits and debt levels. What is more important, the fiscal multiplier is higher in less indebted countries, and this holds both at impact (1 in low-debt and 0.6 in high-debt countries) and into the future (e.g., 0.5 in low-debt and 0.3 in high-debt countries 3 years after the shock). This result indicates that the effectiveness of fiscal policy is considerably stronger in low-debt than in high-debt countries, which is in line with *a priori* expectations and findings in the literature (Rusnak, 2011). Further, spending shocks tend to be followed by higher inflation in low-debt countries, possibly reflecting

<sup>8</sup> The threshold of 60% is in line with the Maastricht criteria for public debt. However, results are similar if the threshold is defined as 50% instead.

higher demand. On the other hand, the dynamics of the response of interest rates are similar, although there are some differences in magnitude.

**FIGURE 4**

*Comparison of impulse responses to a government spending shock of 1% of real GDP – more and less open countries*



Another factor which could influence the effects of fiscal policy is the level of trade openness, since it is expected that, in more open countries, there will be some “leakages” of the positive fiscal shock. In order to analyse this issue, we split our sample into more open and less open countries by using the level of average trade openness to GDP of 50% between 1995 and 2012 as a threshold<sup>9</sup>. Results in below support the *a priori* expectation that the effects of fiscal policy differ according to the level of openness. Somewhat surprisingly, on impact the size of the fiscal multiplier is slightly higher in more open than in less open economies (1.1 and 0.7 respectively). However, starting from one year after the shock, the fiscal multiplier is considerably higher in less open economies. In addition, it is also significant for three years after the shock in less open economies, while it

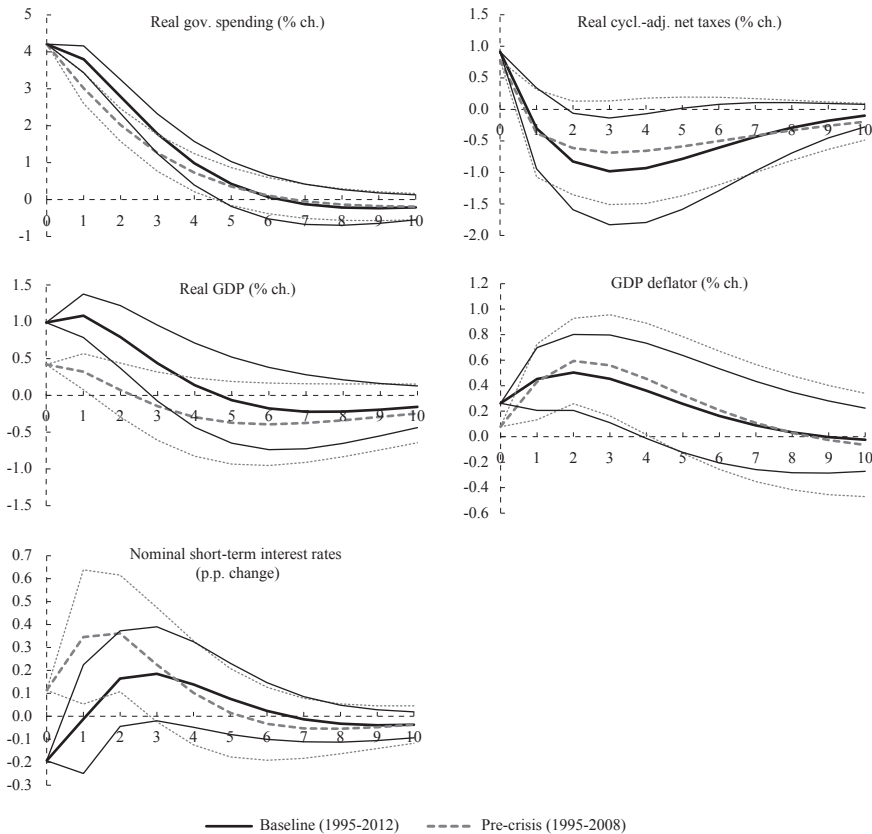
<sup>9</sup> Openness is calculated as the share of foreign trade in nominal GDP. Foreign trade is calculated as the sum of nominal exports and imports of goods and services divided by 2.



becomes insignificant one year after the shock in more open economies. These results indicate that there are considerably more “leakages” in more open economies via the import channel, thus making fiscal policy in these countries less effective. On the other hand, the openness level does not affect the responses of other variables to the spending shock, except for the impact responses.

**FIGURE 5**

*Comparison of impulse responses to a government spending shock of 1% of real GDP – baseline and pre-crisis period*



In circumstances of low demand and zero lower bound of nominal policy rates, it is expected that the size of the fiscal multiplier will be higher than in normal circumstances. Therefore, we also investigate whether our baseline results on the effects of fiscal policy shocks in European countries are partially a reflection of the Great Recession. In order to do so, we compare baseline results (1995-2012) to the ones that obtain when shortening the sample for the crisis years, i.e. using only the pre-crisis period between 1995 and 2008. While the shorter sample of 14 years magnifies potential small sample problems, results of this comparison in figure 5 still yield some interesting insights. In the pre-crisis period, the size of the fiscal multiplier is about half the size of the multiplier in the entire period, both on impact

(0.4 compared to 1) and into the future. In addition, the response of GDP in the pre-crisis period becomes insignificant only one year after the shock, whereas in the entire period it is significant up to three years after the shock. Overall, these results suggest that fiscal policy is considerably less effective in normal circumstances, while the results for the entire period are driven by the higher effectiveness in the recent crisis years. Further, while the responses of other variables are similar, there are some differences in the response of interest rates. In particular, when using the entire period, interest rates fall on impact, and become insignificant thereafter, which is somewhat puzzling. However, in the pre-crisis period, the response of interest rates to spending shocks is significantly positive on impact and up to three years after the shock. This difference is an indication that the response of monetary policy in the entire sample might be driven by the crisis years. Indeed, it appears that central banks respond to positive spending shocks with more restrictive policy in normal times, but accommodate fiscal policy shocks during the crisis years.

Before moving to the analysis of the transmission mechanism of fiscal policy and other extensions of our baseline specification, it is useful to summarise the main findings related to differences between results across various sub-samples (table 2). The fiscal multiplier in the entire sample is around one on impact and after one year, and declines thereafter. However, there are considerable differences across country structural characteristics and also when later crisis years are excluded. Overall, the results from this section and particularly the summary in table 2 confirm the suggestion by Spilimbergo, Symansky and Schindler (2009) that fiscal multipliers are country-, time- and circumstance-specific.

**TABLE 2**

*Fiscal multipliers in the entire sample and in various sub-samples*

	Size of the fiscal multiplier			
	On impact	After 1 year	After 3 years	After 5 years
Baseline (EU27, 1995-2012)	1.0***	1.1***	0.4*	-0.1
Old EU member states (EU17)	0.6***	1.0***	0.6**	-0.2
New EU member states (NMS10)	1.3***	1.4***	1.0**	0.9
High debt (debt/GDP>60%)	0.6***	1.1***	0.3	-0.8*
Low debt (debt/GDP<60%)	1.0***	1.1***	0.5*	0.3
High openness (>50% of GDP)	1.1***	0.9***	-0.2	-0.6
Low openness (<50% of GDP)	0.7***	1.2***	0.7**	0.1
Pre-crisis (EU27, 1995-2008)	0.4***	0.3**	-0.1	-0.4

*Note: The table shows the size of the fiscal multiplier, i.e. the response of real GDP (in %) to a government spending shock of 1% of real GDP. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.*

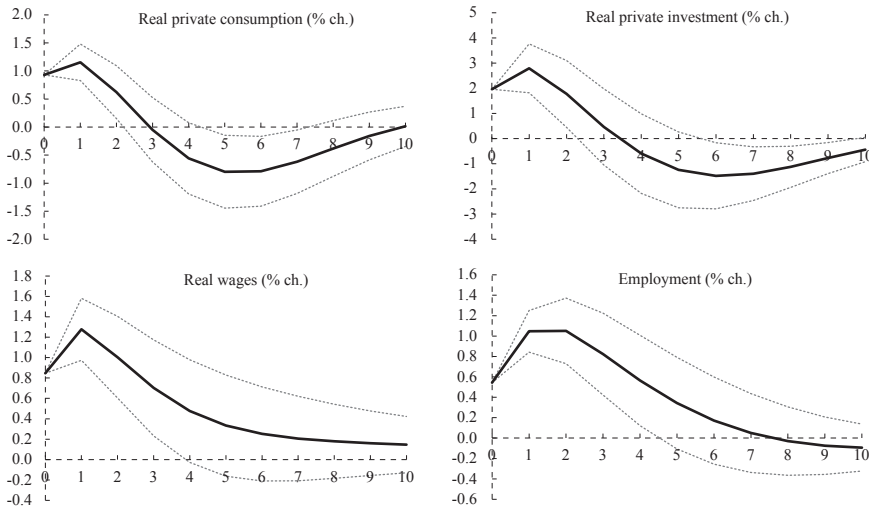
## 5 RESULTS ON THE TRANSMISSION MECHANISM OF FISCAL POLICY

This section provides extensions of the baseline specification in order to shed some light on the transmission mechanism of fiscal policy. In order to do so, we use various components of GDP and fiscal policy, as well as some additional var-

iables. In all cases, we start from the baseline specification of our PVAR (eq. 1) and modify it in accordance with the issues we are analysing. We again present only comparison graphs of impulse responses (with corresponding 95% confidence intervals) for the specifications being analysed, whereas all detailed results are available on request.

We start by augmenting the baseline specification with four additional variables: private consumption, private investment, real wages per employee and total employment<sup>10</sup>. In line with the practice in the literature (e.g. Caldara and Kamps, 2008; and Perotti, 2005), we add one variable at a time to our baseline, which yields four additional specifications with 6 variables<sup>11</sup>. Figure 6 presents the responses of the additional variables in the respective extended 6-variable PVARs. Spending shocks are followed by increases both of private consumption and private investment. While the response of investment is about double that of consumption both at impact and in the future, they both have a similar dynamic and both are significant up to 2 years after the shock. In addition, the rise of private consumption is a reflection of the rise of both real wages and employment following a government spending shock<sup>12</sup>.

**FIGURE 6**  
*Impulse responses of additional variables to a government spending shock of 1% of real GDP – extended PVARs with 6 variables*



*Note: Only responses of the additional variable in each of the four 6-variable PVARs are shown. Complete results of each specification are available on request.*

<sup>10</sup> Most studies on US data use private sector wages and employment. While such an approach would be consistent with the use of private consumption and investment, data on private sector wages and employment for EU countries are not available from the European Commission AMECO database.

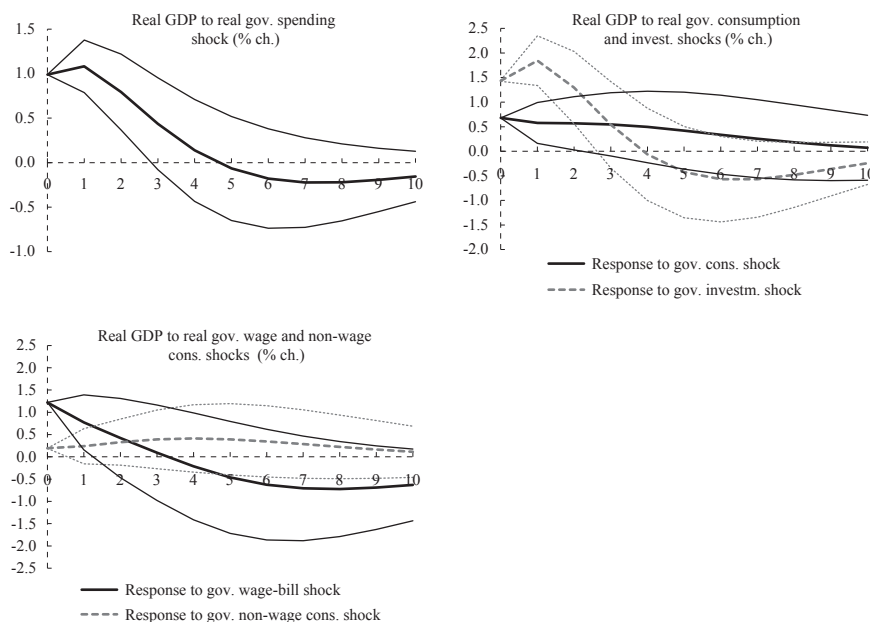
<sup>11</sup> Each new variable is added before GDP. However, as discussed above, the ordering does not matter since we are interested only in the effects of spending shocks, which are ordered first.

<sup>12</sup> When splitting the sample into old and new EU member states, we find similar dynamics and signs of the responses in the two groups, although there are some differences in the strength of the responses. In particular, the rise of consumption, wages and employment is stronger in new EU member states, and this holds both at impact and into the future. These results are available on request.

The extension of the baseline specification with these variables also makes it possible to analyse whether effects of fiscal policy are in line with Real Business Cycle (RBC) or New Keynesian predictions. Both groups of theories predict that government spending shocks cause higher output. Related to this, our previous finding of rising output in response to spending shocks in the baseline specification is in line with the vast majority of other empirical studies as well as predictions of the two main theories. Further, our finding of rising private consumption, real wages and employment is in line with predictions both from extended RBC models with monopolistic competition and “deep habits” in the consumption of individual goods (Ravn, Schmitt-Grohe and Uribe, 2006) and extended New Keynesian models with rule-of-thumb consumers (Galí, López-Salido and Vallés, 2007).

**FIGURE 7**

*Impulse responses of GDP to a shock of 1% of real GDP in various spending components*

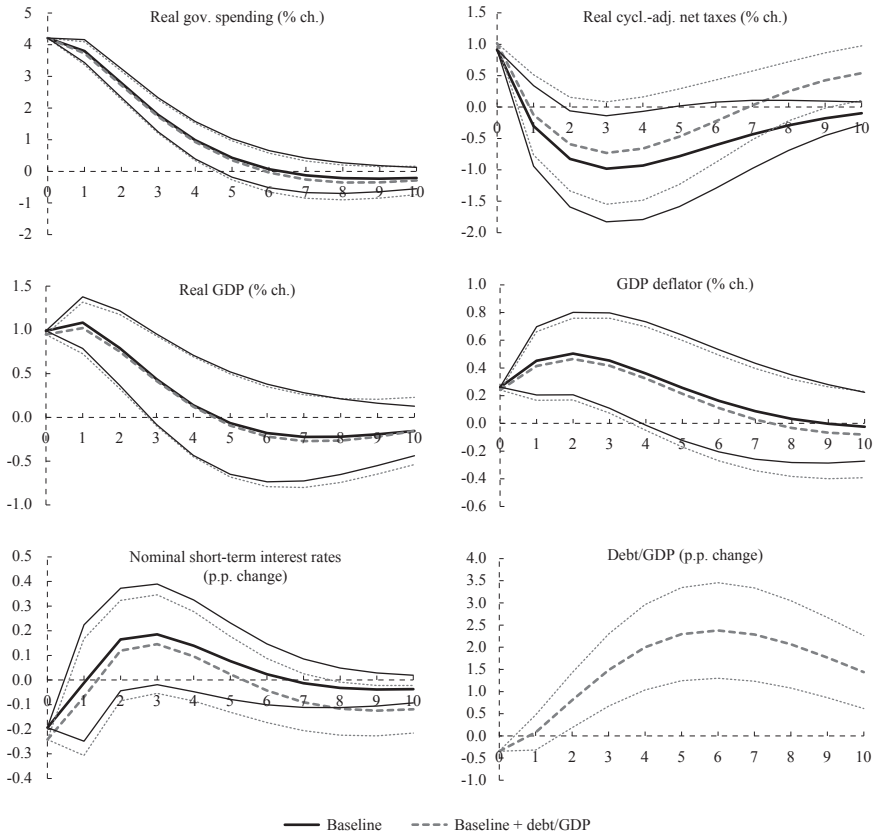


We proceed by analysing the effects of the two components of government spending: consumption and investment. We also consider the two components of government consumption: the wage bill and the non-wage consumption (i.e. goods and services). In the baseline specification, we replace real government spending with its components, one at a time, and present the responses of GDP to shocks of 1% of GDP of various components in figure 7. Results show that government investment is the more effective tool in stimulating output than government consumption. Among the components of government consumption, government wage bill shocks are more effective than government non-wage consumption shocks up to two years after the shock, although in both cases the response becomes insignificant rather quickly. Overall, these results indicate that, if the aim is to stimulate

output, the most effective way to do so is by increasing government investment. If government consumption is used, the effects of government employees' wages are somewhat larger than those of non-wage consumption<sup>13</sup>.

**FIGURE 8**

*Comparison of impulse responses to a government spending shock of 1% of real GDP – baseline and baseline extended with debt/GDP as endogenous variable*

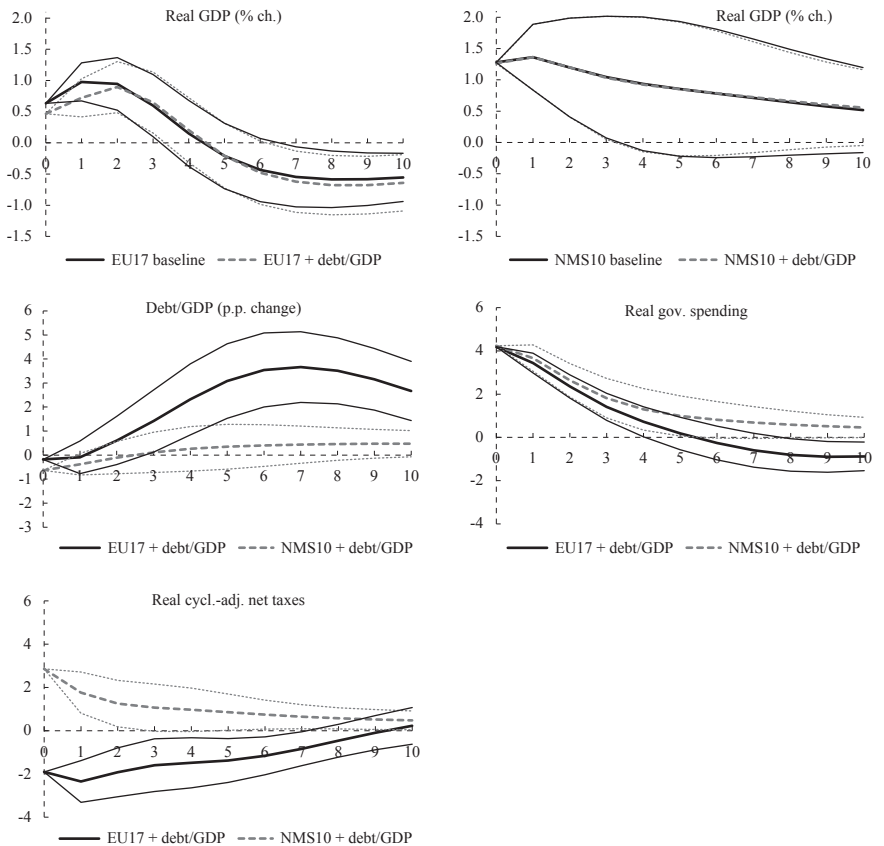


Next we analyse the robustness of our baseline results for the entire sample to the inclusion of the public debt ratio in the specification. Public debt is not usually included in fiscal VARs, which has been criticised by Favero and Giavazzi (2007) since a fiscal shock is expected to constrain future revenues and spending due to the intertemporal budget constraint. Consequently, they argue that results of standard fiscal VARs may be biased due to the omission of debt, and recommend that the analysis of fiscal shocks should take into account debt dynamics and allow

<sup>13</sup> We also considered the effects of various government spending components on private consumption and investment separately by replacing GDP with private consumption and private investment, and then replacing government spending with its components one at a time. Overall, results indicate that fiscal policy works mostly via its effects on private investment, which normally appears to be more responsive, whereas responses of private consumption are lower, in line with the expected higher inertia in household consumption. These results are available on request.

for possible feedback from debt to fiscal and other variables. Therefore, we augment our baseline specification for the entire sample with the share of public debt to GDP as an endogenous variable (ordered last). Results in figure 8 indicate that baseline responses of other variables to a government spending shock are robust to the inclusion of the debt level. This also holds for the response of interest rates, which is opposite to findings by Favero and Giavazzi (2007) that in the US interest rates respond differently to spending shocks when debt is included in the VAR. In addition, the debt/GDP ratio itself slightly falls on impact in response to a spending shock, probably reflecting the rise of net taxes and of GDP on impact. However, there is a significant increase in the debt/GDP ratio of up to 2 percentage points in the future and this response dies out rather slowly. Overall, these results on the response of public debt suggest that spending shocks have a considerable deteriorating effect on fiscal sustainability. Indeed, in the wake of spending shocks, the rise of spending is quite persistent, unlike the positive response of net-taxes, which dies out considerably faster, thus giving rise to higher budget deficits and consequently higher debt levels.

