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THE IMPACT OF MONETARY POLICY ON OTHER MACROECONOMIC POLICIES AND THE FINANCIAL SYSTEM

CONTENT

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The policy mix for the challenges ahead

*Boštjan Vasle**

The macroeconomic situation has changed significantly since the publication of the last year's international issue of "Bančni Vestnik". The latest economic forecasts of international institutions indicate a synchronised slowdown on a global scale and the euro area is no exemption. The latest figures not only show a slowdown in economic activity, but they are also accompanied by increased uncertainty and risk. The escalation of trade tensions, slowing down of China's economy, and the twists and turns of Brexit being just the most notable of these. Such developments call for the response of macroeconomic policies.

Over the past few years, the European Central Bank has played a significant part in helping the euro area overcome its troubles. In battling the macroeconomic consequences of the sovereign debt crisis and a prolonged period of below-target inflation, we have implemented a number of unconventional policy instruments, which have arguably gone further than those used by other major central banks. More specifically, we have broadly extended our arsenal of unconventional measures in three main categories. First, we have surpassed what was perceived to be the lower bound of our main policy tool, the interest rate on the deposit facility, at zero rate. Second, to influence inflation expectations and compress the yields at longer maturities, we ventured into purchasing assets of longer maturities through our Asset Purchase Programme. Finally, in acknowledgement of the important role in forming market expectations, the ECB has added forward guidance to our policy toolbox, and now we can communicate our future policies and contingencies which impact these.

The latest package, adopted in September, was just a reinforcement of our commitment to our goal. The new arsenal of policy instruments is thus aimed at anchoring inflation expectations, bringing inflation closer to its target and supporting the revival of economic growth. However, with interest rates below zero and abundant liquidity, the marginal effectiveness of additional accommodation is diminishing. Therefore, consensus is being formed that other policy measures, especially those of a structural nature and related to fiscal policy, should accompany monetary policy to provide stimulus to our economies. Governments should implement measures aimed at increasing the potential for growth, and countries with fiscal space should implement measures aimed at boosting growth. Estimated fiscal multipliers are shown to be highest when monetary policy is approaching its limit. However, the need for additional fiscal expansion should by no means dissuade governments to abandon prudent policies, which assure the fiscal sustainability.

However, the stimulus provided to the euro area economy did not come without cost. In part this is why September's measures include a two-tier system for reserve remuneration in which some of banks' holdings of excess liquidity will be exempt from the negative deposit facility rate. Still, the low interest rate environment and dampened credit demand induced banks to search for yields by investing in riskier assets. To limit these adverse side effects, the central banks have put in place a series of macro prudential measures. Although these measures were initially designed to address systemic risks building up across the business cycle, they have proved useful in limiting excessive risk-taking in an environment with low interest rates and abundant liquidity. Slovenia is no exception to this, as we have redesigned such measures in the area of household lending just recently. Similar to other central banks, the aim is to maintain financial stability in the system. It is important here to highlight that policies which contribute to the stability of the banking system also contribute to the effectiveness of achieving our main task, price stability. The transmission of monetary policy is more effective in a financially sound and stable banking system.

The crises of the past have led us to abandon existing dogmas and pushed us to take bolder steps. Emerging challenges should encourage us to leave behind some deep-rooted fears regarding other economic policies as well: completing capital and banking union, using fiscal space readily where available and pushing on with the effort to make fiscal policy more a matter of common interest would help to make the euro area more robust.

* Boštjan Vasle, Governor, Bank of Slovenia

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EU fiscal rules and unsychronised eurozone economic policy*

*Dušan Mramor***

In this article, the prevailing doctrine on the reasons for the need for fiscal coordination among the eurozone countries and consequently the chosen or proposed instruments of coordination and its implementation is challenged. It is shown that such fiscal coordination disables the eurozone countries to appropriately respond to economic shocks and cycles, especially pronounced in peripheral/new eurozone countries. And it is also shown that it leads to unsynchronized fiscal and monetary policy on the eurozone level, preventing swift and decisive economic policy response when needed.

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The last financial and economic crisis was a deep demand crisis entailing substantial short-term and long-term loses of GDP. There is a widely accepted view that, to combat effectively such a crisis and minimise the losses, the overall economic policy should be expansionary. In addition, the best results are achieved when, before all, monetary and fiscal policy are synchronised enabling each to use the minimum scope of its most effective instruments.

For a limited period soon after the beginning of the crisis, the ECB conducted an inappropriate procyclical monetary policy by increasing its interest rates. After conditions continue to deteriorate, the ECB accepted a wider view on economic circumstances in the eurozone. As a result, the ECB's assessment of the economic situation in the eurozone changed completely, and it began addressing the crisis with a countercyclical expansionary monetary policy. With "quantitative easing", the economic situation of the entire eurozone was better addressed.

However, as not all member states were in the same position such monetary policy was not appropriate for all of them. Especially Germany, the strongest member of the eurozone with a notably different economic situation than the majority of the eurozone member countries, heavily criticised such an expansionary approach. On the other hand, several member states would have needed an even more expansionary policy.

* This article benefited substantially from comments and suggestions of Mateja Vraničar Erman, Velimir Bole, Saša Jazbec, Nežka Mramor Kosta, Katja Lautar and Gonzalo Caprirolo. If any remaining inaccuracies are found, they are solely my responsibility.

** Dušan Mramor, Faculty of Economics, University of Ljubljana

For an effective response to the crisis, a synchronised fiscal policy of the eurozone, as in the US, would be necessary. As I describe in this article, the combined fiscal policy of eurozone member countries was not only unsynchronised with the ECB's monetary policy but even opposite to it and to the one needed as it was highly restrictive and thus procyclical.[1] In order to be effective, monetary policy had to first neutralise the restrictive fiscal policy with appropriate expansionary measures and, on top, lead such expansionary monetary policy that the entire economic policy had the needed expansionary stance. This double task exhausted available standard monetary instruments pushing ECB in the uncharted territory of unorthodox instruments with ex-ante unknown but most likely smaller effectiveness.

In this article I offer an explanation, based on my personal experience as the Finance Minister of Slovenia, of why coordination of fiscal policies of eurozone member countries, although at first glance conceptually perfectly logical, turned out to be highly procyclical and thus an additional cause of a prolonged and deepened crisis. This article summarises the problems concerning the concepts, methodology and implementation of the EU fiscal rules described in Mramor, 2017, 2019a, 2019b and 2019c, and analyses the effects on overall economic policy and economic performance.

EUROZONE FISCAL COORDINATION: THE CONCEPT AND ITS PROBLEMS

In 1992, long before the introduction of the euro (1999), EU identified the need to coordinate fiscal policies and introduced fiscal rules, stating that general government deficit and gross debt must be less than 3% and 60% of GDP, respectively. These rules were a response to the concern that an individual member state of the eurozone might behave irresponsibly and other members would have to carry the burden.

Tightened "one size fits all": the answer to loss mutualisation

The financial and economic crisis of 2008 showed, that these rules were not sufficient. Several of eurozone member countries became insolvent and needed help. The eurozone responded by upgrading the response systems to shocks (institutions and instruments) and tightening fiscal rules. Among the changes of fiscal coordination, the principle of medium-term objective (MTO) concerning the balance of general government budget was introduced and the maximum 60% debt rule was enhanced.[2]

The aim of the MTO principle is, that over the business cycle a country, which complies with the debt rule and has sustainable long-term level of aging costs, achieves balanced "headline budget" (the budget on the accrual ESA basis). Following the MTO principle, leads to approximately unchanged average and final nominal debt level.[3] If debt level is too high, and aging costs unsustainable, MTO is the appropriate structural budget surplus that assures suitable reductions of debt burden and "fiscal space" to finance aging costs in a sustainable way.

Estimates, resulting from the adopted methodology for estimating the permitted maximum annual deviation from the balanced headline budget for the next year and beyond, are used to check alinement of actual headline general government's budgets of each eurozone member country with this fiscal rule.

The core of the methodology is the so-called "cyclically adjusted balance". It takes predicted annual headline budget balance and adjusts it for its cyclical component - the effect of the so called "output gap", i.e., deviation of annual forecasted GDP from the "potential GDP". If forecasted GDP is lower than potential, a country is in the depression phase, underutilizing its productive resources. Its estimated cyclically adjusted budget balance equals the headline plus positive adjustment that depends on the size of the output gap. In the boom phase, the adjustment to overheated economy is the opposite, i.e. negative. Further adjustment of the headline balance that excludes so-called one-off revenues and expenditures (not correlated with the economic cycles) gives the so-called "structural balance".

For example, to assure a MTO of balanced budget, structural balance should be on average zero. For better control, zero structural balance is targeted every year or over a two-year average. Therefore, headline budget can be unbalanced, depending on the position of a country in the economic cycle: in deficit during depression and in surplus during boom. It was also agreed that the estimated headline deficit is in essence the maximum allowed deficit. However, a country may have higher headline surplus than estimated, thus building so called "fiscal space" to be used when necessary. All key elements of these amendments of fiscal rules were transferred to the legal order of each eurozone member country.

In summary, tightened fiscal rules require an on average balanced general government budget through the business cycle, allowing deficit in

1 This was strongly influenced by Germany and the Netherlands.

2 To simplify this analysis, I leave aside »Expenditure benchmark« that also constitutes the enhanced package of fiscal rules.

3 So called one-offs can be the cause of nominal changes in debt level even when complies with the MTO rule.

depression (spending more in bad times) and requiring surplus in the boom phase (saving in good times). As already stated this "structural balance approach" is intuitively logical and should lead to a (moderately) countercyclical fiscal policy. However, as shown in this article, problems with the methodology and implementation lead to economically hampering results.

Inadequate reasons for fiscal coordination

As noted, the need to coordinate fiscal policies was identified as a response to the concern of mutualisation of the burden if some member states become insolvent. Irresponsible fiscal behaviour was assumed as a predominant cause of insolvency.

As several eurozone countries in the last crisis became insolvent and needed help, the mutualisation concern was confirmed. The response with tightening fiscal rules clearly showed that the cause of insolvency was predominantly attributed to what was referred to as "reckless" fiscal behaviour of a group of member states, most of them from the south and from peripheral eurozone countries. However, I claim that the criticism concerning irresponsible behaviour of peripheral and "new" countries of the eurozone should not be accepted without reservation, as it is not sufficiently supported by the facts.

With adoption of the euro, eurozone member countries have 'surrendered' monetary policy to the European Central Bank (ECB), which leads monetary policy according to the state of the economy of the entire eurozone. Of course the economic situation in eurozone member countries with the largest economic weight is crucial for its policy decisions. Before joining the ERM2 and the adoption of the euro, a number of analyses for a candidate country concluded that economic convergence to the eurozone was successful and that the ECB's monetary policy is suitable for it. The crisis showed a completely different picture, namely, monetary policy of the ECB can be inappropriate for countries like Slovenia even when it is appropriate for the eurozone as a whole, and even more so when it follows primarily the needs of the core countries.

As shown in Bole (2016), also current fiscal rules, including the methodology for estimating structural balance, is less inappropriate for the Core than for peripheral countries. In the case of Slovenia, Bole (2004) warned very early that we were overestimating the appropriateness of EU economic policy for Slovenia, while underestimating the strong impact of EU and eurozone entry on the reduction of the country's ability to effectively conduct its own economic policy when it needs to address unsynchronised economic changes.

Table 1 clearly shows that when all economic policy instruments were available, mostly before entering the EU and ERM2 in June 2004, Slovenian economic policy was much more prudent than that of the core member states or the eurozone as a whole. For example, in the period before 2005 Slovenia successfully neutralised the significant economic shocks caused by the process of EU and eurozone accession. In this period, Slovenia achieved very high GDP growth and low unemployment with significantly higher macroeconomic stability. At the same time, it complied with fiscal rules having low public finance deficit and public debt. Therefore, it was exceeding the economic performance of many core countries in the time when some of them violated the rather lax fiscal rules. However, by joining the ERM2 and the EU Slovenia lost key effective economic policy instruments and was further affected by pro-cyclical fiscal rules, and the pro-cyclical monetary policy at the beginning of the crisis. The result for the entire 13-year period was extremely poor, and the relative economic development of Slovenia in 2017 was at the same level (85% of the EU average) as at the time of its accession to the EU in 2004. Consequently, Slovenia did not converge

Table 1: Slovenia vs. the »Core Eurozone«: 2004 and 2017

2004

	General gov. balance % of GDP	General gov. debt % of GDP	GDP growth in %	GDP PPP pc EU28 = 100
Euro area 19	-3.0	68.4	2.3	110
Germany	-3.7	64.8	1.2	119
France	-3.5	65.7	2.8	109
Slovenia	**-2.0**	**28.8**	**4.4**	**85**

2017

	General gov. balance % of GDP	General gov. debt % of GDP	GDP growth in %	GDP PPP pc EU28 = 100
Euro area 19	-0.9	86.8	2.4	106
Germany	1.0	63.9	2.2	128
France	-2.7	98.5	2.2	104
Slovenia	**0.1**	**73.6**	**5.0**	**85**

Source: Eurostat

Table 2: Variability of annual growth in economic activity (GDP, exports) of the EU Member States in the period 2004-2018

	Standard deviations in percentage points			Percentage variability by which economic activity in 'peripheral' and 'new' members is higher than in core members	
	Core members*	Peripheral members**	New members***	Peripheral members	New members
GDP growth	2.0	3.4	3.8	73.5%	93.0%
Growth of exports	5.1	6.7	7.2	31.9%	41.4%

Legend: Core: AT, BE, DK, FR, LU, NL, DE, UK*
*Peripheral**: EL, FI, IE, IT, PT, ES*
*New***: BG, CY, CZ, EE, HR, LV, LT, HU, MT, PL, RO, SK, SI*
Source: Eurostat

to the EU average during this period.[4] At the same time, as can be seen from Table 1, EU economic policy was very suitable for Germany, which gained substantially during the same period.

Economic shocks affect Slovenia differently than the eurozone as a whole. In most cases, the consequences are 'symmetrical', that is, in the same direction but much larger (unsynchronised) than in the eurozone and in some cases even 'asymmetrical', in the opposite direction. It turned out that the structure of the economies of peripheral member states (for example of Slovenia with its economy of small size, prevailing industrial production of components, significant weight of tourism, an underdeveloped capital market ...) are much more exposed to the cyclical motion of the economy and various shocks. Such differences from the Core cannot be overcome by structural reforms. Slovenia cannot replicate Germany's economic structure for numerous reasons e.g. size, infrastructure, geography, specialisation, labour force, ...

In addition, the Periphery serves as a buffer for the Core in case of large shocks. For example, core countries mitigate overheating of their economies by capital outflows into real estate investments in peripheral countries. For the latter, this means additional demand in an already overheated economy. In recession, investors from core countries cease to invest or even reverse their actions by selling real estate. In addition, financial institutions in peripheral countries, which usually have headquarters in core countries, withdraw financial resources from peripheral countries in case of severe crises (i.e. failing Vienna agreement). With such actions, the core countries neutralise part of the negative economic changes at home, but amplify fluctuations in the peripheral countries, or even cause a collapse of their real estate markets and financial institutions, thus deepening of the economic contraction, like for example in Spain in the latest crisis.[5]

Table 2 shows higher variability of the economic activity of "old" peripheral and, even more, of "new" EU countries compared to core ones.

Both monetary policy and the agreed fiscal policy rules are in the eurozone mostly adapted to the needs of the core countries in spite of the redirection of monetary policy mentioned above. These criteria do not address relatively higher needs to respond to shocks and the much larger economic cycle fluctuations in peripheral and "new" EU countries. As I will show, current fiscal rules immobilise fiscal policy. Especially during crises, they are highly pro-cyclical and thus detrimental before all for the Periphery where the contagion starts, and later affects the whole eurozone. The last crisis revealed that the eurozone is not well designed for depressions.

For geographically peripheral euro area countries the costs of inappropriate signals from the key European fiscal framework indicators after 2005 were enormous. Especially in small peripheral countries, national macroeconomic stability as well as the European stabilisation framework both need a new concept. Lessons learned are reflected in the controversial debate on deepening the eurozone.

In my opinion, irresponsible behaviour of the Periphery, the usual starting point of these discussions, is not the main reason for the eurozone's weaknesses. Thus, the actual problem is that the Periphery lacks essential economic policy instruments to respond pre-emptively or at least immediately to neutralise shocks.

Therefore, in order to pursue an appropriate economic policy and achieve the greatest possible economic prosperity, stronger instruments and measures of economic policy should be available to each member state. A country would need even more flexibility after joining the EU

4 In Slovenia also inappropriate domestic economic policies in some sub periods contributed to this poor result (see: Mramor, 2019b).

5 See for example, Bole et. all (2018).

and the eurozone than before that. In this way, current inadequacies of the ECB's monetary policy and fiscal policy framework for peripheral eurozone member countries could be mitigated.

METODOLOGICAL PROBLEMS

The calculation of the structural balance, the key indicator of compliance with fiscal rules, is based on estimates of the output gap. Therefore, robustness of annual output gap estimates, i.e. their appropriateness and stability through time, is crucial. However, the complex methodology for estimating structural balance for the next fiscal year and beyond is useless for coordination of fiscal policies of eurozone member countries. It produces not only completely unstable estimates, but also frequently inappropriate and illogical results. I will illustrate these two problems on the case of Slovenia. Further, I will point out the methodological problem of significantly different quality of output gap estimates of the Core versus Periphery and problems of inadequacies of the European system of national and regional accounts (ESA).

Total instability of structural balance estimates for a fiscal year

Let us analyse the budgeting and evaluation of fiscal rules compliance with structural balance estimates for Slovenia for the fiscal year 2016.
As every year, in 2015 the budget for 2016 had to be set. The main input into the budgeting process concerning fiscal rules are estimates of the output gap, and the 2016 estimates were made by the EC in spring 2015 using two methods: production function (PF), and HP filter (HP) each having its strengths and pitfalls. Estimated output gaps were PF-0.1% of GDP and HP+0,1% of GDP, forecasting fully utilised economic resources.[6] For the EC these estimates represented the basis to set the required fiscal effort for Slovenia in 2016 in order to reach MTO of 0.25% of GDP structural budget surplus in 2017.[7] For the Slovenian Ministry of Finance these estimates were the limitations of the 2016 budget. Nevertheless, when the budget was about to be adopted by the parliament in November 2015, autumn EC output gap estimates were published. They were not just substantially different from those in the spring but also contradictory: PF+0.5% of GDP forecasted mild overheating, and HP -0.6% of GDP forecasted mild depression. Difficult last minute changes to the budget would be needed if new PF estimates were followed.

It is necessary to strengthen the ability of the eurozone to help member states in cases when, despite the full use of their available economic policy instruments, they cannot neutralise the shocks.

As it turned out this would be a mistake, as subsequent PF estimates again changed the estimated economic conditions in Slovenia in the fiscal year 2016 from mild overheating to depression. Namely, when compliance of 2016 budget with fiscal rules was evaluated by the EC in spring 2017, both output gap estimates were predicting depression with PF -0.4% and HP-1.5% of GDP. To aggravate the problem, estimates for 2016 changed even more from spring 2017 to autumn 2018: PF from -0.4% to -1.6%, and HP from -1.5% to -3.0% of GDP, showing a strongly depressed economy. After that, estimates seem to have stabilised.
For the Ministry of Finance such volatility of estimates makes setting the appropriate level of structural deficit and its needed reduction a complete moving target and leaves it without any control over compliance with fiscal rules during the budgeting and budget implementation period.
Very high volatility of estimates also causes high uncertainty concerning compliance. To mitigate noncompliance risks, member states have to deploy a more restrictive fiscal policy that creates a "reserve" for negative surprises of subsequent output gap estimates when compliance with fiscal rules is evaluated. Required additional restrictiveness of fiscal policy depends on volatility of estimates and can be quite sizable – ex-ante required budget balance could be up to a few percentage points more conservative than the finally discovered ex-post is needed.

Structural balance estimates defying economic reasoning

An analysis of results of the EU output gap methodology through the years reveals an even bigger problem of illogical estimates. This leads to the conclusion that the general appropriateness of estimates is also questionable.

6 The autumn 2015 estimates of output gap for the fiscal year 2016 were PF +0,5% of GDP and HP -0,6% of GDP.

7 It was during the budgeting process in 2015 changed to year 2020.

I. For example, let us examine estimates for Slovenia for the fiscal year 2007, when Slovenian economy was completely overheated with 6.8% (more than twice the EU) GDP growth, nearly twice the eurozone inflation of 3.8%, current account deficit of 4.1% (four times the EU) increase of labour costs of 2.6% (nearly twice the eurozone) etc. The EU methodology that was used in 2006 to predict the output gap for 2007 produced completely illogical estimates: practically 0% of GDP output gap and consequently, in spite of 0.1% of GDP headline budget deficit, 0% of GDP structural deficit. The latest estimates (spring 2019) for 2007 are in the range of 3.4% to 4% of GDP of structural deficit!
II. Contrary, the 2016 spring estimate of the output gap for the fiscal year 2017 showed the highest positive output gap in the EU of 1.8% of potential GDP. This result predicted a seriously overheated economy, a high structural deficit and the requirement of EC to reduce structural deficit not by the minimum 0.5 p.p. but by 1 p.p. of GDP. The result was in total contradiction to the forecasted economic situation: deflation, huge current account surplus, unchanged labour costs, higher than average unemployment, lack of domestic demand, not yet recovered services sector, etc. In short, no overheating. However, based on estimated positive output gap, Slovenia should have responded by very restrictive fiscal policy, decreasing public expenditures not only as percentage of GDP but even in nominal terms. The case was so obviously illogical that even the EC agreed that the estimates should be ignored. If such a decision had not been made, the rapid recovery of the Slovenian economy would have been halted.
III. And, we have already shown inappropriate 2015 estimates of output gap for Slovenia for the fiscal year 2016. They wrongly showed economy at full capacity or mildly overheated and as such were used in the budgeting process to comply with fiscal rules. Subsequent estimates, including the one in the year 2019, showed the opposite - strongly depressed economy in the year 2016. This is clearly showing that estimates made in 2015 forced Slovenia to lead restrictive and procyclical instead of expansionary and countercyclical fiscal policy in 2016.

Different quality of structural balance estimates for different member states

How robust and thus appropriate the EU methodology is for different member states was analysed in Bole, 2016. There is an important difference between old, core EU countries and the smaller and newer, peripheral ones. The analysis shows bigger volatility and probability of illogical estimates for the latter. Thus, for example in the last crisis, these member states had to employ more severe austerity programmes in order to be certain that they are within the lines of the fiscal rules when evaluation is performed. Bole also found that in the few years before the crisis the errors were even larger, but in the opposite direction. Ex post, it is clear that on average the fiscal stance was procyclical.

In summary, the current EU structural balance methodology is using unobservable variables, unreliable forecasts as inputs, problematic time frames etc. It is producing huge differences between successive estimates with high and systematic biasedness between early and late vintage estimates. The results make it ill-suited for the task as its implementation leads to severely procyclical fiscal policy.

ESA 2010 inadequacies

There are some accounting rules set in the European System of Accounts (ESA) that defy economic reasoning and thus inadequately (some severely) alter the headline budget balance. Therefore, they can force inadequate fiscal policy especially for countries following cash flow principles.
One example is treatment of public sector investments. All investments of the public sector are on the accrual basis of ESA 2010 accounted as expenditures in the year when investments are made. In private sector, business investment is not expenditure; it is not an item on the income statement, only depreciation is. This ESA rule severely hampers a country with very pronounced investment cycles, or when responding to economic crisis with accelerated investments is needed. Fiscal rules are, due to this accounting rule, breached very quickly resulting in procyclical fiscal policy – in crisis higher deficit and debt.
This ESA rule also directly contradicts the intention of "Expenditure benchmark" fiscal rule, which favours public investment expenditures assuming their higher GDP multiplier than achieved with other public expenditures.

IMPLEMENTATION PROBLEMS

Procyclical implementation of tightened fiscal rules during the crisis

Fiscal rules were amended during the crisis, when the majority of member states had sizable structural deficits

not meeting their MTOs nor debt level lower than 60% of GDP. Therefore, the so called annual "fiscal effort" was also introduced as the needed annual reductions of structural deficit and of excess debt level. For each eurozone member country the required fiscal effort is determined for every year by the EU Commission (EC) based on its current conditions of public finances and forecasted economic development. The recommended minimum annual reduction of structural deficit is 0.5% of GDP, and the minimum reduction of debt in GDP set to 1/20 of debt in excess of 60% of GDP.

Due to the timing of the adopted tightened fiscal rules in the middle of the crisis, their strictness and short transition periods to reach MTOs, the majority of eurozone member countries were forced to use austerity measures reducing government spending and increasing taxes in order to comply. They had to employ a procyclical restrictive fiscal policy, which was exactly the opposite of what economic circumstances required.

Complex conversions of structural to headline and headline to cash flow balance

This implementation problem will be explained through the case of Slovenia for the budget year 2016 based on my personal experience. To comply with EU fiscal rules, Slovenia had to reduce structural deficit in 2016 by 0.6 p.p. of GDP. Three stages of tricky planning were required to fulfil this requirement. As in most EU countries, budgets are in Slovenia adopted and executed on a cash accounting basis. Therefore, the 2016 cash flow based budget passed by the parliament should have been converted from the structural balance with the required reduction of structural deficit.

I. In the first stage, first in spring and later in autumn 2015, EC determined the estimated output gap, structural balance and its needed deficit reduction for the 2016 budget. As shown, estimates in spring and autumn differed considerably, which made controlled budgeting process very difficult if not impossible. After EC's evaluation and recommendations in October, the budget was finally set in November 2015. Initially, due to inappropriate EU methodology, in spite of the weak Slovenian economy EC determined a required annual structural deficit reduction of 1 p.p. of GDP.
II. In the second stage, the needed headline deficit reduction to achieve the required reduction of structural deficit was calculated. The conversion to headline deficit was even more restrictive than it seems. Namely, 1 p.p. reduction in structural deficit converted to much higher reduction in headline deficit. For example, in spring 2016 Eurostat estimated that Slovenia in the fiscal year 2015 achieved reduction of 1.2 p.p. of GDP headline deficit that converted only to 0.2 p.p. reduction in structural deficit. Beside output gap estimates, the arbitrary ways in which country's measures are classified as structural or not and the weight and direction of one-offs are crucial. However, by November each year it is almost impossible to determine precisely the needed headline deficit reduction. As shown, the estimated structural balance is changing widely within the year when the budget is prepared and adopted for the next fiscal year, in the year(s) it is implemented, and beyond.
III. In the third stage, conversion to actual cash flow based budget (adopted by the parliament) is needed. It is even possible that deficit reduction needed on a cash flow basis has to be even bigger than the reduction of headline balance. Thus to achieve deficit reduction of 1% of GDP in structural terms Slovenia would need to decrease cash flow based general government deficit by a few percentage points – it could easily reach 3 p.p..

During the economic crisis, this would have devastating procyclical effects on Slovenian economy. Fortunately, EC and ECOFIN recognised that the output gap estimates for Slovenia were not logical and clearly showed problems with the EU methodology. Slovenia did not get the requirement of 1 p.p. but only by 0.6 p.p. structural deficit reduction

Changing and problematic Eurostat ESA2010 interpretations

Eurostat is continuously developing interpretations of ESA 2010. These changes of interpretations affect budgeting process, execution process and evaluation of compliance with fiscal rules process. They continuously change headline budget balance and thus alignment with fiscal rules. Examples of changing decisions with substantial impact concern what is included in the public sector and how to treat certain special transactions like those of Slovenian 100% state owned bad bank.

Thus, when preparing the budget for the next fiscal year by November of the current year certain Eurostat interpretations are valid and used by the Ministry of Finance. However, during the whole fiscal year Eurostat is making changes. In Slovenia for example, there were three changes of treatment of bad bank transactions during the fiscal year of 2015. And this was not all. Eurostat changes interpretations even when the fiscal year is over. So

in April 2016 when compliance with fiscal rules in the fiscal year 2015 was assessed by the EC, and a country could not take neutralizing actions for the previous fiscal year anymore, there were additional substantial changes that increased the headline deficit of the 2015 budget of Slovenia by 0.7 p.p. of GDP. For Ireland the increase was 1 p.p. of GDP and for Slovakia, where additional institutions were included into the public sector, it was 0.5 p.p. of GDP.

In order to comply with fiscal rules in a controlled way, these April interpretations of Eurostat would have to be known during the budgeting process nearly two years earlier and should not change afterwards. If they change, they should not be used in the evaluation of compliance with fiscal rules. Since they are used, the constant changes have to be accounted for in the form of a "reserve" that on average reduces budget deficit (increases surplus) beyond optimal. This can produce substantial economic losses, primarily in recession.

Changes of ESA interpretations that have economic sense increase the quality of available information and thus enable better decisions. Unfortunately, some changes in interpretations during the crisis had no economic sense but only required more austerity and were imposed with a threat to the country. For Slovenia, Eurostat threatened that in case of not complying with their new interpretation, an alternative (new) interpretation will be used that will result in not 2.9% deficit but more than 3%, leading to excessive deficit.

One example of a problematic interpretation was the accounting treatment of PPP model of energy saving investments within the so called Junker's programme. If the private sector financed energy saving investment in energy inefficient government buildings and was compensated with savings of the energy costs in the future years, private sector expenditures were treated as public expenditures, all in the year of investment. In addition, they increased the debt level of the country.

One cannot avoid the conclusion that Eurostat's goal was predominantly as conservative accounting as possible, which caused very high economic costs during crisis.

CONCLUSION

The predominant focus in the current EU and eurozone fiscal framework on the reduction of public spending as a means of long-term fiscal sustainability is inappropriate. It leads to suboptimal economic results, as economic resources are not fully employed in the best uses. Difficult demographic and other challenges of the EU are a serious threat to social peace and consequently economic progress (including fiscal sustainability). In an effort to preserve social peace, one of decisive preconditions is the fastest possible, stable economic progress. Thus, the current focus of the fiscal framework should be replaced with a focus on stable economic growth.

To achieve this, the current methodology and a number of other poorly designed public finance rules and procedures that prevent enacting appropriate fiscal policies, should be abandoned or substantially altered. Moreover, a decentralised system of economic policy management in the eurozone needs to be developed, in order to allow eurozone members to neutralise non-synchronous changes of economic activity independently with effective economic policy instruments in a timely and appropriate manner. At the eurozone level, however, it is necessary to strengthen the ability of the eurozone to help member states in cases when, despite the full use of their available economic policy instruments, they cannot neutralise the shocks. It should not be a slow process of conditionality that usually results in a forced privatisation of state assets at low prices. Help should be immediate, rather automatic and unconditional. However, before such a system is introduced some predetermined conditions, like those on the extent and structure of public debt, should be met to avoid moral hazard.

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Central fiscal stabilisation capacity of the EU / euro area: where we are and where do we go?

*Mojmir Mrak**

The objective of the article is to present the context why the EU budget has embarked in the process aimed at introducing a stabilisation role on a systemic basis and to discuss what kind of challenges are associated with this process. The article addresses three main issues. It first presents whether, and if yes, to what extent the EU budget performs the three fiscal policy functions under the fiscal decentralization theory. In the continuation, the text focuses on conceptual challenges associated with creation of a centrally managed fiscal instrument that would perform a stabilisation function of the European monetary union. And finally, the article provides a brief overview of ideas / proposals that have been put forward to address the stabilisation role in the EU / euro area including the one presented within the framework of the ongoing negotiations for the post-2020 EU budget.

JEL G01 H21 O1

1. Introduction

Throughout the decades-long EU economic integration process, it moved from the customs union over the single market to the monetary union with the creation of a common currency, the euro. In contrast to sovereign states organised as federations in which currencies coincide with national states, European monetary union, similarly as some other monetary unions in the past, does not have its central fiscal authority. Although monetary policy and consequently exchange rate policy has been fully centralised for the euro area Member States, fiscal policy remained largely a national responsibility. It should be underlined that fiscal policy coordination implemented through multilateral surveillance was significantly strengthened in the post-2008 crisis period, but this even closer policy coordination may not be sufficient given the growing needs of economic and monetary integration. Creating a central fiscal stabilisation capacity endowed with larger fiscal resources than the current EU budget seems to be of crucial importance for stabilisation of the euro area on a lung-run.

EU is in the midst of its negotiations for the EU budget in the next medium-term covering the period from 2021 to 2027. In May 2018, the European Commission outlined its proposal to be agreed upon among the Member States whereby the EU budget

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would for the first time have an instrument specifically designed to have a stabilisation role. The overall objective of this contribution is to present the context why the EU budget has embarked in the process aimed at introducing a stabilisation role on a systemic basis, and to discuss what kind of challenges are associated with this process.
In addition to this *Introduction* and C*onclusions*, the article consists of three main chapters. In the *second one,* it presents whether and if yes to what extent the EU budget performs the three fiscal policy functions under the fiscal decentralisation theory. The *third chapter* focuses on conceptual challenges associated with creation of a centrally managed fiscal instrument that would perform a stabilisation function of the European monetary union. And finally the *fourth chapter* which provides a brief overview of ideas / proposals that have been put forward to address the stabilisation role in the EU / euro area, but focuses on presentation and assessment of the European Investment Stabilisation Function (EISF) proposed by the European Commission within the framework of the post-2020 EU budget.

2. Fiscal policy functions and the EU budget

To what extent the EU budget is appropriate for assuming this role? When applying the theory of fiscal federalism for the EU, it is necessary to start from subsidiary as one of the EU's founding principle. According to this principle, responsibility for carrying out public policies is primarily in the hands of EU Member States, but they can agree, if better results may be achieved, to entrust implementation of certain policies to the EU level. As far as fiscal policy is concerned, the EU Member States have been so far very restrictive in assigning more fiscal authority to the EU level.
In the EU, the three fiscal policy functions – allocative, redistribution and stabilisation (for details, see Oates, 1972) – are being implemented very differently than in sovereign states including those ones that are organised as federations with central and several levels of sub-central governments. EU is on the one hand far from being a federation and on the other hand is far from being a complete monetary union.
As far as allocative function is concerned, it is implemented in the EU primarily through establishment and development of the common market with free movement of goods, services, capital and labour. The EU budget as the main financial instrument of the Member States at the EU level has also been used for allocative purposes through its financing of European public goods, such as research, mobility in education, trans-European networks, assistance to third countries, is very small and is at the level of not more than 0.1 per cent EU GDP.
Also the other two fiscal policy functions of the EU budget are by and large left to the Member States themselves. The EU budget, for the time being, has literally no stabilisation function. On the other hand, it has a limited redistribution function especially through (i) the cohesion funds aimed at stimulating economic growth and development of less developed regions of the EU and (ii) common agricultural policy aimed at supporting agriculture sector production. Even though as much as 70 per cent of the EU budget is allocated for these two purposes – this indicates that the budget is of a highly redistributive character – its size is very small and amounts to not more than 1 per cent of the EU GDP. This is in sharp contrast which national public finances of the EU Member States that typically account for between 40 to 50 per cent of their respective GDP. While net transfers from the EU budget to main recipients of cohesion funds and funds from common agricultural policy may be sizeable, this fiscal risk-sharing through transfer is significantly smaller in the EU or euro area than in sovereign states of a federative character (Prammer and Reiss, p. 114).
To conclude, small budget has never provided the EU with an effective authority for any of the three basic three fiscal policy functions. On the contrary, the subsidiarity principle applied rigorously in this area made the EU budget highly dependent on the willingness of the Member States to assign spending responsibility to the EU level. And there has been no appetite on the side of the Member States to do so.

3. Central fiscal stabilisation capacity as a necessary instrument of the revised EU / euro area institutional governance

The 2009-2013 financial and economic crisis proved that the original euro area economic governance with poorly functioning Stability and Growth Pact (SGP) as its main crisis *prevention mechanism* and with no crisis *management and resolution mechanism* was simply not appropriate to sustain deep economic crises. More precisely, the crisis and developments then after confirmed that recessions of such a magnitude cannot be addressed effectively with stretching the monetary policy to the limits and without fiscal policy playing a more active role that goes beyond the role of automatic stabilisers. Further deepening of the crisis in the euro

area was caused by the spread of contagion among highly interdependent members of the monetary union as well as by nexus of banking and sovereign crises (Bordignon and Baglioni, 2018, p. 32).

3.1. The post-crisis euro area's institutional governance dominated by sub-optimal fiscal risk-reduction rules

Overall strategy for a systemic reform of economic governance in the euro area has been based on two pillars. The first one has consisted of strengthening the *crisis prevention mechanism* by establishing a fully functioning banking union and capital markets union as well as by "repairing" the fiscal side of the monetary union. As far as second pillar of the euro area governance reform is concerned, the Member States put in place first European Financial Stabilisation Facility that was replaced later on with European Stabilisation Mechanism as an entirely new *crisis management and resolution mechanism* that was missing entirely in the original institutional infrastructure of the euro area.
Where are we today? The EU Member States and especially the euro area countries have made significant steps forward on many fronts. While the creation of the capital markets union is still in its infancy, the banking union project is more advanced with the single supervisory mechanism (the first pillar of the banking union: the Single Supervisory Mechanism - SSM) fully operational and the common resolution system (the second pillar: the Single Resolution Mechanism – SRM) introduced. However, the banking union is still far from being complete as the common resolution mechanism as its financial backstop is not fully funded yet and as there has been no progress yet on the common deposit scheme (the third pillar: the European Deposit Insurance Scheme - EDIS). So, yes, banking sector is better prepared for new crises, but as the banking union is still largely incomplete as there is risk of potential bank runs and capital flights when new crisis will occur.
Let us now turn to the fiscal policy part. The main transformation was a drastic reform of poor-functioning pre-crisis SGP. Conceptually based on fiscal risk-reduction logic whereby the problems of the euro area stem mostly from inadequate domestic policies, the reform was focused at substantial strengthening of fiscal rules for all EU Member States through so-called "six-pack" and additionally for the euro area members through so-called Fiscal Compact and "two-pack". The cornerstones of the reform included broadening the scope of surveillance from narrowly defined fiscal issues to more general macroeconomic issues, adjusting the Council's decision-making rules into "reverse qualify majority voting" and strengthening the role of the European Commission in enforcement of fiscal rules.
Experiences with implementation of fiscal risk-reduction rules over the recent years have clearly confirmed their sub-optimality and sometimes also substantial weaknesses. This is not surprising as the "one fits for all" fiscal rules logic has proved to be inadequate for several reasons. Let me give two examples. The fiscal rules are *de-facto* based on an assumption that the crisis was primarily of a fiscal origin and a consequence of the lack of discipline in controlling public finances. Though this was true in the case of Greece, in was not at all the case is some other countries hardly hit by the crisis, such as Ireland and Spain. Both namely had excellent fiscal position prior to the crisis, so the crisis in these two countries was caused by other reasons, primarily by accumulation of private sector debt and emergence of internal and external imbalances.
Let me point to another weakness of the existing fiscal rules. They were designed in a way to contain provisions that take into account a country's position in the economic cycle, look at each country in isolation disregarding potential fiscal spill-over effects across countries. SGP *de-facto* operates as a fiscal brake and not as a tool for aggregate fiscal management at the EU or euro area level as a whole (Bordignon and Baglioni, 2018, p. 33).

It is realistic to expect that monetary policy in the euro area will remain constrained in the near and medium terms.

3.2. Growing consensus for reformed fiscal risk-reduction rules to be accompanied by fiscal risk-sharing instruments

Over the recent years an intensive debate has been going on how to further reform the euro area's institutional structure and to put on a long-term sustainable path. Within this context and taking into account sub-optimal results of the existing institutional structure based strongly on rigid fiscal rules, a consensus is being built that the fiscal risk-reduction approach dominated so far has to be complemented with fiscal risk-sharing instru-

ments. What seems to be needed is a progress on both fronts – risk-reduction and risk-sharing are complements and not substitutes (Beetsma and Larch, 2018).

Quite a number of ideas / proposals addressing the fiscal risk-sharing in the euro area has been outlined in recent years. These ideas / proposals – they come both from policy-makers as well as from academic circles – have been presented in various levels of details and could be largely classified into two large groups

- ideas / proposals that do not involve financial transfers (or at least do not involve these transfers explicitly) and
- ideas / proposals – called also central fiscal capacity – where these transfers are an explicit component of the idea / proposal.

While the first group will be briefly presented in the remaining part of this sub-chapter, the central fiscal stabilisation capacity will be addressed in more details in the next chapter.

Within the group of ideas / proposals with no financial transfers required, the most prominent ones include the following four (Prammer and Reiss, 2018, p. 117-120):

- *reform of fiscal rules aimed at reducing their pro-cyclicality;* The overall logic of the reform of fiscal rules is to make them stricter in good times and provide sufficient fiscal buffer for bad times. Many aspects of the existing fiscal rules are highly complex and pro-cyclical as they ask for more consolidation in bad times. That is needed is simplification of the rules as well as improvement of the implementation surveillance.
- *different forms of "Eurobonds";* The instrument is aimed at avoiding an increase of sovereign risk premium in case of fiscal problems; these proposals are based either on involvement of a joint and several liability clause or something similar. These kinds of bonds would reduce the cost of a default for the defaulted country, but would on the other side be associated with a moral hazard risk.
- *European Stability Mechanism;* It is an instrument that provides financial assistance to the euro area Member States in trouble in exchange for strict conditionality. The ESM is an institution with decision rules based on unanimity of lenders and with financial assistance provided in the form of a loan at favourable interest rates and with long repayment period.
- *mechanism for sovereign debt restructurings*; The main argument in favour of this sovereign debt restructurings is its application reduces the country's debt problem, imposes more market discipline and reduces the financing needs of the debtor country. If restructuring takes place, it should be conducted orderly and symmetrically (no exception for individual bond holders).

Of all the above fiscal risk-sharing ideas / proposals, only the ESM has actually been established. It should be underlined, however, that even this instrument is not really a macro-management tool, but rather a lender in very specific circumstances, namely when a member state has lost its access to financial markets.

4. Central fiscal stabilisation capacity as an important component of the EU and / or the euro area fiscal policy institutional structure

As presented in *sub-chapter 3.2.*, quite a number of fiscal-risk sharing ideas / proposals has been outlined in recent years. Though all these proposed instruments – as explained, their common characteristic is that they do not involve financial transfers – would together with common monetary policy and national fiscal policies contribute towards strengthening the euro area's fiscal structure, a growing consensus has been developing that effective absorption of large asymmetric and area-wide shocks in the euro area would not be possible without an effectively functioning central fiscal stabilisation capacity.

4.1. Economic rational for central fiscal stabilisation capacity of the EU / euro area

A fiscal stabilisation function at the euro area level would provide resources to deal with asymmetric, country-specific shocks that cannot be managed at the national level alone either because of lack of fiscal space and / or because high borrowing costs of the country concerned. A central fiscal stabilisation capacity would strengthen countries' ability to respond to output fluctuations with countercyclical fiscal policy.

Another important justification for a common central fiscal stabilisation capacity at the euro area level is to deal with common, euro area wide shocks. This kind of shocks would normally be stabilised by monetary policy. However, in periods when the monetary policy has become increasingly ineffective due to its zero or even negative interest level, coordinated fiscal support including central fiscal stabilisation capacity may become an important part of the policy mix, especially taking into account that national fiscal policies are often constrained by high borrowing costs. An effective central fiscal stabilisation capacity may provide a framework for more countercyclical fiscal stance across countries, thereby improving

growth and employment outcomes relative to the circumstances without such a capacity.

Further on, a well-designed central fiscal stabilisation capacity could be an effective instrument for implementation of countercyclical policies in good times by requiring net contributions of Member States in the facility. It can also provide an ex-ante incentive for fiscal discipline by conditioning support in bad times by compliance with the fiscal rules.

4.2. Various proposals for fiscal stabilisation capacity of the EU / euro area with the focus on European Investment Stabilisation Facility

The discussion about central fiscal stabilisation capacity of the EU / euro area takes place within the context of a wider discussion about deepening the European Monetary Union. The discussion was initiated with the Five Presidents Report in 2015 (Junker and others, 2015) and continued with the package of the European Commission proposing, among others, an establishment of a stabilisation instrument to support investment at the European level. The instrument should be developed over time and starting with loans and a limited grant component (EC, 2017). In 2017 and 2018, position papers on this subject came from governments of several Member States. In its paper on reforming the EMU, the Italian government argued for a rainy-day fund to support the unemployed, complemented by an investment protection scheme to support growth (Italian Ministry of Finance 2017). Similarly, a paper by the French Treasury proposed an investment protection scheme financed by cyclically sensitive revenue; namely, corporate income tax and value added tax (VAT) from common consolidated tax bases (Bara and others 2017). At top political level, two initiatives are worth specific mentioning. One is the 2017 proposal of the French president Emmanuel Macron for a full-fledged euro area budget. The other proposal is contained in the February 2018 German coalition agreement advocating for euro area budget line within the European Union (EU) budget. The instrument would be focused on macroeconomic stabilisation and would be developed into a euro area investment budget over time.

In addition to these proposals by policy makers, a large number of proposals came also from academic circles and international institutions, especially IMF. A non-exhaustive list includes Arnold and others (2018), Berger and others (2018), Buti (2017) and Benassy-Quere and others (2018).

4.3. Proposal for central fiscal stabilisation capacity of the post-2020 EU budget

Let me now turn to the central fiscal stabilisation within the context of ongoing negotiations about the post-2020 EU budget. In national countries, fiscal stabilisation of sub-national administrative areas is typically provided automatically through the national budget, through progressive income taxation, through expenditure on national public goods and through explicit budgetary transfer mechanisms. EU budget is in no position to play a similar role at the EU level. First, it is far too small. While national budget are typically at a level of around 20 to 30 per cent of a country's GDP, EU budget is only around 1 per cent of EU GDP. Second, EU budget is not really financed from its own resources. In contrast to national budgets that are largely financed through taxes, EU budget is predominantly financed by contributions from Member States. More than 70 per cent of EU budget revenues come from the GNI source, i.e. from Member States' contributions based on their respective GNI. Third, EU budget is limited with respect to its borrowing. This means that it cannot raise debt in order to address asymmetric or large symmetric shocks. Fourth, EU budget is strictly limited with respect to the purposes for which the funding may be used. This means that the budget is very inflexible when it tome to the use of resources. And finally, the EU budget is a budget of all EU Member States not only of those ones that are in the euro area. The two groups of countries have very different situation with respect to their attitude towards asymmetric shocks. While non euro area members have depreciation / devaluation of a national currency as an effective instrument for addressing asymmetric shocks, euro area members are without this option. Consequently, a central fiscal stabilisation facility is for them in relative terms much more important than for no euro area members (Bordignon and Baglioni, 2018, p. 34-35).

It is realistically to expect that none of the above characteristics of the EU budget will change in the near future and the current proposal of the European Commission for the medium-term financial perspective 2021-2027 confirms this assessment. Still, the proposal for the first time incorporates an instrument with a stabilisation role of the EU budget (for details, see EC, 2018). The instrument called European Investment Stabilisation Function is aimed at providing some insurance for euro area members in the event of major asymmetric shocks and would be complementary to the EU's existing 'toolbox' of instruments to address financial distress in Member States, including the ESM.

The Function would borrow on the financial markets and provide loans to Member States to support public investment in Member States hit by large asymmetric shocks when national governments may not have sufficient fiscal space to maintain this investment. Interest payments would be subsidised from the EU budget and the loans are expected to be reimbursed when the crisis is over. The funding available under the Function would be limited to the euro area members and the countries that entered into ERM-2. The lending would be quasi automatic with the trigger based on exceptional and steep rise in unemployment. As far as the size is concerned, EUR 30 billion was allocated for the Facility for the entire 2021-2027 period and is just around 3 per cent of already small EU budget.

5. Conclusions

While completing the banking union and the capital markets union should improve private sector cross-border risk sharing in the euro area, it will not eliminate the need for effective public sector risk sharing for at least two reasons. First, both, the banking union and the capital markets, union will need quite some time to become fully operational, and second, private cross-border capital flows are likely to continue to be pro-cyclical. This means that even by well-functioning banking and capital markets unions there will be a need for a central fiscal risk-sharing – in conjunction with the reform of fiscal rules – to smooth asymmetric shocks and to support aggregate euro area demand when monetary policy has constrained room of manoeuvring as well as to provide incentives for better fiscal discipline at national level.

It is realistic to expect that monetary policy in the euro area will remain constrained in the near and medium terms. Unconventional monetary policy may continue to provide some additional accommodation, but its effectiveness is on a downward path and the policy also has undesirable distributional consequences. Under these circumstances, it is not surprising that proposals for complementing the euro area's monetary policy with some form of central fiscal stabilisation capacity have mushroomed in recent years. All these proposals share their view that that the instrument should be sufficiently large to be able to absorb large asymmetric shocks and should mitigate well the moral hazard risks. On the other hand, the diverge largely whether the instrument should involve temporary or permanent transfers, whether it should be triggered by asymmetric shocks only or also by large symmetric shocks, whether it should be trigged automatically or at discretion, what kind of support it should provide – general or earmarked for specific purposes, like investment and / or employment support, and finally how it should be financed.

The idea behind the Commission's proposed European Investment Stabilisation Function is to use dedicated financial means from the EU budget to help Member States stabilise their economies in the event of a major asymmetric shock. Leaving aside all operational details, the size of the envisaged Facility is far too small to provide a meaningful stabilisation support to the euro area Member States. Further on, the Facility contains rather small genuine risk sharing component, i.e. the fund from which countries with a loan from the Facility can receive an interest rate subsidy. This subsidy would, indeed, provide direct help to governments under stress. However, the subsidy would just marginally improve the situation in the country under shock. The proposal of the European Commission can therefore be assessed as nothing more than the first step on a long path towards a proper central fiscal stabilisation function of the euro area probably in the form of the euro area budget.

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Financial Cycles: A Monetary Policy Indicator

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Financial cycles have an important impact on the real economy and should be closely observed by the monetary policy makers. This can be done by monitoring individual indicators, using composite indicators, or as we propose in this paper, by developing prediction models for cyclical components of GDP and phase detection. This way, we have tools which rely on financial market conditions that might detect changes in the cycles, which cannot be detected by classical prediction tools. Based on results of studies of eleven European countries, we find that the models have a prediction horizon of one to two quarters and that the properties of predictions correspond with the expectations based on the published studies.

JEL E58, E44, E47, C53

1. Introduction

In a rapidly changing and globally interconnected financial environment, a country's monetary policy faces multiple challenges. One of them concerns its interactions with the financial cycle. Due to well-known unfavourable effects of financial shocks for the real economy, monetary policy actions should not foster financial instability and intensify the financial cycle amplitude. Monetary policy should contribute to overall financial stability, within the constraints of its main objectives. Taking this purpose into account, we present two possible methodologies to be used in the creation of monetary policy based on common financial indicators, which can also be used to signal changes in cyclical components and phases of the business cycle.

Financial cycles are inherent to the financial markets. But where do they have their roots? Praet (2016) suggests two possible origins: the first is investors' behaviour, which inevitably exhibits phases of irrational exuberance due to overoptimistic returns expectations of new investments. The second lies within the financial intermediation infrastructure, where the capacity of credit creation is limited and falls behind the overwhelming demand for credit. Empirical evidence also shows that financial markets have become highly interconnected in the past two decades, which implies the transmission of financial cycles across globalised markets (Adrian, 2018).

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The past has taught us the catastrophic consequences of financial cycles. Navigating the financial cycle and ensuring financial stability require consistent and coordinated policy by regulators (including central banks), supervisors and the governments, the first lines of defence (Praet, 2016). Regulators and supervisors are expected to establish effective countercyclical macroprudential policies. In order to address the risks, particularly systemic risk (which has gotten much attention since the early 2000s), banking-sector regulators have implemented macroprudential policies such as the countercyclical capital buffer and borrower-based instruments for ensuring that lending standards remain proper, e.g., loan-to-value (LTV), debt service-to-income (DSTI), loan-to-income (LTI) and debt-to-income (DTI) tools, as well as maturity limits (ECB, 2019, p.14). A source of financial cycle amplification is the increased risk-taking in the non-banking financial sector with its cyclical under-pricing of risk due to its search for yield, liquidity risk and leverage (ECB 2019, p. 9).

With ample evidence in the literature on the interaction of monetary policy with the financial cycle the action of the central banks is required here (Praet (2016). The action taken has to be in line with its main objective. In the case of the European Central Bank (ECB), its objective is to safeguard the price stability. When doing so, conflicts between objectives may arise. But as Praet (2016) claims, the ECB has sufficient flexibility within its two two-pillar strategy to realise leaning-against-the-wind actions in regard to the financial cycle.

That being said, it is clear that monetary policy makers need to act, but because estimating financial conditions is not an easy task, it remains a challenge to identify the right conditions at the right moment. Also, when monetary policy is put in place with the intention of responding to the undesirable effects of the transmission of financial conditions from global financial markets, Adrian (2018) points out the substantial difficulty of timeliness and effectiveness of monetary policy actions. Past experience has revealed the knowledge gaps leading to an underestimation of potential costs in the sense of reduced macroeconomic prospects as a consequence of systemic financial crises.

Monetary policy needs instruments for proper identification of the accumulation of financial imbalances. To succeed in reducing the harmful consequences of shocks in the financial cycle borne by businesses, it should be able to react quickly, before these instabilities are transmitted into the real sector and their business cycles. Praet (2016), with concern about the identification and modelling of financial stability risks, reports that the European Central Bank (ECB) closely monitors the dynamics in money and credit that act as signals to the build-up of financial imbalances. A synthetic measure of cyclical systemic risk by the ECB measures the build-up of financial imbalances of a cyclical nature including different driving factors, e.g., bank credit, total credit, residential real estate price-to-income ratio, equity market, debt service ratio and current account (ECB, 2019, p. 147). The International Monetary Fund (IMF) calculates a compound index of several variables referred to as the Global Financial Condition Index (Adrian, 2018).

We have developed models and methodologies that can be used to predict and identify financial imbalances by detecting changes in financial cycles. In contrast to the usual approaches, instead of first developing a composite indicator of financial stability, we use common indicators of financial stability in order to predict possible changes in the real economy. Two simple versions of the models are presented below. In the remaining parts of the paper, we present a short overview of the methodology, the data collected for analysis, the key results and conclusions.

2. Literature review

Financial cycles are the topic of numerous research questions and methods. Central banks often struggle to identify financial cycles. Specifically, it is difficult to determine a financial cycle's *duration and frequency* (how long a cycle lasts and the frequency of cycles), *timing* (i.e., synchronicity of financial cycles with economic cycles within a country or among multiple countries), *speed and amplitude* (i.e., the heights of a cycle's peaks and the depths of a cycle's troughs, as well as how quickly these extreme points are achieved) and *proxy variable* (i.e., a composite variable that acts as a proxy of the financial cycle).

Researchers employ innovative research methods when dealing with financial cycles. A sample of these includes filtering, turning point analysis, decomposition and spectral analysis using Fourier and Wavelet transform (spectral analysis), examination of Wavelet coherence with compared cycle, or application of principal component analysis on synchronicity measures. Researchers usually apply these methods on primary indicators such as credit prices (real loans), housing (residential property prices), equity prices, real GDP, interest rates and various ratio indicators, such as credit-to-GDP ratio, housing-prices-to-income ratio and banks' loans-to-total-assets ratio.

Claessens, Kose and Terrones (2011) dealt with an analysis of three primary indicators, i.e., credit, housing and equity prices, to determine the frequency, duration, amplitude and slope of financial cycles. They performed their analysis on 21 countries for the years 1960–2007. They concluded that (1) financial cycles are longer and more severe than economic cycles, (2) credit and housing prices are remarkably synchronised within the individual countries and (3) the observed indicators may impact each other and among themselves.

Altăr, Kubinschi and Barnea (2017) employed Continuous Wavelet Transform (CWT) and Wavelet Coherence Measures to assess the financial cycle length. Based on the 13 countries analysed and credit-to-GDP indicators, the authors confirmed that financial cycles are longer than economic cycles, lasting 23 years on average. In addition, the authors found evidence that financial indicators of Euro Zone members are synchronised with the financial indicators of the United States. They concluded that measuring and assessing financial cycles might be a convenient way to determine systemic risk.

Deutsche Bundesbank (2019) employed a Wavelet Coherence Analysis to compare the impact of cross-country financial and economic cycles to the credit and housing prices within individual countries. They recognised that the general Euro area's business activity has a greater effect on national GDP than the effects of Euro area credit and housing prices on a country's national credit and housing prices. The authors also analysed the fluctuations of loan growth and showed that loans vary less in the case of Germany than in cases in other Euro area countries. Finally, the authors proposed that financial and economic cycles are interrelated and should not be treated independently.

Kunovac, Mandler and Scharnagl (2018) analysed nominal dependencies among long-term interest rates and nominal term spreads, real loans, real credit, real residential property prices and real equity prices. Their analysis was based on 6 countries during 1980–2016. They employed filtering, principal component analysis and measures of synchronicity and similarity, as well as Wavelet Transform Analysis. The authors found that the results from all three different methodologies provided consistent conclusions. Long-term interest rates, term-spread and equity prices were highly synchronised across countries, but real residential property and credit prices were only weakly synchronised. However, strong synchronization was determined for real bank loans to non-financial corporations (NFCs). The authors agreed that, although common cycles cannot be extracted for the housing sector, cycles of real loans to NFCs can be determined, which might help us to better understand the monetary policy implementation of the Economic and Monetary Union.

The ECB (2014) used Turning Point and Spectral Analysis to assess the monitoring and impact of financial cycles, in order to build a framework that drives economic policies. The ECB reported that main drivers of financial cycles tend to be credit prices, housing prices and stock indices and, to a smaller extent, long-term interest rates. However, as financial cycles cannot be observed directly, the ECB employed principal component analysis to generate a proxy. On the basis of the two methodologies, the ECB concluded that although the financial cycle proxy has lesser amplitude than the economic cycle, the results among the two do not agree during the length of the financial cycles.

Rünstler, Balfoussia, Burlon, Buss, et al. (2018) studied cyclical properties of real GDP, housing and credit prices and equity prices together with nominal long-term interest rates and term spreads. The authors analysed 17 countries using the Turning Point, Wavelet Transform and principal component analyses. Also, they assessed the measure of synchronicity and similarity of financial cycles and used special dynamic stochastic general equilibrium models. They found that medium-term (8–18 years) fluctuations in credit and housing prices have strong correlations to GDP. Cycles of financial assets, such as equity prices and long-term interest rate, were significantly shorter than those of credit and housing prices and did not have any high-level correlations. Credit and housing prices were weakly related among different countries.