**FIGURE 9**  
*Comparison of impulse responses of GDP to a government spending shock of 1% of real GDP with and without debt/GDP – old and new EU member states*



We carry out the same exercise, but now we split the sample to old and new EU member states. Results in figure 9 below indicate that baseline responses of GDP to spending shocks are robust to the inclusion of debt in both country groups. In addition, the conclusion from the baseline that fiscal multipliers are higher in new than in old member states holds when debt is added. Finally, it appears that fiscal sustainability is stronger in new than in old member states, since government spending shocks result in a low and insignificant response of debt in new member states, unlike old member states where spending shocks are followed by considerably higher debt levels. Results also indicate that this difference in the response of debt levels is related to the response of net-taxes in old and new EU member states, which was discussed above. Indeed, in new EU member states, government spending shocks are followed by higher net-taxes. On the other hand, higher spending in old EU member states is accommodated by lower taxes, and consequently debt levels are higher, thus giving rise to concerns about debt sustainability.

## 6 CONCLUSIONS AND POLICY IMPLICATIONS

This study provides an empirical analysis of the effects of fiscal policy on output and other macroeconomic variables in EU countries between 1995 and 2012. The empirical investigation uses panel VAR with fixed effects and recursive identification of fiscal policy shocks. We find that higher spending does result in higher GDP in the entire sample, but the size of the fiscal multiplier does not exceed one, implying that the effects of fiscal policy are relatively limited. In addition, the effectiveness of fiscal policy in the entire sample appears to reflect the crisis period, when it was in fact the only policy tool available due to the zero lower bound of nominal interest rates in most countries. This implies that, once the economic recovery becomes sustained, it is likely that fiscal multipliers will fall back to their common levels in more “normal” circumstances, i.e. positive but below one. Consequently, in such a case, preference should be given to monetary policy in attempts to affect short-term output movements, as well as to structural reforms when trying to affect long-term output.

Our analysis also indicates that policy-makers should pay particular attention to structural characteristics of their countries when trying to affect output via government spending. For instance, expansionary spending in transition countries is more effective in stimulating output than in old EU member states. In addition, higher spending in transition countries is also accompanied by higher taxes, which consequently leads to a relatively stable path of public debt. Our results imply that this practice of expansionary spending and higher taxes should also be used in old EU member states in order to prevent the worrying trend of rising debt levels in the wake of higher spending, without at the same time jeopardising the positive effects of higher spending on output. Further, policy-makers in countries with high public debt and high trade openness should refrain from using government spending to stimulate output, since such a policy is largely ineffective.

The analysis of the transmission mechanism of fiscal policy suggests that spending shocks cause rises in both private investment and consumption, with the latter being supported by higher real wages and higher employment. This is in line with findings in most other empirical studies, and also consistent with predictions from extensions of both RBC and New Keynesian models. Findings in this part also suggest that fiscal policy is more effective when implemented via government investment than via government consumption. Further, the introduction of the share of debt in GDP in the model in order to account for intertemporal budget constraints and debt feedbacks yields some worrying implications for fiscal sustainability. In particular, spending shocks are followed by rising debt levels in old EU member states, which could be related well to the recent European debt crisis.

**Disclosure statement**

No potential conflict of interest was reported by the author.



## APPENDIX

## DATA SOURCES AND DEFINITIONS

We follow arguments and definitions in Alesina et al. (2002), Caldara and Kamps (2008) and particularly Beetsma, Giuliodori and Klaassen (2006), Beetsma and Giuliodori (2011) and Suyker (1999). In order to facilitate the exposition of formulas, here we first present variable names alongside their description and sources, and then the formulas to calculate the variables that are used in the empirical investigation.

Unless noted otherwise, absolute amounts are in nominal terms; variables actually used in estimation in the paper are in bold; “ca” refers to cyclically-adjusted variables using trend GDP based on the Hodrick-Prescott filter; AMECO refers to the AMECO Database of the European Commission (May 2013).

Variable name	Variable description (original titles for variables not calculated by formula)	Source
<b>ca_gov_nt_real</b>	<b>Real cyclically-adjusted net-taxes</b>	<b>Formula</b>
<b>ca_gov_rev</b>	Cyclically-adjusted government revenues	Formula
<b>ca_gov_rev_real</b>	Real cyclically-adjusted government revenues	Formula
<b>ca_gov_tran</b>	Cyclically-adjusted government transfers	Formula
<b>ca_gov_tran_real</b>	Real cyclically-adjusted government transfers	Formula
<b>cit_dir</b>	Share of corporate income tax in direct taxes	Formula
<b>comp_avg</b>	Nominal compensation per employee: total economy	AMECO
<b>comp_avg_real</b>	<b>Real wages</b>	<b>Formula</b>
<b>comp_gg</b>	Compensation of employees: general government :- ESA 1995	AMECO
<b>comp_gg_cons</b>	<b>Real government wage bill</b>	<b>Formula</b>
<b>debt</b>	General government consolidated gross debt :- excessive deficit procedure (based on ESA 1995) and former definition (linked series)	AMECO
<b>debt/ngdp</b>	<b>Debt/GDP ratio</b>	<b>Formula</b>
<b>def_gc</b>	Price deflator total final consumption expenditure of general government, 2005=100	AMECO
<b>def_gdp</b>	<b>GDP deflator (price deflator gross domestic product at market prices, 2005=100)</b>	<b>AMECO</b>
<b>def_gfcf</b>	Price deflator gross fixed capital formation: total economy, 2005=100	AMECO
<b>el_cit</b>	Elasticity of corporate income tax with respect to the output gap	EC (2005)
<b>el_dir</b>	Elasticity of direct taxes with respect to the output gap	EC (2005)
<b>el_ind</b>	Elasticity of indirect taxes with respect to the output gap	EC (2005)
<b>el_pit</b>	Elasticity of personal income tax with respect to the output gap	EC (2005)
<b>el_prexp</b>	Elasticity of current primary expenditures with respect to the output gap	EC (2005)
<b>el_soc</b>	Elasticity of social contributions with respect to the output gap	EC (2005)
<b>empl</b>	<b>Employment (employees, persons: all domestic industries; national accounts)</b>	<b>AMECO</b>

Variable name	Variable description (original titles for variables not calculated by formula)	Source
<b>expend_curr</b>	Total current expenditure: general government :- ESA 1995	AMECO
<b>expend_curr_pr</b>	Current primary expenditures	Formula
<b>gc</b>	Final consumption expenditure of general government at current prices	AMECO
<b>gc_cons</b>	<b>Real government consumption</b>	<b>Formula</b>
<b>gc_nw_cons</b>	<b>Real government non-wage consumption</b>	<b>Formula</b>
<b>gdp_cons</b>	<b>Real GDP (gross domestic product at 2005 market prices)</b>	AMECO
<b>gdp_trend</b>	Trend gross domestic product at 2005 market prices (based on the Hodrick-Prescott filter)	AMECO
<b>gfcf_gg</b>	Gross fixed capital formation at current prices: general government	AMECO
<b>gfcf_gg_cons</b>	<b>Real government investment</b>	<b>Formula</b>
<b>gfcf_priv</b>	Gross fixed capital formation at current prices: private sector	AMECO
<b>gfcf_priv_cons</b>	<b>Real private investments</b>	<b>Formula</b>
<b>gov_spend_real</b>	<b>Real government spending</b>	<b>Formula</b>
<b>gov_tran</b>	Government transfers	Formula
<b>inter</b>	Interest: general government :- ESA 1995	AMECO
<b>ir_st</b>	Nominal short-term interest rates (note: the series corresponds to nominal 3-month money market interest rates)	AMECO and IMF IFS
<b>m</b>	Imports of goods and services at current prices (national accounts)	AMECO
<b>ngdp</b>	Nominal GDP (gross domestic product at current market prices)	AMECO
<b>open</b>	Trade openness	Formula
<b>pc_cons</b>	<b>Real private consumption (private final consumption expenditure at 2005 prices)</b>	AMECO
<b>pit_dir</b>	Share of personal income tax in direct taxes	EC (2005)
<b>prop_paid</b>	Property income, payable	Eurostat
<b>prop_rec</b>	Property income, receivable	Eurostat
<b>rev_curr</b>	Total current revenue: general government :- ESA 1995	AMECO
<b>soc_ben_paid</b>	Social benefits other than social transfers in kind: general government :- ESA 1995	AMECO
<b>soc_rec</b>	Social contributions received: general government :- ESA 1995	AMECO
<b>subs</b>	Subsidies: general government :- ESA 1995	AMECO
<b>tax_dir</b>	Current taxes on income and wealth (direct taxes): general government :- ESA 1995	AMECO
<b>tax_ind</b>	Taxes linked to imports and production (indirect taxes): general government :- ESA 1995	AMECO
<b>trpg</b>	Other current transfers paid by government	Formula
<b>trrg</b>	Other current transfers received by government	Formula
<b>x</b>	Exports of goods and services at current prices (National accounts)	AMECO

## Formulas used to calculate variables

### Expenditures

$$\text{gov\_spend\_real} = \text{gc}/\text{def\_gc} * 100 + \text{gfcf\_gg}/\text{def\_gfcf} * 100$$

$$\text{gc\_cons} = \text{gc}/\text{def\_gc} * 100$$

$$\text{gfcf\_gg\_cons} = \text{gfcf\_gg}/\text{def\_gfcf} * 100$$

$$\text{expend\_curr\_pr} = \text{expend\_curr} - \text{inter}$$

$$\text{comp\_gg\_cons} = \text{comp\_gg}/\text{def\_gc} * 100$$

$$\text{gc\_nw\_cons} = (\text{gc} - \text{comp\_empl\_gg})/\text{def\_gc} * 100$$

### Revenues (“ca” refers to cyclically-adjusted variables using trend GDP based on the Hodrick-Prescott filter)

$$\text{ca\_gov\_nt\_real} = \text{ca\_gov\_rev\_real} - \text{ca\_gov\_tran\_real}$$

$$\text{ca\_gov\_rev\_real} = \text{ca\_gov\_rev}/\text{def\_gdp} * 100$$

$$\text{ca\_gov\_tran\_real} = \text{ca\_gov\_tran}/\text{def\_gdp} * 100$$

$$\text{ca\_gov\_rev} = \text{ca\_tax\_dir} + \text{ca\_tax\_ind} + \text{ca\_soc\_rec} + \text{ca\_trrg}$$

$$\text{ca\_tax\_dir} = \text{tax\_dir} * (\text{gdp\_trend}/\text{gdp\_cons})^{\text{el\_dir}}$$

$$\text{ca\_tax\_ind} = \text{tax\_ind} * (\text{gdp\_trend}/\text{gdp\_cons})^{\text{el\_ind}}$$

$$\text{ca\_soc\_rec} = \text{soc\_rec} * (\text{gdp\_trend}/\text{gdp\_cons})^{\text{el\_soc}}$$

$$\text{ca\_trrg} = \text{trrg} * (\text{gdp\_trend}/\text{gdp\_cons})^{(-1 * \text{el\_prexp} * \text{trrg}/\text{expend\_curr\_pr})}$$

$$\text{trrg} = \text{rev\_curr} - \text{prop\_rec} - \text{tax\_ind} - \text{tax\_dir} - \text{soc\_rec}$$

$$\text{ca\_gov\_tran} = \text{gov\_tran} * (\text{gdp\_trend}/\text{gdp\_cons})^{(\text{el\_prexp} * \text{gov\_tran}/\text{expend\_curr\_pr})}$$

$$\text{gov\_tran} = \text{subs} + \text{soc\_ben\_paid} + \text{trpg}$$

$$\text{trpg} = \text{expend\_curr} + \text{cons\_fix\_gg} - \text{gc} - \text{subs} - \text{soc\_ben\_paid} - \text{prop\_paid}$$

$$\text{el\_dir} = \text{el\_pit} * (\text{pit\_dir}) + \text{el\_cit} * (\text{cit\_dir})$$

### Other variables

$$\text{gfcf\_priv\_cons} = \text{gfcf\_priv}/\text{def\_gfcf} * 100$$

$$\text{comp\_avg\_real} = \text{comp\_avg}/\text{def\_gdp} * 100$$

$$\text{debt}/\text{ngdp} = \text{debt}/\text{ngdp}$$

$$\text{open} = ((x+m)/2)/\text{ngdp}$$

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# Demographic change and income tax revenue in Germany: a microsimulation approach

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**Abstract**

*As a result of high net migration, both Germany's overall population and its work-force potential are currently growing. However, within a few years this demographic trend will be reversed, leading to a decline in population as a whole and especially in the number of those gainfully employed. In this paper, we use a population projection to apply a static ageing approach to German micro data. Then, we simulate income tax revenue with a microsimulation model for the future population. In 20 years' time the annual price-adjusted income tax loss is estimated to be equal to € 18 billion or almost 7 per cent. This fall in income tax revenue resulting from a shrinking and ageing society will place a huge strain on public finances in Germany, an effect further enhanced by the shift of the tax burden from pension contributions to pension benefits.*

*Keywords: public finance, tax revenue, demographic change, microsimulation*

**1 INTRODUCTION**

Since 2011, Germany's public finances have continuously benefitted from record tax revenues due to a robust economic performance and a solid development of the labour market. Labour market participation and the workforce increased during this time, yielding a plus of about two million employees by 2015. Accordingly, tax revenue from wages and incomes increased massively, putting Germany's public finances in a comfortable budgetary situation. The German budgetary situation yielded surpluses, which eventually reduced the public debt-to-GDP ratio. Since the good economic performance and development of the labour market are expected to last for the next few years especially due to high net immigration, the European Commission (2016) evaluated Germany's situation with respect to fiscal sustainability as being of low risk.

Recent developments regarding the migration of refugees to Germany have contributed to a growing working-age population. In 2015, Germany experienced a net immigration of about 1.1 million people. While about 2 million foreigners immigrated, roughly 0.9 million foreigners emigrated (Federal Statistical Office, 2016). Since this trend is expected to continue in the next years, if to a lower extent, the population projection of the Cologne Institute of Economic Research (IW) predicts a rise in the total population from 82.5 million in 2016 to nearly 84 million in 2024 (Deschermeier, 2016). This projection incorporates continuously high immigration, including an update on the expected number of refugees. It also accounts for refugees going back to their country of origin after a couple of years.

A somewhat different picture is given by the population projection for the time after 2024. Then, the ageing process of society will not be compensated by immigration and demographic changes will reduce the total population year by year. Between 2025 and 2035, the population is expected to shrink by over 700,000 persons (figure 1). This still means a population level above the current value but a steady decline from 2014 onwards. However, due to the higher immigration

assumed in the projection by IW, it differs from earlier projections, e.g. from Bachmann et al. (2013) or the Federal Statistical Office (2016), that predict a shrinking population in the short run.

**FIGURE 1**

*Population projection for Germany (number of inhabitants in millions)*



Source: Deschermeier (2016), Federal Statistical Office (2015).

If the focus is placed on the level of total population, the impact and consequences of demographic changes on the economy might be inadequately assessed. The working-age population, which is defined as people from 20 to 64 years, will grow almost at the same rate as the total population within the next years. While the total population will rise by 1.5 million people (+1.7 per cent) until 2024, the working-age population will grow by 0.7 million to a total of 50.8 million persons (+1.5 percent). This increase has two reasons. Firstly, the statutory retirement age will be shifted from 65 to 66 in the year 2024 and secondly, the immigrants coming to Germany are predominantly attracted by the positive employment perspectives and, therefore, belong to the working-age group. Even if the process of integrating immigrants and especially refugees into the labour market succeeds only slowly, immigration is expected to raise the number of employees. While the productivity of working refugees is supposed to be lower in the short run, it is assumed to be comparable to that of the original population in the long term.

In the long run, the effect of the ageing population is somehow undetermined. The old-age dependency ratio, which means the number of people in retirement age of 65 and above as a percentage of people between the ages of 20 and 64, will rise from 34 per cent in 2013 to 55 per cent in 2035 according to the prediction of the Federal Statistical Office (2015) in its scenario “Continuity with high immigration”. In the underlying study assessed with the IW projection, the ratio will rise to 52.6 per cent in 2035. If the old-age dependency ratio is defined with a starting age of 67 instead of 65 for the elderly, the value is 45 per cent for 2035 according to the IW projection, while the Federal Statistical Office estimates it to be equal to

47 per cent. The ratio will be driven by the retirement of the baby boom generation, i.e. in Germany, the birth cohorts between 1955 and 1969, from 2020 onwards.

In this study, the population projection by IW forms the input data for a static ageing approach of representative micro data of the German Socio-Economic Panel (GSOEP). In combination with a microsimulation model that simulates income tax, it is possible to predict the effect of demographic change on income structure and tax revenue. This approach has been applied in the literature; see for example Peichl, Pestel and Schneider (2012), who take a retrospective look at changes in the population structure and evaluate the effect on income distribution. De Blander et al. (2013) also use a population projection for their static ageing model and investigate the income distribution and the interaction with the tax-benefit system in Flanders.

## 2 LABOUR MARKET AND FISCAL BUDGET

While the population structure in the IW projection is given for every year by age and gender from 2016 to 2035 (Deschermeier, 2016), assumptions have to be made with respect to the labour market participation. We start with the assumption of a constant unemployment rate of 4.6 per cent from 2017 onwards according to the definition of National Accounts. Breaking down labour market participation by age group and gender, we base our modelling on the latest available information from 2014 of the microcensus (Mikrozensus). This provides a consistent data base for the weighting factors of the GSOEP data because the population projection by age and gender is based on enhanced census information. Keeping the participation rates constant over the time frame would be an unrealistic scenario because of recent trends: a law shifting the statutory retirement age from 65 years to 67 years was passed in 2007. This shift is to be implemented as a steady procedure ending in 2031, when the statutory retirement age will be 67 years for all new retirees. Since the shift started in 2012, increasing labour market participation rates have been observed for people aged 65 and older. We expect that this trend will continue and therefore anticipate slightly increasing participation rates for the older age groups. Starting with a participation rate of 8.7 per cent for men aged 65 and older in the year 2014, we end up with a rate of 10.4 per cent in 2035. For women in the same age group, the participation increases from 4.0 per cent to 7.0 per cent. The increased participation of the elderly is supposed to spill over to the age groups below, ending in the group from 45 years old upwards. The increase is relatively higher for women assuming a sustained trend of higher labour market participation of women in general (table 1). In summary, the underlying scenario can be seen as a rather optimistic one with a robust labour market and continuing trends in participation.