Stremmel (2015) identified the most suitable indicators for studying financial cycles as credit-to-GDP ratio, credit growth and housing-prices-to-income ratio. He also reported that the correlations among these variables were higher in bearish markets. Another ECB study comes from Schüler, Hiebert and Peltonen (2015), who dealt with power cohesion measures and time-varying aggregation of financial indicators. The authors found that credit and asset prices may correspond to equal cyclical properties and may outperform the traditional credit-to-GDP approach in predicting systemic banking crises.

An innovative approach of modelling a financial proxy indicator for financial cycle is found in Voutilainen (2017), whose work is also employed by the Bank of Finland.

Filardo, Lombardi and Raczko (2019) analysed the financial cycles for the Bank of England and, according to the 120 years of historical data, stressed that financial cycles display recurrent and endogenous swings in financial activity.

3. Methodology

In this paper, we present two types of tools.[1] With the help of these tools, we can predict cyclical components of the GDP growth rate and the relative phases of business cycles. Both predictions are based on indicators of financial cycles found in the literature, which are adjusted for prediction purposes. There are, however, two important limitations that apply to the prediction models. First, our definition of the cyclical component differs from definitions normally used by central banks. Second, we distinguish only between peak-to-trough and trough-to-peak phases in the business cycle. Turning points are determined by official turning point dates published by the Organization for Economic Cooperation and Development (OECD); therefore, there is no direct correspondence between these two types of predictions.

Nevertheless, both prediction procedures rely on the same first step. After transforming the original data to growth rates, decomposition is applied by using Discrete Wavelet Transform (DWT). This is a tool for identifying certain frequency bands at certain time intervals within a time series (Dahlke and Maass, 1995). DWT is based on the introduction of a so-called family–father and mother wavelets or the transforming functions. These are the small and oscillatory waves (Shensa, 1992). Families of wavelets act as decomposition signals that are scaled and translated over the whole time series several times to approximate where in the time series (translation) each time frequency band (scale) is located. To do so, a family of wavelets is scaled to extract the frequency band and translated to extract the location of certain frequency bands within a time series. The higher the frequency of a family of wavelets, the higher the series of frequencies extracted.

A family of wavelets represents the bandpass filter of varying frequency settings. This bandpass filter with varying frequency settings is run multiple times. The DWT procedure denotes this number as the *level* and names the complete procedure as its *decomposition*. Using DWT, the time series can thus be decomposed into multiple signals or spectral components, at different frequencies. This means that the obtained spectral components vary from low frequency cyclical signal to high frequency noise.

When the spectral components are decomposed, a number of manipulation methods can then be performed. One of the most convenient among them is thresholding, or filtering, where the spectral components are added back or reconstructed into the original time series, using fewer spectral components. Next, denoising is applied, where the high frequency noise spectral components are considered for thresholding, i.e., whether or not these components are taken into account. Wavelet denoising is extensively used in image processing as well as for image denoising and compression (Chang, Yu and Vetterli, 2000), statistics (Girimurugan, Chicken, Pignatiello and Zeisset, 2013), signal detection (Qiu, Lee, Lin and Yu, 2006) and economics (Yogo, 2008).

After the filtering procedure, the transformed time-series data are used for predicting either the cyclical component of the GDP growth rate or the phase of the business cycle. For these two purposes, we use different types of modelling methods. We also use one strong limitation in this process, since we try to use same list of variables for each country. We only allow variations in lag structure of the prediction models.

4. Data

The dataset used in this study consists of several financial and economic indicators. The selection of variables was based on the results of studies published by other researchers and restrictions regarding data availability.

Table 1 shows the list of the indicators used and the data source. All data were gathered on a quarterly basis. Total credit consists of loans and securities other than shares of nonfinancial corporations (NFC) and households, as well as nonprofit institu-

Table 1: Financial and Economic Indicators

No.	Financial and economic indicator	Obtained from
1.	Credit-to-GDP gap (GAP)	ECB's Statistical Data Warehouse
2.	Total credit (CREDIT)	ECB's Statistical Data Warehouse
3.	Residential property prices (RPP)	Bank for International Settlements
4.	Long-term interest rate (LTIR)	OECD Data
5.	Harmonised index of consumer prices (HICP)	Eurostat
6.	Stock index (STOCK)	Yahoo Finance, Investing.com
7.	Real GDP index (GDP)	Eurostat

1 Developed by the authors at the Institute for Finance and Banking, University of Maribor.

tions serving households (NPISH). According to Claessens et al. (2011), CREDIT and RPP are especially suitable for long-term analysis of financial cycles, while STOCK and GDP present medium-term economic indicators (Drehmann, Borio and Tsatsaronis, 2012). In order to build a dataset for each country, we collected all available financial and economic indicators. Table 2 shows the list of examined countries and their data availability. Data are organised quarterly.

Most of the countries studied have around 20 years of data. However, Slovenia, Italy and Austria have a lack of data and only shorter periods exist. Financial and economic indicators are transformed into annual growth rates and normalised into a 0–1 range.

5. Results

In order to obtain a filtered data series, the original data series were first decomposed using a wavelet analysis procedure. Here, a 6-level *Daubechies* db4 family of wavelets was used (Daubechies, 1992). Next, the decomposed series were denoised and reconstructed using a fixed thresholding by eliminating the high-frequency noise from the signal. Denoising was performed for each of the 7 listed financial and economic indicators. The filtered and denoised data series were then used for building prediction models.

In Figure 1, models for predicting cyclical components are presented. For some of the countries, an additional dummy variable was introduced in order to capture significant structural changes after the global financial crisis. This is seen as sharp changes, normally seen as drops, in the cyclical movement in the first quarter of 2008. The prediction models have a forecast horizon of either one or two quarters

Table 2: List of Countries and Data Availability*

Country		GAP	CREDIT	RPP	LTIR	HICP	STOCK	GDP
Austria 2001Q1 2019Q2	Min	-8.38	81.50	84.68	0.14	74.92	1070.21	85.10
	Max	3.83	95.50	138.32	5.70	107.11	4869.80	115.10
	Mean	-2.72	88.12	104.51	3.01	90.40	2490.46	99.67
	Median	-2.67	88.10	96.56	3.53	89.13	2421.32	101.15
	Std. dev.	3.39	4.05	15.11	1.68	9.89	961.75	8.23
Belgium 1998Q4 2019Q2	Min	-22.13	52.80	59.11	0.14	71.67	1642.89	78.80
	Max	23.16	69.30	104.25	5.70	108.09	4624.23	111.40
	Mean	5.83	62.21	88.86	3.19	89.29	3036.58	96.54
	Median	5.53	63.00	98.92	3.65	90.10	3014.60	98.50
	Std. dev.	11.00	4.64	15.13	1.69	11.14	679.15	9.21
Denmark 1998Q4 2019Q2	Min	-31.95	109.80	65.59	-0.03	73.20	186.65	85.10
	Max	34.55	199.50	126.70	5.96	102.40	1024.29	115.50
	Mean	4.69	159.14	95.81	3.10	90.15	488.79	100.35
	Median	7.33	166.90	97.36	3.58	91.70	393.52	101.00
	Std. dev.	19.66	26.54	17.07	1.82	9.34	274.10	7.34
Finland 1998Q4 2019Q2	Min	-26.19	40.30	62.57	0.09	73.07	1214.23	74.60
	Max	24.75	94.60	100.94	5.71	103.71	4239.42	109.10
	Mean	2.20	74.20	89.06	3.12	88.88	2461.81	96.42
	Median	2.94	79.10	95.50	3.63	88.34	2305.22	99.80
	Std. dev.	11.37	19.09	11.82	1.71	9.74	852.01	9.12
France 1998Q4 2019Q2	Min	-6.79	67.20	50.31	0.17	76.21	2627.72	80.60
	Max	12.01	100.00	106.64	5.57	105.35	6462.03	112.10
	Mean	3.74	83.31	86.86	3.19	90.94	4376.42	98.30
	Median	3.54	86.20	96.32	3.64	92.24	4307.40	99.70
	Std. dev.	4.11	10.40	18.07	1.59	9.09	915.17	8.03
Germany 1998Q4 2019Q2	Min	-14.40	75.70	99.14	-0.16	77.10	2426.24	87.00
	Max	8.96	103.30	130.70	5.49	106.00	12897.69	117.00
	Mean	-3.58	88.57	109.98	2.89	90.65	7098.26	100.56
	Median	-6.04	88.60	107.79	3.32	91.50	6405.39	100.10
	Std. dev.	7.04	9.07	8.80	1.75	8.86	2769.69	8.53
Ireland 1998Q4 2019Q2	Min	-82.10	39.64	66.75	0.38	70.70	2194.55	59.70
	Max	103.64	171.40	154.30	11.07	102.10	9402.64	174.90
	Mean	14.13	96.93	104.29	4.01	92.31	5234.84	104.14
	Median	14.11	85.15	101.54	4.24	96.60	5209.57	100.35
	Std. dev.	42.96	39.64	23.90	2.17	9.56	1657.10	28.04
Italy 2003Q4 2019Q2	Min	-19.42	61.40	75.08	1.22	79.10	14275.74	96.00
	Max	16.54	93.40	105.05	6.61	104.20	41954.00	106.20
	Mean	0.53	80.25	91.08	3.71	93.70	24062.47	100.03
	Median	7.51	82.20	91.91	4.15	94.60	21738.96	99.80
	Std. dev.	11.90	9.55	10.15	1.23	7.81	7559.17	2.68
Slovenia 2008Q1 2019Q2	Min	-35.20	43.26	78.34	0.36	84.57	518.19	97.20
	Max	5.05	84.05	115.57	6.55	106.10	2623.68	118.50
	Mean	-17.29	64.30	94.44	3.38	97.52	944.63	104.36
	Median	-18.47	65.38	94.33	3.91	99.64	802.56	102.10
	Std. dev.	13.52	15.21	11.19	1.89	5.09	481.93	6.10
Spain 1998Q4 2019Q2	Min	-55.97	67.10	51.67	0.81	66.88	5477.20	71.20
	Max	47.19	166.90	118.69	6.43	105.18	15101.90	110.30
	Mean	0.24	119.50	81.56	3.87	88.77	9740.14	94.36
	Median	12.74	111.80	77.08	4.15	92.06	9532.10	96.70
	Std. dev.	35.60	31.77	18.96	1.45	12.28	1982.63	10.00
United Kingdom 1998Q4 2019Q2	Min	-32.17	73.10	48.88	0.84	70.70	3613.30	78.20
	Max	22.11	114.00	121.73	6.50	107.90	7687.80	117.80
	Mean	-6.57	91.17	93.93	3.64	86.93	5840.76	99.63
	Median	-6.49	89.40	98.67	4.18	85.50	5908.80	100.50
	Std. dev.	13.10	8.95	19.09	1.52	12.04	975.66	10.72

** Note: Variable GAP and RPP are available for all datasets up to 2019Q1. Denmark's and Ireland's CREDIT are available up to 2019Q1 only, while France's to 2018Q4. Ireland's GDP is available up to 2019Q1.*

Figure 1: Prediction models for cyclical component

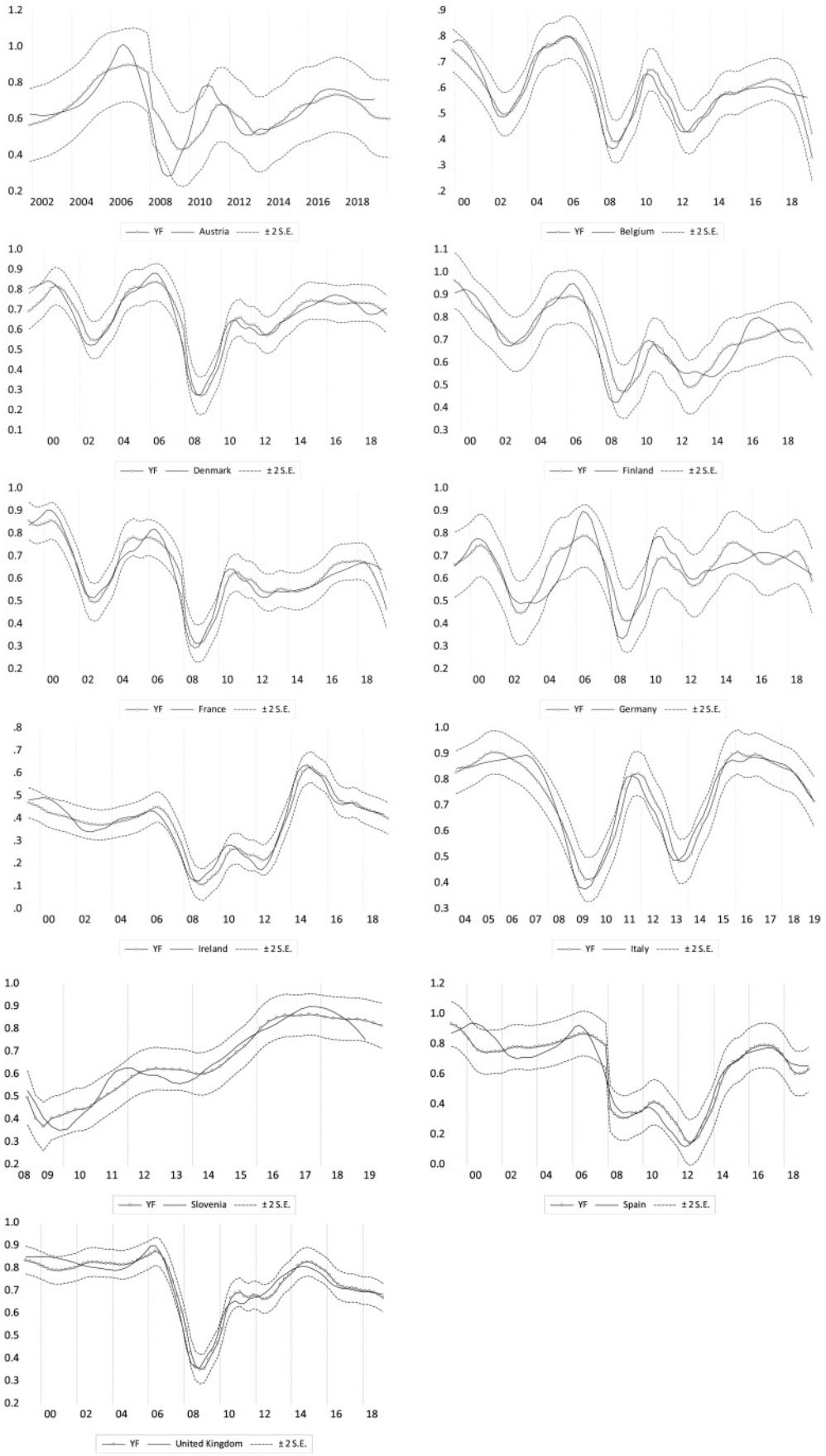
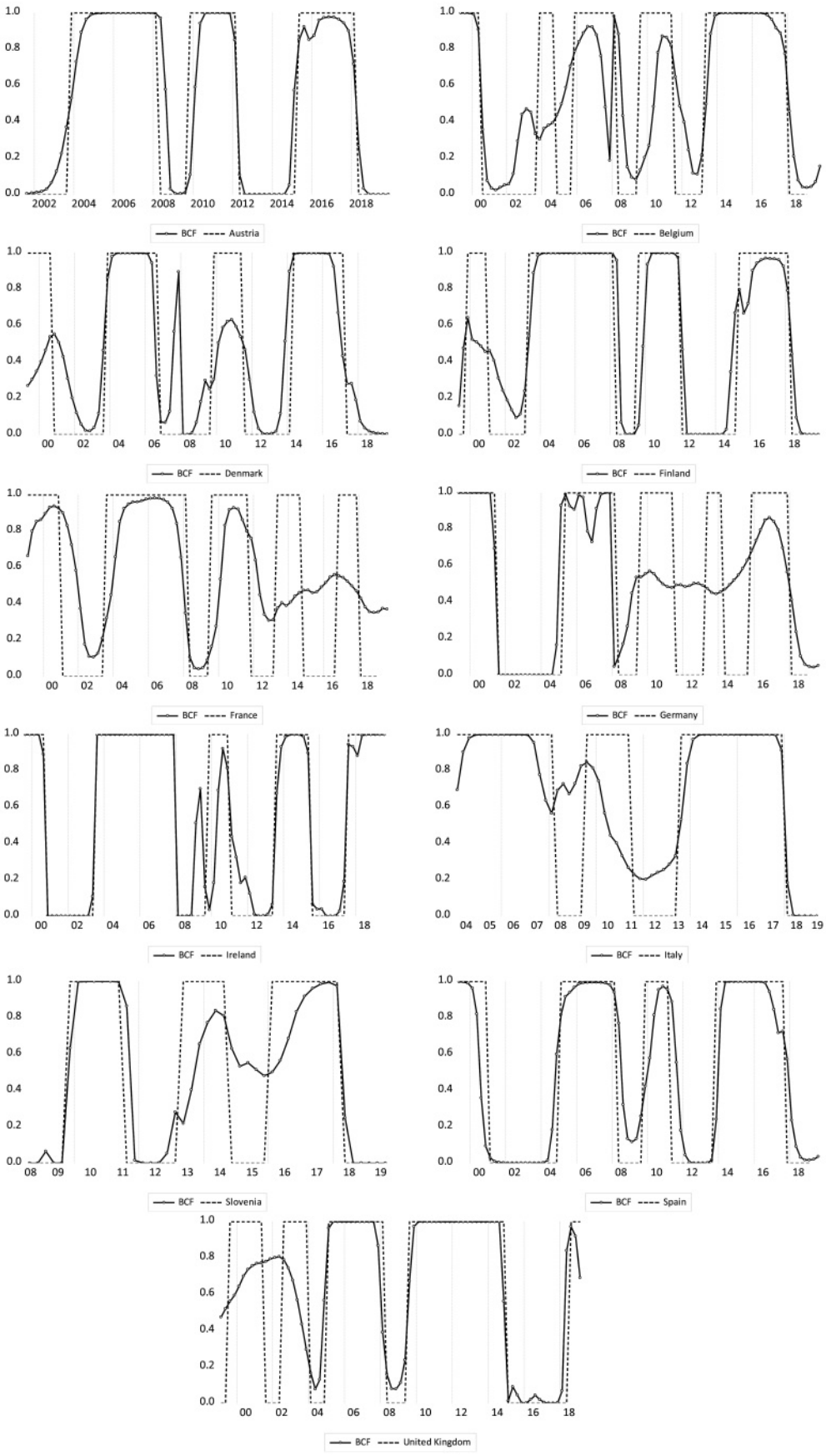


Figure 2: Prediction models for business cycle phase



ahead. If we account for announcement delays of quarterly GDP, the models can act as possible short-run predictions or at least as coincidence indicators.

Looking at the results for individual countries, we can observe one common property: predictions for most of the observed countries indicate a moderate drop in the cyclical component of GDP. These can be interpreted as changes in the business cycle phase and should be taken into account by the policy makers. For some countries, the latest available data show large changes and monetary policy should be implemented carefully while observing conditions in the financial markets. We should remember that these predictions are made based on the common indicators of financial cycles.

In Figure 2, the results for the second type of prediction models, business cycle phases, are presented. As mentioned, the results do not correspond directly to the results of the first type of prediction models, since we use only a two-phased model (phase 0 is peak-to-trough and phase 1 is trough-to-peak). This classification is not made by applying cyclical components from the first type of prediction models, but, rather, we used official OECD dates for cyclical turns.

If we examine the results, we can see that the models have a forecast horizon of one to two quarters. For most of the countries, a period of reduced growth rates in GDP is predicted. Additionally, important observations can be made by looking at how successful models could detect cyclical phases in each country. Some of the cyclical phases were detected almost perfectly and timely. However, neither episodes of changes in the phases are detected nor are important time lags in the detection observed.

We believe that these findings are closely related to the observations and results of the studies presented previously. Short forecast horizons indicate a high level of synchronization between financial and business cycles. Lagging or nondetection of individual cyclical phases is a sign of different causes that may trigger the change in the business cycle phase. Therefore, the financial cycle cannot be the only and most important driver of the business cycle but should be considered only as one possible driver. Finally, it seems that faster changes in the phase of the cycle are not well detected by the models. This might result from the fact that financial cycles might have more stable frequency.

6. Conclusion

Central banks and regulators around the world often struggle to identify financial cycles. Specifically, it is difficult to determine a financial cycle's duration, frequency, timing, speed and amplitude. Monetary policy needs modelling instruments capable of proper identification of cycles of financial imbalances in order to react in a timely fashion before these instabilities are transmitted into the real sector and affect business cycles. This article suggests two methodologies to help predict financial cycles.

The recommended method applies decomposition algorithms by using discrete wavelet transform to identify frequency bands at certain time intervals within a time-series dataset. A family of wavelets is then generated to represent the bandpass filter of varying frequency settings. This bandpass filter is then run multiple times. Next, the spectral components are used to reconstruct the original time series. Denoising approaches are then applied, where the high-frequency noise spectral components are considered for thresholding. After the filtering procedures, the transformed time-series data are used for predicting either the cyclical component of the GDP growth rate or the phase of the business cycle.

The generated prediction models have a forecast horizon of either one or two quarters. This means the models are capable of only short-run predictions or act as coincidence indicators.

Based on our findings, the predictions for most of the observed countries indicate a moderate drop in the cyclical component of GDP. We also used the models to predict the business cycle phase, where some of the cyclical phases were detected almost perfectly and in a timely fashion. In addition, we found that during short forecast horizons, there were high levels of synchronization between financial cycles and business cycles. We conclude that financial cycle is not the only driver of the business cycle, but it is certainly an important one.

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Policy options for a low interest rate environment

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Low interest rate and inflation environment exacerbated by short-term policy disruptions rooted in populism is driven by secular trends. Growth rates experienced prior to the Global Financial Crisis in the absence of major technological turnaround improving productivity growth rates, addressing the challenge of population ageing and income distribution are not likely to be attained. A major overhaul of the policy set up is needed. In the new normal of low growth and inflation environment, the key policy task is to determine how policies should act and coordinate to offset economic downturns, sustained growth without hindering financial stability. Monetary policy alone cannot stabilize the economy. More forceful coordination with fiscal policy to offset downturns and underpin growth is needed and reasonable macroprudential policy to prevent imbalances. Fostering more inclusive societies, labour participation and suitable migration and shifting the policy focus from material growth to well-being is needed.

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The broad context

The current environment is characterised by low interest rates and inflation and weak growth performance in advanced countries. In this environment, negative yields have become common in global bond markets, where about USD 17 trillion or one third of total bonds trade with negative yields. Real yields are negative and policy rates are low in the US and negative in the euro area (EA), Switzerland, Japan, Denmark and Sweden. While the global balance of macroeconomic risks in the short-term are skewed to the downside and explained by trade tensions and Brexit, the drivers of economic trends seem rooted in ongoing long-term processes including global integration, ageing of society, inequality of income distribution, lower productivity growth trend and global risk aversion. All these factors point out to future lower economic growth in advanced economies than historically experienced prior to the Global Financial Crisis (GFC). Thus, the challenge we face goes beyond short-term policy disruptions that are motivated by the resurgence of nationalism and populism rooted in widening of inequality and broad disenchantment with the current status quo.

Besides the factors underpinning long-term economic trends, the GFC has profoundly altered perception about the possibility of occurrence of extreme events ("tail risk").

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Such a fear put at risk the very existence of the Monetary Union in 2012 and might contribute to explain the observed search for safety and reduction of risk-free rates, thus pressing interest rates to or below the Zero Lower Bound (ZLB).

The persistence of an environment of low interest rate is challenging for financial business, savings and growth. That is why rethinking policy options is critical. Particularly, considering economic downturns. To this end a stock-taking of the current policy issues is made followed by a framed discussion disentangling the role of monetary policy and current conditions to draw policy conclusions.

Current policy issues

While the change in risk perception contributes to explain the current low interest environment, long-term of secular trends in the economy seem to be the major driving force behind the reduction of policy space for monetary policy to offset business cycle fluctuations. In particular, the room for monetary policy to use interest rates to attain inflation targets and mitigate slowdown is significantly reduced in a low interest rate environment. Central banks are struggling to prop up inflation to their targets by all policy instruments at disposal and get policy space to be used to counteract potential future recessions. This search includes changes to their monetary policy framework. The concept of ZLB is becoming less of a policy category and being replaced by that of Effective Lower Bound reflecting the search of effectiveness of monetary policy and recognition that negative interest rates are clearly an option in the existing environment.

Given the challenge for monetary policy to respond to next economic downturn, the calls for fiscal policy intervention or its deployment are getting stronger. Including unprecedented policy coordination and even for dominance of fiscal policy over monetary policy as proposed by the so-called Modern Monetary Theory (MMT) and direct monetary financing of deficits (Helicopter Money). Unlike monetary policy, the low interest environment provides certain room for fiscal policy intervention. Such environment, by reducing debt service cost adds fiscal space beyond deliberate governments efforts to reduce deficits or improve fiscal stance. The use of fiscal policy besides at the time where the GFC reached its peak has not been very systematic or somehow erratic. The use of fiscal policy varied in the period 2010-2019 in major advanced economies (EA, US and Japan). After a broad post-crisis fiscal consolidation (2011-2015), which was pro-cyclical in the case of the euro area, cyclically adjusted deficits narrowed in the euro area (below 1% of GDP in 2019) and Japan (3.5% of GDP) while in the US widened (above 6% of GDP in last two years). While fiscal policy can be and effective tool to increase aggregate demand, its extensive use Japan (deficits averaging 6% between 2001-2014) has not resulted in lifting inflation to its target, yet it might have prevented a recession to occur pointing out also to limits of fiscal policy. Obviously, the question for the Japanese economy is what would be the counterfactual in terms of growth performance in absence of fiscal stimulus. This is also the case for the US in the last two years when fiscal policy has been expansionary. These developments call for a careful consideration of the use of fiscal policy including composition of fiscal stimulus, coordination with monetary policy and timing of intervention. This is more important given resurgence of populism and activism and thus the so-called deficit bias in policymakers. More broadly, it includes assessing what countries have done so far with the fiscal space obtained in the low interest rate environment and what will they do with the additional space resulting from the persistence of such environment and a positive differential between interest rate and GDP growth.

Financial regulation and macroprudential policy are other important policy dimensions in a low interest environment where the incentives to take risk increase. This concerns, particularly the banking system in the EA. The post GFC overhaul of financial regulation has strengthened banks' balance sheets and the recovery, underpinned by accommodative monetary policies, have contributed to this aim. In the EA, the Banking Union and the Single Supervisory Mechanism are the key milestones contributing to stability. Going forward, the interaction of persistently low or negative interest rates and search for profit, increasing non-bank competition and challenging economic environment, might increase risk taking (i.e. poor lending and purchase of risky assets) and weaken balance sheets. In particular, small banks might engage in risk lending and the environment might keep alive zombie firms. Nevertheless, banks' balance sheets are in better position to withstand this challenges and potential shocks. Importantly, banks have higher capital ratios and substantial progress has been made to mitigate the risk of perverse loop between governments' and banks' balance sheets (e.g. privatisation of banks in Slovenia). Banks have also deleveraged below the pre-crisis level and made important progress in decreasing non-performing loans. The credit recovery in the EA, underpinned by increase in Tier 1 capital, is visible although uneven among members due

to different exposure to banking crises and leveraged counterparts prior to the crisis.

Framing the discussion to draw policy conclusions

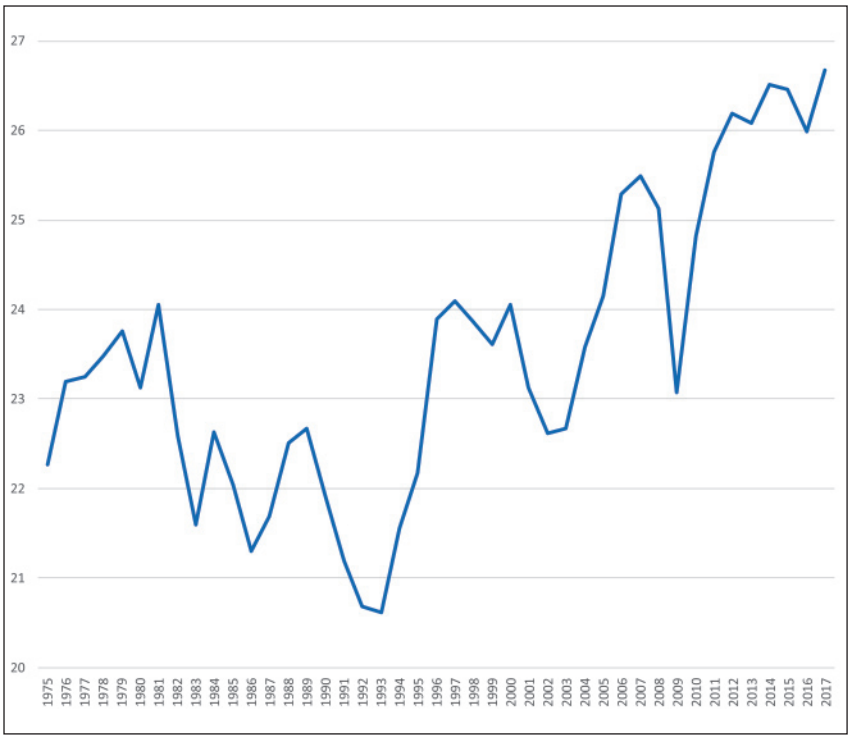
To assess and draw conclusions and policy options concerning the interaction of monetary policy and other policies in a low inflation and interest rate environment including their impact on banks' balance sheets, it is necessary to frame the discussion. In this regard, it is important to disentangle two issues. First, to what extent global considerations influence observed economic developments? Second, what is behind the low interest rate environment since the persistence of such environment demands accommodative monetary policy? This later issue is addressed taking into account the following considerations: a) Whether it is the result of frictions (rigidities and market imperfections) preventing the economy to equilibrate at full employment or it is the result of aggregate demand shortages and thus chronic excess of savings over investment where monetary policy might be powerless; b) Is monetary policy driving the low interest environment or it is preventing its persistence, which answer can lead to complete set of policy conclusions; and c) How effective is monetary policy to restore equilibrium, can it even affect the potential rate of economic growth and thus natural rate or it is powerless requiring rebalancing the policy mix.

Global factors behind low interest environment and inflation

Concerning the first issue, the international dimension, it can be said that it is a critical factor contributing to explain current economic developments due to the strong process of global integration including capital flows and trade. Capital flows and trade integration were reflected in the build-up of imbalances prior to the GFC with impact on global price dynamics (Forbes 2019). Research on this issues point out not only at integration as one of the important forces triggering the global financial crisis in the background of week financial regulation (Bernanke 2010), but also that economies have strong common global components in their output gap and monetary policy stance which have been converging since 1970 (Jorda and Taylor 2019). Moreover, given the similar trends in real interest among advance countries, it is possible to think of a global interest rate (Blanchard et al., 2016). Similar factors among advanced economies are explaining the decrease in the natural rate such as ageing of population, raising inequality and surge in savings (Rachel and Smith 2015). For example: total world savings as a percent of GDP increase from 23.2% in the 1990s to 25% in this decade (Figure 1).

An important issue in this context is the extent to which globalisation contributes to explain prevailing low inflation. In the US, the slope coefficient of the wage Phillips curve is three times that of the price Phillips curve. Globalisation might be an important determinant of weak workers bargaining power and despite some wage pressure firms might be reluctant to pass through that pressure on prices. Also, digitalisation might be a factor contributing to low inflation. Nevertheless, there are different views concerning the influence of globalisation on inflation. On the one hand, research at conducted at the ECB (2017) suggests that the commonality of low inflation can to a large extent be explained by a change in monetary policy orientation and global commodity price developments rather than global slack. The alternative view suggests that global factors, due to integration through trade and supply chains, should no longer play an ancillary role in models of inflation dynamics (Forbes 2019).

Figure 1: World Gross savings (% of gross national income)



Source: World Bank

Insufficient aggregate demand or frictions behind low interest rate environment

Turning to the current low interest rate environment, the first question to address is whether this is the result of insufficient aggregate demand or frictions preventing monetary policy achieving full employment and stable inflation? Regarding the first view, Summers (2014) suggests that the underlying economic trends in advanced countries are explained by chronic excess of saving over investment or insufficient aggregate demand resulting in real interest rates that might not be achievable to assure full employment. In fact, prior to the GFC there was a surge in savings influencing significantly the decline in the real interest rate in the US. That secular development pushed down real policy rates. In such environment, the natural rate of interest compatible with full employment and stable inflation, would have fall to negative territory. Furthermore, it is claimed that under current conditions in Japan or the EA there might be no interest rate that delivers full employment and achieve inflation target (Palley 2019). More recently, research combining business cycle and endogenous growth theories (Benigno and Fornaro 2018) suggest that lower than full employment might arise from an adverse loop between weak aggregate demand and weak productivity growth. Pessimistic views about the future might explain the drop in aggregate demand pushing the central banks' policy rates to ZLB. Such environment affects firms' profits and their investment. In turn low investment translates into weak productivity growth, validating the initial low-growth expectations.

The alternative view explaining low interest rates to that of chronic shortage of aggregate demand is framed in the new Keynesian approach indicating the observed rates are reflection of declining natural rates and of frictions preventing market clearing equilibrium. Basically, the natural rate is affected by supply factors like demographics or trend productivity growth. In this context, frictions such as price stickiness result in a wedge between actual and potential output and between inflation and target. To close the wedge central bank set the nominal interest rate to minimise the variability of the inflation rate and the output gap around their target values. As discussed below, natural rates have decreased significantly consequently influencing policy rates as derived from Taylor rules used for setting policy stance to achieve target inflation and full employment.

While there is a growing consensus that monetary policy is at or close to its limits, as testified by low or negative central bank policy rates and use of non-standard monetary policies, alternative views concerning the underlying reasons behind low interest rate policy also produce different policy recommendations. Those advocating shortage of aggregate demand (Lawrence and Stanbury 2019) suggest that further loosening monetary policy in an environment of secular stagnation could be counterproductive and even not needed. Thus, monetary policy is powerless and thus fiscal policy should get pre-eminence to foster demand.

Those arguing the presence of frictions are of the view that monetary policy can still provide incremental stimulus and that the ZLB is not necessarily a binding constraint. Central banks' negative deposit rates and the recent adopted ECB policy Package (September 2019) points to this view.[1]

To this purpose, the Federal Reserve Board (Fed) in the US has embarked on a review of its policy framework in view of the recognition of an increased likelihood that the Fed's policy rate will reach its effective lower bound in future economic downturns (Clarida 2019). Under this approach, monetary policy still has fire power but policy space can be enhanced. Yet, in the case of the ECB there is growing recognition that fiscal policy has a role to play to steer aggregate demand activity. However, such a role for fiscal policy intervention, in countries that have capacity, it is primarily the result of current downside risks rather than recognition of that monetary policy is powerless in a low interest environment if this is regarded as the new normal.

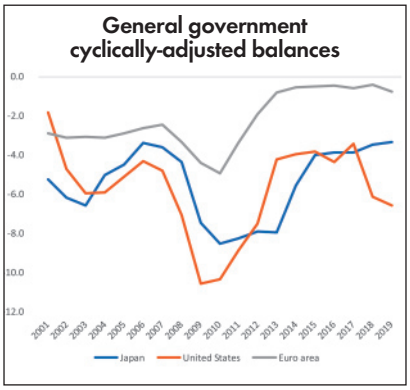
To make sense of alternative explanations about current low interest environments and of appropriate policy response, it is convenient to separate the issue of effectiveness of monetary and fiscal policies to offset downturns from that of sustaining aggregate demand. The policy set up to offset downturns and current downside risks is different than that required for addressing a protracted low growth-inflation-interest rate environment, when this is the new normal. Clearly in the case of downturn, fiscal policy is a must on the back of the tight coordination with expansionary monetary policy.

But, what will be the appropriate policy mix if low interest rates are going to stay low for long? For example, to what extent the recent observed growth performance in the US is the result of the 2016 presidential elections promising a large-fiscal loosening subsequently delivered and now when its impact is fading away the economy might be going back to a low growth trend (Figure 2). Or to what extent the sustained GDP

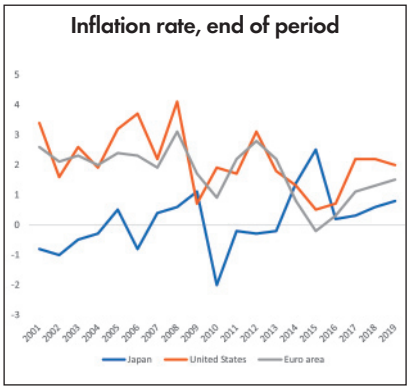
1 The package included a further 10bp cut to the deposit rate, open-ended quantitative easing, stronger forward guidance, more favorable TLTRO-III conditions and a tiered reserve system.

Figure 2: Real GDP growth

Source: IMF



Source: OECD



Source: IMF

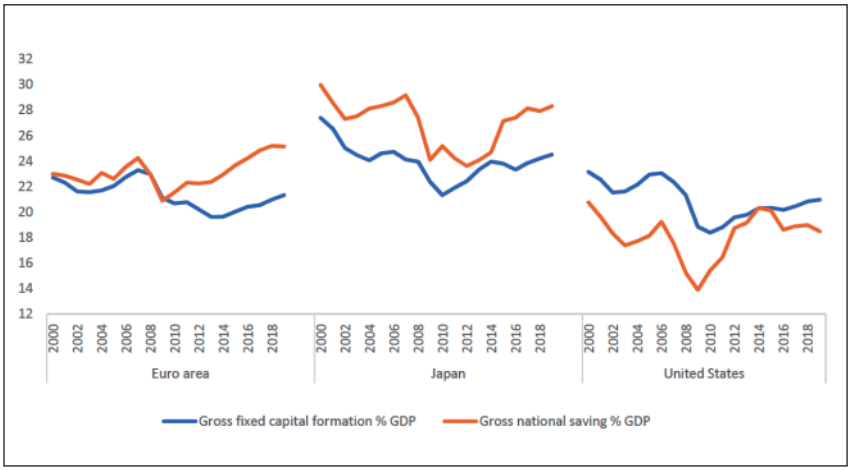
growth expansion in Japan since 2012, yet at low rates, is underpinned by fiscal policy (Figure 2). Is the EA facing a protracted low growth environment? Should fiscal policy be expansionary and the conventional fiscal-monetary policy mix rebalanced so that output is maintained at potential through combination of large primary deficits and low interest rates as for example suggested for Japan by Blanchard and Tashiro (2019).

A comprehensive response to the issue of repositioning the policy mix to sustain demand and output in a low growth environment requires discussing the concept of natural rate (see below) and to take into consideration country specific context particularly in the case of the EA. In this regard, it is also important to look at investment and savings performance in the case of Japan, US and the EA in the last 18 years to get some insight of how they might be influencing overall interest rate developments. Currently, savings as percentage of GDP are at its highest level in the EA or above average in Japan and the US (Figure 3). Investment, on the other hand, is well below the level prevailing at the beginning of the 2000s in the three cases. Abstracting from developments of global savings, that have also increased (Figure 1), this suggests that there are strong downward pressures underpinning interest rates. In this context, the issue of whether monetary policy is driving the low interest environment or rather simply responding to it can be addressed. Answering this question would provide alternative policy recommendations. This is particularly relevant in light of arguments suggesting that ultra-lax monetary policy is to be blamed for the current low interest environment.

Impact of money policy on interest rates and other macroeconomic policies, who is to blame?

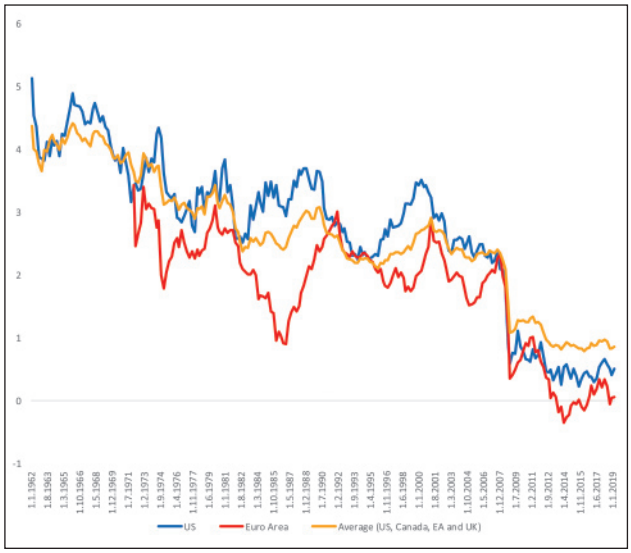
The natural rate of interest (i.e. the real interest rate consistent with output equalising the potential output and stable inflation perceived as inflation target), while being an unobservable variable it plays a central role in policy making and macroeconomics. Central banks targeting inflation set their interest policy considering inflation forecast and the natural rate of interest. An inflation targeting central bank sets the key rate above or below the estimate of the natural rate depending on whether the forecast inflation is above or below the target. There is a broad consensus that the natural rate has exhibited a downward trend in advanced countries (Figure 4). Where there is no consensus is on what are the current levels of the natural rates and whether central banks have positioning appropriately their key rates with respect to the natural rate. A comprehensive overview of estimates and drivers of the natural rate is presented in Brand et al.,

Figure 3: Gross fixed capital formation and savings, % GDP



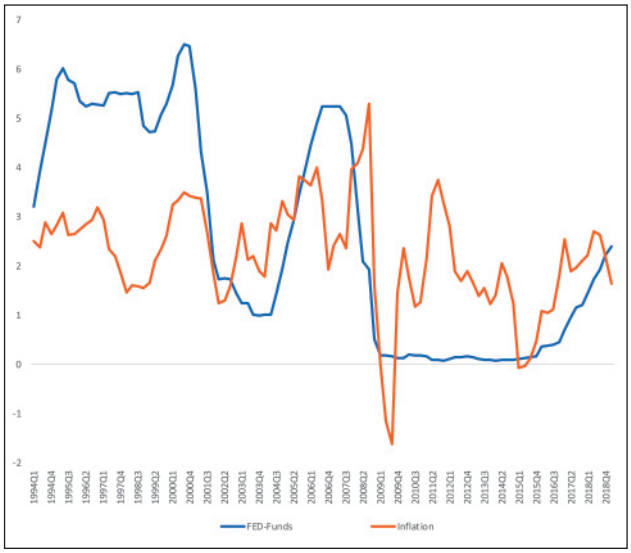
Source: AMECO

Figure 4: Natural rate (%)



Source: FED; average own calculation

Figure 5: FED Funds rate and inflation (%)



Source: FED

(2018). It indicates that despite conceptual and statistical differences, different approaches and techniques all point out to a protracted decline in natural rates.

The explanations behind declining natural rates to historically low levels in the U.S. and advanced economies are primarily demographic factors and slowdown in productivity, increase in risk aversion in the aftermath of GFC reflected on the preference for safe assets and widening of income inequality. With declining trend growth, the demand for investment decreases meanwhile longer life expectancy tends to increase household savings (Hong and Shell 2019). Importantly, rising income inequality seems to be a significant factor lowering the natural rate as it influences aggregate savings (Rachel and Smith, 2015). Rich households have a higher propensity to save that increases with higher permanent income (Dynan, Skinner and Zeldes (2004). The issue of income inequality should be placed also in global context as with financial and trade integration in search for profit, this process has not only resulted in common global interest rate and instability of capital flows but also in relocation of firms and marginalization of segments of society explaining the resurgence of nationalism in the US and UK. Paradoxically, pursuing protectionist or closed economy policies in the background of huge inequality might only further excerpt pressure on the natural rate and generate financial bubbles in those countries.[2]

Although there is agreement that natural rates have decreased over time, there are arguments pointing out that central banks, particularly now the ECB, has mistakenly assessed the level of the natural rate and by lowering their policy rates via conventional and unconventional policies what they actually have done is reducing permanently the natural rates. There are also claims that in a globalised world inflation is less determined by domestic slack and misinterpret the low inflations a cause of low natural rate. The claim behind wrong assessment of the level of the natural rate is that monetary policy drives financial cycles and in this context is not possible to determine the exogeneity of the natural rate (Borio et al., 2019).

Claims behind wrong policy assessment about the level of natural rate and its current low level suggest that prior to the GFC, expansionary monetary policy, and not the decrease in the natural interest rate, is the key reason for the low interest environment (Taylor and Wieland 2016). Additional criticism is based on the unreliable estimates of the natural rate (Fiedler et.al 2018). The main argument pointing out the blame on monetary policy is that the Fed's low interest rate policy in 2003-2005 and its deviation from Taylor rule and lax enforced financial regulations were responsible for the boom and consequent bust influencing the natural rate. Figure 5 shows that the real interest rate in the US was negative indeed between 2003 and 2005; nevertheless, as Bernanke (2010) indicates, the reasons were that recovery on the post dot com bubble was weak and jobless in late 2003 and that there were concerns, already at that time, about developments in inflation and the Fed rate hitting its ZLB as in Japan. In addition, capital inflows in the US and advance economies help to explain the low

2 It is worth pointing out that the recent large repatriation of capital in the US due to tax break has mainly resulted in increase in buybacks of stocks and M&A rather than in capital expenditure.

long-real interest rates (Bernanke 2010). From that point of view, the asset price increases at that time reflected weakness in regulatory oversight of financial institutions and primarily important gaps in the architecture of financial regulation around the world. On the other hand, real rates in the US (Figure 5) and other advanced countries were very high during the 1990s and quite in excess of underlying natural rates (Blanchard et al., 2016). Furthermore, Fed's policy can explain the movement of real rates prior to the 2000s but then it became fairly neutral contributing little to long-term real interest rates movements.

While the interaction of interest rates and risk taken in a lax regulatory environment can result in financial cycles, monetary policy is customary decided based on output and inflation forecast and should take into account financial vulnerabilities potential effect on the forecast (Bernanke and Getler 2001). A critical issue is whether because a coexistence of negative output gap and a financial bubble the monetary authority should prioritise the latter and rise its key policy rates. To some extent, such a dilemma seems to have prevailed early in the 2000s when trade-off between economic recovery and price (i.e. housing) and financial bubble intensified. A more recent approach to this dilemma suggests that monetary policy authorities should not just care about the conditional mean forecasts of inflation and output, but also take financial conditions into account, even when macroprudential policy is the appropriate tool (Adrian et al., 2019). In this context, it is also claimed that monetary policy does not affect the natural rate (Adrian 2018). In particular, Adrian and Duarte (2018) developed a micro founded New Keynesian model where financial frictions (i.e. financial vulnerability) interact with the supply side of the economy affecting a natural rate. In such a model, with the purpose to prevent the build-up of financial vulnerabilities in circumstances when the output gap is closed or positive and inflation is at or above target, the optimal rule for the central bank key rate is slightly tighter monetary stance than the standard Taylor rule. The opposite should happen when the output gap is negative and thus monetary policy stance should be more relaxed than suggested by the Taylor rule. Furthermore, according to Taylor and Jorda (2019), which argue that monetary policy cannot influence the natural rate, if monetary policy key rate is tighter than that suggested by the natural rate then the policy stance can lead to long-run persistent downturns and lower natural rates.

There is ongoing research dealing with the issue of monetary policy affecting the potential rate of economic growth. Bernanke and Mihov (1998) and, Stadler (1990). They point out that productivity outcomes could reflect policy, but the effects are not directly related to monetary policy (Bernanke and Mihov (1998) and, Stadler (1990)), besides its role in pursuing a stable macroeconomic environment (Eberly et al., 2019).

Looking at estimates of natural rate for EA (Holston et al., 2019) in Figure 4 indicates that it turned negative in 2014 and since then it remained fairly close to zero. Such a rate would argue in favour of the actual negative rate of the ECB since 2014 and a preemptive logic. This rate should be looked at also in the context of core HICP inflation in the EA that stuck at an average 1% since 2015 and only projected to rise, absent of second round effects due to the recent oil price shock, towards the end of 2020 but not reach 2% in two years' time. In this context, the issue of financial stability as policy concern in monetary policy making seems relevant. The main question being how much damage negative rates might inflict to a bank-based system and to the transmission of monetary policy particularly if policy rates are to be kept negative for long-term.

If the ECB policy has been shaped taking into account a declining natural rate and not driven the low interest environment as claimed by some of its critics, but instead it has been creating conditions for meeting its inflation target, then what has been the role of fiscal or macroprudential policies in this context? To answer this question, we first look at issue of monetary policy effectiveness and then to the role of the other two policies.

The effectiveness of monetary policy to restore equilibrium

The current macroeconomic conditions in the EA could be characterised by one in which downside risks prevail and are building up amidst an environment in which low interest rates underpinned by low natural rates is likely to prevail for an extended long period, driven by secular forces. If this is the new normal, the space for monetary policy is thin and would require a major overhaul of macroeconomic policy. Even more it would require rethinking the way we conceived and measure progress beyond increase in quantities. Nevertheless, while the space for monetary policy is currently perceived as narrow, monetary policy still has traction power.

Absent of trade wars and Brexit risk, overall macroeconomic performance would be better. The EA's HICP headline inflation was approaching 2%, credit activity was increasing, unemployment was falling and reached in 2019 its lowest level since July 2008.

The trend contraction in credit to private sector stopped in 2014 and turned positive for the whole EA in 2016. Furthermore, recent research suggests that central banks can continue stimulating demand with negative interest rates, that the transmission mechanism for monetary policy is not impaired (Altavilla, C. et al., (2019a) and that the power of central bank to fight recession is not constrained in the negative interest rate territory (Agarwal and Kimball 2019). The transmission channel of monetary policy in a negative interest rates environment seems to operate differently. It works through healthy banks passing through negative interest rates to their customers or a corporate finance channel (Altavilla, C., et al (2019a). Banks' customers with large deposits getting negative rate (i.e. corporates) rebalanced their portfolio towards investment in real or financial assets. In this context, stronger banks are in better position to transmit lower rates since their overall deposits do not decrease, their cost of funding is reduced and consequently they are able to increase their lending. The policy channel works differently than in normal times where lower interest rates are transmitted mostly by weak banks, whose financial constraints are relaxed. Thus, healthy banks in a below zero bound environment are better able to transfer negative rates on their depositors more than other banks.

In the context of fighting a recession within a negative interest rate environment, which can be also compatible with a low and persistent interest environment, it is argued that monetary policy has power to end a recession within a short time (Agarwal and Kimball 2019). This can happen when: i) the rate of return on paper currency becomes a variable (i.e. engineering a negative interest rate on paper currency at the cash window (non-zero paper currency interest rate); ii) the stability of banks is ensured; and iii) a zero interest rates for small depositors is provided. This would give central banks unlimited firepower and, if used by means of deep negative rates for short time its advantages are superior than using mild negative rates for long. Such a proposal requires further theoretical, empirical, legal and practical considerations and appropriate communication strategy.

Another issue related to the transmission mechanism of monetary policy in below zero bound is the claim that the conditions for banks are taken for granted and negative rates erode bank profit (e.g. Steenis 2019). Furthermore, interest rate cuts can become contractionary for lending. To this regard there is a growing literature (for a brief review see Agarwal and Kimball 2019). A recent review on the EA's banking system and how monetary policy has been transmitted indicates that banks' profitability has been gradually recovering though it remains low by historical standards (Altavilla et. al. 2019b). Net interest income has remained broadly unchanged and monetary policy measures have had a positive impact overall on lending volumes, credit quality and induced capital gains, which together have offset the decrease in net interest margins. Also in this context net fee and commission income increased. Thus, the overall impact of recent monetary policy measures on bank profitability is found to be broadly neutral.[3]

Monetary policy while constrained by a low interest environment, it might not be necessarily powerless to fight a recession, particularly if one envisages the possibility for temporary deep negative rates. However, this deserves thorough analysis and consideration. Prolonged negative rates can create important distortions and perverse incentives. While the impact of negative interest rates on banks and wider population can be mitigated by means of bank deposits tiering systems, which at the same time facilitates money market rates to move lower, such environment if persistent might be adverse for households with large savings on deposits, banks with less sound balance sheets or pension funds and asset managers requiring safe assets with real returns. The change of transmission of monetary policy from banking credit to negative deposits rates might not be also smooth and might create incentives for weak banks to engage in excessive risk taking. While not a particular feature of negative rates but in general a low interest environment creates incentives for leverage and asset bubbles including housing prices which can become a recurrent problem (Figure 6).

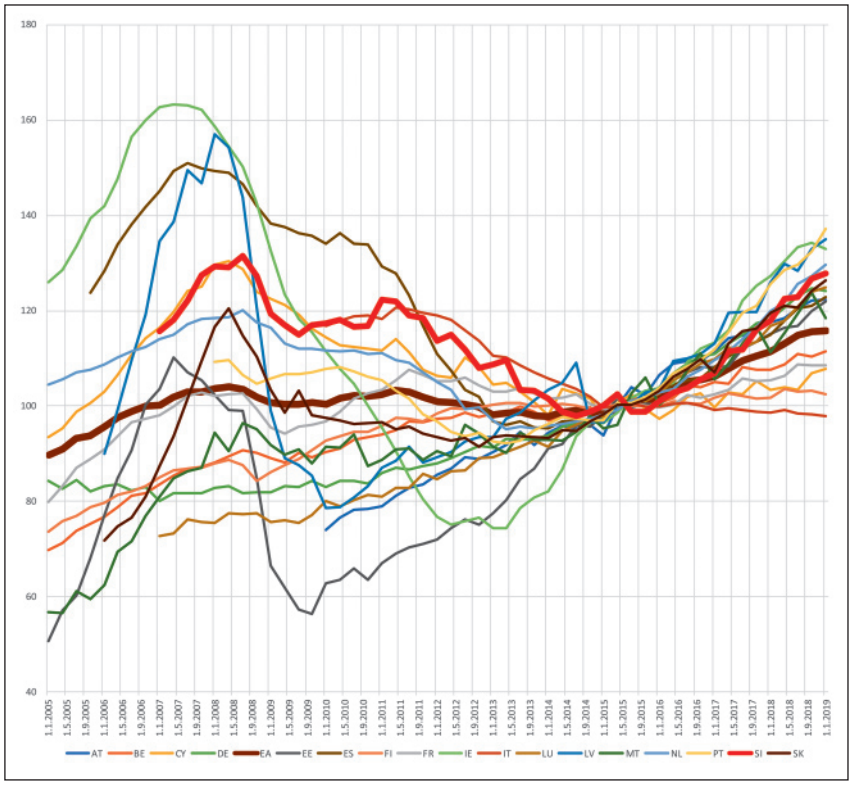
Another issue concerning the effectiveness of monetary policy is the ongoing review processes by some central banks of their respective policy frameworks (e.g. the Fed). However, if secular trends underpin interest rate development the question is what would be the relative success of those reviews in rising inflation without crating distortions.

Role of fiscal policy

The role of fiscal policy in a low interest rate environment underpinned by secular trends should be discussed in the context of fighting recessions and of chronically weak demand if this is

3 In Slovenia, the banking system's figure for profits after tax has steadily increased in the last four years and this is also the case when comparing the outcome of the first semester of 2019 to that in the previous years. Net interest income while declining until 2017 started to increase again. Non-income revenue increased in 2018 and continued in first semester of 2019. Therefore, total gross income is increasing since 2017.

Figure 6: Housing price (quarterly index)



Source: ECB

the new normal. To this end a brief account of fiscal stance developments in the EA and the impact of low interest environment on the fiscal stance is presented.

The EA's aggregate fiscal stance in the period 2000-2018 has been fairly erratic as suggested by ex-post output gap estimates and the change in structural primary balance. Except for 2009, where the fiscal stance was clearly countercyclical expansionary and the recession severe, in the rest of the years, when the output was either positive or negative it was broadly neutral. Yet, it was procyclical restrictive at the time of the euro area crisis 2011-2013. The fiscal stimulus was already withdrawn in 2011 and the accumulated decrease in the structural primary balance in those three years was 3.8 p.p. of GDP. Probably contributing to the weak economic recovery.

While the EA's fiscal stance was broadly neutral in the period 2014-2017 (EFB 2019), it benefited importantly from the low interest environment in that period. This is the result of low interest environment reducing the cost of government debt service which creates fiscal space either to increase other expenditure or create a buffer for contingencies and enhance sustainability by means of extending debt maturity profile. In this context, it is important to look at the contribution of interest and primary expenditures to total government expenditure growth, to have an idea of the impact of low interest environment on the reduction of governments interest bill and how the fiscal space has been used so far.

The ECB's policy impact on government's bond yields of all EA members is increasingly visible after the announcement of the ECB's policy of "whatever it takes" and when the banking crisis in peripheral and new EU Member States subdued in 2014. Where the impact of the ECB policy on government yields is clearly notorious is from 2014 onwards when the ECB announced a comprehensive policy package including negative interest rates on deposits and quantitative easing (i.e. public sector purchase programme). The accumulated impact of lower interest cost on total expenditure growth over the period 2015 until 2019 (estimate)[4] has been positive for the EU countries (Figure 7). It offset the increase of primary expenditure on total expenditure growth. This means that governments used the fiscal space created by lower debt service cost. A longer perspective (2011-2019) including the EA crisis (2011-2014) provides an alternative view on the effect of low interest environment because the impact of the crisis was asymmetrical among members and some counties also benefited from the fly-to-safety process during the double-dip recession (Figure 8). The core countries benefited throughout the whole period while all EA countries since 2014. The low interest environment has brought significant reduction in government interest expenditure in the EA countries when measured as percentage of GDP in the period 2015-2019 (Figure 9) whose effect on total expenditure has been offset by an increase in primary expenditure. Another important issue concerning the outlook of a foreseeable low for long interest rate and considering the macroeconomic challenges is where the fiscal space thus far created has been used. Despite the importance of investment as a potential macro-stabilisation tool, the data on the ratio of Government's Gross Fixed Capital Formation (GFKF)-to-GDP in the period of common monetary easing (2014-2019) indicate that it decreased by 0.4 p.p. of GDP between 2015 and 2019 while at the time interest cost as percentage of

4 AMECO data base

Figure 7: Accumulated growth 2015-2019

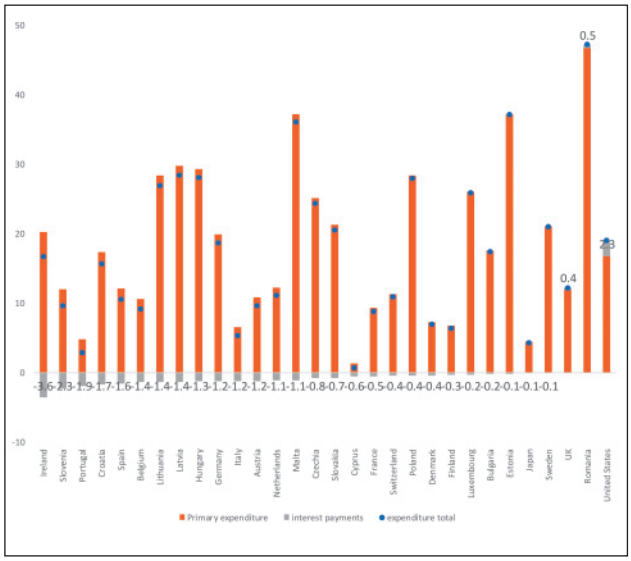
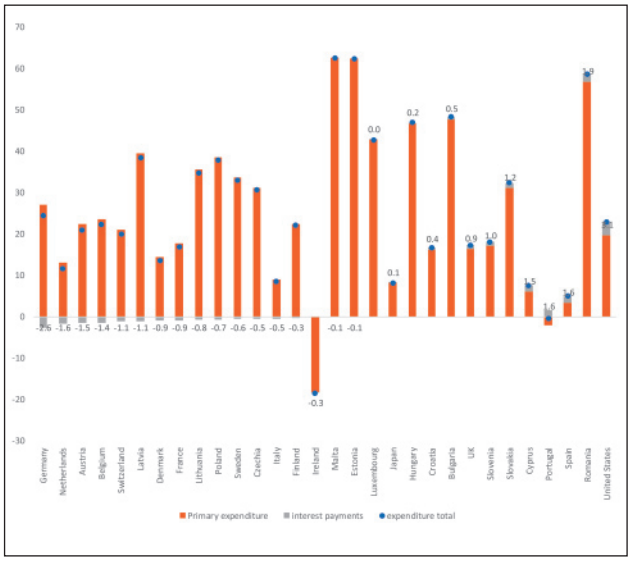


Figure 8: Accumulated growth 2011-2019



GDP decreased by 1.2 p.p. of GDP (Figures 9 and 10).