TABLE 1

*Population and working population by age group (in millions)*

In the year	Age group in years								Total
	under 20	20-29	30-39	40-49	50-54	55-59	60-64	65 and older	
<b>Female population</b>									
2016	7.3	4.8	5.0	5.7	3.5	3.1	2.7	9.9	42.0
2024	7.2	4.5	5.3	5.1	2.8	3.4	3.3	10.8	42.4
2035	6.9	4.1	4.7	5.5	2.7	2.5	2.6	12.9	41.9
<b>Female workforce</b>									
2016	0.5	3.6	4.1	5.0	2.9	2.4	1.3	0.4	20.3
2024	0.5	3.6	4.5	4.6	2.5	2.8	1.9	0.6	20.8
2035	0.4	3.1	4.1	5.1	2.4	2.0	1.5	0.9	19.5
<b>Male population</b>									
2016	7.7	5.1	5.2	5.8	3.5	3.0	2.6	7.6	40.6
2024	7.6	4.9	5.7	5.2	2.8	3.4	3.2	8.7	41.5
2035	7.2	4.4	5.2	5.8	2.8	2.4	2.5	10.9	41.2
<b>Male workforce</b>									
2016	0.6	3.8	4.9	5.6	3.2	2.6	1.6	0.7	22.9
2024	0.7	4.0	5.5	5.1	2.5	3.0	1.9	0.8	23.4
2035	0.6	3.4	4.9	5.7	2.5	2.1	1.7	1.1	22.0

Source: Deschermeier (2016), Federal Statistical Office (2015), own calculation.

Table 1 shows the population structure in the base year 2016 as well as in 2024 and 2035. While the total population is supposed to grow in the following years and is expected to lie above the 2016 value in the year 2035, the working population is expected to decline in the same period. This development would have implications for the social security system, which are discussed and simulated in the literature on a broad scale (e.g., Deutsche Bundesbank, 2016; Kochskämper, 2016). An increase in the number of people in retirement combined with a decline of the working population will naturally put pressure on pay-as-you-go systems like the German statutory pension system or the health system (Dolls et al., 2015). The relationship between demographic change and tax revenue has been rather disregarded in the literature, with few exceptions (e.g., Decoster, Flawinne and Vanleenhove, 2014). Bach et al. (2002) conclude that the social security system will be more strongly affected by demographic changes than tax revenue.

However, the consequences of an ageing society on incomes, tax base and tax revenue should not be underestimated. A significant share of the social security system is financed via taxes, which results in considerable interdependencies. The statutory pension system was subsidised by nearly 90 billion euro in the year 2016, a sum that comes from the federal budget. The ministry of finance expects it to increase to more than 100 billion euro in 2019. Additionally, civil servants' pensions are completely financed by taxes. The public expenses for civil servants' pensions will increase due to demographic changes in the next few decades (Hentze, 2015). A closer look at tax revenue is worthwhile due to the relationship between the public budget and the social security system. The less

the fiscal space in the future, the more important will be additional structural changes in the tax system.

German personal income tax applies a progressive tax scale on the sum of total income, which incorporates all sources of market income and pension income. An exception applies for capital income, which is taxed at a constant rate of 25 per cent. The revenue from income tax including the tax on capital income was about 280 billion euro in 2016, constituting 40 per cent of the total tax revenue in Germany. An important reform of the personal income tax for this analysis was implemented in 2004 – the Retirement Income Law (*Alterseinkünftegesetz*). The income tax law was reformed by shifting the tax liability from contributions for the statutory pension system to the received retirement incomes. Precisely, the tax-exempted share of contributions continuously increases year by year while the taxable share of old-age income is taxed to a growing extent. The deferred taxation reform will be fully implemented by the year 2040.

### 3 MICROSIMULATION APPROACH AND DATA

The effect of demographic changes on income tax revenue is simulated in a micro-simulation model. The tax and benefit microsimulation model of IW (“STATS”; see Beznoska, 2016) uses the latest data from GSOEP. The GSOEP data is a panel with 30,000 persons in nearly 16,000 households with its current wave from 2014 and provides rich information on income and social-economic characteristics of a representative German population. This information is available on an individual as well as on a household level and enables a detailed simulation of income tax.

To simulate the effect of demographic changes, the population is firstly re-weighted and uprated from 2014 to 2016. This is done by adjusting the weighting factors according to the new population, which comes from the external data described above from census and microcensus. The 2016 population is derived from the uprated census 2011 data, which also forms the base of the IW population projection. The adjustment of the weighting factors includes age group, gender and labour market participation according to the given marginal distributions. The uprating from 2014 to 2016 of the income information in the data set is done differentiated by wage, pension and profit income with factors derived from the National Accounts.

Based on this status quo for 2016, the population is re-weighted according to the population projection to “age” the data. This re-weighting or static ageing of the data yields the marginal distributions, which are shown in table 1. It is technically similar to the approaches in the literature (see e.g., Peichl, Pestel and Schneider, 2012; De Blander et al., 2013).

The re-weighted data are used to simulate the income tax implying an unchanged policy framework. All tax law parameters are kept constant except for future changes that have already passed into law. This affects the deductibility of statu-

tory old-age provision as well as the deferred taxation of pensions. The income tax law predetermines the parameters of deductibility and deferred taxation until 2040, which are taken into account in the simulation. The individual incomes are fixed on the 2016 level and no growth is assumed, meaning that all results are in real terms of 2016. The modelling also abstracts from productivity changes in the time frame. Thus, all results are solely driven by the demographic changes. The idea is not to construct a realistic future scenario including a prediction of future tax revenue but to isolate the effect of demographic changes on tax revenue in the simulation. Behavioural changes are also neglected.

Besides the base year 2016, we select the years 2024 and 2035 as points in time for the simulation. The year 2024 is selected for two reasons. Firstly, in the course of shifting the statutory retirement age from 65 years to 67 years, the transition to 66 years will be completed in 2024. Secondly, the year 2024 will mark the maximum of total population in the projection. The year 2035 is selected because it marks the end of the IW population projection where the baby boomers will have almost completely retired.

#### 4 UNCERTAINTIES IN THE STATUTORY PENSION SYSTEM

A critical assumption regarding income tax revenue is the development of the average retirement income in the statutory pension system. There are three policy parameters in the statutory pension system: the contribution rate, the level of average pension income and the statutory retirement age. It is somehow unclear how these three parameters will be adjusted in the future. Therefore, we take the contribution rate and the transition to a retirement age of 67 years until 2031 as fixed. However, the number of retirees and therefore of pension payments will rise in the simulation in spite of the higher labour market participation of the elderly. This will lead to a financial shortfall in the statutory pension system, which has to be solved via assumptions. The Germany statutory pension system is pay-as-you-go financed, meaning that pension payments are directly financed by the contributions of the working population.

Firstly, we keep the ratio of the sum of contributions to the sum of pension payments, as measured in the data for 2016, constant for the simulations of the future. This basic approach helps to minimise the assumptions about future pension politics. Thus, it implies that pension incomes will be financed with a constant share by employee contributions, which results in a pension income cut if the contributions decline or the number of retirees increases. The distribution of employment patterns, that are crucial for the entitlement to pension income, is also kept constant with no structural changes over time.

Holding the share of contributions to pension incomes constant in the simulation implies an overall cut in pension income of over 9 per cent in 2024 and of over 27 per cent in 2035. This approach stands in conflict with the current law that protects the minimum pension level (§154 SGB VI). The law sets the level of the standard-



ised pension income in the future, which refers to a pensioner retired at the regular retirement age with 45 years of earning the average wage income. It says that in the year 2020 the projection of the ratio of standardised pension income to the average gross wage income is not allowed to lie below 46 per cent or below 43 per cent in 2030. In 2016, the ratio lies around 47.5 per cent and would drop in the simulation until 2024 and 2035 below the legislated values. To avoid this, we increase the pension income in the simulation to the minimum pension level. We further assume that the minimum pension level, which is only legislated for until 2030, also applies for 2035. This approach accrues an uncovered deficit of 9.5 billion euro in 2024 and of about 39 billion euro in 2035, which are then financed by an increase in the contribution rate (from 18.7 per cent to 22.5 per cent in 2035). As a result, we still end up with an effective pension cut of 4.6 per cent (11.5 per cent) in 2024 (2035) compared to the average pension income in 2016. The treatment of the pension income is rather a stylised updating than a prediction of the future's pension system and shall only enable the modelling of pension taxation. It has to be noted that changes in the average gross wage income are only endogenous to the static ageing of the population because the monetary values are kept in 2016 real terms without any growth.

## 5 RESULTS

Our simulation reveals an increase in the taxable income in the next years (table 2). Aggregated wages will rise due to a higher number of employees. The same applies for pension income, indicating that the ageing of society is already in process. Total wage income will rise by 1 per cent in real terms until 2024, solely as a result of demographics. The expenses for the statutory pensions will be 5.5 per cent higher in 2024. Although taxable income will increase significantly, income tax will decrease because of the transition to deferred taxation. While employees can deduct a higher percentage of their pension contributions, the share of taxable pension income increases. However, the marginal tax rate of employees will be higher than that of retirees. Therefore, the progressive tax scale will yield an overall loss in income tax revenue. Thus, the average income tax burden will decrease below 16 per cent in 2024. After 2024, the total wage income will continuously decrease, while pension income will go sharply up. In spite of a constant unemployment rate, wage income will fall by nearly 90 billion euro per year by 2035.

The income tax revenue will almost remain at the same level in the near future, but decrease by around 7 per cent per year by 2035 compared to 2016. This corresponds to a minus of 18.4 billion euro in spite of a higher labour market participation of the elderly, which is driven by the effects of demographic change and transition to deferred taxation. The robust estimated confidence interval of 95 per cent lies between 15 billion euro and 22 billion euro and reflects the uncertainties of sampling as well as of the weighting factors. The revenue curve of the social security contributions is driven by the wage incomes but increases due to the higher modelled contribution rate of the statutory pension system in 2035.



TABLE 2

Effects of the demographic change (numbers for Germany for the years 2016, 2024 and 2035 based on simulations from the STATS model)

	2016	2024		2035	
	in billion euro	in billion euro	in per cent compared to 2016	in billion euro	in per cent compared to 2016
Wage income	1,290.9	1,304.0	1.0	1,217.4	-5.7
Statutory pensions	245.6	259.0	5.5	280.9	14.4
Total income	1,699.6	1,766.8	4.0	1,752.6	3.1
Income tax	281.3	280.3	-0.3	262.9	-6.6
Social security contributions	330.4	336.3	1.8	360.3	9.0
Child benefit	41.0	39.4	-3.9	38.1	-7.2
<i>memorandum item:</i>					
Population in million	82.5	83.9		83.1	

Source: GSOEP data v31, own calculation.

These numbers reflect the demographic changes in the short and medium term, which are accompanied by high net immigration. A special characteristic of these changes is observed by the decreasing amount of paid child benefit. This trend indicates an intensifying phenomena. Additionally, the decrease in wage income could have implications for other taxes, like indirect taxes. The shrinking number in the labour force is therefore expected to have a severe impact on public finances.

## 6 THE EFFECT OF DEFERRED TAXATION

Since the working population faces higher marginal tax rates than retirees, the transition to deferred taxation has significant implication for future tax revenue. Since 2005, taxation has continuously been shifted from statutory old-age provision towards pension income, which will be completed by 2040. This process only unfolds its magnitude over time letting the taxable share of pension income increase year by year to 100 per cent. If the retirement entry is before 2040, a fixed amount of the pension income is tax-exempted while future pension income growth has to be fully taxed. This transition to deferred taxation can be seen as a precautionary policy in expectation of the demographic change. As a result, the revenue from pension taxation will increase for two reasons: firstly, the number of retirees will increase and secondly, the share of taxable pension income will rise slightly over time.

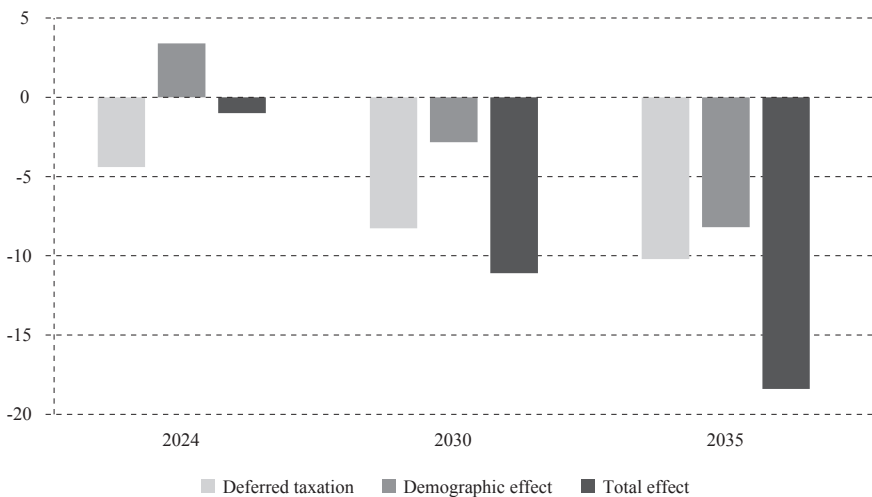
However, the higher taxability of pension income comes along with a higher deductibility of statutory old-age provision, which will diminish the taxable income of employees. Since they will face on average higher marginal tax rates than retirees, overall tax revenue will decrease. This policy-induced revenue effect should be distinguished from the pure demographic effect. In figure 2, the total effect is disaggregated into a deferred taxation and a demographic effect. The year 2030 is added for illustration purposes. The pure demographic effect is simulated

by ageing the population and holding the tax law according to the 2016 legislation. Thus, the effect of the deferred taxation results from the difference between total and demographic effect.

The decomposition in figure 2 shows that without the transition to the deferred taxation, income tax revenue would be 4 billion euro higher in 2024, about 8 billion euro higher in 2030 and more than 10 billion euro higher in 2035. Initially, the pure demographic effect on the income tax would be positive because of the high net immigration. In 2024, the revenue would be over 3 billion euro higher than 2016. In the long run, the ageing of society would yield a significant decline. In 2030, the negative demographic effect would be nearly 3 billion euro lower than today – this is over 6 billion euro than in 2024. In 2035, the minus would be over 8 billion euro compared to today and nearly 12 billion euro compared to 2024. This means the revenue will shrink by about 3 per cent in the next 20 years solely due to demographic change. Compared to 2024 this drop will be more than 4 per cent within 11 years. Again, these numbers are in real terms of 2016.

**FIGURE 2**

*Decomposition of the income tax revenue effect (effects compared to 2016 income tax revenue in billion euro)*



Source: GSOEP data v31, own calculation.

## 7 CONCLUSION AND POLICY OPTIONS

In this paper, we use the IW population projection to apply a static ageing approach on German micro data and simulate the income tax revenue with a microsimulation model for the future population.

In summary, the tax revenue in Germany can be expected to decrease significantly within the next 20 years as a result of two effects: firstly, the ongoing shift from pension contributions to pension benefits is supposed to diminish the overall tax

revenue since pensioners pay on average lower taxes than employees. Secondly, the labour force is projected to diminish as a result of an ageing population even if net immigration continues as expected.

As a consequence, politicians have a time frame of about two election periods to build a more sustainable system against the background of demographic changes. If not, tax revenue might shrink by 18 billion euro on a price-adjusted level, i.e. not accounting for productivity growth. Increasing the retirement age to 67 years is already considered an eventual measure in this regard.

On the one hand, public finances will be more and more under pressure. On the other hand, employees will benefit from the fact that they can fully deduct their pension contributions from their taxable income (table 3). In contrast, pensioners will likely pay higher taxes since year by year an increasing share of the pension payments will be taxed. The full amount will be taxable by 2040.

**TABLE 3**

*Average income tax burden by age group (income tax burden in percentage of gross income)*

Age group in years	2016	2024	2035	2035 scenario “revenue-neutral”
18-24	7.3	6.9	6.3	6.8
25-34	14.6	14.0	13.0	13.9
35-44	17.3	16.6	15.8	16.8
45-54	18.3	17.7	17.0	18.2
55-64	17.8	17.4	16.8	18.0
65 and older	7.0	8.3	9.5	10.1
Total	15.1	14.7	14.1	15.1

*Source: GSOEP data v31, own calculation.*

Due to the anticipated decreasing tax revenue, the sustainability of public finances is at risk. The developments in the pension system are expected even to worsen the situation since demographic changes will accelerate. A common political response to this development would be an increase in tax rates. If so, even employees over 55 years would pay higher taxes than today and, thus, the benefit from deferred taxation would be overcompensated in this age group (scenario “revenue-neutral” in table 3). Only employees under 45 years would still benefit. Again, any behavioural adjustments are not considered. This is an important note since labour incentives worsen due to the higher tax burden. However, an increasing participation rate by older employees is essential in order to stabilise the whole system and it is a central assumption of the underlying analysis.

To avoid the negative effects resulting from a possible tax hike, politicians should think about alternative approaches. This is especially true as demographic changes will not stop by 2035 (Werding, 2013). The German central bank – Deutsche

Bundesbank (2016) – has proposed to defer retirement to 69 years by 2060. Supplementarily, a better job integration of migrants, a higher share of women offering their labour or a higher degree, adequate job offers for elder people and an efficient education system are prospective answers to the demographic challenge and the shrinking tax revenue (BMF, 2016b). A similar opposing effect would appear through higher productivity, which would be reflected in higher real wages.

However, all these favourable approaches might not be sufficient. Therefore, public finances should be well prepared for a time of decreasing tax revenue by the establishment of a demographic fund. Current as well as future surpluses could be partly used to finance the effects of demographic changes in 20 years or so. Strict rules are needed concerning, amongst other things, the purpose of such a fund and a precise but flexible payment plan. Against a background of low interest rates and the long-term outlook, an appropriate share of the fund should be invested in the stock market at a reasonable risk exposure.

While these proposals look at the revenue side, it is also necessary to challenge government expenses. The ministry of finance fears deficits in the public finances, since government expenses might surge against the trend of decreasing revenue (BMF, 2016b). The impact of demographic changes on the composition of government expenses is straightforward. An aged society requires a better supply of health and care services while fewer roads, houses or administration officers might be needed by a shrinking population (SVR, 2011:163f).

### **Disclosure statement**

No potential conflict of interest was reported by the authors.

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# The determinants of health among the population aged 50 and over: evidence from Croatia

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Article\*\*

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## Abstract

*The aim of this paper is to explore the association between demographic, socio-economic and physical health variables and self-assessed health (SAH) of people aged 50 years and over in Croatia. Cross-sectional data was collected in 2012 in the survey "The Economics of Ageing in Croatia" that was based on the SHARE (Survey of Health Ageing and Retirement in Europe) study. Altogether 761 individuals aged 50 and over were included in the working sample that has been used in statistical analysis. Data were analysed in an ordered logistic regression model. The results show that females were more likely to report a higher category of SAH than males. Higher educational level was a statistically significant predictor of higher SAH, when controlled for other variables. This study, unlike other studies in Croatia, introduces a set of physical health variables as the determinants of health. Our results suggest that people aged 50 and over with fewer limitations, health related symptoms and diagnosed chronic conditions were more likely to report higher levels of SAH. These findings could be beneficial to policymakers in their efforts to improve health among elderly in Croatia.*

*Keywords: self-assessed health (SAH), Croatia, SHARE, population ageing, health determinants*

## 1 INTRODUCTION

Population health status and health care systems have always been of strategic importance for a country. Health care is a key determinant in maintaining good health, which in turn affects a country's productivity and the level of social well-being. Western countries have experienced a significant increase in total health care expenditures since the 1980s, and its share in GDP will continue to rise in the future. This increase is mainly spurred by population ageing (Harper, 2006; Dormont, Grignon and Huber, 2006), and improvements in medical technology (Okunade and Murthy, 2002; Bodenheimer, 2005). Health care expenditure trends could become a great challenge for the public health care systems in developed countries, seriously threatening their sustainability (Newhouse, 1992; Follette and Sheiner, 2005; Stuckler, Basu and McKee, 2013).