A low interest environment facilitates the stabilisation properties of fiscal policy because it does not only provide fiscal space by decreasing debt service cost but provided that the level of interest rates is firmly anchored at a low level by the central bank, governments in an extreme way (as suggested by Blanchard and Tashiro (2019) when discussing the situation in Japan) can create deficits and debt, never rise taxes in response and the debt-to-GDP cannot explode but decrease over time. Thus, the discussion of macroeconomic stabilizing role of fiscal policy cannot be isolated from the stance of monetary policy and of available policy options ranging from use of deep cuts of negative interest rates to helicopter money. In this setting, it is important to differentiate the deployment of fiscal policy in three different contexts: a) recession; b) sustained shortage of aggregate demand; and c) low equilibrium growth environment. Similarly, it is important to take into account the EA's fiscal policy rules and framework, the absence of an EA's aggregated fiscal stance, the existence weak coordination among its members beyond that enticed by EU fiscal rules and the lack of common fiscal capacity.

In the event of recession, under the existing EA's policy set up and limited monetary policy space (e.g. resistance to large negative rate cuts) fiscal policy undoubtedly has to step up.[5] The issue is only when and how. Should fiscal policy be relaxed in a preventive manner prior to the recession where the output gap is still positive but closing or, forcefully when a recession ensues? Given the existing EU fiscal framework and the importance of avoiding undermining institutional credibility and foster deficit bias of populistic governments, it seems that the clear option is to act forcefully when recession ensues. The policy mix in this case should ensure strong surge in aggregate demand. To be successful, it would also require strong fiscal policy coordination among the EA members. Furthermore, given the relative different degree of vulnerability of EA members, it would be important to deploy a common central fiscal capacity that would facilitate an appropriate policy mix to common shocks and to smooth country specific shocks. In other words, it requires finalising the EA fiscal architecture. The big question in this regard is the lack of political will since the issue is not high in the EA policy agenda nor in that of the new elected EU Commission.

How should fiscal policy be positioned in a context of protracted aggregate demand shortage or when growth is balanced but chronically low? Abstracting from the constrains of EU fiscal rules preventing fiscal expansion beyond medium term objectives, if economies suffer protracted shortfall of aggregate demand like in Japan, one option would be a massive and sustained fiscal expansion like that in in Japan since 1999 where the average deficit was 6% of GDP until 2015 and net debt increase close to 90% of GDP which allowed low but positive growth (Figure 2). Even if this will be necessary, in the EA it is difficult to foresee in the medium term a change in the fiscal framework that would allow deficits to go below 3% of GDP for a sustained period. Furthermore, such large deficits and consequent debt accumulation while being potentially an option for large core EA countries is questionable for those that are small. In the case of small EA members the notion of "issuing debt in

5 Outside of the existing framework options such as "going direct" are part of available growing menu of policy options to deal with downturns (Bartsch et al., 2019)

Figure 9: Interest payment % GDP (Change)

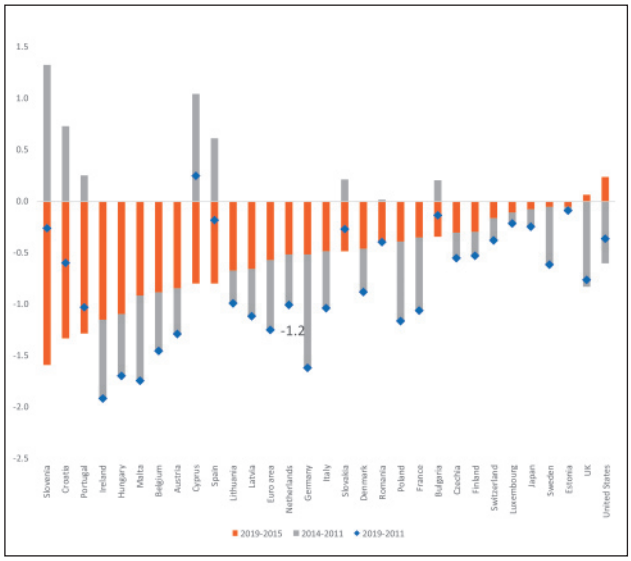
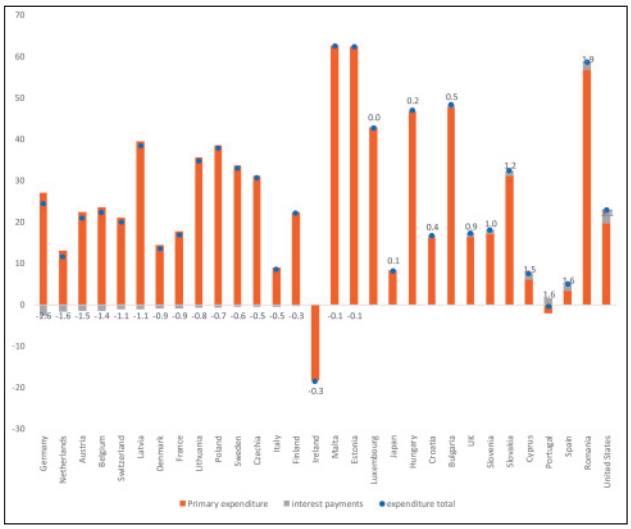


Figure 10: General government gross fixed capital formation % of GDP (Change)



its own currency" can be called into question. A scenario of unleashing strong fiscal intervention if happened hypothetically would probably have to entail a severe recession putting at risk the very existence of the EA. But even in such a case a strong fiscal expansion might not happen. In absence of such a possibility, what might be useful is to create a common fiscal capacity that would benefit all members equally or mitigate the asymmetric transmission of common shocks among the EA members.

A very likely scenario where fiscal policy might confront and an appropriate policy response deployed is one of protracted low growth which goes beyond the current short-term downside risks. Such scenario is consistent with estimates of natural interest rate reflecting the EA's low trend productivity growth and population ageing. As discussed previously, a massive fiscal expansion is not an option. Even if feasible, the issue is whether fiscal policy would be able to overcompensate the secular trends. However, since the line between a scenario of protracted low growth and of shortage of aggregate demand is very thin, in the absence of policy response, both scenarios could easily materialise, particularly if the EA enters into a recession. To this purpose, it is important that fiscal policy framework and policy making in the EA is revised. This implies changing existing fiscal rule in favour of a golden rule that favours investment, create a common fiscal capacity and ensure unified and coordinated policy at EA level. The case of favouring government investment is clear taking into account that investment levels are below that prior to the GFC (Figure 3) and that GFKF has decreased in the last 4 years at the time where the interest bill decreased for all its members (Figure 10). In this regard, it is essential to invest in productive projects and improve private incentives to invest including improving business environment.

Would increase in government investment including fostering innovation prevent the EA falling into a chronic aggregate demand trap? Probably not, but it seems the best option at hand. However, due secular trends it might be required a more comprehensive approach to economic thinking. One that would foster wellbeing and inclusive societies; stimulate labour participation throughout the life cycle; prevents freeriding on welfare states that are increasingly challenged and ensuring fairness. In light of ageing of population reducing productive capacity designing appropriate migration strategies is also relevant.

Macroprudential policy and financial regulation

Financial regulation and macroprudential tools are critical components of the policy mix in a low interest rate environment. The period prior to GFC clearly shows the lesson of how financial and real state price bubbles surge in an environment of low interest rates and excessive global savings. Despite similarities in terms of policy setting between the current one in that prior to GFC, particularly regarding accommodative monetary policy, although the current policy stance is clearly more expansionary, the key difference is the financial and institutional regulatory system that has been overhauled. The financial regulatory set up is completely different including the financial architecture in the case of Europe.[6] The post crisis regulatory environment

6 A lot of progress has been made in terms of financial regulation and in terms of prudential tools. In EA the banking union, the single supervisory mechanism and Resolution Authority and Fund are important pillars in the architecture that still needs to be completed. The presence of the state in banking system has been reduced preventing from moral hazard and the link between of banks and government balance sheets weakened.

contributes to effectiveness of monetary policy as it mitigates the potential consequences of low interest rates on financial stability. Low interest environment and light regulatory environment creates tensions for the central bank to aim simultaneously at economic stability (I.e. full employment and targeted inflation) and financial stability. Nevertheless, despite improvement in the financial regulatory setup, the low and negative rates create strong incentives for search of higher return investments, and in the case of banks can lead to distortive allocation of resources and create vulnerabilities. In the current context, concrete challenges facing macroprudential policy includes: 1) emergence of financial and real state bubbles; and) weak financial institutions engaging in risk taken behaviour and poor credit allocation; and 3) erosion of banks profitability and weakening banks' balance sheets.

Given that in a negative interest environment the monetary transmission channel seems to operate through healthy banks, this suggest that small banks require particular attention regarding asset allocation. Small banks might be less able to pass through low rates to their customers.[7] Also, negative rates might allow zombie firms to remain in existence creating vulnerabilities that exacerbate downturns.

In a low interest environment preserving the integrity of regulatory progress is a key component to macroeconomic stability. The search for high return in a foreseen protected low interest environment will result in stronger claims for scraping existing regulations (Taylor, J. 2013) and for undermining central bank independence.

7 In the case of Japan, small banks have increasingly extended credit to lower quality borrowers and real estate projects in the face of the rising share of nondebt households and nondebt viable firms

Policy mix for a low growth environment

Monetary policy has been instrumental to the economic recovery in the post crisis period and also contributed to creation of fiscal space and debt sustainability. However, the policy space has become thin. Governments have had erratic fiscal stances and in the low interest environment are reducing interest on debt service and lengthened debt maturity profile. Nevertheless, the fiscal space created so far has been used in increasing expenditure other than investment. While assessing the quality of expenditure in which the fiscal space has been used goes beyond this article, it points out to the importance of making the most out of it given macroeconomic challenges.

In a protracted low growth environment, preventing from falling in a trap of weak aggregate demand like Japan cannot rely only on monetary policy alone. There is a case for rebalancing the policy mix towards fiscal policy to reduce the reliance on monetary policy, or making it more effective as recently pointed out by president of the ECB Draghi (2019). Thus, repositioning monetary policy to a more neutral stance (e.g. zero rates) and reducing the side effects of monetary policy and stepping up fiscal policy. In this context, the effective and rational use of macroprudential policy based on existing regulation is essential, as well as completing the banking union and the capital markets union.

Empowering fiscal policy in the EA requires: (i) giving investment an important role in fiscal rules (i.e. the golden rule); (ii) making the most of fiscal space (pursue growth friendly expenditures (Investment, education, life-long learning)); (iii) coordinating fiscal policy at EA level and defining common fiscal stance; and (iv) creating a common central fiscal capacity to underpin stability.

Nevertheless, given the ageing of population, the pattern of income distribution in some countries and in absence of major technological advance, the policy effort must go beyond fiscal and monetary policies. This is particularly relevant because welfare states will become increasingly under pressure including that arising from low returns on savings. Required policies would include those that keep cohesive societies, foster adherence to labour force through life time cycle, provide adequate social protection but at the same preventing freeriding of the welfare systems and foster and reward creation and innovation. Emphasis should be given to preventive policies that preserve healthy societies through also civic engagement. Strengthening the rule of law and legal systems, as well as delimiting the boundaries between public and private interests, are critical to sustained welfare improvement. To the extent that labour will become a binding constraint to production capacity targeted migration policies are essential. Preserving openness to trade and finance underpinned by robust regulation are also part of the required policies. Thus, resistance to populistic and nationalistic policies is relevant.

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Monetary and fiscal policy challenges in a time of volatile economic growth: searching for the right solution

*Mitja Gaspari**

The consequences of the great financial and economic crisis have led to a re-assessment of the underlying assumptions of an optimum monetary-fiscal policy combination. The concept of Conventional Macroeconomic Analysis (CMA) has been criticised by Modern Monetary Theory (MMT) and Classical Keynesian Theory (CKT). The main point of contention is whether by changing interest rates we can avoid a liquidity trap and secular stagnation, in other words, escape from a »bad« equilibrium. The unorthodox MMT that champions a concept of a persistently expansive fiscal policy and exogenously determined central bank's low interest rates may seem attractive in the eyes of the policymakers. However, orthodox Keynesians argue that MMTers have failed in effort to work out a solution to investor inertia in the face of the falling interest rates. To solve the current economic conundrum will take a well-thought-out proposal of economic theory and policy to show the way out of the bad equilibrium combining low economic growth, low inflation and interest rates and huge public debt.

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I. INTRODUCTION

SlThe Conventional Macroeconomic Analysis (CMA) emphasises how effective the countercyclical fiscal policy is when it comes to addressing »the liquidity trap« (effective lower bound) when monetary policy is constrained by the lower bound on interest rates that can no longer be used to control aggregate demand. In normal circumstances for economic growth and moderate rates of inflation, the optimal choice for efficient economic policy would be to that monetary policy uses the interest rate to balance fluctuations in the economic cycle and provide for non-inflationary full-employment economic growth over the short term. Such monetary policy is in line with the New-Keynesian paradigm on »frictions« that prevent the national economy from restoring full employment balance. It means that relative prices, including wages, are not fully flexible downward over the short term and, therefore, monetary policy (according to the school of economic thought called monetarism) can influence real aggregates. To cut the long story short, the goal of macroeconomic stability defined by a zero output gap and a stable low rate of expected inflation, should be ensured by stabilisation monetary policy with an interest rate instrument and not by adjusting the quantity of the central bank base money.

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The second important macroeconomic target for CMA is a long-term fiscal sustainability to be pursued by fiscal policy as its sole target and defined by a stable, that is, sustainable ratio between the nominal public debt (D) and nominal gross domestic product (GDP). The emphasis of this analysis is that that the main direction for fiscal policy is to operate through primary budget balance (B) that by the generated surplus paves the way to a gradual lowering of the ratio of debt to GDP (D/GDP). True as it may be that the ratio between the interest rate on outstanding public debt (r) and on the rate of economic growth (g) can be an important factor in lowering that ratio when (r) is lower than (g); nevertheless, the emphasis is on the stabilisation function of fiscal policy. In the years before the financial and economic crisis, that concept was carried out as » expansionary fiscal contraction - austerity«. It is a contraction in public spending that in an economic crisis should restore confidence of financial markets in public finance and enable to resume unhindered government financing on those markets and a revitalisation of economic growth. Alternative financing with the central bank issuing money is not allowed in this concept, since the central bank is independent from the state treasury and only takes care of macroeconomic stability, mostly it is price stability (Palley, 2019).

Modern Monetary Theory (MMT-Wray, Kelton, Fullwiler, Grey, Tcherneva among others) gained a foothold in the United States primarily as an answer to the negative consequences of the concept of expansionary contraction of public spending and effort to identify solutions to ongoing financing of broader social, employment and environmental programmes. This theory is based on the concept of Functional Finance (FF) developed by Abba Lerner and its core message: »The central idea is that government fiscal policy, its spending and taxing, its borrowing and repayment of loans, its issue of new money and its withdrawal of money, shall all be undertaken with an eye only to the *results* of these actions on the economy and not to any established traditional doctrine about what is sound or unsound.....The principle of judging fiscal measures by way they work or function in the economy we may call *Functional Finance*« (Lerner, 1943, page 298). Therefore, the idea is that the government has to determine its fiscal position at such a level that is in accordance with price stability and full employment, regardless of the pre-existing public debt or fiscal deficit. Any level of public debt is sustainable since a sovereign state can never become insolvent due to the amount of public debt denominated in domestic currency. Therefore, taxes and borrowing are allocated to reducing government spending when it is necessary in order to limit inflationary pressure and not for normal government spending financed by issuing central bank money; hence the amount of public debt is not a constraining factor.

In a nutshell, the MMT concept is based on three unorthodox tenets. The first tenet defines the non-conflict interrelations between the treasury and the central bank. In terms of the institutional arrangement, it is suggested that 'consolidation' should be considered with a consolidated single actor that includes both the treasury and the central bank and claims that their internal relationship shall be fruit of political decision-making and not a corollary of a theoretical concept. The second tenet addresses the issue of how money is created and when it comes to choosing between state money and credit money, advocates the concept of a sovereign state that creates money (issues its own currency). There would be no possibility for private entities on the market to issue legal tender in the first place, although it stops short of challenging the Financial Instability Hypothesis (Minsky) that draws upon the credit view of money where business cycles are generated by the flow of funds as bank credit. The third tenet holds that a sovereign state with a debt denominated in its domestic currency with a flexible exchange rate and a privileged position in world' finance ("exorbitant privilege") should never face the need to default on its debt. Inflation, however, is a constraint that can limit government spending. A surging public debt is not a problem, given the additional assumption that the central bank is capable of and has to control its domestic interest rate. Its target must be to maintain at all times the interest rate close to zero rate, which means that there is no threat of a deteriorating debt-to-GDP ratio.

The bottom line is that the difference between mainstream macroeconomics (CMA) and MMT is in assigning different roles to the two policy instruments (interest rate and the primary budget balance) in order to achieve the two targets (price stability and fiscal sustainability). The first sees the normal role of monetary policy being the provision of price stability by means of the interest rate set by the central bank and the role of fiscal policy by using primary balance in achieving debt/fiscal sustainability. The other one, however, emphasises the active role of fiscal policy in achieving price stability by using government spending and the role of monetary policy in ensuring fiscal sustainability with the nominal interest rate set by the central bank exogenously fixed (Jayadev and Mason, 2018).

II. THE ANALYSIS OF THE MMT ASSUMPTIONS BY USING THE IS-LM MODEL

When it comes to assessing the core MMT assumptions, the textbook 'IS-LM' model could be used since it combines both flows and stock of the analysed economic variables (flow/stock approach). According to MMT, monetary equilibrium is defined as the equilibrium between the demand for money at the end of the period and the money stock at the beginning of the period and net supply of money in the period. The crucial building blocks of the model (Buiter and Mann, 2019) for the analysis of the MMT tenets are the following:

- A closed national economy and absence of international transactions,
- An economy with a starting material excess capacity,
- All aggregates are expressed in real quantities with a given price level and expected rate of inflation, and
- The analysis starts off with the economy being in IS/LM equilibrium.

The initial surge in public consumption (or reduced taxation) is financed by the central bank's emission of base money vis-à-vis the state (see Figure 1). During a period in which there is a fiscal stimulus, at the end of the period it causes a downward LM curve shift (LM and LM) to the right driven by the additional supply of central bank money. In the same period, additional public spending influences the IS curve to shift upward to the right (IS in IS). At the new locus of the curves, we get a new equilibrium point (E), where the new interest rate equilibrium (r) is higher than the initial interest rate equilibrium (r). According to the MMT approach, it is just the opposite since there is an interest rate drop below the initial interest rate due to the fact that expansionary fiscal policy lowers the equilibrium interest rate, if it is financed by issuing base money of the central bank. However, the fact of the matter is that the effect of additional money issuance on the shift of the LM curve is stronger than the effect of the fiscal stimulus on the shift of the IS curve. Such a result is illustrated by the equilibrium interest rate (r) at the locus of the IS and LM curves.

No such effect would be realised, should the government opt for borrowing on the financial market to provide for additional fiscal stimulus, since in that case, there is no additional money issuance, but it is only about the reallocation of the existing liquidity within the system (Bofinger, 2019). Therefore, when there is the upward shift of the IS curve to the right on account of the additional fiscal stimulus, there is no simultaneous LM curve shift, since there is no additional money issuance. The final consequence is a rise in the equilibrium interest rate – a phenomenon considered quite common in normal economic circumstances. Should we assume that the monetisation of fiscal stimulus will be constant, it will gradually lead to the so-called zero lower bound, since due to the LM curve downward shift to the right will overpower the shift of the IS curve upward to the right. Therefore, the wealth effect of the growing stock of base money on spending will be lower than the effect of the increasing money supply. At the end of the day, the LM curve will become infinitely elastic (horizontal) within zero interest rate, whereas the IS curve will be vertical. Against the backdrop of certain assumptions, the IS-LM model shows that the national economy »naturally« gravitates to the liquidity trap and we are not to expect any fiscal constraints on the government consumption, as long as the interest rate is lower than the rate of economic growth. Needless to say that it also applies if the interest rate is in negative territory and economic growth is close to stagnation. However, should that be the case, the interest due on the outstanding stock of public debt can always be covered by additional debt issuance.

III. THE DILEMMAS REGARDING THE MMT ASSUMPTIONS ON EXPANSIONARY FISCAL POLICY

The issue raised here is whether the MMT tenets apply not only in the event of the liquidity trap, that is, in the case of the zero nominal interest rate set by the central bank, but also when the national economy emerges from the stagnation equilibrium. The latter is defined by a chronic deficit of aggregate demand vis-à-vis aggregate supply and, consequently, chronic surplus of saving over investment (also the excess in loanable funds supply over demand for loanable funds). The problem encountered in that bad equilibrium is that no traditional recipe for its elimination works since what happens is the increase in the expected future price levels and in the expected inflation rate coupled with the real interest rate slipping to the rate of interest termed 'neutral' or 'natural' real interest rate. These events should increase spending and output and, consequently, also the equilibrium real interest rate. In the absence of a functioning expansionary monetary policy, deploying directly expansionary fiscal policy remains the only realistic exit from the conundrum.

MMT claims that such a concept for overcoming the bad equilibrium by embracing expansionary fiscal policy is also a general recipe for conducting economic policy when a national economy is in a 'normal' equilibrium

with a positive nominal interest rate and positive economic growth close to an optimum and with a stable low expected rate of inflation. The condition for fiscal policy to be expansionary should the circumstances be different without fuelling inflation growth is founded on the unorthodox assumptions. The first MMT tenet holds that the central bank and the state treasury should act as if they were a consolidated single actor. It means that there is a single owner of both institutions (the state) and the central bank is the emission source for the treasury. In turn, it would make sense to connect the two balance sheets and carry out consolidation so as to enable the state to get the entire currency issuance profit, as well as non-interest bearing financing of its spending by issuing the central bank money (state money). In terms of its substance, such an assumption makes sense and is derived from the understanding of the role of a sovereign state. The sovereign shall have a monopoly over the issuance of its currency – the task mandated to the central bank on its balance sheet. On the ground, however, the functioning of the monetary and of the fiscal system paints a different picture. Central banks and treasuries are institutions with separate balance sheets and independent by law; central banks have special mandates granted by the states/governments to take care of price stability and, as a rule, they are not to finance deficits of state/government budgets. States may finance their budget deficits only on the financial market by issuing their IOUs (bonds). Revenue from the central bank money issuance is generated in the relationship between the central bank and commercial banks (save for issued cash where it is direct revenue of the state) through the reserves commercial banks hold at the central bank. The banks that issue credit (bank or credit money) to non-financial institutions by doing so create deposits of those institutions they hold and for which they have to hold a portion of the money deposited with them as reserves (the system of fractional reserves) at the central bank. The non-inflationary money issuance revenue or 'seigniorage' (1) is a positive figure for the central banks as long as the growth of its money does not cause a surge in the rate of inflation. This is why the MMT thesis on expansionary fiscal policy financed by the issuance of the central bank money would be plausible only in a situation regarding the liquidity trap when due to a rising supply of money, the rate of inflation does not rise. Provided that a national economy is not in the bad equilibrium, such policy will lead to full employment output followed by triggering the inflationary spiral as demonstrated by expanding the IS-LM model to the aggregate demand and aggregate supply (AD-AS) model with the price level and the real output on both coordinates.

The second MMT tenet that justifies monetisation of the budget deficit is its borrowing in the domestic currency. It means that servicing debt can always be done by additional issuance of the central bank money and there is no fiscal constraint other than inflation considerations (2). Where the debt-to-GDP ratio is very high, it is even possible that fiscal expansion due to a high pre-existing state debt reduces that ratio provided that the interest rate paid by the government is less than the growth rate. The effect of decreasing interest expense shall prevail over the effect of budget deficit (Blanchard, 2019). It does apply to large economies, even though substantial constraints remain, since it is not by free will of a country that has defaulted to choose when to declare insolvency. Furthermore, such countries may find themselves in a situation of runaway inflation and economic crisis. Nevertheless, the impact financial markets may have on taking their fiscal decisions is less significant than in the case of small, open economies.

The third MMT tenet advocates the argument that taxpayers must pay their taxes to the state in central bank money (state money). That money would be created only by spending of the state that pays its dues with the state money that the receivers of those payments use eventually to pay taxes to the state. Such an explanation means that the starting point is the primary budget deficit that enables normal payment of taxes to the state and, therefore, the supply of state money determines demand for money of the private sector. Under real conditions, such an assumption would be inconsistent, given the fact that a sovereign may augment the quantity of money of the central bank also by lending to the private sector by purchasing private debt or by buying-back own debt from the private sector by decreasing the balance on its account held with the central bank.

VI. HOW TO OVERCOME SECULAR STAGNATION AND LIQUIDITY TRAP

A decade after the onset of the financial and economic crisis in the main world's economies (U.S.A., Europe, Japan), the expectations that there would be a positive post-crisis economic scenario seen in the past in the aftermath of a crisis and recession failed. The characteristic of the period following the most recent crisis is that we are still facing huge public debts, strong increases in central bank balance sheets (huge supply of central bank money), low nominal

and real interest rates, low inflation rates and unusually lukewarm response of investments to the interest rate cuts. It all adds up to sluggish economic growth, relatively large share of underemployed active population and the difficulties in continuing to run the programmes that determine the level of the country's welfare (health, age, education, infrastructure, etc.).

The conventional response of the New Keynesian theory is that the combination of low inflation, a declining neutral real interest rate and the liquidity trap (a lower bound on nominal interest rates) that precludes the restoration of full employment output can be resolved by reducing the existing real interest rate. Subject to the assumption that the interest rates are sufficiently elastic, by reducing nominal interest rate expansionary monetary policy will enable departure from the bad equilibrium. It will take place by increasing interest-sensitive components of aggregate spending – mostly new investments. The problem arises when the declining interest rates fail to encourage investment and only increase propensity to saving and further weaken aggregate demand. At the same time, low interest rates tend to increase public debt and the negative effect on disposable income in the private sector. Thus, monetary policy as an instrument for adjusting demand when nominal interest rates are low and even negative, tend even to be an inhibitory factor in bringing aggregate demand into alignment with aggregate supply (Summers and Stansbury, 2019).

MMT's polemic on a solution to the described problem favours the use of expansionary fiscal policy. Since it assumes that a budget deficit is the natural condition of public finance, its proposition is founded on the monetisation of the state debt until full employment output is reached. MMT sees a solution to the problem of arriving at fiscal sustainability, which is not its macroeconomic target, in having the central bank provide for the low, that is, zero interest rate. For such a concept to be viable, much depends on whether 'automatic stabilisers' are actually positive and higher than zero not only in a liquidity trap, but generally, so as to boost aggregate demand. The issue to which MMT has no answer is how to rein in an explosive debt-to-GDP ratio, should the only the full employment output be the sole objective of economic policy. It is assumed that fiscal policy can prevent an overheating of the economy (lower expenditure, higher taxes) and reduce fiscal instability (a very high public debt). The principals objections to the concept are that it continues to underestimate the 'bias' of the government policy with regard to running a budget deficit even when it is not necessary in order to revive aggregate demand and also that it is not generally acceptable to insist on the central bank's real interest rate be kept in the zero lower bound.

The Keynesian critique (Palley, 2019b) of using the natural rate of interest as the main instrument to escape from the liquidity trap and secular stagnation emphasises that unemployment may persist even if the nominal interest rate of the central bank is negative. It is the thesis according to which investment is insensitive to declining interest rate, if return on investment in physical capital is lower than competitive returns on an array of other assets (non-reproduced assets - NRAs). These assets include, in addition to fiat money, precious metals and minerals, land, rent streams, intellectual property such as patents and copyrights, etc. Therefore, due to low interest rates, it may happen that saving is re-allocated to other assets and not invested in real productive assets thus falling short of reviving aggregate demand. In the IS-LM model, the IS curve becomes vertical or even negative when the nominal interest rate drops below zero and the real output declines. Consequently, a Keynesian critique today denies that the main cause of the so-called bad equilibrium could be attributed to frictions in the labour and goods market that would otherwise cause downward-sloping rigidity of relative prices and wages.

We may say that no school of economic theory has as yet come up with the right answer to the problem posed by the liquidity trap and secular stagnation. Nevertheless, both mainstream and unorthodox economists are more often going back to the issue of political and economic causes for the problem of low economic growth, low investment and high public debt at low inflation and interest rates. Skidelsky (2019) brings to the fore two interesting arguments. The first one is the issue of the size of the state and its proper economic role and the financial resources it needs to live up to that role. The second issue is that maintaining full employment is one of the chief responsibilities of the government. Skidelsky summarises that the main goal of fiscal policy according to Keynes should be to balance the national economy and not to balance the government budget. Such a view also converges with Jason Furman's view (2016) and the arguments in favour of his position in the "New View of Fiscal Policy and its Application" that fiscal policy is often beneficial for effective countercyclical policy and may provide a sustained stimulus, especially if it is in the form of effectively targeted investments that expand aggregate supply.

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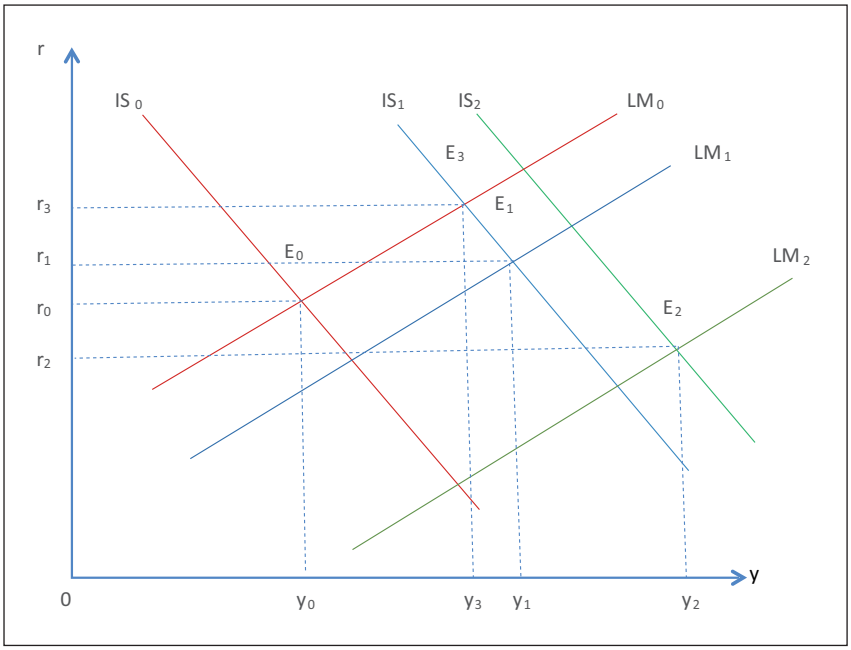
Figure1: Expansionary fiscal policy financed by the CB money issuance or by government borrowing in the financial market



Remarks

1) The share of real GDP (that is extracted through non-inflationary monetary issuance) is the following equation: $\Delta M/PY = (1+\pi)(1+g)m - (1+i^{M})m_{1}$; M – nominal money supply, P – general price level, Y – real GDP, m – real money stock as a share of real GDP (M/PY), π – rate of inflation, g – rate of real GDP growth, i^{M} - average interest rate on central bank money, if reserves earn interest. See Buiter and Mann (2019)

2) Fiscal constraint for primary (augmented) government budget deficit or surplus is defined by two components in the equation: $\Delta d = [(r - g)/(1+g)]d - b$; $b = T\text{-}G/Y + \Delta M/PY$, d = D/PY. If the first element of the equation is negative, no budget surplus is required (b) for the ratio (d) to remain stable or even decrease. See Palley (2019b)

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Uncertainty, fiscal policy and the way(s) out

*Aleš Delakorda**

Uncertainty may have non-negligible impact on economic activity and thus budget performance. The current environment is characterised by high uncertainty and monetary policy undertaking unconventional measures. The fiscal policy should be aware of these uncertainties and contribute to stable long-term economic prospects and fiscal sustainability. This is especially important in the monetary union. We describe the relation between uncertainties, stemming from monetary policy set-up, and fiscal policy and propose ways for the fiscal policy to remain stabilisation tool.

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Economic policy, including fiscal policy, is exposed to many uncertainties at current junction. Uncertainty impacts the behaviour of economic agents and markets. This is reflected in government revenues and – depending on the volume of automatic stabilisers and on the activist bias of the government – eventually in expenditure. Our purpose is to shed light on the relation between uncertainty and fiscal policy, where the latter operates along the unconventional monetary policy. The latter has clearly had a positive effect on the stabilisation of global economy in the early phase of its implementation. Nevertheless, it is important for fiscal policy to be aware of the risks that may result from the current monetary policy set-up. First, we describe some stylised facts about uncertainty and present rough estimates of how uncertainty may affect budget performance in Slovenia. Next, we ask whether and how unconventional monetary policy may induce risks to fiscal policy. A far-fetched from today's perspective but presumably important topic in the future is dealt with, explaining fiscal policy-related uncertainties that may originate in the withdrawal of unconventional monetary policy measures. Providing an efficient stabilisation tool is crucial in a monetary union, where fiscal policy is to a large extent the only instrument available to cushion the effects of idiosyncratic shocks at national level. We therefore conclude with a discussion on what fiscal policy can do to remain the stabilising tool and to ensure welfare in the era of uncertainty.

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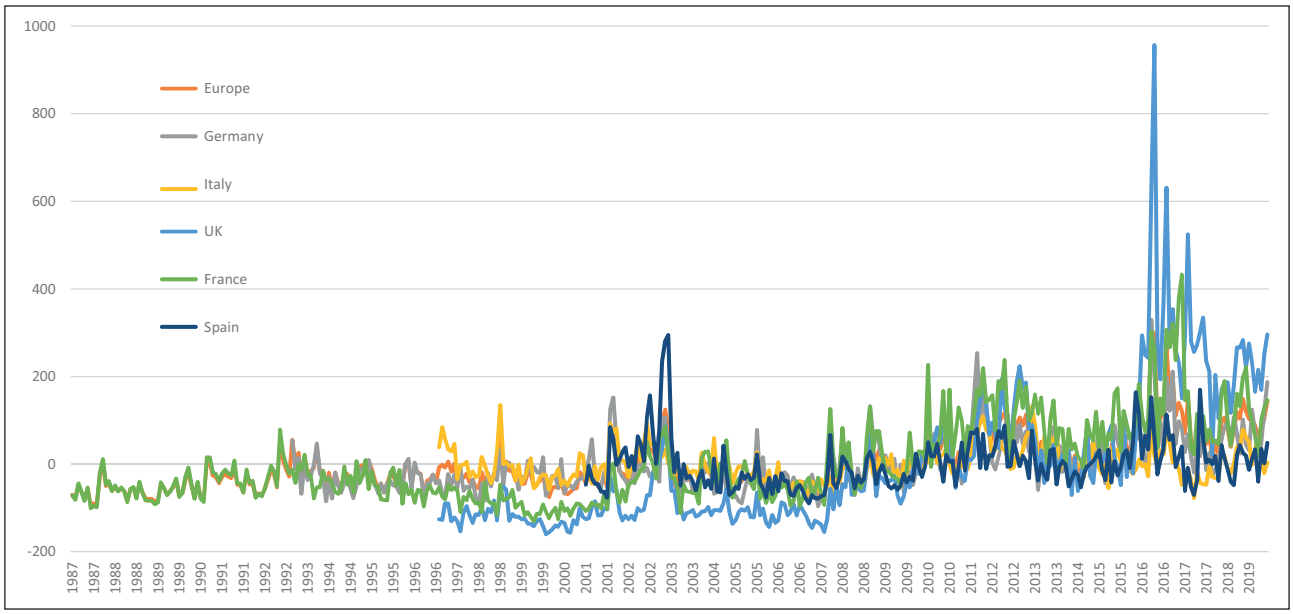
Figure 1: Policy uncertainty, deviations from long-term averages



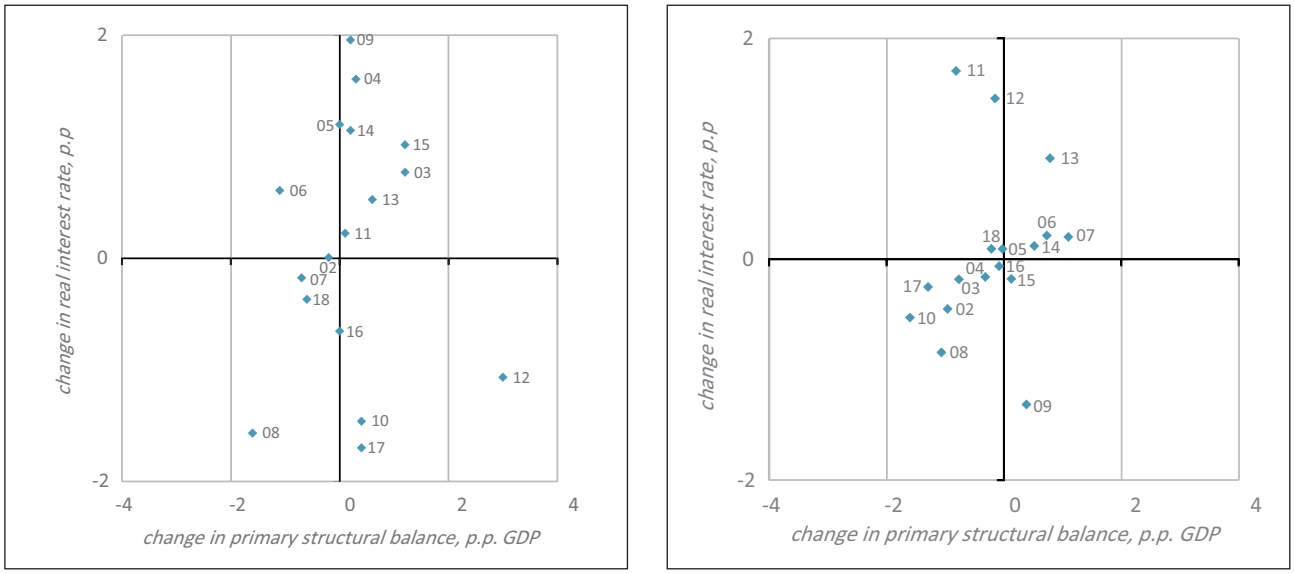
Source: http://www.policyuncertainty.com/index.html. Author's calculations.

Economic policy, including fiscal policy, is exposed to many uncertainties at current junction. Uncertainty impacts the behaviour of economic agents and markets. This is reflected in government revenues and – depending on the volume of automatic stabilisers and on the activist bias of the government – eventually in expenditure. Our purpose is to shed light on the relation between uncertainty and fiscal policy, where the latter operates along the unconventional monetary policy. The latter has clearly had a positive effect on the stabilisation of global economy in the early phase of its implementation. Nevertheless, it is important for fiscal policy to be aware of the risks that may result from the current monetary policy set-up. First, we describe some stylised facts about uncertainty and present rough estimates of how uncertainty may affect budget performance in Slovenia. Next, we ask whether and how unconventional monetary policy may induce risks to fiscal policy. A far-fetched from today's perspective but presumably important topic in the future is dealt with, explaining fiscal policy-related uncertainties that may originate in the withdrawal of unconventional monetary policy measures. Providing an efficient stabilisation tool is crucial in a monetary union, where fiscal policy is to a large extent the only instrument available to cushion the effects of idiosyncratic shocks at national level. We therefore conclude with a discussion on what fiscal policy can do to remain the stabilising tool and to ensure welfare in the era of uncertainty.

Uncertainty and budget – some stylised facts

The uninterrupted global economic expansion after the Global Financial Crisis (GFC) has been accompanied by persistently high uncertainties. The current growth episode has reached the normal length of a business cycle with the positive, albeit diminishing, quarterly dynamics in the Euro area being present for seventh year in a row. The main policy uncertainty over the last couple of years in the EU can be detected in the UK, linked to Brexit. Nevertheless, the spikes of uncertainty indicators in some other main EU economies have been exceeding the long-term averages over the last years. Uncertainties also stem from as of yet unchartered medium- to longer-term consequences of unconventional policy tools applied since the crisis. From a broader perspective, the uncertainty about the positioning of economic policy also relates to the new steady state of economy. The so called "new normal" is usually described as a situation of secular stagnation, where global economy has entered an extended era of low growth and low productivity, but also of low interest rates, fiscal policy hampered by high public debt and worsening demographic situation. Uncertainty also relates to different policy stances among Euro area member states, which increases the possibility for divergent macroeconomic outcomes. Monetary-fiscal policy mix in the euro area and Slovenia over the last two decades has been similar on average but divergent in individual years. It was characterised by largely neutral stance on average, being only slightly more restrictive in Slovenia. The stance was clearly procyclical, looser just prior to the crisis in 2007-2008 and tighter in years fol-

Figure 2: Policy-mix in Slovenia (left) and in the euro area (right)



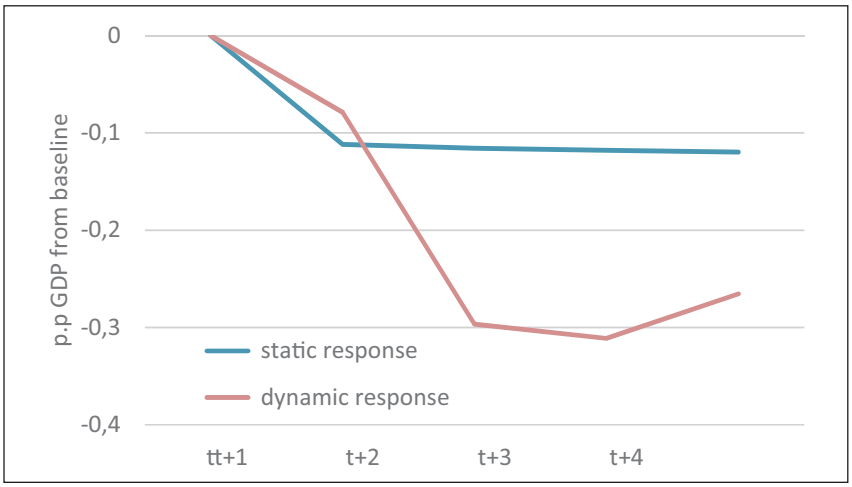
Note: The calculation of real interest rates is based on policy rates and ex-post inflation.
Source: ECB, OECD, Eurostat. Author's calculations.

lowing the beginning of the crisis, in Slovenia compared to Euro area. At the same time, one may note the more dispersed, that is bumpier, path of economic policy orientation during and after the crisis in Slovenia. This reflects a more volatile macroeconomic developments, including the exceptional circumstances in the crisis, but also a large uncertainty linked to policy management during the crisis. Uncertainty fluctuations may importantly influence the economic performance and outlook and thus budget. The transmission channels are multiple, time-varying and event-related. They range from effects via consumption and investment which have a role in labour market decisions, thus affecting the revenue side of government balances, to the effects eventually determining expenditure items, be it automatic stabilisers or discretionary fiscal policy measures. To put the uncertainty effect into perspective, we estimate an impact of an uncertainty shock on the government budget developments.

Estimates show a non-negligible effect of uncertainty on government budget performance in Slovenia. The estimation included a three-step procedure. First, a typical shock was defined by calculating a mean of positive changes of the uncertainty indicator in the 2000-2018 period.[1] In the second step, an impact of uncertainty on economic activity was calibrated based on own calculations and by reviewing the literature on the topic. The estimates show that a one-point increase in uncertainty index reduces GDP growth by 0.07%. This activity elasticity of uncertainty was applied in the static model based on a standard uncertainty shock determined in the first step, while in the dynamic model, the same standard shock was used directly. The effect of uncertainty on budget was determined in the third step, using a simple static model based on multipliers and, alternatively a dynamic macroeconomic model, with a shock duration of one year. Simulations show that a historical average increase in uncertainty may

1 Based on the survey indicator estimated by SORS: »restricting factors - uncertain economic conditions in the manufacturing sector, measured by the share of employees«. Its average increase amounts to 4.3. In the beginning of the crisis, i.e. in the final quarter 2008 and in the first quarter 2009, the indicator increased by 13 and 21 points respectively.

Figure 3: Impact of an increase in uncertainty on budget balance



Source: Author's calculations.

worsen the budget balance by roughly 0.1 p.p. of GDP in the first year after the shock. In the fourth year following the shock, the difference between static and dynamic model widens, with estimates using showing a worsening of budget balance of between 0.1 and 0.3 p.p. of GDP.

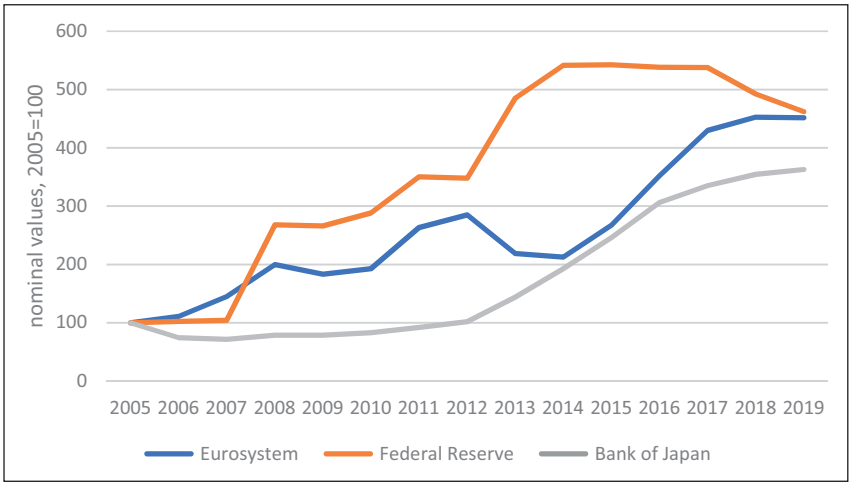
Monetary-policy induced uncertainties and fiscal policy

The extended duration of non-conventional monetary policy may bring uncertainties to the fiscal policy set-up. The limit for monetary policy to provide further accommodation to the economy in conventional terms is reached once the ZLB is attained, after which the expansion of central bank balance sheet – via purchases of government and private sector assets – becomes the main instrument to provide such accommodation. This is chiefly done by purchasing government and private sector securities, trying to influence the longer end of yield curve.[2] We describe the relation between the uncertainties, induced by such monetary policy, and fiscal policy.

First, we discuss the interrelation of fiscal policy and central bank balance sheet. In normal circumstances, fiscal implications of central bank policies do not deserve much attention as they may be almost non-existent and are recognised as inevitable secondary effects. Direct fiscal policy effects stemming from accommodative monetary policy are deemed positive, as purchases of government bonds depress bond yields and thus reduce government debt service costs. These savings may be especially large when the public debt is relatively high. The volume of balance sheets of major world central banks has increased strongly[3] during the global financial crisis due to the unconventional tools introduced. Historically too, big expansions and contractions of balance sheets have been associated with periods of geopolitical or financial crisis (Ferguson et al., 2014).

Large changes in the dynamics and in the structure of central bank balance sheets may incur distributional fiscal effects. This is valid both at the bank-level and at the level of countries as a shift in relative demand for specific securities results in a shift in relative prices of these securities, both private and government ones. The prolonged unconventional support also implies higher exposure to risks, as assets on the central bank balance sheet may reflect the usual diminishing eligibility standards as collateral is accepted that would not qualify in pre-crisis operations. Orphanides (2018) calls the way monetary policy causes indirect fiscal effects, which may be negative "the fiscal power of balance sheets".

Figure 4: Balance sheets of major central banks



Note: Data for 2019 as of 30 June 2019.
Source: Federal Reserve Board, ECB, Bank of Japan. Author's calculations

Prior to the crisis and coinciding with the period of serious breaks of Stability and Growth Pact, Eurosystem adopted thresholds for the eligibility of government debt, based on credit ratings.[4] Such disciplining of the sovereigns adopting irresponsible policies created a so-called »cliff effect« (Orphanides, 2018). It originated in fears of downgrades and potential default becoming self-fulfilling with markets guessing that the Eurosystem may refuse to accept government debt as collateral, even for sovereigns with sound fundamentals. The reliance on credit ratings has initiated markets to form adverse expectations about the weaker sovereigns in the Euro area. Such dynamic led to a shift in relative demand for euro-denominated government debt away from "weak" governments to "strong" governments, inducing an indirect fiscal transfer in the form of a risk premium for "weak" sovereigns and a related subsidy for "strong" sovereigns.

Too long subscription to such policies may also entail quasi fiscal activity by hiding actual solvency problems on

2 In addition to quantitative easing, there are further unconventional policy easing options at ZLB, including exchange rate policy and communication policies that influence expectations of future policy actions.

3 This explains the co-movement between the central bank balance sheet size and public debt levels in the past. According to Ferguson et al. (2014), long-term central bank balance sheet changes show that measured by historical standards, the increases of central bank balance sheets during the GFC were not unprecedented.

4 When the euro was created, the eligibility of government debt acting as collateral in monetary operations was unquestionable, with an exemption of extreme circumstances that rendered a debt of a specific sovereign unsustainable.

the side of counter-parties (see Durre and Pil, 2012). This may become a self-fulfilling prophecy as the reactivation of money markets would not necessarily solve the problems of suffering banking institutions. Such monetary policy measures may give rise to moral hazard issues[5] and may erode the credibility of central banks as the economic agents may conclude that hidden goals of central banks indeed prevail above the official monetary policy objectives.

In this situation, a relation between monetary policy and fiscal policy becomes blurred as some of the central bank operations indeed substitute the usual tasks of the government. According to Orphanides (2016), high-powered money and government bills become near perfect substitutes. Liquidity is injected in the economy with the government issuing additional bills at zero rates or the central bank raising the quantity of high-powered money, also at zero interest. In addition, bailout operations to restore the health of the financial sector may be effectively operations, which should belong to the realm of fiscal policy. In that sense, provision of credit to specific private or government-related entities may keep in business some that would have otherwise collapsed. This is equivalent to providing fiscal support by the government. At the same time, the provision of such financial support during the crisis may have important distributional effects at sector and at country level, thus also initiating questions about the central bank independence.

Looking at the effects of unconventional monetary policy from a longer-term perspective, lax monetary policy is assumed lead to a self-fulfilling prophecy with regard to the drive for structural reforms and thus the reduced ability to increase long-term potential of the economy. In this context policy makers usually do not see a need to rush with the unpopular reforms in times of favourable financing conditions. Contrary to this common belief, the ECB working paper (Da Silva et. al, 2017) finds that lower rates tend to promote reforms, since they provide additional room for redistributive policies, as low rates could offset potential short term cost for some agents. The lax monetary policy may be thus more useful for countries without the fiscal space in terms of taking measures to enhance their long-term productive capacity, including Slovenia.

Fiscal uncertainties linked to the exit from unconventional monetary policy

Accumulated high volume of assets in central bank balance sheets poses a risk regarding their reduction and the path back to normal.[6] Goodhart (2017) claims that the longer-term objective should be to return the volume of balance sheets to the pre-crisis levels along with interest paid on central bank reserves remaining at minimum levels and banks holding high values of high-quality liquid assets, e.g. in the form of treasury bills, where appropriate. Ferguson et al. (2014) on the other hand argue, based on historical experience, that the nominal reductions of the central bank balance sheets are rather rare. Thus, one can probably expect that the future reduction in balance sheets may be protracted and to take place relative to GDP rather than in nominal terms. Central bank balance sheet reductions are also associated with lower-than-trend GDP growth, whereas credit and equity markets usually experience downturns. On a pricing side, research by Titzck and van den End (2019) shows that changes in size and composition, but also in the duration of balance sheet components affect bond yields. Market developments at the turn of 2018/2019, after the Federal Reserve began trimming its balance sheet, show this may also cause higher volatility in financial markets. The combined effects of the aforementioned relations of macro variables with the reduction in balance sheet could thus negatively impact public finance results.

The overall implications for public finance of reductions in central bank balance sheet will also depend on the timing of the start and the consequent pace of this process. If the start of a reduction coincides with uncertain economic environment, the public finance costs may be higher as yields of securities to be disposed of may increase and their prices drop – probably amid increased volatility – below the value when purchased by the central bank. The same may happen, when reduction starts in the overheated economy as both central bank rates and securities yields may be high. In this case, however, any such effects would materialise against the backdrop of an economy that was operating above its potential, which could be expected to boost the public finances in other ways (see OBR, 2019). Some economists (Goodfriend, 2014) thus stress that the central bank is well advised to retain profits when it expands its balance sheet so that it has sufficiently strong capital buffers to counteract possible losses associated with the subsequent normalisation of policy. Acting that

5 According to Hartwell (2018), "The unresolved fiscal issues of the EMU mean that Member States will always have an incentive to indulge their fiscal urges in hope that the ECB will come to their rescue with monetary policy. At the same time, the financial sector pushes for socializing both risk and losses, with the ECB effectively giving their business a soft budget constraint."

6 The topic may not be relevant in late 2019, though it seemed highly topical early this year, also in the view of preparing this issue of Bančni Vestnik. Still, the topic is worth exploring as it may become important for central banks, commercial banks, financial markets and eventually fiscal policy in the future.

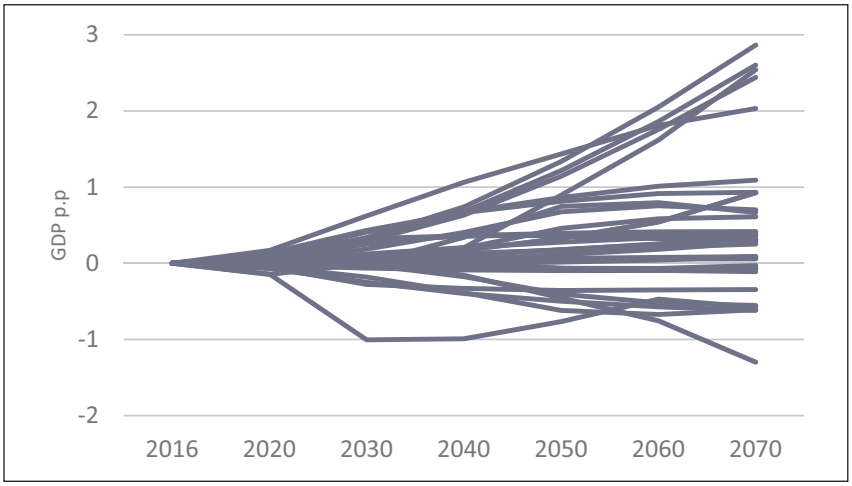
way, fiscal pressures arising from this source would diminish.[7]

What orientation for fiscal policy in an uncertain world?

There is an ongoing debate on how fiscal policy should operate in the new normal, also characterised by unconventional monetary policy. Some prominent (ex-)policy makers (e.g. Blanchard, 2019) advocate higher spending and debt accumulation in times of low interest rates, as this is supposed to result in low welfare costs and no fiscal costs. Such thinking is popular since, according to Woodford (2010), fiscal multipliers increase once the ZLB is reached. In this case, the expected utility of economic policy may be maximized by increasing government spending to prevent the negative output gap that would otherwise exist in the absence of central bank's ability to cut interest rates. Clearly, the output gap is currently not negative in Slovenia neither it is expected to become negative soon,[8] despite an expected moderation of economic growth, thus downplaying a need for counter-cyclical expansionary fiscal policy in the near term. As Erceg and Linde (2010) warn, the prudence is also required due to the relation between multiplier and spending level. Even if the multiplier may be high for small increases in government spending, it may decrease considerably at higher spending levels. Fiscal policy should thus avoid overreacting in times of a new normal, including an overreaction in the period of a moderating dynamics in economic activity while the output level remains high. Many economists continue to argue that in order to respond to the uncertainties, the governments should react via increasing rate of saving even in the low interest environment. A single measure to enhance the fiscal space is not the way out, but rather a comprehensive approach that includes measures to improve long-term economy's potential. The rise of potential output can be supported by improving human capital endowment and ensuring stable institutional framework, but also by efficient investments, which all contribute to rising productivity. As confirmed by the IMF analysis (Aiyar et. al, 2019), structural reforms that support higher productivity of the private sector not only improve the resilience of the economy, but also simultaneously make the counter-cyclical policy more efficient while reducing the burden of public finances. Fiscal policy of a small open economy with a lack of fiscal space and numerous and extensive upside long-term fiscal risks linked to demographic changes should thus remain cautious. It should keep in mind that the presence of multiple equilibria[9] at – not necessarily extraordinary high – certain levels of debt might increase the chances of self-fulfilling prophecies. Investors who only even consider the levels of debt excessive may require higher risk premia, which in turn makes debt-servicing more expensive and, in the end, probably unsustainable.