The Croatian health care system is built on the principle that virtually all legal residents have equal access to health care. It is a mixed system financed from both public and private sources. The majority of the funds to finance health care provision is pooled via compulsory health insurance contributions. Co-payments are applied to certain statutory services, and these have either to be paid out-of-pocket (OOP) or covered by complementary health insurance (Džakula et al., 2014). There is also voluntary supplementary health insurance for higher standards of health care services (Vončina et al., 2006). The World Health Organisation (WHO) (2016a) estimated that the total Croatian health expenditure was 7.8% of GDP, which is approximately 1,650 PPP\$ per capita. When compared to other European Union countries Croatia is among countries with the lowest health expenditure per capita just ahead Bulgaria, Romania and Latvia. Private expenditures are



mainly in the form of OOPs, but in 2014 they amounted only to 18% of total spending on health in Croatia (WHO, 2016a).

If we look at the general health status of the Croatian population, we can see it continued to improve during 21<sup>st</sup> century at a relatively moderate pace. Life expectancy at birth rose from 73 years in 2000 to 78 years in 2014. The increase was larger for males (from 69.1 to 74.8 years) than for females (76.7 to 81.1 years) (WHO, 2016a). At the same time healthy life expectancy (HALE) at birth reached 69.4 years in 2015 for both sexes, an increase of 3 years from 2000 (WHO, 2016b). We can observe a steady increase in the gap between HALE and life expectancy at birth, which indicates that people in Croatia spend on average more years in poor health. Indeed, the high prevalence of cardiovascular diseases and increase of cancer incidence rates could be the reasons for a decrease in health quality and consequently in healthy life expectancy. Most recent data from 2014 show that ischaemic heart and cerebrovascular diseases were the leading cause of 35% of deaths in the general population and nearly 40% of deaths among the population aged 65 and over, followed by malignant neoplasms in second place (CNIPH, 2016). Therefore, we can state that the efficiency of the Croatian health care system should be questioned since health care systems should strive to improve health status, compress morbidity and disability, especially in advanced ages, and thus extend HALE.

Recent empirical research use self-assessed health status as a common measure of health and health system performance. In order to improve our understanding of the general health of older Croatian citizens we explore several determinants of the most important measure of health at an individual level, i.e. self-assessed health status (SAH). SAH is easy to measure, and is widely used to measure health in many international studies, e.g. European Values Study (EVS), European Community Household Panel (ECHP) or the Survey of Health Ageing and Retirement in Europe (SHARE). In general respondents are asked to assess their own health status using a four or five-point scale, either from “excellent” to “poor” (US version of SAH) or from “very good” to “very bad” (European version of SAH) (Idler and Benyamini, 1997; Jürges, Avendano and Mackenbach, 2008). SAH is considered to be the most feasible, inclusive and informative measure of health status (Idler and Benyamini, 1997; Jylhä, 2009). In addition, SAH has proven to be a strong and valid predictor of future mortality and morbidity or even disability (see e.g., Bailis, Segall and Chipperfield, 2003; Franks, Gold and Fiscella, 2003; Nicholson et al., 2005; McFadden et al., 2009; Kaplan et al., 1996; Dominick et al., 2002).

In Croatia, only few studies cover the topic of SAH determinants and further research as from the international studies should be encouraged. A study done by Čipin and Smolić (2013a) explored the demographic and economic determinants of SAH in Croatia from four different cross-sectional data sets. Their findings suggest that age is the most important determinant of SAH in Croatia, followed by educational level. The effects of household income and employment status, when combined with other variables, were ambiguous and even statistically insignifi-

cant in some data sets. Other research papers explored the association between lower income and educational level and individual health status (Šučur and Zrinščak, 2007) or financial resources and health of unemployed people in Croatia (Galić, Maslić Seršić and Šverko, 2006). Unlike the previously mentioned research on health determinants in Croatia, this study emphasizes variables of physical health, e.g. (instrumental) activities of daily living, chronic health conditions and physical limitations, and exposure to risk behaviors like tobacco use and alcohol consumption. Indeed, physical health measures were significantly associated with SAH among persons aged 50 and over. Respondents who reported fewer (I)ADL limitations, chronic health conditions and distressing symptoms were more likely to report higher category of SAH. In addition, we found statistically significant association between the variables “gender”, “educational level”, “household income”, “help received” and SAH.

The rest of this paper is organized as follows: in section 2 of the literature review SAH is explained and linked with key determinants of health. In section 3 we describe the methodology and data. Following in section 4 we present the results of ordered logistic regression and in section 5 we discuss policy implications, study limitations and suggestions for future studies of SAH in Croatia.

## 2 LITERATURE REVIEW

### 2.1 SELF-ASSESSED HEALTH

In a detailed review of twenty-seven studies Idler and Benyamini (1997) detected SAH as an independent predictor of mortality. Many other studies since the 1980s revealed this consistency in conclusions about SAH. The SAH measure is simple, inexpensive, widely used, reliable and a predictive indicator of mortality even when many other determinants are controlled for (Kaplan and Camacho, 1983; Idler and Angel, 1990; Idler and Kasl, 1991; Kaplan et al., 1996; Reile and Leinsalu, 2013; Schnittker and Bacak, 2014; Meng and D’Arcy, 2016). SAH is easy to measure (Bobak et al., 2000), predicts longevity (Mossey and Shapiro, 1982) and is a powerful predictor of future health and health services utilization (Jylhä, 2009). In the longitudinal framework, Bailis, Segall and Chipperfield (2003) have found that present SAH significantly predicted a respondent’s future SAH. Nevertheless, we still poorly understand the association of SAH with mortality because there is no single, universal agreement upon a definition or direct measure of “health” or “health status” (Jylhä, 2009:309). However, the lack of its definition is viewed, in part, as the strength of self-rated health (Schnittker and Bacak, 2014). Idler and Angel (1990) argued about the inability of self-reports unambiguously to control for objective health status. They say that assessing the medical significance of SAH is difficult, while Jylhä (2009) questions the comparability of SAH distributions across cultural groups and distant age groups. Idler and Banyamini (1997) conclude that cross-cultural differences affect the consistency of international studies of SAH, and Jylhä (2009) proposed the use of qualitative approaches in studying how respondents reason about their health, and pointed out the role of experience and bodily sensations and biomarkers to better understand a biological basis of SAH.

We find a similar conclusion in the study of Lindeboon and van Doorslaer (2004: 1084) where, e.g. age, sex, education, language and personal experience of illness can influence the answers on SAH in different sub-groups of the population even though they have the same level of “true” health. Desesquelles, Egidi and Salvatore (2009) noticed the following problems with the comparability of SAH data for people in France and Italy: different wording of SAH questions, the order in which response categories were listed in questionnaires, and the different time the surveys were carried out. In addition, Jürges, Avendano and Mackenbach (2008: 779) conclude that “differences in the wording of response categories could lead to bias in comparisons of SAH between countries”. Peersman et al. (2012) revealed the importance of another approach in understanding what a global SAH item measures by asking people to elaborate their assessment of health. Several studies (see e.g., Crossley and Kennedy, 2002; Zajacova and Beam Dowd, 2011) also found that respondents tend to give different answers when asked standard SAH question twice or on two different occasions.

Idler and Banyamini (1997) proposed more detailed investigation of this issue which is related closely with the survey instrument and survey methods (e.g., responses to the SAH question could be affected by their context in the survey instrument). The differences in responses can be quite significant, e.g. 28% of respondents changed their answer after a set of health questions in the study of Crossley and Kennedy (2002), and nearly 40% between two interviews one month apart (Zajacova and Beam Dowd, 2011). To conclude this part, we have to mention studies reporting SAH as nonsignificant or a not so strong predictor of mortality. They usually include only older (old and old-old) people in the samples (Idler and Angel, 1990; Banyamini et al., 2003) or study only certain populations (Idler and Banyamini, 1997, call these “special populations”), e.g. African Americans (Ferraro and Kelley-Moore, 2001).

## 2.2 THE DETERMINANTS OF SELF-ASSESSED HEALTH

There is a strong commitment of many cross-sectional and longitudinal studies to exploring important determinants of SAH. Many researchers since the 1980s have endeavoured to understand the complexity of health assessment influenced by different socio-economic, demographic, cultural, psychological or political factors. Idler and Banyamini (1997) detected a wide range of SAH determinants in studies from all over the world. Among them age and gender, variables of socioeconomic status, e.g. educational level and income, measures of chronic conditions and functioning, health practice risk factors (smoking and alcohol consumption), and measures of social networks and life satisfaction were the most common.

We present major findings of national and cross-country studies of SAH determinants in the following part of the paper. In the study for seven post-communist countries (Russia, Estonia, Lithuania, Latvia, Hungary, Poland and Czech Republic), Bobak et al. (2000) found a strong association between educational level and material deprivation and SAH, i.e. higher educational levels and lack of material

deprivation were associated with higher category of SAH. Similar analysis done in Russia concluded that education, marital status, ability to rely on informal care or absence of informal social networks affect SAH (Bobak et al., 1998). In order to investigate the SAH in Estonia, Reile and Leinsalu (2013) included age, gender, ethnicity, educational level, and income, measures of physical health (chronic and long-term illnesses) and psychological health (depression) as predictors. The strongest associations were found for indicators of physical health, i.e. Estonians without any chronic illnesses or restrictions on their daily activities reported better health, *ceteris paribus*. A longitudinal study in Canada revealed the effects of determinants like gender, age, place of residence, education, marital status, etc. on SAH status change. The most important findings however were related to daily functioning and number of chronic illnesses that were consistently associated with SAH at each wave of the study (Meng and D'Arcy, 2016).

Pirani and Salvini (2012) focused on SAH of Italian population 65 and over by employing age, gender, diagnosed chronic illnesses, socioeconomic status, measures of lifestyle, family structure and social network. They found a slightly lower effect of education on SAH than similar studies, and they were discreet in conclusions about the effects of the economic situation on SAH. However, they stress the strong association between poor health and inadequate social networks (e.g., spouses, relatives or friends) among elderly Italians. From the seven-country study of Mackenbach et al. (2005) we realize that higher household income is associated with better SAH among men and women. This result has been confirmed in Estonia (Reile and Leinsalu, 2013), Canada (Meng and D'Arcy, 2016), Croatia (Šućur and Zrinščak, 2007).

Marital status is very often a significant predictor of SAH because the availability of spousal support is considered an important determinant of health outcomes (Dominick et al., 2002). Conclusions on the association of this variable and SAH are not homogeneous however. They still range from being complex, especially in the multinational studies (e.g., Huijts, Monden and Kraaykamp, 2010; Desesquelles, Egidi and Salvatore, 2009), notably nonsignificant for older age groups (Bobak et al., 1998; Nicholson et al., 2005), and significant for men and women and people aged 65 and over (e.g., Leinsalu, 2002; Meng and D'Arcy, 2016). A report on the elderly Spanish population found age, chronic conditions and functional status to be the main determinants of SAH (Damian et al., 1999). Peersman et al. (2012) confirmed that physical health problems are the dominant determinant among the respondents who were rating their health, but other reasons beyond physical functioning have been detected too, e.g. prior health experience or educational background. Prior health experience and socioeconomic situation over the life course have been detected as very important determinants of SAH in one study of Russians aged 50 and over made by Nicholson et al. (2005).

In Croatia, we found only a few studies where the determinants of SAH have been analysed. Šućur and Zrinščak (2007) examined the differences in SAH and access

to health care, controlling for different income groups, urbanization level, and regional distribution in Croatia and European Union countries. In addition, Galić, Maslić Seršić and Šverko (2006) examined the financial situation and health of unemployed individuals, while Čipin and Smolić (2013a) analyse four cross-sectional data sets available in Croatia (ESS, EVS and ISSP) to explore the extent to which individual health is related to demographic and socio-economic determinants. More work on SAH determinants in Croatia is thus required. Currently there are only cross-sectional frameworks in use, but in the future, there will be longitudinal data sets available from studies like SHARE.

### 3 DATA AND METHODS

The data used in this paper come from the survey “The Economics of Ageing in Croatia” that was based on SHARE questionnaires from waves 1 and 2. SHARE is a unique longitudinal database of micro data on the health, socio-economic status and social and family networks of respondents aged 50 and over covering most of the European Union, Switzerland and Israel (Börsch-Supan et al., 2013). Croatia formally joined the SHARE study for wave 6 in 2014. Respondents in this survey were all members of randomly selected households present in 221 settlements in Croatia, aged 50 and over at the time of the interview (i.e., they were born in 1962 or before), and their partners irrespective of their age. The sample was designed as a two-level random sample, where the first level of the selection was the selection of sampling points with corresponding addresses of persons aged 50 and over in all Croatian counties. Sampling points were settlements stratified by size (population aged 50 and over) in four categories: 30,000 and over, 5,000 – 29,999, 500 – 4,999 and 499 or less. By simple random selection from each stratum, we have selected as many addresses that proportionally correspond to the size of the individual strata in total population.

Each respondent had a 70-minute face-to-face interview (CAPI) with our interviewers. Interviews were conducted from July to December 2012. Most respondents (86%) filled in an additional short drop-off questionnaire, which they returned to the interviewer or mailed to the agency shortly after the interview. In total, 1,180 respondents aged 50 and over were interviewed in 855 households. The response rate of sampled households was 53% (Čipin and Smolić, 2013b). For the purpose of this paper, we have excluded partners who were born in 1963 or later. Complete data on all variables were available for 761 respondents. In the next steps, the determinants found to be associated with SAH were included in the analysis. We use ordered logistic regression to determine the association between SAH, the outcome variable, and already theoretically established a set of socio-economic, health status and demographic variables. Ordered categorical variables like SAH, measured on an ordinal 5-point Likert type scale are appropriate for ordered regression models (see e.g., Agresti, 2002; Liu and Agresti, 2005; Long and Freese, 2006). In addition, the SAH scale has been modified so that higher numbers correspond to better health. The data set contains a single-item measure of SAH, which assessed individual health perception measured on an ordinal

5-point scale. Respondents were asked this question: “Would you say your health is... very good, good, fair, bad or very bad?”

Age was measured in years, and categorized into two groups: “50-64” and “65 and over”. Educational level is presented at three levels: primary education or below (ISCED 0-2), secondary level of education (ISCED 3-4) and tertiary education (ISCED 5-6) as the reference category. We categorized marital status in four groups while the reference group is “Married”. In addition, the variable of social support was included that indicates if the respondent received help from outside the household or from a helper in the household. To capture the lifestyle of respondents, we use BMI equal or greater than 30 indicating obese respondents, share of smokers, ex-smokers and non-smokers, and lastly the share of those who had one or more drinks per week. Asking respondents to answer whether they were suffering from, e.g. back or joint pain, angina or chest pain, breathlessness, sleeping problems, etc. we found out more about symptoms, which is another important determinant of SAH.

The economic situation is described by employment status of respondents containing five categories. Moreover, respondents in this survey (financial respondents) were asked to think of household’s total monthly income. Household financial situation was assessed using a question: “Thinking of your household’s total monthly income, would you say that your household is able to make ends meet...” with the answer options “with great difficulty”, “with some difficulty”, “fairly easily” and “easily”. Answer options were categorized in two “some or great difficulty” and “no difficulty”. We did not obtain precise data about income on an individual level, and only the reported financial situation of households was included our model.

#### 4 RESULTS AND DISCUSSION

Table 1 represents the distribution of outcome and predictor variables. On average 38.4% of respondents reported their health as “Fair”, and around one out of three assessed their health as good or very good. However, almost every fifth man and every third woman reported a bad or very bad category of SAH. A descriptive analysis of the sample revealed that the share of females is somewhat higher, while the majority of the respondents have completed secondary education. The proportion of married respondents in the sample was very high, and one out of four individuals aged 50 and over is widowed, mainly females (37.4% of females vs. 8.4% of males). Every fourth respondent lived alone, one third of them with a spouse or partner only and the rest of the sample respondents with others only (e.g., children, other relatives and non-relatives). Around 35% of respondents received a number of different types of help (e.g., care, help with practical tasks and administrative tasks) from either outside or inside the household.



**TABLE 1**

*Socio-economic, health and demographic variables, and SAH (percentages) among individuals aged 50 and over in Croatia from “The Economics of Ageing in Croatia” survey in 2012*

Variable		Weighted %
SAH	Very bad	6.67
	Bad	20.74
	Fair	38.42
	Good	22.35
	Very good	11.82
Age <sup>a</sup>	50-65	50.05
	65 and over	49.95
Gender	Male	40.88
	Female	59.12
Educational level	Primary or below	34.75
	Secondary	45.84
	Tertiary	19.41
Marital status	Married	62.91
	Widowed	25.52
	Never married	5.47
	Divorced/separated	6.10
Help received	No help received	65.69
	Help from household member(s)	23.12
	Help outside household	11.18
Living with	Living alone	23.07
	Living with spouse/partner	32.95
	Living with others	43.98
BMI <sup>b</sup>	Less than 30	71.82
	Equal to or greater than 30 (obese)	28.18
Smoking	Current smoker	23.69
	Ex-smoker	23.75
	Non smoker	52.26
Drinking	At least once per week	34.06
Conditions	No diagnosed condition	26.15
	One or two conditions	48.95
	Three or more conditions	24.90
Symptoms	No symptom	25.16
	One or two symptoms	43.46
	Three or more symptoms	30.38
(I)ADL	No (I)ADL limitation	56.45
	One or two(I)ADL limitations	26.24
	Three or more (I)ADL limitations	17.31
Employment status	Employed	16.37
	Unemployed	9.30
	Retired	60.30
	At home	12.65
	Other	1.38
Household financial situation <sup>c</sup>	Some or great difficulty	78.50
	No difficulty	21.50

<sup>a</sup> Mean age = 65.45 years. <sup>b</sup> Categories: underweight = BMI  $\leq$  18.49; normal weight = BMI 18.50-24.99; overweight = BMI 25.00-29.99; obese = BMI  $\geq$  30.00. <sup>c</sup> Reported income at the household level only.

Source: Author calculations.

TABLE 2

Odds ratios (OR) with p-values and 95% confidence intervals (CI) from the ordered logistic regression of the self-assessed health (SAH) of men and woman aged 50 and over in Croatia (N=761); "The Economics of Ageing in Croatia" survey

	OR	95% CI	
<b>Age (50-64)</b>			
65 and over	0.82	0.57	1.19
<b>Gender (Male)</b>			
Female	1.61**	1.15	2.26
<b>Educational level (Tertiary)</b>			
Primary or below	0.39***	0.25	0.62
Secondary	0.54***	0.37	0.78
<b>Marital status (Married)</b>			
Widowed	0.89	0.54	1.48
Never married	0.70	0.33	1.49
Separated/divorced	0.60	0.31	1.17
<b>Help received (No help received)</b>			
Help from household member(s)	0.51**	0.32	0.83
Help outside household	0.73	0.51	1.03
<b>Living with (Living alone)</b>			
Living with spouse/partner	1.30	0.73	2.34
Living with others	1.32	0.82	2.14
<b>BMI equal to or greater than 30</b>	1.04	0.76	1.42
<b>Smoke (Never smoker)</b>			
Ex-smoker	1.13	0.79	1.62
Current smoker	1.03	0.72	1.49
<b>Drink</b>	0.84	0.61	1.16
<b>Conditions (Three or more)</b>			
No diagnosed condition	3.86***	2.42	6.15
One or two conditions	1.78**	1.23	2.58
<b>Symptoms (Three or more)</b>			
No symptom	6.21***	3.84	10.05
One or two symptoms	2.05***	1.41	2.99
<b>(I)ADL (Three or more)</b>			
No limitation	7.46***	4.51	12.36
One or two limitations	3.65***	2.28	5.86
<b>Employment status (Employed)</b>			
Unemployed	0.77	0.43	1.39
Retired	0.84	0.53	1.33
At home	0.83	0.44	1.58
Other	0.33	0.09	1.16
<b>Household financial situation (Some or great difficulty)</b>			
No difficulty	2.07***	1.46	2.93

Note: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ . Reference category is in the brackets.



A very small proportion of respondents reported being underweight, but more than seven out of ten fit in the overweight and obese groups. One out of four respondents smoked every day while 24% of them stopped smoking. More than 34% respondents had at least one drink per week whereas 15% have been drinking every day in the last six months. From table 1 we notice that almost every second respondent has been diagnosed with, or currently has, one or two health problems (conditions), e.g. high blood pressure or hypertension, high blood cholesterol, diabetes, osteoporosis, etc.

Only one out of four respondents did not report problems with the symptoms presented on the showcard during interviews. Problems with activities of daily living (ADL), e.g. dressing, eating, bathing, and instrumental activities of daily living (IADL), e.g. cooking, shopping, etc. were observed for almost every second respondent aged 50 and over in the sample. As expected, employment rate among elderly individuals was low. Nonetheless, one out of three individuals aged 50 and over in the working contingent age group was employed, and another 16% of them were looking for a job. We noticed a bulk of households (almost 80%) having at least some difficulty in making ends meet in a typical month.

As mentioned earlier, 761 cases were included in the working sample, and the SAH scale has been modified so that higher numbers correspond to better health. The parallel regression assumption in the ordered logistic model has not been violated, and the results are displayed as proportional odds ratios in table 2. Inferential findings are explained separately by each or a group of the SAH determinants.

#### 4.1 GENDER

We found a statistically significant association between gender and SAH. Men aged 50 and over were less likely to report higher categories of SAH than women were, after controlling for other variables in the model. Conclusions on gender differences with respect to SAH from previous research are not clear enough (McDonough and Walters, 2001). In many cases, the determinants of SAH are explored separately for men and women. Gender gap in SAH is observed in the general population, e.g. from the EU-SILC data in 2014 for all EU member states. For the Croatian population aged 16 years and over, men were more likely to rate their health as very good or good, whereas women tended to rate their health lower. In addition, healthy life expectancy based on self-perceived health at the age of 50 was 17.8 years for males and 19.2 years for females in 2014 (Eurostat, 2016a). Another striking indicator available from the EU-SILC is “self-perceived long-standing limitations in usual activities due to a health problem”. Among the population aged 65 and over 27.7% of males and 30.5% of females reported severe levels of activity limitation due to health problems in 2015. The proportions of men and women aged 65 and over who reported some or severe level of activity limitation were 68.5% and 75.9%, respectively (Eurostat, 2016b). Čipin and Smolić (2013a) used four different data sets to explore SAH determinants in Croatia, and did not find statistically significant gender differences in SAH in the European

Social Survey data sets. Benyamini, Leventhal and Leventhal (2000) argue that men's SAH judgments reflect mainly serious, life threatening, whereas women's SAH judgments reflect both life-threatening and non-life-threatening diseases.

Furthermore, while reporting their SAH respondents' perceptions of health status seem to be holistic, e.g. they also include information on medical status. Also, men and women in different social positions evaluate such information differently with different reference groups providing different social comparisons (Idler and Benyamini, 1997). On the other hand, a follow-up study of sociodemographic factors of SAH and mortality in the US show that women report lower health status but exhibit lower mortality (Franks, Gold and Fiscella, 2003). Poor health ratings among male respondents could indicate prevalence of more serious health conditions, but their poor ratings are more predictive of mortality than women's poor rating (Idler and Benyamini, 1997). After all, we should not forget that SAH could be affected by respondents' subjective perception, their social and cultural background as well as by their previous health experience.

#### 4.2 EDUCATIONAL LEVEL

Educational level proved to be strongly associated with better SAH. Individuals who have completed primary education or lower (e.g., who finished elementary school only or did not complete elementary school) and secondary education, were significantly less likely to report higher category of the SAH than those with tertiary education, controlling for other variables. This finding comes as no surprise, as it was already confirmed in many previous studies. Low educational level is often found to be an important determinant of poor health and systematically higher morbidity and mortality rates (Leinsalu, 2002; Mackenbach, 2006; Beam Dowd and Zajacova, 2007). Education is generally the most basic variable in improving the health of the population. The Grossmans' theory of demand recognized the central role of education implying that better-educated persons tend to be economically more efficient producers of health status (Grossman, 1972).

#### 4.3 LIVING ARRANGEMENTS AND SUPPORT

Widowed, non-married and separated/divorced versus married subjects were less likely, but non-significantly, to report a higher SAH category. Huijts and Kraaykamp (2011) proved that the strength of the relationship between marital status and the SAH differs substantially among nations, and that is affected by the national marital status composition. Because of the high proportion of married persons aged 50 and over in Croatia, health selectivity into marriage, i.e. selection of healthy people in the marriage and of unhealthy people into widowhood or divorce (Huijts and Kraaykamp, 2011:284), seems to play a stronger role.

We also analysed the association between household size and the SAH of respondents. Living with spouse/partner only or living with other family members only was positively associated (but statistically non-significant) with better health. Individuals, who were living with spouse/partner only or with others only as com-

pared to people living alone, were more likely to report a higher category of SAH, *ceteris paribus*. A variable “help received” is employed to understand who provided the support or a help to respondents. Respondents who have received help from (a) household member(s) were significantly less likely to report a higher category of SAH. A similar finding accounts for a category “help received outside the household”; however, the association between it and SAH was not statistically significant.

#### 4.4 RISK BEHAVIOURS AND PHYSICAL HEALTH

Ex-smokers and current smokers had a non-significantly slightly higher likelihood of reporting higher levels of SAH, while drinkers were less likely, and again non-significantly, to report higher SAH, holding all the other variables constant. Descriptive analysis showed that functional status deteriorates with age, e.g. almost 70% of respondents in the 50-64 age group had no limitation (combined ADL and IADL) as compared to 43% of those aged 65 and over. Moreover, we can see that multi-morbidity is prevalent in older age groups, i.e. one out of three persons aged 65 and over reported being diagnosed with or suffering from three or more illnesses, but only one out of seven respondents reported the same in the youngest age group. Even though previous research in Croatia confirmed that SAH deteriorates with age (e.g., Čipin and Smolić, 2013a) we are not able to confirm these findings. When analysing covariates of physical health, i.e. daily functioning, number of chronic conditions and number of symptoms that distress people in their everyday life, we found consistency in association with the SAH. Average odds ratios (OR) ranging from 1.78 to 7.46 indicate a several times higher likelihood of respondents who reported one or two symptoms and no symptom, respectively, versus respondents having three or more symptoms to be in higher category of the subjective health status measure, controlling for the rest of model variables. In addition, people with no diagnosed condition were significantly more likely to report a higher SAH category.

Comparing the categories of (I)ADL limitations, people without any (I)ADL limitation were significantly more likely to report higher categories of the SAH than individuals with at least three (I)ADL limitations. For a better SAH, fewer limitations on physical and instrumental daily functioning and fewer diagnosed chronic conditions proved very important. This conclusion has been confirmed in the study of Meng and D’Arcy (2016) on longitudinal data, for each of three observed waves. Reile and Leinsalu (2013) established it in one Estonian study where those who had limitations in their daily activities were 4.5 times more likely to assess their health as bad or very bad. They conclude that “the SAH scale demonstrates continuity in respect to physical health measures”, i.e. association for physical variables was statistically significant across all SAH levels (Reile and Leinsalu, 2013:561). Lima-Costa et al. (2012) investigated the socioeconomic inequalities in health and concluded that physical functioning is a key measure of successful ageing. Similar findings came from the studies in Japan (Sun et al., 2007), France and Italy (Desesquelles, Egidi and Salvatore, 2009), etc.

#### 4.5 EMPLOYMENT STATUS AND INCOME

In the working sample, about 57% of respondents who were employed reported very good or good health compared with slightly less than half of those who were not employed. Previous studies confirmed significant association between unemployment and poor SAH (e.g., Giatti, Sandhi and Cibele, 2010; Desesquelles, Egidi and Salvatore, 2009), while financial deprivation could lead to the poor health of unemployed persons (Galić, Maslić Seršić and Šverko, 2006). Unemployed, retired and persons at home were less likely to report better health, but we could not confirm that any category is significantly associated with SAH.

A better household financial situation, i.e. referring to those households that are able to make ends meet with their monthly income easily or fairly easily is significantly associated with better SAH among both men and women. Respondents from the households with no difficulty in making ends meet with their monthly income were 2.1 times more likely to be in a higher category of SAH than individuals living in households that experienced some or great difficulty in making ends meet, controlling for the rest of the model variables. Our findings clearly support previous conclusions that income is an important predictor strongly associated with health among men and women.

#### 5 CONCLUSION

Findings in this paper can be considered useful for policymakers within health and social care systems in Croatia. They should foster evidence-based public policy measures that could increase the physical functioning of the older population. Social security is already a large part of government spending in Croatia, and costs of pensions, disability allowances and long-term health care are becoming a great problem. One of the most challenging issues in the next decade will probably be a serious increase in the demand for long-term care services. This will occur because of the higher incidence of chronic disease in the cohorts moving into older ages and morbidity expansion. The negative consequences could be curtailed if a more efficient health care system could reduce morbidity and disability by improving general health of the population and increasing healthy life expectancy. This paper also revealed the positive effects of education on the health of an individual. Policymakers should realize that education is associated with health inequality, and encourage policies for more years of schooling and supporting early childhood education that may have health benefits (Adler and Newman, 2002). Governments should support education institutions and programs, e.g. life-long learning programs among the elderly especially for “older workers”. Finally, following the paper’s findings we saw that financial situation could have an important role in an individual’s health status. We found that a better financial situation is significantly associated with better health among the population aged 50 and over. A disadvantaged financial situation, which is highlighted among today’s older population in Croatia, may have detrimental effects on health status. Nevertheless, the perspectives for the improvement of their current living standards are not so bright, even in the long run. The number of pensioners will con-

tinue to grow, and combined with inadequate income from pensions, could lead to a further decline in the average health of the elderly.

Like many other studies, this study exhibits several limitations. One of them is the cross-sectional data that are not adequate to explore the causal relationship between education and health, or any other health determinant. Longitudinal data sets are thus necessary to improve our understanding of health and health changes in Croatia. In addition, we excluded other determinants of the SAH in our model that might also help to explain health inequalities. Forthcoming research of the SAH determinants in Croatia, besides the longitudinal data, could include a set of country-specific variables, e.g. exposure to the homeland war of certain populations or address the regional differences in SAH properly. The low response rate (e.g., household response rate of 53% and individual response rate of 42% in this survey) could also be an issue. Additional concern arises from the discovery that respondents tended to give different answers when asked standard SAH question twice or on two different occasions, and this is especially the case with older individuals. Lastly, despite the subjective nature of outcome variable and predictors, the results presented in this paper should be considered relevant and reliable estimators of the health status of the elderly in Croatia as well as good predictors of future health care needs.

### **Disclosure statement**

No potential conflict of interest was reported by the author.

## APPENDIX

## SUMMARY OF SELECTED STUDIES OF THE SAH DETERMINANTS

Author(s)	General research strategy	Time period	Countries included	Main findings
Bobak et al. (1998)	Cross-sectional study in a national sample of the Russian population of social and psychosocial determinants of two self-reported health indicators: self-rated health and physical functioning. Logistic regression for two dichotomised outcomes: poor self-rated health and low physical functioning.		Russia	Material deprivation is strongly related to both outcomes. Education was inversely related to self-rated health. Unmarried men reported poor physical functioning substantially more often. Subjects not approving the economic changes reported poorer health. Subjects who could not rely on informal social structures when in problems reported worse health.
Bobak et al. (2000)	Study examined the association between perceived control and several socioeconomic variables and self-rated health in seven post-communist countries. The associations between poor health and socioeconomic factors were estimated by logistic regression.	1996-1998	Russia, Estonia, Lithuania, Latvia, Hungary, Poland, Czech Republic	Education and material deprivation are strongly related to self-rated health.
Damian et al. (1999)	The five-category dependent variable was grouped into two categories: good and poor self-assessed health. Age, sex, social class, use of physician services, number of chronic conditions, and functional capacity were included as main explanatory factors. Adjusted odds ratios were estimated through multiple logistic regression models.	1994-1995	Spain	Age, chronic conditions, and functional status were the main determinants of perceived health among the Spanish elderly. The effect of social class on perceived health markedly decreases with age.
Desquesnelles, Egidi and Salvatore (2009)	The prevalence of self-rated bad health is studied in a cross-national comparative study based on the data of National Health Surveys conducted in France and Italy. Logistic regression models were applied.	2002-2003 (France); 1999-200 (Italy)	Italy, France	Differences in population structure regarding the individual characteristics (sociodemographic characteristics, diseases and disabilities, lifestyle, and others) significantly affected the SAH in two countries.

Author(s)	General research strategy	Time period	Countries included	Main findings
Franks, Gold and Fiscella (2003)	Ordinary linear regression analyses were used in this study of adjusted relationships among baseline self-reported health, derived from SF-20 subscales (health perceptions, physical function, role function and mental health) and sociodemographics (age, sex, race/ethnicity, income and education) and subsequent mortality.	1987	USA	Physical function showed the greatest decline with age, whereas mental health increased slightly. Women reported lower health for all scales except role function. Greater income was associated with better health. Greater education was associated with better health. Compared with whites, blacks reported lower health, whereas Latinos reported higher health.
Huijts and Kraaykamp (2011)	Multilevel regression analyses exploring the extent the often found association between marital status and self-assessed health is influenced by the marital composition of the country people live in.	2002, 2004, 2006	29 European countries	Living in a country with a high proportion of married people appears to be beneficial to the health of never married persons, but detrimental for widowed people. Divorced, widowed, and never married persons may be worst off when living in countries with high proportions of people who are in the same situation. The never married are worst off in countries with a high proportion of cohabitants.
Huijts, Monden and Kraaykamp (2010)	Multilevel regression analyses is applied to examine whether own educational level and spouse's educational level are independently associated with self-assessed health throughout European societies.	2002, 2004, 2006	29 European countries	Educational level and the spouse's level of education positively affect SAH in Europe. The degree of educational heterogamy does not influence the average level of self-assessed health in a country.
Idler and Benyamini (1997)	Review of 27 international studies	1982-1997	Sweden, Lithuania, Israel, UK, The Netherlands, France, Poland, Hong Kong, Japan, Australia, Canada, USA	Global self-rated health is an independent predictor of mortality in nearly all of the studies, despite the inclusion of numerous specific health status indicators and other relevant covariates known to predict mortality.



Author(s)	General research strategy	Time period	Countries included	Main findings
Jürges, Avendano and Mackenbach (2008)	Ordered probit regression on SHARE data. Study compares the WHO recommended version (ranging from “very good” to “very bad”) with the US version (ranging from “excellent” to “poor”) in European countries.	2004	Germany, Spain, Greece, The Netherlands, Austria	Authors assessed the difference of answers of US and WHO version so the SAH questions. They found less than 10% of respondents provided discordant answers.
Jylhä (2009)	Paper presents model describing the health assessment process to show how self-rated health can reflect the states of the human body and mind. Based on the proposed model, it examines the association of self-rated health with mortality.	—	—	Analytic distinction is made between the different types of information on which people base their health assessments and the contextual frameworks in which this information is evaluated and summarized.
Mackenbach et al. (2005)	The proportion of respondents with SAH less than “good” was measured in relation to educational level and income level. Inequalities were measured by means of age-standardized prevalence rates and odds ratios.	1980s-1990s	Finland, Sweden, Norway, Denmark, England, The Netherlands, West Germany, Austria, Italy, Spain	Socioeconomic inequalities in self-assessed health showed a high degree of stability in European countries. The relatively favourable trends in the Nordic countries suggest that these countries’ welfare states were able to buffer many of the adverse effects of economic crises on the health of disadvantaged groups.
Leinsalu (2002)	Study examined differences in self-rated health by eight main dimensions of the social structure on the basis of the Estonian Health Interview Survey, carried out in 1996/1997. A multistage random sample (N=4711) of the Estonian population aged 15-79 was interviewed. This study includes those respondents aged 25-79 (N=4011) with analyses being performed separately for men and women.	1996/97	Estonia	Low educational level, Russian nationality, low personal income, and for men only, rural residence were the most influential factors underlying poor health. Education had the biggest independent effect on health ratings. Material resources, in this study measured by personal income, were important factors in explaining some of the educational and ethnic differences in poor self-rated health. No differences between men and women in their health ratings were found.



Author(s)	General research strategy	Time period	Countries included	Main findings
Mackenbach et al. (2005)	Study examined the shape of the relationship between household equivalent income and SAH. Data were obtained from nationally representative health, level of living, or similar surveys and applied to men and women aged 25 years and older in the 1990s.	1990s	Belgium, Denmark, England, Finland, France, The Netherlands, Norway	A higher household equivalent income is associated with better self-assessed health among men and women in all countries, particularly in the middle-income range.
McFadden et al. (2009)	Study examined the relationship between SAH and mortality by occupational social class in a prospective study of 22,457 men and women aged 39-79 years, without prevalent disease.	1993-1997	Norfolk – UK	SAH was related to subsequent mortality. The prevalence of poor or moderate SAH was higher in manual than in non-manual classes. However, SAH was similarly related to mortality in manual and non-manual classes.
Meng and D'Arcy (2016)	Study compares determinants of SAH among a large community-dwelling cohort of Canadian seniors (N=3255) at three points in time (1991, 1996, and 2001), and examines the effects of determinants on change in SAH over a 10-year period. Multivariate ordinal logistic regression on Canadian Study of Health and Ageing data.	1991, 1996, 2001	Canada	Factors including cognition, daily functioning, chronic disease, and availability of help were significantly linked to self-rated health over time.
Nicholson et al. (2005)	Study examined the influence of socioeconomic risk factors over the life course on the SAH of older Russian men and women. A random sample of the general population of the Russian Federation in 2002 included 1,004 men and 1,930 women aged 50 years and over in a cross-sectional study.	2002	Russia	Self-rated health in older Russians reflects social exposures accumulated over the life course, with the differentials observed only partially explained by current social conditions. Health behaviours were not involved in mediating social differences in self-rated health.

Author(s)	General research strategy	Time period	Countries included	Main findings
Pirani and Salvini (2012)	Stepwise multilevel logistic regression models using the data on health conditions which come from a survey conducted by the Italian National Statistics Institute (ISTAT).	2004-2005	Italy	Each component of the socioeconomic status is autonomously correlated with individual perceptions of health. The lack of a network of relationships was also found to be strongly associated with a poor health status for elderly Italians.
Reile and Leinsalu (2013)	Multinomial logistic regression analysis was used to study the association of socio-demographic, physical and psychological health and well-being characteristics with positive (good or very good) and negative (bad or very bad) SAH as compared to fair SAH.	2006	Estonia	Negative SAH was related to male gender, the presence of chronic illnesses, limitations in daily activities and physical functioning, emotional distress, an external locus of control, and to low satisfaction with life and physical fitness. Positive SAH was related to younger age, an Estonian ethnic identity, and to higher education and income.
Schmittker and Bacak (2014)	Cox regression of SAH predicting mortality on GSS data.	1980-2002	Germany	More schooling and more cognitive ability increase the predictive validity of SAH, but neither of these influences explains the growing association between SAH and mortality. Good SAH is correlated with “can go out alone to distant places”, no depression, no weight loss, absence of self-rated chronic disease, good chewing ability, and good visual ability in men; whereas with “can go out alone to distant places”, absence of self-rated chronic disease, no weight loss, no depression, no risk of falling, independent IADL, good chewing ability, good visual ability, and social integration (attend) in women.
Sun et al. (2007)	Multivariate logistic regression was used to identify the factors associated with good SAH and sex specific effect was tested by stepwise logistic regression.	2005	Japan	

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# Determinants of disability pensions in Croatia: the role of institutions

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Article\*\*

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## Abstract

*The goal of this paper is to investigate why Croatia has a large number of disability pension beneficiaries. Approximately one quarter of Croatia's retired population is receiving a pension based on disability. After a presentation of the most important facts and figures, the following possible determinants of disability pensions in Croatia are considered: health status, conditions of work, socioeconomic status, war, and institutions. Simple before-after comparisons suggest that institutional reforms had a strong impact on the number of disability pension beneficiaries. Furthermore, the granting of disability pensions has been plagued by corruption, which shows the importance of informal institutions as well. Future research should focus on micro-data in order to find specific social and health care policy measures to alleviate the effect of socioeconomic and health factors on the incidence of disability.*

*Keywords: disability pensions, Croatia, corruption, war, institutions*

## 1 INTRODUCTION

It is widely acknowledged that institutions matter. "Institutions form the incentive structure of a society, and the political and economic institutions, in consequence, are the underlying determinants of economic performance" (North, 1994). They consist of formal constraints (e.g. regulations, laws, constitutions), informal constraints (e.g. norms of behaviour, self-imposed codes of conduct, conventions), and their enforcement characteristics. A pension system is framed by institutions as well, and disability pensions are no exception, even though it seems obvious that they are primarily health dependent.