The Slovenian Fiscal Rule Act focuses on a balanced structural position with a view to provide long-term fiscal sustainability. The embedded rule is supposed to ensure counter-cyclical positioning of fiscal policies by setting maximum expenditure threshold that is to remain unchanged during the implementation of a medium-term budgetary framework. However, a small open economy, such as Slovenia, should extend its public finance targets. In line with experiences of some other countries, one way to achieve

Figure 5: Risk scenarios of costs of ageing



Note: The figure shows deviations of risk scenarios from the Ageing Report 2018 baseline projections for Slovenia.
Source: Ageing Report 2018, Author's calculations

7 This is very important for small economies, which can be exposed to unproportionally strong shocks. The analysis by Kocina et al. (2019) shows that financial buffers of the Bank of Slovenia are comparable to that of the median of the Eurosystem central banks. At the same time, financial buffers of both Bank of Slovenia and of Eurosystem have increased by less than central bank balance sheets during the crisis, the difference being lower in the case of the Bank of Slovenia.

8 It is worth noting that the definition of real-time cyclical position of the economy is one of the eagerly discussed items in the fiscal policy debate. Currently available methodologies – and specifically the one used within EU fiscal governance – seem to produce pro-cyclical estimates of output gap subject to numerous revisions. The real-time orientation of fiscal policy thus represents another source of uncertainty. The Slovenian Fiscal Council tries to evade these uncertainties by considering a range of estimates of a cyclical position as well as a range of cyclical indicators (See Fiscal Council, 2018).

9 As Blanchard (2019) stresses, multiple equilibria typically hold for a large range of debt. In addition, even a realistic reduction in debt while debt remains in such range does not rule out the bad equilibrium with all the negative consequences incurred thereof.

this could be that the government sets an explicit long-term nominal public debt target, i.e. for a horizon that goes well beyond its mandate, and defines a credible path to achieving it, in line with the proposal by Wyplosz (2019). This could help in building sufficient fiscal buffers and preventing the unwanted exposure to markets as a result of too high debt increase. This would also help in anchoring expectations.

By making policy more predictable, a long-term oriented target and an ex-ante defined credible path to achieving it could assist in reducing uncertainty. Mbaye et al. (2018) estimate that financial crisis may increase public debt by about 20-25 p.p. of GDP, a finding confirmed by Laeven and Valencia (2018). Considering this effect together with levels of public debt that eventually harm growth and taking into account projections of rising costs of ageing and an aversion for the public debt to accumulate to unsustainable levels during the crisis calls for a cautionary approach. As the public debt at just slightly below the 60% of GDP Maastricht threshold may not provide enough fiscal space, economic policy could define a lower debt target, as e.g. proposed for Sweden (see Andersson and Jonung, 2019). Such commitment would be complementary to the Article 148 of the Slovenian Constitution, which states that "Revenues and expenditures of the budgets of the state must be balanced in the medium-term without borrowing, or revenues must exceed expenditures".

Policy-makers should recognise that year-to-year budget smoothing and adjustments to accommodate fiscal rules at margins and chiefly in the outer years of medium-term fiscal plans may not be the optimum policy. What matters in uncertain times, also in the current absence of a central fiscal stabilisation capacity at Euro area level, is realistic and credible planning with focus on growth-friendly and inequality decreasing measures taking into account prudence required and limitations set by the Fiscal Rule Act. Currently, these do not imply austerity but rather a neutral fiscal policy stance and should be coupled with a persistent strive to ensure long-term sustainability of public finances. As Auerbach (2014, p.14) concludes, "...What is clear is that hoping for a better future does not constitute an appropriate policy response to uncertainty, and waiting until the size of the problem is known is waiting too long...".

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Rules vs. discretion: Case of monetary policy in Croatia

*Neven Vidaković**

The paper reviews the effects of monetary policy in Croatia over the period of time from 2000 until 2018. The time period is divided into three parts. The first period from 2000 to 2007 is the period of the accumulation of macroeconomic imbalances (the boom phase of the financial cycle); the second period from 2008 to 2015 is the period of crisis and self-adjusting period through deflationary adjustment (the bust phase of the cycle); the third period is from 2016 onward (low inflation phase). The paper highlights the relationship between rules-based monetary policy and the real economy. The rules-based monetary policy (the exchange rate serves as a nominal anchor for disinflation) has forced monetary policy to pursue a policy of internal devaluation. After the crisis the economy has self-adjusted but at a considerable cost in unemployment and GDP. The analysis provides a clear blueprint for the behaviour of monetary policy during the next financial crisis.

JEL E42 E52 E58

01. Introduction

The most heated debate in macroeconomics is probably the question of rules vs. discretion in economic policy. What should we do during economic crisis? It is generally accepted, at least in theory, that the rules are better than discretion. This was the original argument of the seminal rules vs. discretion paper of Kydland and Prescott (1977). In theory, and to a large extent in practice, the rules have won. Actual central bank behaviour – including the Federal Reserve and the European Central Bank – follows a clear set of rules. The inflation- targeting monetary regime of the ECB and the dual mandate of inflation-targeting and full employment of the FED, are clear examples of behaviour under rules. Central banks will act if the economy is not in the state to achieve the desired levels of the variables targeted as defined by rules based policy[1].

However, a review of the behaviour of central banks during the Great Recession shows that during the periods of extreme financial stress like the subprime mortgage crisis in the USA or the Greek crisis in the EU the discretion trumps rules[2]. During these crises, central banks did "whatever it takes" to prevent a full-blown global and domestic economic collapse. This approach was also shown to work in theory. Kocherlakota (2016) presents a clear theoretical case when discretion is preferable to rules. The paper also shows that not all rules are optimal.

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1 Author would like to thank Dubravko Radošević for valuable comments.

2 The clear fact that discretion has upper hand during the crisis is the title of Ben Bernanke's 2015 book which is The Courage to Act. Not Courage to follow rules. For behaviour of ECB during the crisis see Radošević (2019)

The purpose of this paper is to review a case of a central bank which has followed rules in times of economic crisis. As an example, we are going to look at the behaviour of the Croatian central bank and what were the economic effects of following a strict rule. In order to present a clear case of the real-life examples of rules vs. discretion, we will look at the behaviour of the CNB during the three periods. The first period from 2000 to 2007 is a period of economic boom. The second period from 2008 to 2015 is a period of economic depression (bust) and a period of the economy self-adjusting; the third period is from 2016 until today when the central bank is working in the low inflation, low economic growth environment.
In the case of the Croatian central bank, the rule is stated as the definition of monetary policy framework: "The *CNB maintains stability of the exchange rate The CNB's monetary policy framework is based on maintaining the stability of the nominal exchange rate of the kuna against the euro. A stable exchange rate of the kuna against the euro constitutes the so-called nominal anchor of monetary policy by which the CNB stabilizes inflationary expectations and, ultimately, inflation itself*[3]". From the rule we can see there is no real economy in the rule. Stable inflation is equated with a stable exchange rate, regardless of the real economy's need for monetary policy. The central bank has also never announced definition, methodology and quantitative indicator for inflation target, such was the practice of the ECB and other central banks. Basically, the CNB does not have an inflation target, which means that regarding the inflation, there is unconstrained discretionary policy with the exchange rate as the intermediate target, which is *de facto* the only and the main target for monetary policy.
The policy paper is structured as follows. Part two provides a theoretical overview, part three provides a data overview. Part four analyses the implications of the rules for real economy and for the next economic crisis. Part five concludes.

Without the help of monetary policy during the economic crisis, the real economy plunged into what can only be described as economic depression.

2. Theoretical overview

The main trust of the argument between rules and discretion is the philosophical position between positive and normative economics. Positive economics argues for rules and relies on market forces while normative economics calls for discretion. In terms of conduct of economic policy, rules are much easier and simpler to enforce. Fiscal and monetary policy either follows the rules or does not. The problem with discretion is that there are many shades of grey and the lingering question: how much of discretion is too much?
The economic legacy of high inflation in Croatia as described in Rohatinski et all. (1995) has created a strong argument in favour of rules-based economic policy. The stability of the exchange rate has been perceived as being paramount in controlling inflation and creating monetary stability. Monetary stability along with fiscal rules should provide enough economic stability for a small open economy in order to entice foreign direct investment and economic growth.
The discretion argument relies on the fact that Croatia is a small open economy and as such is open to a diverse set of economic shocks as described in Perišin (2006). Because of the inherent instability tied to a small open economy, fiscal policy should follow rules of low deficits, but monetary policy should use discretion in recognising economic shocks and then acting on those shocks in order to be a stabilising factor. In reality, the opposite has happened. After the anti-inflationary programme executed in 1994, the CNB has taken a stance that monetary policy should follow rules for exchange rate stability and has become a pillar of exact conduct of monetary policy under a firm rule. The fiscal policy has been left open to run a budget deficit as much as it is needed in order to obtain funds for spending. The lack of budget rules was especially clear during the economic crisis when the budget deficit went from 2.4% of GDP in 2007 to 7.8% of GDP in 2011.
This arrangement has created strong pro-cyclical policies (Zdunić and Radošević, 2018). During the economic boom, the central bank would increase the quantity of money and decrease interest rates, while fiscal policy would increase budget spending. On the other hand, during the recession, both fiscal and monetary policies would act extremely contractionary. Monetary policy would decrease the quantity of money, while

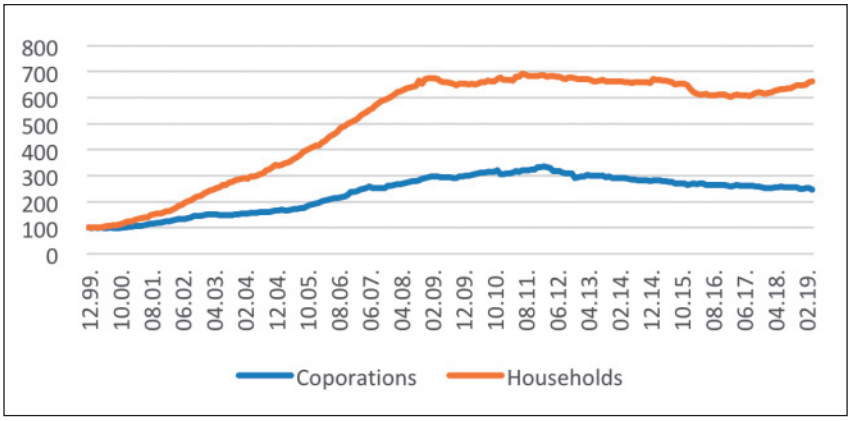
3 Taken from the CNB's web site https://www.hnb.hr/core-functions/monetary-policy/monetary-policy-framework

fiscal policy would increase taxes. For more on the procyclicality of economic policies in Croatia, see Gregurek and Vidaković (2009).
Viewed from a theoretical standpoint, in Croatia there is a firm commitment to rules in monetary policy and firm commitment to discretion in fiscal policy. However, both policies are suboptimal because they behave in a procyclical rather than in an anti-cyclical fashion. The procyclical behaviour of monetary policy will be clearly seen in the data overview in the next part of the paper.

3. Overview of the three periods

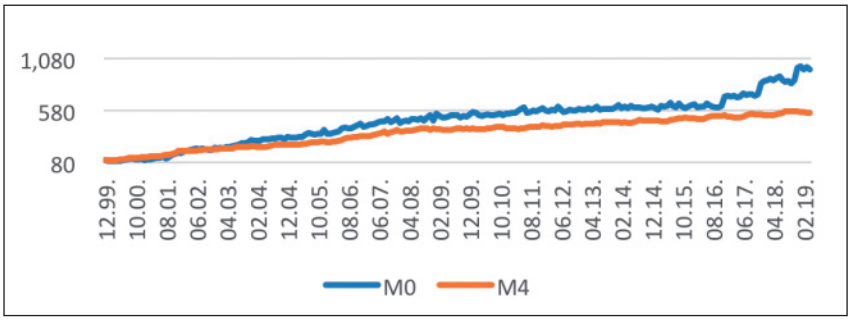
Since the focus of the paper is on the conduct of monetary policy, we are going to focus on monetary variables during the three periods as we have defined then in part one. The methodology used is as follows all variables are indexed as 100 at the end of 1999. So the value of the index is December 1999 = 100. The data we are going to look at are: loans to corporations, loans to households, foreign debt, inflation, real exchange rate, aggregates M0 and M4, nominal GDP[4].
As we can see from the graphs the patters of monetary data are clear. During the first period we have growth of all variables and appreciation of the real exchange rate. While credit growth to corporation can be explained by economic expansion, the increase in foreign debt and loans to households clearly indicate the creation of economic instability. Foreign debt increases over four times in just eight years. Credit and debt expansions are followed by a monetary expansion since there is a significant increase in monetary aggregates.
In this period, inflation is increasing as well, which is to be expected, but what is especially detrimental for the real economy is the real exchange appreciation of more than 15%.
While the monetary imbalances are deepening, the real economy is losing its competitiveness. This is the state referred to as financialisation or financial deepening/credit growth as described by Radošević and Cvijanović (2015).
The second period is the period of stagnation and economy's self-correction after a Minsky's moment as described in Minsky (1986). In that period, we see stagnation in lending and decrease in debt levels. Monetary aggregates are stable and so is foreign debt. This is the period of economy self-correcting which is followed by a significant decrease in both real and nominal economic activity. Post-crisis deleveraging of the debt overhang and credit crunch have been characteristic for this period in Croatia. The most important feature of this period was that central bank allowed the Croatian economy to slip into outright deflation. The idea behind such monetary policy was that there is also good deflation that will allow financial markets to automatically self-adjust real economy in a protracted period and make a new basis for sustainable recovery, although on a lower level of output and employment (see, Radosevic, 2014).
During the third stage we can see signs of economic recovery but in a low inflation environment. Monetary aggregates start to increase again, there is a limited credit expansion to households. The levels of loans to corporations are steadily decreasing which is an indication that the real economy has paid the price of self-correction. While loans to households have reached pre crisis levels, loans to

Graph 1: Lending activity in Croatia



Source: CNB and author's calculation

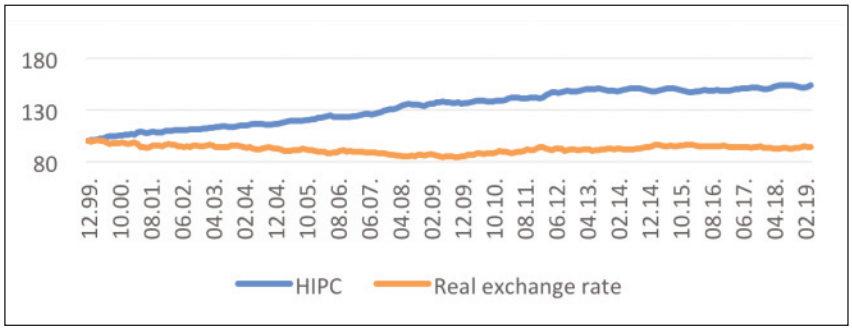
Graph 2: Monetary aggregates



Source: CNB and author's calculation

4 Due to small number of data points GDP is put into a table

Graph 3: Inflation and real exchange rate



Source: CNB and author's calculation

corporations are significantly below the pre-crisis levels. In this period the inflation has stabilized and the real exchange rate has also depreciated, but since the real economy shrunk corporations cannot benefit from the improvement in the real exchange rate. All this is understandably followed by a decrease in foreign debt since the cross-border EU banks have decreased their lending activity and the demand for loans has dropped precipitously. There is a slight increase in M4. As an important point the increase in M0 from 2017 onwards is not due to expansionary monetary policy but because Croatia has joined SEPA and the Croatian central bank has started to perform speculative REPO operations as it can be seen from the annual report of the central bank.

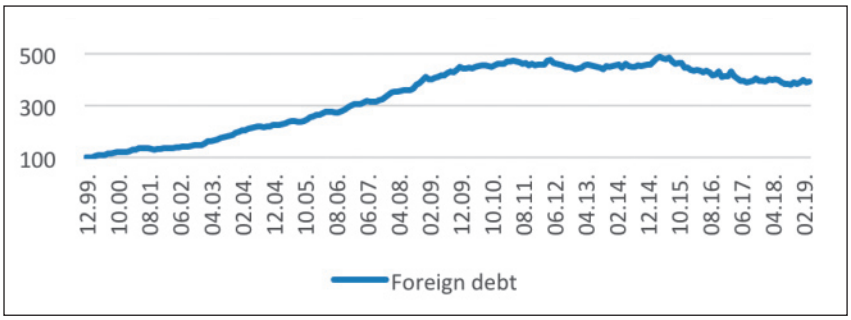
During the third state even the government finances have improved significantly and in 2017 and 2018 fiscal budget has a surplus.

From the data we can see that the economy has self-corrected without the help of active monetary policy. Just like the monetary imbalances have accumulated during the first period, they have readjusted during the second and third period with the real economy paying the price of the readjustment. From the data we can clearly conclude that in case of Croatia's monetary policy under rules will lead to economy self-adjusting over time. Economic imbalances accumulated over a period of time will decrease in the future. From the perspective of conduct of monetary policy passive, rule following monetary policy will in the long run be optimal for the economy.

In the case of Croatia monetary policy under rules has been and still is procyclical, instead counter - cyclical, that resulted with secular stagnation and suboptimal GDP growth and employment. Economic imbalances accumulated over a period of time will lay the foundation for the new crisis in the near future, in particular, in case of external shocks (Hard Brexit, Italian banking crisis, recession in Germany, etc.). From the perspective of conduct of monetary policy in the medium term, we think that Croatia needs a new monetary policy framework, protracted gradualist convergence to ERM II and a dual mandate of the central bank (optimal inflation and full employment, as policy goals) thus removing all the operational problems as mentioned in Vidaković (2016.

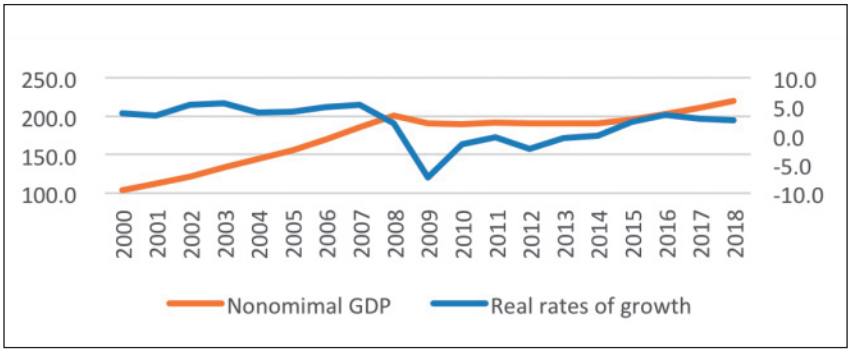
It is important to note that from the data it is clear that the CNB has led a consolidation policy through internal devaluation. This policy was not necessarily a policy choice as much as it was a choice by default, because central bank opted for "systemic deflationary bias". Once central bank embraces the rules it has to remain passive both during good and bad times by conducting the rules-based monetary policy.

Graph 4: Foreign debt



Source: CNB and author's calculation

Graph 5: Nominal GDP and real rates of growth



Source: Croatian Bureau of Statistics and author's calculation

4. Implications for the next crisis

The policy of internal devaluation has indeed led to monetary variables readjusting over time and moving back towards the equilibrium. In case of the real variables that is not the case. We have seen what effect the crisis has had on the real GDP. We have similar negative effects in employment. From 2008 to 2014 more than 130 thousand jobs were lost[5]. Without the help of monetary policy during the economic crisis, the real economy plunged into what can only be described as economic depression.

This behaviour of the CNB during periods of creation of economic imbalances and during the periods of readjustments of the economy is exceptionally important in case of a future crisis and Croatian process of adopting the euro. Once Croatia joins the ERM II mechanism and then the EMU, the possibility for discretion will be nil.

The ERM II mechanism in general is nothing more than rules-based monetary policy in its perfect form. It is deflationary fiscal – monetary policy mix with ultimate goal to achieve nominal convergence, but it will hurt real convergence. The period of crisis 2008 - 2015 can be viewed as a real-world case what will central bank do if there is another recession while Croatia is in the ERM II mechanism. We also have an example of what will be the effects of such policies on the real economy. What is more important is that the ECB follows policy that can be described as "rules, but not all the time" which can clearly be seen in Draghi's famous phrase "whatever it takes"[6]. This is not the case of the CNB which has policy "rules, no matter the cost" as it was pointed out multiple time during the crisis by the CNB's governor as stated in Rohatinski (2007, 2009a, 2009b)

5 Persons in paid employment at legal entities. Data from the Croatian Bureau of Statistics.

6 For more on the monetary policy of the ECB, see Radošević (2018).

5. Conclusion

This policy paper presents a short overview of the monetary policy in Croatia during three distinct economic periods. The CNB has a rule-based monetary policy from 1994. During the economic boom, such policy would lead to a surge in macroeconomic imbalances. During recession, such monetary policy would leave the economy to self-adjust and eliminate accumulated imbalances. This process of readjustment has led to a period of economic depression (debt-deflation crisis) in Croatia with severe costs for the real economy.

Relying on monetary policy rules regardless of the cost as monetary policymakers did during the previous financial and economic crisis could be seen as a blueprint for the misbehaviour of monetary policy during the next economic crisis. As shown by economic theory in Kocherlakota (2016), such behaviour of monetary policy is suboptimal and it leads to economic readjustment at the severe cost to the real economy.

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Spillover effects of non-standard monetary policy measures and of future monetary policy normalisation on Serbia

*Ivan Nikolić**

Unconventional monetary policy in the EU and other advanced economies has had no negative impact on Serbia so far. With respect to its inevitable consequences, especially on interest rates, it is assessed that the key risks in the period ahead will emanate from the international environment and, as such, may affect the monetary policy stance. These risks far outweigh the expected monetary normalisation. Hence, as so far, monetary policy will be predictable and consistent in delivering low and stable inflation in the medium run, which will, along with the preservation of financial stability, contribute to sustainable economic growth and strengthening of resilience to external uncertainties.
Over the past years, the country has fully transformed its economy for the better. Foreign investors have shown huge interest there. We point out the important development potential in the medium run and the unique opportunities resulting from Serbia's accession to the EU, issues strongly dependent on the acceleration of the structural reforms.

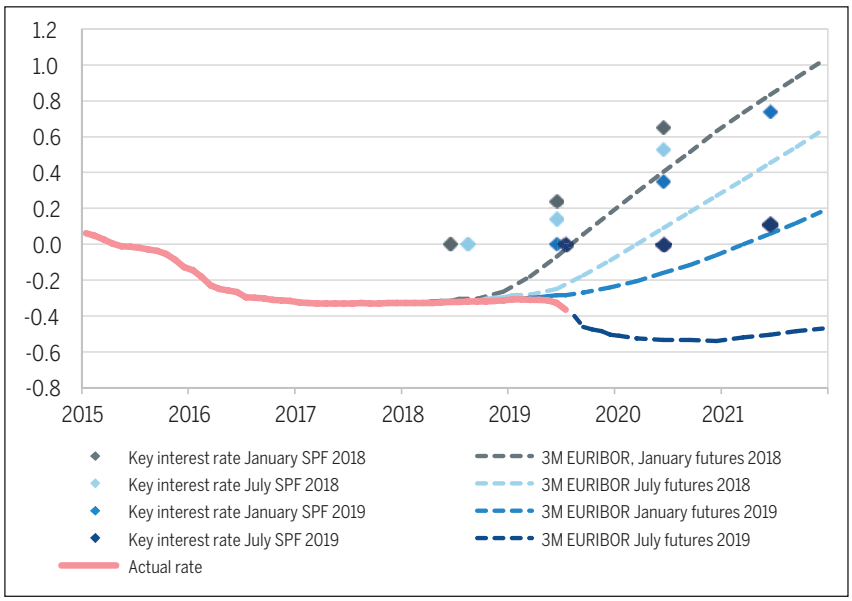
JEL E32 E52 E58

1. Introduction

After a long period of applying unconventional monetary policy tools such as direct loans to banks, quantitative easing, forward guidance and negative policy rates, major central banks embarked on the process of policy normalisation in the middle of this decade. First of all, the U.S. Federal Reserve ended its asset purchase programme in 2014, then increased its key rates in December 2015 and embarked on the plan to shrink its balance sheet in 2017. The benchmark rate was raised three more times in 2017 to 1.25-1.50% and normalisation continued into 2018 when the rate was raised on four more occasions to 2.25 -2.50% at the end of 2018. However, due to weaker global growth prospects this process is interrupted. At the very beginning of 2019, the FED emphasised that its monetary policy would be more flexible in the coming period and did not indicate which direction it expected the policy rate to take. The final U-turn happened at the end of July 2019 when the FED has cut interest rates for the first time in more than a decade and signalled its readiness to provide more support as growth slows in the world's largest economy. The US Federal Reserve has cut interest rates by a quarter of a percentage point for the first time in more than a decade and signalled its readiness to provide more support as growth slows in the world's largest economy.

* Ivan Nikolić, member of Council of the Governor of National Bank of Serbia and director of the Economics Institute of Belgrade; text peer-reviewed by Professor Jurij Bajec, Economics Faculty - University of Belgrade.

Figure 1. Expected ECB key interest rate* and futures for three-month EURIBOR (p.a., in %)



Source: ECB, Bloomberg and NBS

The aforementioned policy has been followed by the ECB, it seems, in a slightly milder variant. Firstly, in April 2017, the ECB began to gradually reduced the pace of its asset purchases, but the first indication of monetary policy normalisation appeared in June 2018 after an additional decrease the pace of its asset purchases to EUR 15 billion per month beginning from October and announcement that the asset purchase programme would be closed by the end of 2018 after running for almost four years. However, things got complicated in the early 2019. Economic activity in the euro area and EU28 slows down. For example, during the second quarter of 2019, GDP in the EU28 increased by 0.2 % compared with the previous quarter (after +0.5% in the first quarter of 2019). Slowdowns and recessionary pressures are more pronounced in the largest countries – decreases were observed in the UK (-0.2%), Germany and Sweden (both -0.1%), while Italy stagnates (which is a good result, as activity has been declining for two consecutive quarters on an annual basis, see EUROSTAT). At the beginning of September 2019, the eurozone's biggest economy, Germany, is widely thought to be on the brink of recession.

Consequently, the ECB estimated that interest rates (the interest rate on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility are 0.00%, 0.25% and -0.40%, respectively) will remain at their present or lower levels at least through the first half of 2020, and in any case for as long as necessary to ensure the continued sustained convergence of inflation to its aim over the medium term. Furthermore, the ECB also underlined the need for a highly accommodative stance of monetary policy for a prolonged period of time, as inflation rates, both realised and projected, have been persistently below levels that are in line with its aim.

Practically on the day this text was submitted (mid-September) The ECB has unveiled fresh stimulus measures to bolster the eurozone, including cutting the key interest rate. The deposit facility rate, paid by banks on reserves parked at the ECB will be cut from minus 0.4% to minus 0.5%. The ECB also said it was re-starting quantitative easing. It will buy 20bn of debt a month from 1 November.

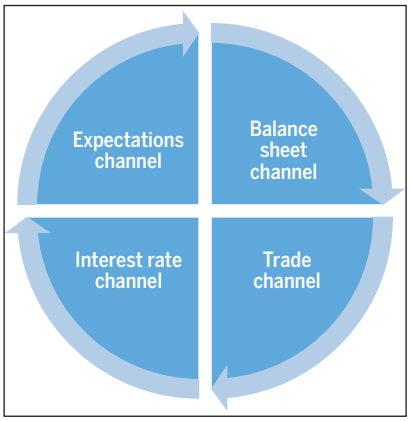
2. Ongoing Challenges and Future Prospects

One of the most significant questions for monetary policy makers in small open economies, including the National Bank of Serbia, is the question of the nature and magnitude of potential effects of leading banks' policy normalisation on their economies. Overall, these effect can work their way primarily through the channel given in the figure 2.

(a) Expectations channel - monetary policy normalisation of leading central banks may induce investors to expect that yields in developed countries will increase, leading to higher expected yields in emerging markets and/or capital outflow from emerging markets;

(b) Balance sheet channel - asset purchases by central banks pushed liquidity levels up, resulting in higher portfolio investment in emerging markets. On the other hand, the shrinking of central banks' balance sheets might reverse capital flows;

Figure 2. The key channels of effecting leading bank normalisation on the Serbian economy



Source: Author's creations

(c) Interest rate channel - policy rate increases in the euro area money market would push up the cost of new corporate and household borrowing in euros, lifting also the costs of the repayment of existing euro and euro-indexed loans;
(d) Trade channel - economic growth of developed countries, which is a precondition for monetary policy normalisation, has a positive impact on emerging markets' exports.

The magnitude of the potential effect through these channels will depend primarily on the pace of monetary policy normalisation of leading central banks and on the extend of its consistency with market expectations. However, by all indicators, it will be slower than initially expected in the case of both the FED and the ECB considering the global economic growth deceleration.

Given Serbia's strong economic and financial linkages with the euro area (the EU Member States account for around two-thirds of external trade; the first two major export destinations are Germany and Italy (see: Nikolic, et al. 2016), with the total export share of 13% and 11%, respectively in the first six mouths of 2019), with over 60% of FDI inflows to Serbia originating from these countries, it is inevitable that macroeconomic developments in the euro area have a significant impact on the economic and credit activity in Serbia.