Krokstad and Westin (2004) study medical and non-medical causes of disability pensions in Norway and discover that medical determinants alone cannot interpret the increased incidence rates of disability pensions in the observed two decades. They find a geographic pattern for the prevalence of disability pensions at a municipality level, which suggests that structural and cultural factors are also vital in determining the level of disability in society. A study of disability pensions among immigrants in Sweden (Österberg and Gustafsson, 2006) shows that foreign-born individuals are more likely to have a disability pension than native-born Swedes. Specifically, the highest rates of receipts of disability pensions are reported for persons born in Greece, Yugoslavia (Croatia is one of Yugoslavia's successor countries) and Turkey. The authors classify these countries as East Mediterranean. They do not investigate the causes of the higher risk of being on a disability pension. Interestingly, Börsch-Supan, Brugiavini and Croda (2009) find that the southern countries in their sample have a high prevalence of early retirees. The geographical variation highlights the possible importance of informal institutions.

Research by Börsch-Supan, Brugiavini and Croda (2009) also leads to a conclusion that health and demographics play only a small role in cross-national differences in work and retirement, even when it comes to disability benefits. Most international variation in disability-benefit reciprocity rates can be explained by the insti-



tutional factors. As institutional factors the authors employ a set of OECD (2003) variables on the generosity of the disability benefit system in each of the 11 countries covered by the Survey of Health, Ageing and Retirement in Europe (SHARE). These variables measure coverage, minimum disability level required for full benefits, medical assessment, benefit generosity, vocational assessment, and the generosity of the unemployment benefits. The most important institutional variable, which explains 60% of the cross-national variation, is the minimum level of disability required for obtaining full benefits. Health is a significant determinant of earlier retirement within each country.

Hanel (2012) also points out that disability benefits may serve as an exit route to early retirement and encourage individuals to leave the labour force early. In her study of the institutional reform of disability pensions in Germany in 2001 she finds that individuals whose health status is very bad do not react to financial incentives because a labour market income is not attainable. The opposite holds true for people who are of relatively good health. Their decision to enter disability retirement depends on the implicit tax rate on further work, i.e. the extra gain in income from further work. Research on Denmark confirms that when people experience an acute health shock, the retirement effect following it is immune to various welfare state programs and institutions available to older workers (Datta Gupta and Larsen, 2007). A link between institutions and disability is found in Austria as well. Staubly (2011) shows that stricter eligibility rules have a strong influence on disability enrolment. Screening stringency is important too; De Jong, Lindeboom and Van der Klaauw (2011) use a controlled experiment in which some regional disability insurance offices in the Netherlands were notified to screen applicants more intensively. The authors find a large decrease in disability insurance applications in regions with more stringent screening.

Apart from health status and institutions, socioeconomic status is important as well: low education, low income, receipt of social benefits and unemployment increase the risk of entering disability retirement (Gjesdal et al., 2004; Karlsson et al., 2008; Krokstad and Westin, 2004; Upmark et al., 2001). Unfavourable working conditions are another risk factor for disability pensions (Falkstedt et al., 2016; Robroek et al., 2013). Gravseth et al. (2007) show the importance of biological and social factors from childhood (maternal marital status, parental disability, birth weight below the mean, chronic childhood disease, low educational achievement) for the taking of disability pension. It is further shown that relative municipality deprivation accounts to an increase in disability pension incidence (Krokstad et al., 2004). The majority of papers on the determinants of disability pensions refer to Denmark and Norway.

One of the features of the Croatian pension system is the large number of disability pension recipients. Approximately one quarter of Croatia's retired population is receiving a disability pension. This share includes disability pensions that were by law, starting from 2015, transformed into old age pensions for beneficiaries

older than 65. In comparison, according to the latest available Eurostat (2016a) data, in 2013 disability pensions accounted for 14% of total pensions in the European Union (average without Belgium, Greece, Hungary and Poland due to missing data). In the same year the share of disability pension expenditure in GDP in Croatia was 3%, while the EU average (excluding Greece and Poland) was 1%. A logical explanation for the high share of people receiving disability pensions in Croatia compared to other countries would be war. However, even without the war veterans, the share of disability pensions in total pensions in Croatia is approximately five percentage points higher than the EU average.

All previously mentioned papers take into account only formal institutions. To the author's knowledge, the link between informal institutions and disability pensions has not yet been studied. Since disability can only be observed imperfectly, it is difficult to determine whether claimants for disability pensions are truly disabled. The screening procedure should limit potential moral hazard, since claimants for disability pension may overstate their health problems. However, one important factor is neglected in the literature: corruption. Individuals seeking disability benefits may bribe those people who are in charge of approving applications for disability pensions.

The aim of this paper is to provide descriptive evidence of how various factors, especially institutions, affect disability pensions in Croatia. The paper is structured as follows. Section 2 describes disability pensions in Croatia through basic facts and figures. In section 3 the link between institutions, both formal and informal, and disability pensions in Croatia is analysed. Other possible factors determining the probability of someone having a disability pension are also investigated. Section 4 is the conclusion. Simple before-after comparisons suggest that institutional reforms had strong effects on the number of disability pension beneficiaries.

## 2 DISABILITY PENSIONS IN CROATIA: FACTS AND FIGURES

The leading trend in the Croatian pension system is the worsening ratio of workers/contributors to pensioners/beneficiaries. According to Croatian Pension Insurance Institute data (HZMO, 2016a), at the end of 2015 the ratio was 1.15 while in 1990 it was 3. Croatia has 1.2 million pension beneficiaries, which is 28% of the total population. The average net pension is ca HRK 2,400 (EUR 320) and the share of pension expenditures in GDP is about 11%. Only 55% of pension expenditures are covered by the pension insurance contributions of the currently employed, while the remaining 45% comes from the government budget. The mandatory retirement age for men is 65 and for women 61.5 but it is gradually being increased until 2030, when it will be 65 too. However, approximately one fifth of old-age pension beneficiaries entered early retirement.

One pathway to early retirement inheres in obtaining a disability pension. At the end of 2015 around 207,300 people in Croatia were receiving disability pensions, but this number excludes approximately 87,200 beneficiaries of disability pen-

sions that were by law at the age of 65 transformed into old age pensions starting from 2015 (HZMO, 2016b). Altogether, there were around 294,500 beneficiaries of pensions based on disability. The majority of them obtained their pension by the general Pension Insurance Act – ZOMO (75%), and the second largest group consists of Croatian Homeland War veterans, i.e. Croatian defenders (20%), followed by members of the Croatian Army (3%) and members of the Croatian Defence Council – HVO (2%). For the last three groups special laws apply, the most important one being the Law on the Rights of Croatian Defenders from the Homeland War and of Members of Their Families – ZOPHBDR. In the total number of pension beneficiaries, disability pension recipients comprised 18%, or 24% when the disability pensions of the previously mentioned three groups are added to the beneficiaries of disability pensions under ZOMO.

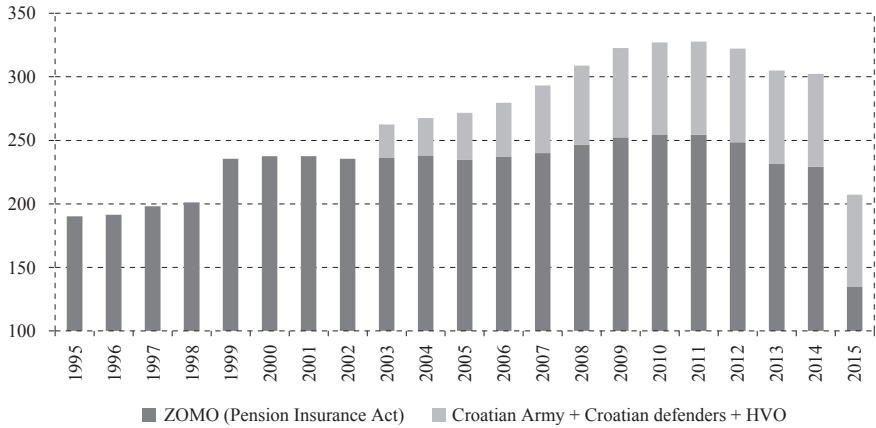
Figure 1 shows the trend in the number of beneficiaries of disability pensions from 1995 to 2015. The greatest rise occurred in 1999, because the new Pension Insurance Act was passed. On this occasion the previous work-disabled recipients of disability-related benefits, were transformed into recipients of disability pensions. Since that time, the number of beneficiaries of disability pensions defined according to ZOMO has been relatively stable, with the proviso that this number rose by 8% from 2005 to 2010. In addition, starting from 2010 the number of disability pension beneficiaries has started falling. The sharpest drop happened from 2014 to 2015 (41%) due to the already mentioned transformation of disability pensions into old-age pensions at the age of 65 if the underlying cause of disability was a disease.<sup>1</sup> Other possible factors are injury, occupational disease and accident at work. Furthermore, a Single Body of Expertise started working in 2015, which means that the Croatian Pension Insurance Institute (HZMO) is no longer charged with making decisions on medical eligibility for a disability pension.

The number of beneficiaries of the HRVI (Croatian wartime military disabled) status, that is, defenders', or veterans', disability pensions in terms of ZOPHBDR rose almost three times in the period from 2003 to 2012.<sup>2</sup> The data before 2003 are not available. The greatest rise was recorded in 2007, for then 5,500 defenders who had received benefits for incapacity to work were transformed into recipients of disability pensions. Since 2012 the number has been falling.

<sup>1</sup> Transformation of disability pensions into old-age pensions is not uncommon. This is also the case in, for example, the Czech Republic, Finland, Latvia, Poland, Spain and Sweden.

<sup>2</sup> According to this Law, a Croatian wartime military disabled person from the Homeland War is defined as a Croatian defender whose organism is at least 20% impaired because of a wound or injury obtained defending the sovereignty of the Republic of Croatia, or as a prisoner in prison or enemy camp. It is considered that the impairment of the organism of a captive in an enemy camp is at least 20% permanent. A HRVI (Croatian wartime military disabled) is a Croatian defender whose organism is at least 20% impaired because of illness, and the illness, or deterioration of the illness or the occurrence of the illness is an immediate consequence of involvement in the defence of the sovereignty of the Republic of Croatia in the Homeland War. HRVI rights can also be claimed by a person (medical personnel, war reporters, members of fire-fighting units, sailors, crew members of ships of the merchant marine and other persons) whose organism is at least 20% impaired because of a wound or injury obtained in the performance of military or other duties at the order of the competent bodies of government of the Republic of Croatia in the defence of the sovereignty of the Republic of Croatia in the Homeland War or as a captive in an enemy camp in the Homeland War.

**FIGURE 1**  
*Disability pension beneficiaries (in thousands)*

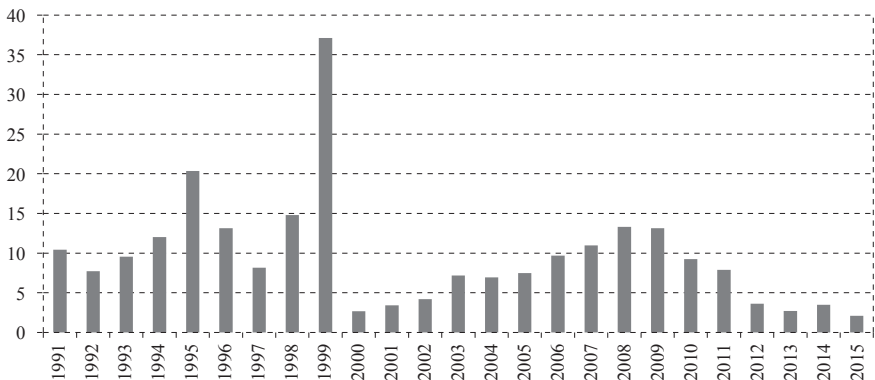


*Note:* In HZMO publications data for the Croatian Army and defenders before 2003 are not available, and HVO pensions have been awarded since 2008.

*Source:* HZMO.

From a look at the trends of just the new beneficiaries of disability pensions according to ZOMO (figure 2), still more obvious is the sudden rise in 1999 of 37,112 new beneficiaries, which was 45% of total new beneficiaries in that year. Also salient is 1995, because of the war, and quite large rises are also perceptible in 1998, 2008 and 2009. During the economic crisis the number of new beneficiaries of disability pensions has been falling, but the number of beneficiaries of early retirement pensions has been increasing (figure 3). Determinants of early retirement should be separately analysed (see Vukorepa (2015) for legal changes) but entering early retirement has often been a way to find financial security within the pension system for people who are unemployed or have a high risk of becoming unemployed.

**FIGURE 2**  
*New beneficiaries of disability pensions according to the Pension Insurance Act – ZOMO (in thousands)*

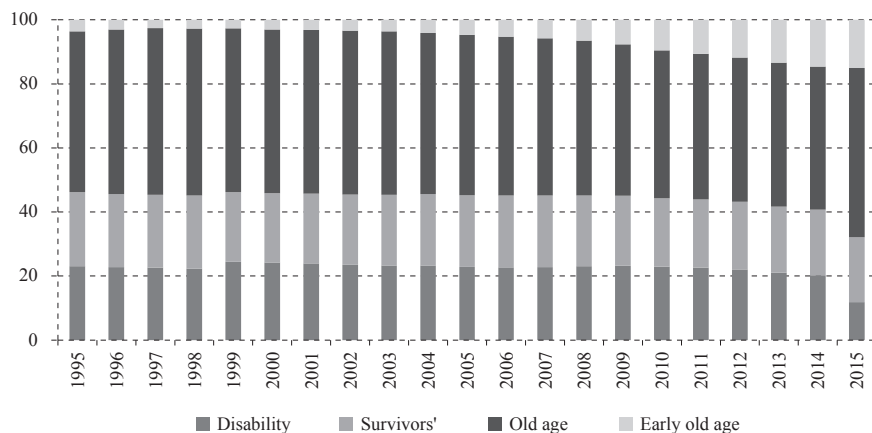


*Source:* HZMO.

Figure 3 shows the proportions of individual categories in the total number of pensions beneficiaries according to ZOMO (these figures do not include the Croatian Army, the HVO and defenders in terms of ZOPHBDR). The proportion of survivors' and disability pensions has not changed considerably over the course of time (except in 2015), but a rise in the proportion of early retirement pensions is observable: in 2000 there were 3% of them, in 2015 as many as 15%. At the end of 2015, along with 15% of early retirement pensions, there were 53% of old age pensions, 12% of disability pensions and 20% of survivors' pensions (HZMO, 2016b). Although the law discourages early retirement, it is still on the rise.

**FIGURE 3**

*Proportions of individual categories in the total number of pensions beneficiaries according to the Pension Insurance Act – ZOMO (in %)*



Source: HZMO, author's calculations.

According to ZOMO, a disability pension can be obtained if an insured person has one of two possible types of disability: occupational or general incapacity for work, in addition to completed qualifying period. The former is considered to be total disability and the latter partial. Temporary disability pension has also been introduced in 2015 for persons with reduced working capacity who even after having completed professional rehabilitation remained unemployed for at least 5 years, provided that their unemployment lasted until the age of 58 (Vukorepa, 2015). At the end of 2015, 43% beneficiaries had total disability, and at the end of 2014 66%. Obviously, total disability was more prevalent among beneficiaries whose disability pensions were at the age of 65 transformed into old-age pensions in 2015. At the end of 2015 a total disability pension was approximately HRK 300 higher than a partial disability pension.

Beneficiaries of disability pensions have particular characteristics as compared with other pension beneficiaries, and they also differ within the group. The average age of old age pension beneficiaries according to ZOMO in 2014 was 71 years, while that of holders of disability pensions was 64 years (HZMO, 2015).

Disability pension beneficiaries take pensions earlier than beneficiaries of old age pensions: the average age for the former at retirement is 53 years, for the latter 62 (data for new beneficiaries in 2015). They also have a shorter contributions record: 23 years as compared with 34 years. Still, in spite of retiring earlier, disability pension beneficiaries on average use their pensions only a year longer (20.5 years) than old age pensioners (19.5 years) – data for beneficiaries who died in 2014. From this it can be concluded that the health problems of beneficiaries of disability pensions considerably shorten their life spans.

The next feature is the average amount of pensions. The average disability pension paid out in December 2015 for beneficiaries according to ZOMO came to HRK 1,842, while the old age pension came to HRK 2,413 (HZMO, 2016b). However, beneficiaries of disability pensions who acquired the right to a pension up to 1999 had an average pension of HRK 2,378, while beneficiaries who achieved that status after 1999 got HRK 1,742. Here only “true” disability pensions were taken into account, and not those that were transformed into old-age, but the amounts are similar. The average HRVI (defender) pension came to HRK 4,850.<sup>3</sup>

Unfortunately, the Croatian Pension Insurance Institute (HZMO) does not publish records of beneficiaries of disability pensions according to groups of disabilities. In the EU, the structure is as follows (Marušić, 2011): mental disability (27.6%); skeleto-muscular disabilities (21.7%); vascular diseases (11.8%); neoplasms (10.5%); congenital disabilities (0.8%); and other disabilities (27.6%). However, the Croatian Institute for Public Health (HZJZ) does publish the most common diagnoses for the causes of the disabilities of persons claiming disability rights via the HZMO. Apart from disability pension, disability rights are also: compensation for physical impairment, which results from work injury or professional disease (71,710 beneficiaries at the end of 2015 according to HZMO), and assistance and care allowance (7,919 beneficiaries). Starting from 1999 the latter right has been transferred from the domain of pension insurance to that of social welfare. In April 2016, 313,847 persons claimed disability rights via HZMO, a number that does not include defenders (HZJZ, 2016a). HZJZ obtains information about defenders from the Ministry of Veterans’ Affairs.

Table 1 can lead to the conclusion – after all forms of mental sickness and disorders are aggregated – that the structure of beneficiaries of disability pensions per disability group is similar to that of beneficiaries of disability pensions in the EU. Mental illnesses and disorders dominate; after that come skeleto-muscular illnesses and disorders of the vascular system. HZJZ also keeps records of the most common causes of physical impairments to persons who claim disability rights via HZMO, but the percentage of physical impairments had been determined for

<sup>3</sup> People in the HRVI category claim their disability pensions according to ZOPHBDR. In the calculation of their pension, the general pension formula is used, but the points used depend on the basis for rank and establishment post, a special initial factor is stipulated, and personal points are enlarged by 45%, while a contributions record of 40 years is assumed.

around 40% persons. Dominant is “total loss of one segment of the cervical region after fracture of the spine”, then “total loss of function of one segment of the lumbar region” and “limited mobility of the hip joint”. Of all the persons who claimed disability rights via HZMO in April 2016, 49% were in the active working period, 59% of them men, and 41% women.

**TABLE 1**

*Most common diagnoses of the causes of disability of persons who claim their disability rights via HZMO in 2016*

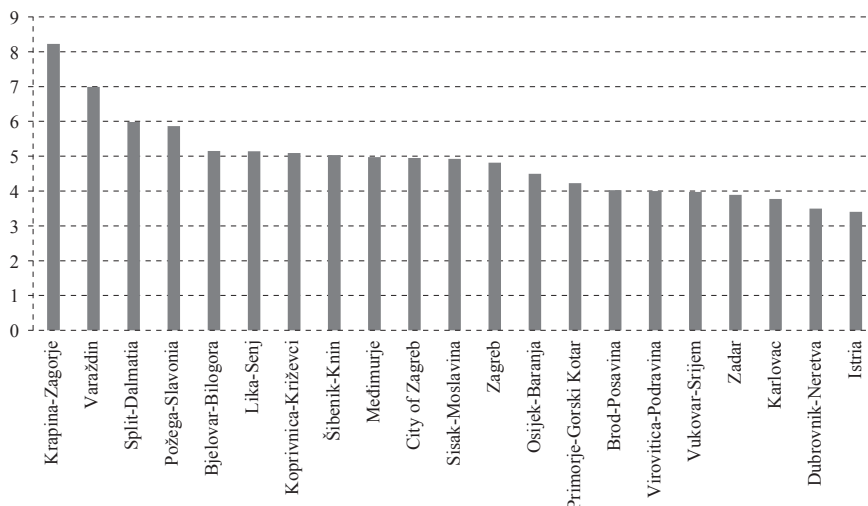
Diagnoses	Number of persons
Skeleto-muscular disorders	57,594
Affective disorders*	22,899
Neurotic, stress-related and somatoform disorders*	20,209
Hypertensive diseases	13,977
Arthropathies	13,287
Schizophrenia, schizotypal and delusional disorders*	8,337
Cerebrovascular diseases	7,329
Organic mental disorders*	6,870
Diabetes mellitus	6,240
Mental disorders due to use of psychoactive substances*	5,095

\*Mental illnesses and disorders.

Source: HZJZ (2016a).

**FIGURE 4**

*Share of people receiving disability pensions in total population by counties (% , in 2014)*



Source: HZMO and author's calculations.

The highest share of disability pension beneficiaries in the total population at the end of 2014 (HZMO, 2015) was recorded in Krapina-Zagorje County (8.2%), fol-



lowed by Varaždin County (7%) and Split-Dalmatia County (6%). The lowest share was in Istria County (3.4%) and Dubrovnik County (3.5%). The ranking is very similar when the share of disability pensions in total pensions is taken into account. There is no clear Continental/Adriatic pattern due to Split-Dalmatia County having one of the highest shares of disability pensions and at the same time Karlovac County one of the lowest. The difference among counties should be further examined.

### 3 DETERMINANTS OF DISABILITY PENSIONS IN CROATIA

The choice of factors that affect the number of beneficiaries of disability pensions in this paper is partially related to earlier scientific research (mainly from Scandinavian countries) in which the emphasis is placed on health indicators, working conditions and socio-economic status. The other two factors (war and institutions) were arrived at from a study of data for Croatia, that is, from its specific features.

#### 3.1 HEALTH INDICATORS

As mentioned in the Introduction, persons who suffer from chronic diseases and who are in general in a poor state of health have a greater likelihood of becoming beneficiaries of disability pensions. Accordingly, here certain health indicators and risk factors are adduced. At the beginning, it is the most important to bring out the expectancy of healthy years of life at birth. The average for the EU15 in 2015 came to 71.8 years, and for Croatia 69.4, which is three years longer since 2000 for Croatia (WHO, 2016). However, the difference between the EU28 and Croatia in healthy life years at ages 50 and 65 is approximately three years (Eurostat, 2016b). Furthermore, in 2010, only 48% of people in Croatia were self-assessed as being in good or very good health (Eurostat, 2016b). This is the worst result among EU countries, alongside Latvia. In Scandinavian countries, for example, this number is above 70%. However, self-assessed health in Croatia seems to be improving; in 2014, 58% of people in Croatia were self-assessed as being in good or very good health, while the EU28 average was 67%.

It was said earlier that among users of disability rights, cardiac patients represent a high percentage. In Croatia in 2013, the age-standardised mortality rate for all ages per 100,000 inhabitants for ischaemic heart conditions came to 188 for men and 114 for women. In the EU15 the average for men was 78, and for women 36 (WHO, 2016). As for the issue of mortality rate for mental disorders and disorders of the nervous system, the value for Croatia in 2013 was 29 and in EU15 countries 41. The age-standardised mortality rate for all ages per 100,000 inhabitants for malignant neoplasms in 2013 in Croatia was 210 (the second worst result after Hungary) and in EU15 countries 156. Improvement can be reached both by appropriate care for one's own health and by preventive examinations. According to 2014 figures, in Croatia 59% of the population over the age of 18 was overweight, which is the same as EU15 average. In addition, 27.5% of the population over 15 were smokers, and in the EU15 22%. Croatia had a greater average annual consumption of pure alcohol per capita: 12 litres as against 10 litres in the EU15.



Since 2002, HZJZ has kept a Croatian Disabilities Registry, but the first data only became available for 2009, because of the time needed to organise the Registry and collect data.<sup>4</sup> In April 2016 there were 511,121 persons in the Registry, 60% of them men and 40% women (HZJZ, 2016a). According to this, the prevalence of disability in the Republic of Croatia amounts to 11.9%. Table 2 shows data from the Registry according to kind of impairment. Among persons with disabilities, impairments of the locomotor system and multiple impairments dominate, followed by mental disorders and impairment of other organs.

**TABLE 2**

*Presentation of the kinds of impairment that lead to disability or as comorbidity diagnoses contribute to the degree of functional impairment of the organism (2015)*

Kinds of impairment	% of total disabled persons*	Prevalence/ 10,000 inhabitants
Impairment of the locomotor system	29.5	351
Mental disorders	25.2	301
Impairment of other organs	23.1	275
Impairment of the central nervous system	18.2	217
Intellectual difficulties	4.8	57
Learning disabilities	4.4	53
Impairment of sight	3.4	41
Impairment of hearing	2.6	31
Impairment of the peripheral nervous system	2.4	29
Congenital anomalies and chromosopathies	2	24
Pervasive developmental disorders	0.4	4
Multiple impairments	29.5	352

*\*Overall number of diagnoses exceeds the number of disabled persons due to multiple impairments.*

*Source: HZJZ (2016a).*

### 3.2 CONDITIONS OF WORK AND SOCIO-ECONOMIC STATUS

Conditions of work also affect the likelihood that someone will become a beneficiary of a disability pension. As can be seen from figure 5, the sharpest fall in the number of accidents was recorded from 1990 to 1992, and again from 2008 to 2014, as a result of an economic downturn (Bađun, 2016). The largest number of accidents (44,900) was reported in 1990 and the smallest in 2014 (13,785). In 2015, there were 16,015 accidents at work (HZJZ, 2016a).

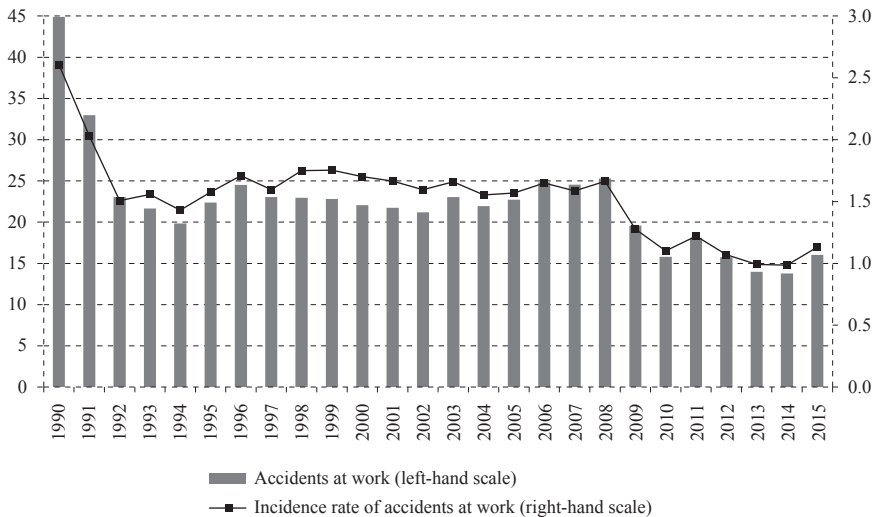
The 2014 EU average was 1,536 accidents (excluding fatal accidents) per 100,000 persons employed (Eurostat, 2016c). Croatia performed better than the EU average, with 870 accidents per 100,000 persons employed. Worth noting are some statistical problems concerning accidents at work, such as: (1) under-reporting; (2) questionable accuracy of data on the number of employed persons by activity

<sup>4</sup> According to the Law concerning the Croatian Disabilities Registry, disability is a permanent limitation, reduction or loss of capacity (deriving from impaired health) to perform some physical activity or psychic function appropriate to the age of the person and that relates to capacities, in the form of complex activities and conduct universally accepted as essential components of everyday life.

(which influences the incidence rate of accidents); and (3) differences across countries in the definition of persons subject to reporting obligation (Bađun, 2016). The problem under (1) arises from either employers' ignorance or their fear of the financial damage for the company due to higher needs for investment in safety at work. An additional problem is "the black economy". In 2014, fatal accidents at work in the EU totalled 3,739. Croatia reported 1.9 fatal accidents at work per 100,000 persons employed (the EU average was 1.8). Fatal accidents are almost always reported, which explains the more consistent statistics. It is interesting to point out that only 3.8% of disability pension beneficiaries in Croatia receive their pension on the basis of work injury or professional disease (data for March 2016 provided by HZMO upon an Access to Information Request).

**FIGURE 5**

*Accidents at work (in thousands) and incidence rate of accidents at work per 100,000 active insured persons in Croatia (in thousands)*



Source: HZJZ.

Persons with lower education are more probable beneficiaries of disability pensions. According to data from the Croatian Disabilities Registry for March 2016, 63% of persons with disability have elementary level education or less, 28% have secondary qualifications and only 3% have tertiary qualifications (HZJZ, 2016b). Croatia has in general a lower standard of education; according to the census of 2011, 31% of the population older than 15 are educated only to elementary level, or have less than complete elementary education, or no education at all (DZS, 2011). Unfortunately, data on the education structure of disability pensioners are not available. Unemployment also has an influence on the greater likelihood of taking up disability pensions, and unemployment is one of the greatest economic problems in Croatia. In 2015 the unemployment rate was 16.3% (HNB, 2016).

### 3.3 WAR

Both World War II and the Homeland War increased the number of beneficiaries of disability pensions in Croatia. In the Croatian Disabilities Registry at the end of 2015 there were 60,053 veterans with disabilities, of whom 57,566 were receiving pensions (HZJZ, 2016a). Eighty-seven per cent of HRVI pensioners receive disability pensions because of general incapacity to work. The Registry has data about the most frequent diagnoses of veterans with disabilities, but not about the numerical structure of veterans per diagnosis. The five most frequent diagnoses are: (a) post-traumatic stress disorder (PTSD) as a result of captivity or trauma of war, (b) major muscular injuries with functional handicaps, (c) clinically established neuroses and psychoses, (d) impairment of nerves in the lower extremities, (e) disc hernia after trauma (HZJZ, 2016a).

However, data are available about veterans with disabilities in terms of percentage impairment to the organism (table 3). About 80% of veterans with disabilities have 20-40% impairments of the organism, and 1.4% of them have 100% impairment. To be precise, 851 HRVI veterans have 100% impairment, the most common causes of disability being: fractured spinal column, amputation of one or both legs above the knee, serious impairment of the sight, amputation of one or both legs below the knee and the results of damage to the nerves of the lower extremities.

Table 3 shows a comparison of veterans with disability and beneficiaries of invalidity benefits via HMZO in terms of percentage of impairment of the organism. While in the case of veterans there are most beneficiaries with 20% impairment, in the case of beneficiaries of disability rights via HZMO those with 70% impairment dominate. According to the Regulations for the Determination of the Percentage of Impairment of the Organism of HRVI veterans of the Homeland War, PTSD represented less than 20, or 20 or 30 or 40% impairment, and it can be assumed that a large share of the veterans with disabilities have “only” PTSD or PTSD with an additional diagnosis that represents a relatively small impairment of the organism. According to a Croatian government report (Vlada RH, 2014:38), PTSD is the leading cause of disability among HRVI veterans. About 56% of HRVI pensions beneficiaries are between 40 and 55 years old, while for beneficiaries of disability pensions according to ZOMO, the age structure is not published. The average contributions record period of HRVI veterans in 2015 was 20 years and 5 months, while in the case of ZOMO-classified disability pensions beneficiaries (including those that were transformed into old-age pensions), it is 3 years longer (HZMO, 2016b).

In spite of the longer contributions record and the average greater degree of impairment of the organism, in the case of beneficiaries of disability pensions according to ZOMO, their average pension is about 2.5 times smaller than a HRVI pension. Here one should once again remark that – unfortunately – no data about the physical impairment of the beneficiaries of disability pensions exist, rather of disability rights, but most claimants actually receive a pension. It is also important to add

that the percentage of physical impairment is set for only around 40% of the persons who claim their disability rights via HZMO, while in the case of veterans with disability the percentage of physical impairment is determined for all.

**TABLE 3**

*Percentage of impairment of the organism in defenders with disabilities and claimants of disability rights via the HZMO*

<b>Organism impairment percentage (%)</b>	<b>Proportion of total number of veterans with disabilities (%)</b>	<b>Proportion of beneficiaries who claim disability rights via HZMO (in %)<sup>a</sup></b>
100	1.4	8.9
90	0.7	0.4
80	1.5	0.7
70	2.5	37.1
60	4.6	2.8
50	7.8	5.1
40	17.4	15.3
30	25.3	29.7
20	38.8	0.0
Total	100.0	100.0

<sup>a</sup> Percentage of physical impairment is established for about 40% of the persons who claim disability rights via HZMO (exclusive of veterans).

Source: HZJZ (2016a).

In April 2016 Croatia also had 7,684 disabled veterans of World War II and civilian disabled of the war and post-war period (HZJZ, 2016a). Around 55% of them are older than 75, with the proviso that most persons have an impairment rated at 60%, and there is about the same percentage of persons with 30% impairment. The most frequent diagnoses are: major muscle injury, impairment of sight, head and neck deformities, and scarring that disturbs organ function. It is undisputed that war affects civilians, not only soldiers, but HZMO does not keep records about civilian disabled in terms of disability pensions. The Croatian Bureau of Statistics publishes expenditures on rights of civilian war invalids and members of their family, but pensions are not included. In 2014 disability rights (for personal disability benefit, orthopaedic supplement, supplement for assistance and care of another person, supplement for home help) amounted to HRK 20.7 mil (DZS, 2016). Data on number of beneficiaries are not published.

According to Žilić (2015), during the war in Croatia 1991-1995 more than half a million individuals of all ethnicities were displaced. Forced displacement had adverse effects on self-assessed health, on the probability of suffering from systolic and diastolic hypertension, and on mental health. However, displacement did not cause a change in healthy behaviours; the negative effect of displacement is channelled through unfavourable economic conditions that the displaced individuals face.

### 3.4 INSTITUTIONS

The statutory arrangement and implementation of retirement insurance also has a great effect on the number of pension beneficiaries, and also on the differences in outlays on disability pensions among countries (Marušić, 2011). In concrete terms, countries can have: (a) different definitions of disability and conditions for claiming rights; (b) a differently defined minimum degree of reduced working capacity that provides the right to a disability pension; (c) different arrangements for obtaining expert medical opinions; (d) differences in vocational rehabilitation; (e) different pensions formulae; (f) differences in whether pensions are provided only for those insured in the pensions system or to other groups as well, and so on.

Analysing institutional variations in disability pensions among different countries is beyond the scope of this paper. Regarding formal institutions in Croatia, here we shall recall the sudden jump in the number of disability pensions according to ZOMO in 1999, the increase in the number of HRVI pensions in 2007, and the decrease in the number of disability pensions according to ZOMO in 2015. In all cases, changes in regulations were involved. These changes were of an administrative nature, i.e. mostly did not change the “motivation” to enter into disability pension, but rather created a statistical mess. However, definitions of disability were also changed in 1999 and 2015 (Rismondo, 2000; Vukorepa, 2015). Regarding the transformation of disability pensions into old-age pensions, it is problematic that “old age pensions are calculated on the actual years of service (contributions paid) while disability pensions are calculated on the years of service plus ‘additional period’, that is a fictive period (not covered with contributions) accredited with the purpose of increasing the disability benefits” (Vukorepa, 2015:294) and now they are grouped together. This change applies only to beneficiaries according to ZOMO, and not special regulations.

Screening stringency has been increased in order to reduce the costs of disability pensions, which resulted in a smaller number of new beneficiaries starting from 2010 (MSPM, 2014:25). Ad hoc control examinations have been introduced and recertification of disability pensions is done automatically every 3 years (it used to be 4), as prescribed by ZOMO, which came into effect in 2015. Furthermore, the Single Body of Expertise was established in 2015 to reduce fraud by unifying disability assessments. Every positive assessment is subject to review carried out by a special unit in the Ministry of Labour and Pension System. Two-step assessment was actually established in 2013 but prior to the Single Body of Expertise, the first assessment was done in HZMO. In 2015 the Strategy for Suppressing Errors, Misuse and Corruption in the Field of Social Protection in the Republic of Croatia was adopted (MSPM, 2015). According to this document, the Independent Review Sector (unit in the Ministry of Labour and Pension System) declined 27% requests for disability pension approved by HZMO in 2013 and 23% in 2014. In addition, the Independent Review Sector checked almost 1,000 earlier disability rights based on anonymous/non-anonymous reports. In 40% of almost 600 cases relating to physical impairment, pension rights have been reduced or abolished.

In 2015 Croatia was one of the worst performing EU countries according to the Corruption Perceptions Index (Transparency International, 2015). In addition, Croatia's rank on the Social Capital sub-index from the Legatum Prosperity Index for 2015 (Legatum Institute, 2015) was 121 out of 142 countries, which positioned Croatia in the group with mostly African countries. The Social Capital sub-index measures countries' performance in two areas: social cohesion and engagement, and community and family networks. There is a great deal of talk about corruption in the case of disability pensions, but not enough in the way of evidence (especially for the 1990s).

Pursuant to USKOK's (State Prosecutor's Office for the Suppression of Organized Crime and Corruption) actions Diagnosis I in Split and Diagnosis II in Osijek in 2008 and 2009, 18 persons were indicted (USKOK, 2011). In both cases it was the illegal acquisition of HRVI status that was concerned. In Split bribes from EUR 4,200 to 6,500 were paid; most were taken by HZMO expert physicians and by expert physicians in the Commission for the Review of Disability Rating in the Ministry of Defenders of the Republic of Croatia. In Osijek, bribes amounted to from 5,000 to 8,000 euro, and the damage to the budget was estimated at HRK 3.2 million. The court proceedings have not yet ended, and some of the accused have died in the meantime. The largest corruption scandal regarding disability pensions came in 2012, when 69 persons were charged with taking and giving bribes in order to obtain disability pensions. The main accused was head of the medical expertise department in HZMO who immediately pled guilty and got a two-year prison sentence.<sup>5</sup> An additional 58 of the accused reached a plea bargain with the prosecution, while the remaining 10 of them went to court. All of them were convicted in 2015; some got prison sentences and some probation (mostly people who were giving bribes).

As was previously mentioned, PTSD is the dominant disability of Croatian war veterans. Since most PTSD diagnostic elements are based on self-report, malingering is not difficult. Anecdotal case reports and medical research have shown individuals falsifying their engagement in combat and other traumas with the aim of getting benefits or financial compensation (Hall and Hall, 2006). It is a challenge for health care professionals to identify individuals with true PTSD and differentiate them from those who are only malingering. At the same time, there is fertile ground for corruption. In a paper which aimed to explain why Iraq and Afghanistan War veterans are seeking PTSD disability compensation at extraordinary rates, malingering was detected as one of the most plausible explanations (McNally and Frueh, 2013). The second very important reason was financial need, especially among veterans whose inadequate vocational skills reduces their ability to make a good living (Angrist, Chen and Frandsen, 2010).

Regulations (i.e. ZOPHBDR) determine the way in which pensions are calculated in the case of HRVI veterans. The amount of a pension certainly motivated veterans

<sup>5</sup> Alongside, he had to give government EUR 79,000 in cash and one of his apartments worth around EUR 200,000. He got out of prison after 1.5 years.

who could meet the conditions for a disability pension to seek pensioning and in this way settle their need to make a living without remaining in the labour market – if the physical impairment was relatively small. Campolieti (2002) has found that the increased generosity of disability benefits in the Canada/Quebec pension plan was to a great extent responsible for the increase in the incidence of musculoskeletal conditions on the disability rolls, which she considers hard-to-diagnose medical conditions. In addition, the increased rigour of medical screening has led to a reduction in the incidence of musculoskeletal conditions on the disability rolls. It is interesting to note that of almost 600,000 veterans in the USA receiving compensation for disability at the end of 2012, 7% of them were receiving it for PTSD. The exact percentage for Croatia is not available, but it can be assumed that it is larger due to PTSD being the dominant diagnosis (in the USA it takes the third place).

#### 4 CONCLUSION AND POLICY RECOMMENDATIONS

The pensions system is in a sense a mirror image of Croatia, which is particularly well seen in the case of disability pensions. To be more precise, most of the leading problems faced by the country are reflected in the pensions system. The ill-considered legislative framework, the consequences of the war, the poor educational structure, the high unemployment, poor conditions of work, inequality of rights, the relatively poor state of health of the general population and individuals' lack of care for their own health as well as widespread corruption have led to a large number of beneficiaries of disability pensions. From the analysis of the problem, certain recommendations for policy makers can be made: (a) better consideration of changes to the legislation, for it is hard to make up for errors after the event; (b) improvement of conditions of work and health status, particularly of individuals' care for their own health; (c) improvement of the educational structure and reduction of unemployment; (d) more emphasis on rehabilitation programs; (e) suppression of corruption; (f) equalisation of rights deriving from disability. Finally, databases should be improved, this primarily relating to records of beneficiaries of disability pensions according to groups of diseases.

It will take time to see the final results of the positive legal changes such as improvement in the medical screening procedure, stricter assessment of disability, and more frequent assessment of current health status. However, it seems that the institutional changes are already working since the leading pathway to earlier retirement is now early old-age pension. Future research should focus on micro-data (e.g. SHARE data which will soon be available for Croatia) in order to find specific social and health care policy measures to alleviate the effect of socioeconomic and health factors on the incidence of disability. Health is already an important determinant of disability pensions, but after the institutional framework is “put in order”, health should play an even larger role.

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# Multi-level finance and the Euro crisis – causes and effects

EHTISHAM AHMAD, MASSIMO BORDIGNON  
and GIORGIO BROSIO (Eds.)

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The relationship between central and local government is always complicated, particularly in a time of economic crisis, insufficient public revenues and increased demands of an electorate that wants to keep the existing level of social services with lower costs. The new book *Multi-level Finance and the Euro Crisis – Causes and Effects* is a significant collection of contributions that effectively shed light on the mentioned relations in a fairly large group of countries. This book raises a number of crucial fiscal and political economy questions, such as, what was the role of local and regional governments in the crisis? How did conflicts between different levels of government contribute to the worsening of fiscal indicators and deepening of the crisis? Is there any golden rule to solve the fiscal problems and the situation from the supranational to the local? The publication contains these and many other important issues that have been mostly neglected, regardless of their relevance.

In the introduction chapter, the editors Ahmad, Bordignon and Brosio remind us that the euro area has been caught in a vicious circle of deflation, weak demand, insufficient investment and increased unemployment with a high share of people that have to wait a long period for a job. All this leads to increasing social conflict and centrifugal trends (for example, a tendency to accept less EU integration). Obviously, the crisis shows that the promises of development, harmony and prosperity that were the basis of the EU are almost unattainable goals. This is particularly true when one considers that due to high budget deficits and increased public debts, in many countries there is a need for further reduction and limitation of basic public services and employment in public and state sectors. It seems that the northern European countries are behaving in a more serious and responsible manner than other EU members, and have managed their public finance better during the crisis. This does not mean that they do not also have serious problems with fiscal and organisational adjustments in the relations among various levels of government, primarily a clear division of authority and responsibility, as well as with insufficient accountability in some cases. In many countries, sub-national governments very often participate in the *game-play*, with the desire to avoid regulations on expenditures, hiring, or deficits. This is usually done by putting liabilities in activities or means that are complicated to control, or by using publicly owned private enterprises to perform on their behalf. The central governments usually try to improve accounting rules and information requirements and pressure the local governments to accept more incorporating budget rules.

Teresa Ter-Minassian analyses the importance of stimulating stabilizing and sustainable sub-national fiscal policies in the euro area (EA). She points out that the public finances of the EA member countries have been significantly impacted by the two crises. First, through the functioning of the automatic stabilizers, discretionary stimulus packages in 2008-2009, and in some countries the payment of contingent liabilities, particularly from rescue operations for domestic banks. These triggered an increase in the average gross public debt, causing the need for significant future fiscal adjustment efforts. As there are differences between EA

member countries (four are federations, while fourteen are unitary states) there is a wide array of intergovernmental fiscal arrangements, variations in the degree of revenue and decentralization of expenditure, the statutory and *de facto* autonomy of their lower level governments and systems of borrowing controls. The initial reaction of most EA central governments (CGs) to the global financial crisis in 2008 was to accommodate the effect of the automatic fiscal stabilizers on the revenue side of the budget and cyclically sensitive expenditures, and to adopt and implement stimulus measures. Their goal was to stimulate plummeting domestic demand, mostly through various forms of tax cuts, increases in transfers to families and firms, and reduction in public investments. In many countries, national governments transferred through their sub-national governments (SNGs) a substantial share of the increased spending to compensate them for reduced own or shared revenues. Thus, the share of intergovernmental transfers in total sub-national revenues and the share of sub-national spending in GDP increased. Many central governments try to ensure fiscal responsibility and longer-term debt sustainability of sub-national governments and for these goals use various types of borrowing controls. Some focus on minimizing pro-cyclicality measures and try to protect the quantity and basic characteristics of essential public services delivered at sub-national level. In the search for responsibility, discipline and debt sustainability, standing fiscal rules have been most often used. Although usually focused on debt sustainability, they keep some space for borrowing to finance public investments. The most common combination has been a *golden rule* – an obligation that requires at least balanced current budgets of sub-national governments. In the implementation of various measures, the main challenges are to define adequate criteria and mechanisms for the vertical and horizontal distributions of general government budget targets and debt ceilings; to minimize risks of sub-national pro-cyclicality; and to preserve appropriate space room for public investments. For the successful achievement of defined goals – primarily promoting sub-national fiscal discipline – it is crucial to provide a robust and stable legal framework and to define a responsible body to monitor sub-national compliance with the rules and/or agreed targets. Probable weaknesses in monitoring and enforcement mechanisms can undermine the effectiveness of both rules and negotiated arrangements.

Although coordination and control mechanisms mostly differ in various countries, there is no possibility that they will be effective without full and timely information on the nature and timing of the financial obligations. Thus, Ehtisham Ahmad writes on the political economy of information generation and financial management for SNGs. He firmly believes that effective management of liabilities is critical to ensuring a better buy-in from the private sector and a more credible environment for greater stability for contracts. An appropriate institutional framework is a precondition for successful management of budget revenues, expenditure and tax assignments. Such a framework and adequate policy design are required to provide proper incentives to sub-national governments, by, for instance, expanding own-source taxation at lower levels. Furthermore, it is important to adopt more flexible and effective budget management elements. These activities must

be supplemented by uniform budget standards to reduce or at least to limit the problems with asymmetric information and game-play between enterprises and the public sector as well as between the centre and lower levels of government. Political gaming operates even in Germany, probably the most responsible country in Europe, which produces a bad impression and a negative impact on the weaker countries, reducing incentives for responsible behaviour.

The reader can ask why Germans are so loath to be in debt. The answer is provided by Georg Milbradt who explains the development of budget rules and national and sub-national debt in recent German history. To understand the reasons behind the concept of German behaviour regarding debt (which was in a modified form introduced at the European level), one has to look at German historical experiences. During the 20<sup>th</sup> century, the German population lost its monetary resources twice. The first time in 1923, in the hyperinflation crisis that resulted in an unbelievable exchange rate of one trillion old Mark to one RM (Reichsmark). The second time, after the Second World War, when the currency reform of 1948 resulted in an exchange rate of 100 RM to 6.5 DM (Deutsche Mark) in the West, and significantly greater losses in other German territories. After the unification, a West German bailout helped to avoid a third sharp devaluation in the former East Germany. The reason behind these drastic devaluations was that German governments financed their expenditures primarily via debt, and used the printing press, either directly or indirectly. The hyperinflation caused great social tensions and is often considered a key element in the rise to power of the fascist government. Thus, aversion to debt financing and inflationary policy is deeply rooted in the German collective memory.

Financial problems in the biggest countries in Europe – Germany and France – are presented in the second part of the book. In Germany, according to Paul Bernd Spahn, apart from their dominant role in public fixed capital formation, local governments are also strongly committed to spending on social assistance. These outlays have tended to grow primarily due to unfunded mandates heaped upon local governments by federal legislation, for example, the newly introduced right of a kindergarten place for each child. Not surprisingly, over the longer period, local taxes and state transfers could not keep pace with the local social expenditures, which exposes the structural weakness of the local government sector. This was one of the most important reasons why Germany was the first country on which a formal EU mechanism sanctioning excessive deficit and debt was imposed, in 2002. Pierre Garelo describes how France was exposed to the same procedure in 2003. One of the causes of fiscal problems in France is the chaotic and sometimes confusing decentralisation process with complex division of national territories, *départments* and regions. This is further aggravated by an increasing lack of transparency in local governance since the representatives at the council of the inter-municipal administration are not directly elected but are appointed by the council of the municipality. Such a situation made it very hard for taxpayers to understand the responsibility, authority and accountability of a

particular level of government, who is managing what and with whose money costs have been covered. Furthermore, some very big part of public expenditures like the social security budget is almost beyond the control of the parliament. The analysis provided clearly shows the need to clarify the responsibilities devoted to each level of government and to allocate financial resources in a way that makes each level accountable.

The situation regarding central and sub-national governments is particularly worrisome in the countries of Southern Europe, so the third part of the book examines the situation in Greece, Portugal, Spain and Italy. Each of the mentioned states has own specificities. Chortareas and Logothetis explain the crisis in Greece by a number of accumulated macroeconomics and institutional weaknesses. Macroeconomic problems are primarily linked to structural deficiencies and a lack of competitiveness, while institutional troubles are related to a lack of clarity about local and municipal functions. By contracting arrangements for local services, wages are paid by the central government, while liabilities are parked in public enterprises and off-budget entities. In the reform of the territorial organisation of local government, the number of municipalities decreased, but their responsibilities were broadened. The reduction aimed at creating economies of scale to increase local government efficiency, but this has not been fully achieved probably due to widespread rent-seeking and the extensive clientelistic and electioneering practice that characterised local politics.

Mário Fortuna explains the situation in Portugal, where sub-national government behaviour has impacted the financial crisis directly and through local municipal enterprises. Portugal is characterised by inadequately designed accounting rules, serious structural problems regarding the sustainability of local finance and poorly managed equalization transfers. This leads to the frequent application of soft budget constraint at the sub-national level. In order to circumvent stricter fiscal rules, municipalities and regions broadly use public-private partnerships and/or hide liabilities in publicly owned enterprises, and resort to other off-budget practices. In addition, the transfers are not made a function of needs, but of potential revenues. Thus, on average the municipalities with the highest GDP per capita and own revenues per capita receive more transfers per capita, which means that the existing system does not contribute to equalization. Due to the changes in inter-governmental relationships caused by the crisis, the reform of the budget framework law, reduction in transfers and wage cuts at the local level, more comprehensive budget rules to eliminate off-budget practices were adopted. In addition, the information on fiscal flows and local taxes was improved and is now given in more detail. There is also an intention to reduce the number of municipalities. Particular attention is paid to establishing a stable rule of transfers, which is quite opposite to the recent practice of transfers based on political negotiation, leading to a very uncertain and subjective process. All reforms tend to make sub-national government more accountable, and one can hope that with more fiscal autonomy the citizens will be better aware of the costs of public spending.



According to Lago-Peñas and Solé-Ollé, the current crisis in Spanish public finances has both external and domestic origins. The real estate bubble at the beginning of the 2000s was caused mostly by the flows of international capital after the accession of Spain to the Eurozone. The domestic causes consist mostly of the inadequate decentralization process, the inappropriate tax system, an insufficient fiscal discipline and weak institutions. Additionally, there is an inefficient model of equalization transfers, mostly related to ad hoc criteria and political bargaining in defining the amount of equalization grants received by regions. With the decentralization of the 1990s, significant responsibilities in the management of important social policies, such as health and education were given to the lower level of government, which had limited tax autonomy. After receiving financial windfalls from the real estate boom before the crisis, sub-national governments deemed such revenues to be permanent, which induced overspending. The resulting increase in corruption among local and regional politicians ruined the quality of political accountability. With the bursting of the real estate bubble, all levels of government experienced a serious financial crisis, with rapidly increasing deficits and debt levels. Realised reforms were insufficient and were halted due to the empowerment of populist parties.

Unlike in Spain, according to Ambrosanio, Balduzzi and Bordignon, the dire situation of public finances in Italy did not allow the activation of a counter-cyclical policy when the economic crisis hit the country in 2008. This led to massive fall of output and employment, which had only partially been recovered by 2010. The 2011 euro crisis was followed by massive capital flight and called into question the sustainability of the huge national public debt. This forced the country to begin with a serious and demanding fiscal adjustment programme that pushed the economy into an even more serious recession. Taxes were sharply increased and capital expenditures more than halved. Current expenditures were frozen in nominal terms, with an impact more or less equally distributed between the centre and sub-national governments. Local and regional governments were forced to raise money, through enforced savings, to finance the general government budget. The crisis effectively changed the real balance of power between different levels of government, leading to recentralization. Provinces were abolished, while regions' functions were drastically reduced. Time will show how realised and further reform for more efficient and responsible system of government may eventually lead to a return to sustainable economic growth.

Brosio, Piperno and Suarez Pandiello examine the ways in which Barcelona and Turin managed the problems of the Olympics, a highly costly and financial risky event for the soundness of municipal finances. The impact of the nomination of a city as the organizer and the needed decisions and investments, range from the most physical (construction projects) to the most intangible (local self-esteem or international impact, one of the most valued effects). Regardless of significant transfers from central states and revenues from sponsors, host cities are held responsible for the success of the event, which can imply significant unexpected and



unplanned outlays. Host cities can be tempted by the exceptionality of the event to implement projects associated with urban transport and thus to cause increased expenditures. Turin with its underground network, finished two years after the Games, is an excellent example for such renewal projects called *the Olympic legacy*. While the population of Barcelona was willing to continue to pay higher taxes for the benefit of better public services and help to regenerate the city, which in turn attracts further investments and growth, this was not the case in Turin. There the investments did not have an equal regenerative impact, and the city was unable to regain its role as the regional industrial hub. The Summer Games because of their large size, might generate positive effects in the mid-term as touristic attractive location, and in the long run can improve the openness of the market and internationally visibility, which can attract new and sustainable economic activities. While Barcelona was a success story, this was not the case with Turin, which should be a lesson for the future organizers of such huge events.

The problems of relations between the central state and subnational government in accession countries are analysed by Marjan Nikolov using the case of Macedonia. The higher autonomy offered to local government via free access regarding the property tax allowed them to cope better with the effects of the economic crisis, in spite of reduced transfers from the centre. The process of decentralisation was based on the gradual devolution of responsibilities given the increased capacity of local governments to manage tasks, and on the provision of equitable and adequate transfers from the central government. However, there have been constant problems with fissures in intergovernmental fiscal relations as well with the lack of clarity regarding the authority and responsibility of various governmental levels. Furthermore, although relatively well protected from the global economic crisis, there were no efforts by the central government to compensate local government for the revenue shortfall resulting from the impact of the economic crisis. Instead, VAT transfers were lowered, despite legal requirements, which has caused serious problems for local governments. In the existing decentralisation process, all local governments have the same responsibilities regardless of their size and tax capacity, while the benefits of local autonomy go hand in hand with greater levels of inequality. In that way, the central government should consider developing a more explicit grant system for horizontal equalization.

The book finishes with a section dedicated to some general lessons containing two contributions. The first by Alex Mourmouras and Peter Rangazas examines clientelistic politics and multi-level finance and the consequences of this relation to regional inequality and economic growth. The persistence of backward regions in generally successful growing middle and high-income countries has been a long-standing policy issue. Since regional development and income diverged, concern over increased regional differences resulted over the course of time in bigger regional transfers. In the analysis of the interactions between central and local governments regarding the distribution of grants with particular attention to the poorest regions, there is a need to use a political economy framework. In it, the

relations between levels of governments are strongly determined by mutually beneficial political trades. Politicians at various governmental levels through clientelistic politics collude, exchanging transfers for electoral support. Such a political setting is often characterized by corruption, particularly at the local level and in the underdeveloped regions, which causes significant suboptimal solutions. There are no simple solutions for such behaviour, but it looks as if co-finance arrangements for transfers can help reduce the leakages. Furthermore, other fiscal rules – like stricter implementations of financial constraints and debt limitations – can be useful to fortify budgetary constraint.

Over the last decades, fiscal decentralisation has been implemented in many European countries in the hope of enhancing governance and budgetary efficiency. Efficiency gains are based on improved information, competition and accountability, but there are also possible disadvantages of decentralisation. Using the case studies explained in the book, Leo Fulvio Minervini and Annalisa Vinella deal with the political economy of incentives and non-respecting budget constraints. Soft budget constraints may not fully internalize the costs of local spending if they are financed through a common pool of transfers from the central government. Furthermore, if local government is aware that central government will be at its disposal in the event of it defaulting, obviously, moral hazard can appear and/or local government will be inclined to overspending and may restrain its tax effort. The authors deem that in some rare cases, there can be a welfare gain in the central government guaranteeing important and critical investments, even if this can cause a softening of the existing budget constraint at the sub-national level. In the case of asymmetric or incomplete information, the central government can take advantage of the uncertainty and avoid rescuing a lower level of government, which can be a motivation for implementation of effective fiscal measures. The most important measure against soft budget constraints is a good guide for policy making.

The authors clearly show the complexity of multi-level finance and inform the readers on many crucial fiscal and political economy phenomena. Their contributions are even more important because these intricate issues have been mostly neglected in spite of their relevance. In the period of increased demands for efficient spending of public money under current fiscal decentralisation, there is an obvious need for establishing sound financial management for the delivery of local services. For such a task, it is important to establish transparent rules and criteria as well as to improve monitoring capacities. There are probably no easy solutions for these complex problems, but this book is without doubt a praiseworthy contribution to the improvement of the dire situation with multi-level finance in Europe.



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