The results of the analysis carried out at the National Bank of Serbia in 2019 show that the movements of the cyclical component of Serbia's and euro area's economic activity significantly overlap, as measured by the real GDP in the period from 2004 until Q1 2019. The value of the index which measures the degree of synchronisation of cycles in Serbia and the euro area at 0.52 shows that Serbia and the euro area's economic cycle phases were in a synchronized regime for more than half of the quarters in the period observed (see NBS - Inflation report, may 2019, p. 28-30).

The synchronised cyclical dynamics of the economic activity in Serbia and the euro area becomes even more pronounced if gross value added is used as a measure of economic activity (the synchronisation index for the period observed is 0,62; see *ibidem*). That way eliminates the impact of agriculture, as a sector most vulnerable to seasonal factors and weather conditions.

It makes it difficult to analyse much of it part of domestic economic policy, primarily relatively massive subsidised lending programmes and the NBS's monetary policy easing. It is just a credit activity entered into the expansion phase soon after the subsidised lending programmes, but as of May 2013, credit activity was additionally encouraged by the NBS's monetary policy easing, which led to a fall in interest rates on dinar-denominated loans.

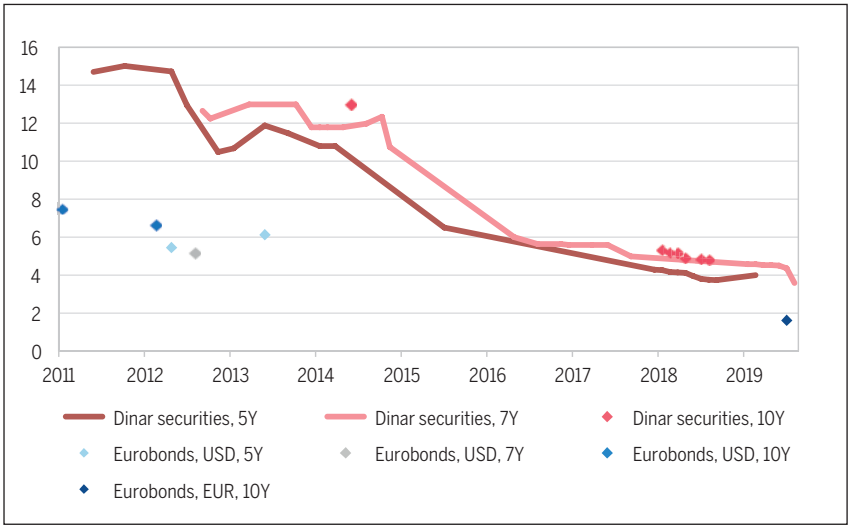
In addition, low interest rates in the euro area, together with the low country risk premium, further boosted credit activity in Serbia, in expansion since the beginning of 2018.

In this regard, there is no dilemma that the ECB announced slower montary policy normalisation, the expected prolongation of the period of lox interest rates in the euro area shoul continue to positively impact credit activity in Serbia.

The effects of monetary policy normalisation of leading banks on emerging markets largely depend on the specific characteristics of individual economies, too. In case of Serbia, the negative impact of global factors has been broadly offset by considerable improvement of macroeconomic indicators and increased resilience of the domestic economy to potential shocks from the international environment.

It should be emphasised that growth in Serbia is today more balanced and that domestic factors are a much stronger driver of growth, while export potential has strengthened further through increasingly higher investment in tradeable sectors. Fiscal discipline has taken root, with the general government budget recording a surplus for three consecutive years – both on the back of strict control of current

Figure 3. Interest rates in the primary market of dinar government securities and eurobonds (p.a., in %)



Source: Ministry of Finance, Republic of Serbia

expenditure and economic growth and strong tax revenue generation. Public debt falling by about 15 percent of GDP since the beginning of 2017.

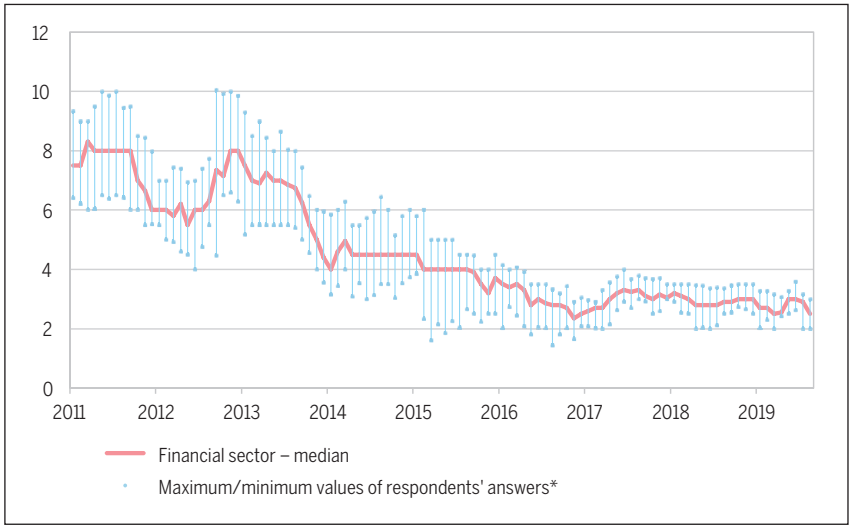
Stronger resilience of the domestic economy primarily stems from the reduced internal and external imbalances – net FDI flows more than fully covering the BOP current account deficit in last four years, which, by the way, has been lowered since 2013 to close to 5% of GDP. Inflation expectations anchored within the target tolerance band, stable and robust financial sector and an adequate level of FX reserves. The government's needs for external financing have been significantly reduced. Diversifying exports by product and market, Serbia has also decreased its exposure to disruptions in certain segments of external demand in the last couple of years. Inflation expectations of the financial and corporate sectors anchored within the target tolerance band suggest monetary policy credibility. This is particularly important in view of the IMF's analysis which suggests that anchored inflation expectations limit the pass-through effect of the potential depreciation of the national currency on the domestic prices and provide more leeway to the monetary policy of emerging markets for mitigation of potential negative effects of monetary policy normalisation of developed countries.

The reduction of the non-performing loans (NPLs) to record low level (5.2% in June 2019, which is a reduction of 17.2 pp from July 2015), high capital adequacy ratios (despite the decreased regulatory minimum by the introduction of Basel III standards) and greater availability of domestic sources of funding at lower cost in conditions of sustainable economic growth have considerably strengthened the resilience of the domestic banking sector to potential shocks from the international environment. That the domestic banking sector is resilient to shocks from the domestic and international environment despite the numerous challenges it faced during and after the crisis is confirmed by the macroprudential stress-tests conducted by the National Bank of Serbia on a regular basis.

In the period ahead, the NBS will also carefully watch and analyse the decisions of central banks of developed countries and assess their potential effects on Serbia, while simultaneously continuing to boost the resilience of the financial sector and the economy to external uncertainties through its monetary, macroprudential and micropurudential policy.

Unlike volatile monetary policy of major central banks and its apparently limited negative effects Serbia, like other small-open economies, remains vulnerable to spillovers from external developments, including weaker-than-expected growth in key trading partners. At the moment, external demand conditions and terms of trade seem to be more important for Serbia's economic growth than external financial conditions.

Figure 4. One-year ahead inflation expectations of the financial sector (y-o-y rates, in %)



Source: Bloomberg; NBS

3. Conclusion

A non-standard monetary policy measures has been going on for too long. They proved their worth during the crisis but accumulated risks of uncertainty, at the same time (Neri and Siviero, 2019). We cannot know what lies in store for monetary policy once non-standard measures have been cut back. But now it doesn't seem to matter... Apparently these measures have become the "new normal", and therefore, they should remain in the monetary policy toolbox and be applied under normal conditions as well. This condition should be accepted (Weidmann, 2019). The fact is that unconventional monetary policy in EU and other advanced economies had no negative impact on Serbia so far. With respect to inevitable consequences, especially on interest rates, it is assessed that the key risks in the period ahead will emanate from the international environment and, as such, may affect the monetary policy stance. These risks far outweigh the expected monetary normalisation. Hence, as so far, monetary policy will be predictable and consistent in delivering low and stable inflation in

the medium run, which will, along with the preservation of financial stability, contribute to sustainable economic growth and strengthening of resilience to external uncertainties.

Over the past years, the country has fully transformed its economy for the better. Foreign investors have shown huge interest there. We point out the important development potential in the medium run and the unique opportunities resulting from future entry in EU, issues strongly dependent on the acceleration of the structural reforms.

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UDK 336.02:336.7(520)

The Impact of the Bank of Japan's Low and Negative Interest Rate Policy on Financial Institutions

*Tomohiko Takahashi**

The Bank of Japan (BOJ) introduced its zero-interest rate policy in 1999. Since then, our policy rate has been under 0.5%. In 2013, we have Quantity and Quality Easing (QQE). Since 2016, some of interest rate of excess reserve has been negative, and the Bank of Japan controlled yield curve too. The bank of Japan call, "QQE with Yield Curve Control". Under this circumstance, the thesis mentioned how Japanese financial institutions survived and how its profitability changed especially after QQE policy.

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The Bank of Japan (BoJ) introduced its zero-interest rate policy in 1999. Since then, the policy rate has been under 0.5%. In 2013, the BoJ made a step further by adopting the policy of quantitative and qualitative easing (QQE). Since 2016, some of the interest rates of the excess reserve have been negative and the BoJ has controlled the yield curve as well. The BoJ called this 'QQE with Yield Curve Control'. Against this background, this study discusses how Japanese financial institutions have survived and how their profitability has changed, especially after the introduction of the QQE policy. Using the data envelopment analysis (DEA), the study empirically proves that regional financial institutions are inefficient and that they must be restructured.

1 Background: Deregulation and Financial Turmoil after the Bubble

Japan experienced its 'bubble economy' in the late 1980s. After the bubble burst in the early 1990s, asset prices decreased slightly and the BoJ eased its monetary policy. Banks had to cope with non-performing loans but they could not decrease their capital because the Basel Committee's Capital Accord – Basel I – was already in effect. Therefore, Japanese banks had to increase and diversify their income sources.

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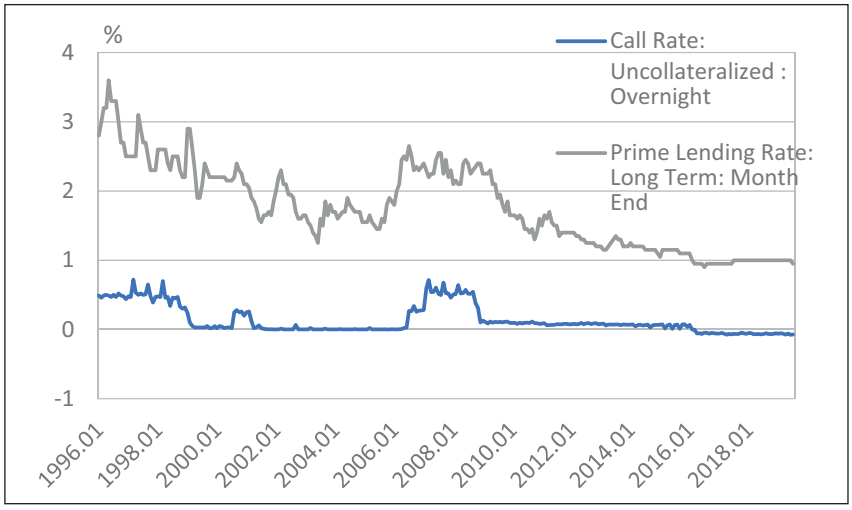
Figure 1: Interest Rate



Source: CDM NEXT

In 1997, by scrapping a range of financial regulations, the Hashimoto administration launched the 'Japanese Financial Big Bang'. Financial institutions could realize economies of scope. Starting in 1998, banks were allowed to sell securities and investment trust and manage asset-backed securities (ABS) through a special purpose company. By 2001, banks were also allowed to sell insurance products such as life insurance and fire insurance policies. Thus financial authorities helped banks to diversify their sources of income, which proved useful over the next ten years.

However, after the rise in consumption tax in 1997, the Japanese economy slipped into a deep recession. Three big banks went bankrupt within two years. The BoJ introduced its zero-interest rate policy in 1999. At that time, the long-term prime rate was over 2% and financial authorities helped to increase banks' profits to equip them to better handle the problem of non-performing loans.

In 2002, the Koizumi administration launched the Financial Revitalization Program, which encouraged money centre banks (major banks) to decrease their proportion of non-performing, or delinquent loans. The Japanese government encouraged major banks to merge and injected public money into Resona Bank which was the fifth largest bank in Japan in terms of asset size. Major banks reconstructed their loans and NPL ratios decreased dramatically. The number of big financial institutions decreased dramatically too as seen below in Figure 2.

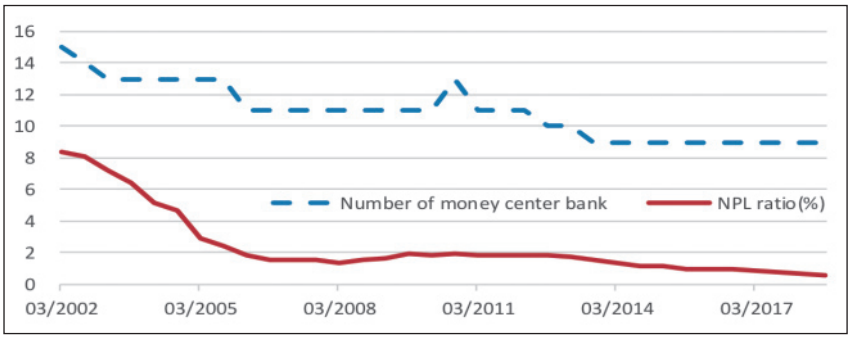
The program also encouraged "relationship banking" for regional banks and credit unions. Small banks covered the deficits in lending to some degree. Relationship banking focuses on SMEs in particular. At first, the government wanted small banks to decrease the NPL ratio too, but doing so could have resulted in a credit crunch. In 2003, Ashikaga Bank, a regional bank was nationalised. Moreover, public funds were injected into the bank and in doing so, the government hoped small banks would realize the importance of relation banking.

Through these actions the evolution of regional banks was delayed compared to that of major banks. There are two types of regional banks. The first is the standard type of a regional bank; the number of standard regional banks has remained constant at 64 for more than two decades although city banks decreased seriously. They did not change dramatically. Regional banks have a deep connection with the local government.

The second type consists of regional banks Ⅱ, which are banks that are members of another association of regional banks; most are mutual savings banks. Regional banks Ⅱ sometimes underwent bankruptcies and their numbers have decreased.

In relationship banking, both types of regional banks were expected to strengthen the ability to consult with SMEs. The FSA expected a contribution to the local area as well. The structure of small banks made it simple to pool information from individual companies and cultivate strong and long-lasting relationships. Regional banks were expected to consult with SMEs and undertake business matching as well as revival of zombie companies.

Figure 2 Number of major banks and NPL ratio



Source: FSA, major bank means city banks, long term credit banks and trust banks

Table 1 Lending of Financial Institution (Trillion Yen)

	Total	YoY	Money Center Bank	YoY	Regional Bank	YoY	Credit Union	YoY
2001	512.2	▲ 4.0	270.2	▲ 4.9	176.9	▲ 2.5	65.1	▲ 4.3
2002	488.7	▲ 4.6	251.2	▲ 7.1	174.7	▲ 1.2	62.9	▲ 3.4
2003	467.1	▲ 4.4	231.7	▲ 7.7	173.3	▲ 0.8	62.0	▲ 1.4
2004	450.3	▲ 3.6	216.8	▲ 6.5	171.9	▲ 0.8	61.6	▲ 0.7
2005	441.9	▲ 1.9	207.1	▲ 4.4	173.2	0.8	61.5	▲ 0.1
2006	446.9	1.1	207.0	▲ 0.1	177.8	2.6	62.1	0.9
2007	450.2	0.8	206.2	▲ 0.4	181.7	2.2	62.3	0.4
2008	458.0	1.7	208.0	0.9	187.4	3.1	62.6	0.5
2009	467.7	2.1	210.8	1.3	193.4	3.2	63.5	1.4
2010	459.0	▲ 1.8	202.5	▲ 3.9	193.8	0.2	62.7	▲ 1.2
2011	455.7	▲ 0.7	196.8	▲ 2.8	196.6	1.4	62.3	▲ 0.7
2012	458.8	0.7	195.7	▲ 0.5	201.1	2.3	61.9	▲ 0.7
2013	467.2	1.8	198.8	1.6	206.6	2.7	61.9	▲ 0.0
2014	477.8	2.3	201.6	1.4	213.6	3.4	62.6	1.2
2015	489.7	2.5	204.3	1.3	221.6	3.7	63.9	2.0
2016	500.6	2.2	206.2	0.9	229.1	3.4	65.3	2.3
2017	515.2	2.9	211.0	2.3	237.2	3.5	67.1	2.7
2018	526.3	2.1	212.5	0.7	245.2	3.4	68.6	2.3

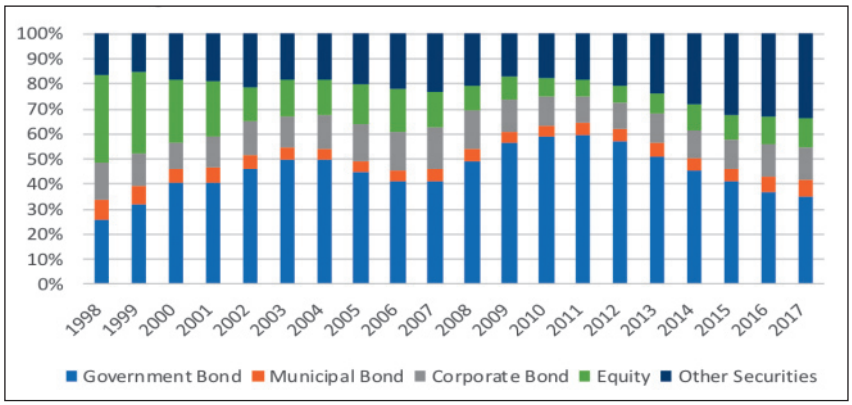
Source: BOJ

During the process of city banks merging and forming megabanks, there was a decrease in non-performing loans. Following the mergers, the megabanks acquired international financial institutions. They succeeded in diversifying their profit resources to some degree.

After the shock of the fall of Lehman Brothers, the BoJ eased policy rate to 0.1%. Moreover, there was a slump of lending demand until 2012, and long-term interest rates were still low. An elevated level of interest income was unlikely as both loan volume and interest rates were level. Japanese banks hold substantial levels of Japanese Government Bond (JGB) as seen below in Figure 3.

Mr. Kuroda, the new governor of BoJ, initiated QQE in 2013. The BoJ set the price stability target at 0.2%. It purchased a significant amount of JGBs to increase the monetary base; it also bought ETFs and REITs. However, commercial banks could not buy many JGBs and municipal bonds. In 2019, FSA stated that about 40% of JGBs and municipal bonds possessed by regional banks would be redeemed within the next three years.

Figure 3 All Banks Securities held breakdown



Source: Japanese Bank Association

Under the low, long interest rate and the slump in demand for borrowing, banks have to strengthen international operations and buy high-risk securities. Regional banks had to ease excess competition and diversify their profit resources. Therefore, the FSA plans to reconstruct the network of regional banks, as big banks and credit unions have already merged, but regional banks have not. The FSA injected public funding into more than ten regional banks ll when the Lehman shock occurred and the Great East Japan Earthquake occurred. They have a connection with both politicians and senior bureaucracy. Many of their senior management were former senior government officials; as a result, they enjoy political clout.

At the beginning of 2016, BoJ introduced QQE with a negative interest rate. Banks had a substantial excess reserve under the QQE policy, and the BoJ had to adopt a limited negative

rate policy. The negative interest rate was applied only to the outstanding balance of each financial institution's current account, not to the balance of the existing account. A negative interest rate of ▲0.1% was applied to some of the excess reserve.

The JGB rate came turned a negative even on 10-year bonds, but the stock price was almost the same and the foreign exchange rate strengthened.

Under QQE, financial institutions changed their lending rate to a floating rate and the negative rate decreased their margin of lending.

The FSA expected three mega-banks to incur losses amounting to approximately 300 billion yen in FY2016.

In September, the BoJ initiated "QQE with Yield Curve Control", through which it gained control over short - term and long-term interest rates during the decline in real interest rate. The BoJ stated that its utilization of negative interest rates, purchases of JGBs, and the application of new tools such as fixed-rate purchase operations, were effective to control yield curve.

Under these circumstances, Japanese Bank can't expect income revenue so much, so fees and commissions are important. After deregulation, bank's fees and commissions had grown steadily right until the Lehman shock, generating revenues of approximately 3 trillion yen. It became the second most important revenue pillar after interest income. However, the income from fees and commissions decreased after the global financial crisis; despite this, it surpassed 3 trillion yen after 2013.

The breakdown of its income is different between the major banks and the regional banks.

Sales of investment trusts and funds transfer services are the two main pillars of regional banks.

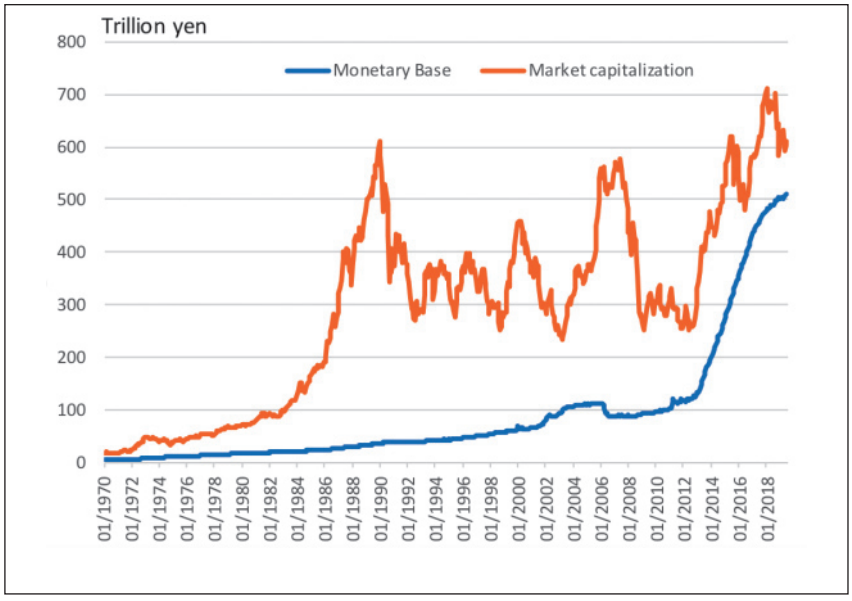
For major banks, funds transfer services and investment banking and sales of investment trusts are major contents of fee business.

The below figure shows the effect of QQE policy in terms of the dramatic increase in monetary base, the increase in stock prices and growth in the sales of investment trusts.

Japanese banks have many employees and branches, therefore they have to operate efficiently to earn interest income and fees and commissions. The population in Japan is decreasing and the aging society primary resides in the local area. Regarding increasing fees and commissions, the FSA emphasised fiduciary duty. Many customers had made a loss on their investments, as financially literacy was inadequate, especially in the older population. Therefore, the fee earned through investment trust was not a very reliable revenue source.

Next, we explore the empirical study.

Figure 4 Monetary Base & Equity



Source: CDM NEXT

2. Method and Data

We use data envelopment analysis (DEA[1]) to show several outputs when calculating efficiency. Typically, there are two approaches to determining efficiency, One is the Stochastic Frontier Analysis (SFA) and the other is DEA. We opted to use DEA as we consider two outputs.

Moreover, there are several approaches to thinking about the bank's product. The most popular approaches are the production approach and an intermediate approach. We use the production approach in this study.

We adopt two inputs; the number of employee and branches.

There are various types of DEA, variable return to scale (VRS) is adopted, because this thesis compares banks of different sizes. The Constant Return to Scale (CRS) model is too strict for small banks. Additionally, we use the input-oriented model.

Output variables are profit variables. One is interest income and the other is fees and commissions. We use two inputs and two outputs.[2] We compare

1 If you want to know DEA in detail, there are many books about DEA. For example see Cooper, Seiford, Tone(2000).

2 We can describe easily, when
input = $w_1 x_1^k + w_2 x_2^k$
output = $u_1 y_1^k + u_2 y_2^k$
Max $(u_1 y_1^k + u_2 y_2^k) / (w_1 x_1^k + w_2 x_2^k)$
Subject to $(u_1 y_1^k + u_2 y_2^k) / (w_1 x_1^k + w_2 x_2^k) \leqq 1$
Optimal weight, u_1, u_2 or w_1, w_2 would be determined

110 banks including 5 city banks and 64 regional banks and 41 regional banks II. Data is parent data and fiscal year 2014-2017.

When we consider input matrix X(m×n), output matrix Y(s×n)

$$\text{Min } w_i^T x_i \quad (1)$$
$$\text{sub to } x_i - X\lambda \geqq 0 \quad (2)$$
$$y_i - Y\lambda \leqq 0 \quad (3)$$
$$e\lambda 0 = 1 \quad (4)$$
$$\lambda \geqq 0 \quad (5)$$

x_i; m dimensional input vector
y_i; s dimensional output vector
e; n n dimensional row vector which all factors are 1
λ; n dimensional non-negative vector

We used DEAP Version 2.1 developed by the University of New England to calculate efficiency scores.

3. Empirical Result

Empirical results suggest that city banks are efficient relatively and regional banks & regional banks II are relatively inefficient.
They have many branches, automated teller machines (ATMs) and employees in local areas. However, their effort to make improvements has been not sufficient, so the FSA focuses on regional banks now.
Six banks were efficient in the study period. Their scores were 1.00 through the years.
Three megabanks, MUFG Bank (formerly, the Bank of Tokyo-Mitsubishi UFJ) and Mizuho Bank and Sumitomo Mitsui Banking Corporation (SMBC) are efficient. All are among G-SIFIs (Global Systematically Important Financial Institutions). The megabanks have operations in foreign countries and have also succeeded in M&A and project financing.
They were able to expand their fee business in trust and many area in the internal market.

Table 2: DEA VRS Average Result

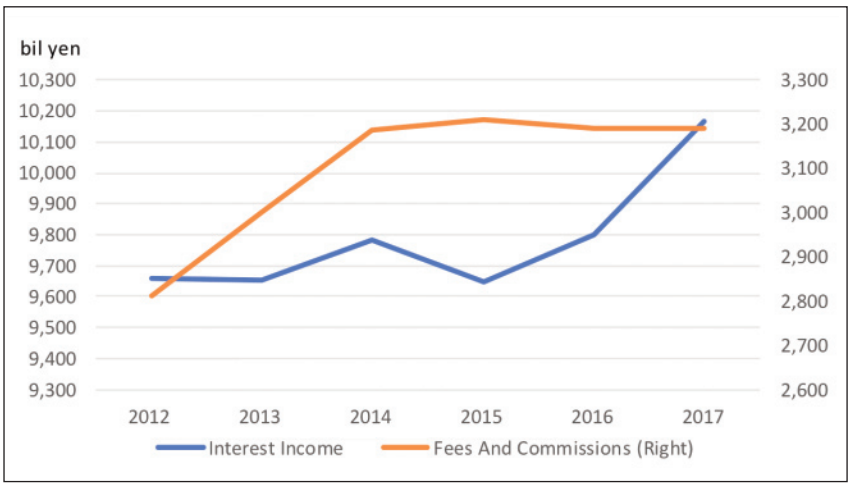
	2013	2014	2015	2016	2017	Average
City banks	0.861	0.866	0.865	0.854	0.875	0.864
Regional banks	0.454	0.450	0.443	0.399	0.483	0.446
Regional banks II	0.467	0.450	0.428	0.391	0.541	0.455

The Bank of Nagasaki (Regional banks II) is also efficient. This bank belongs to Nishi-Nippon Financial Holdings, which is very stable.
The Tokyo Star Bank (Regional banks II) is also efficient. This bank introduced foreign ownership (CTBC group).
Suruga Bank (Regional bank) is efficient. This bank is very aggressive with housing loans.
However, Suruga Bank was involved in a housing loan scandal in early 2018, when it emerged that it provided excessive loans. It was shocking because Suruga Bank was one of the most profitable leaders among the regional banks. Authorities forbade Suruga Bank from issuing any new property loans for six months.
Another bank, The Taisho Bank was efficient in 2013. Moreover it marked a high score after, the bank is in the second city, Osaka, and has an alliance with Tomoni Holdings which has two regional banks II (Tokushima Bank, Kagawa Bank).

4. Conclusion

In Japan, the interest rate has been low and the spread between long and short interest rates has been tight. Therefore, banks cannot expect their interest income to increase much.
Regional banks, including regional banks II, are inefficient. In terms of fees and commissions because they are not competitive. In addition, non-financial institutions have started offering financial service in the FinTech sector, especially cashless settlement. The cashless payment ratio in Japan was around 20% in 2018. The aim of the Ministry of Economy, Trade and Industry (METI) is to raise this ratio to more than 40% by 2025.
Regional banks must therefore raise various fees. They established securities subsidiaries to strengthen their asset business and strengthen their consulting ability through SMEs. They should also strengthen their business matching abilities. They should also raise various types of deposit and loan fees.

Figure 5 All banks income in recent years



Source: Japanese Bankers Association

Should these measures prove insufficient, they will have to merge and establish more alliance. For example, the alliance of the conventional system and common ATMs was brought about by FinTech. Regional banks should exploit AI and robotic process automation (RPA) more frequently. Foreign ownership is another solution. Almost all regional banks are listed companies and their PBR is low. Japanese authorities have started to help encourage alliances and mergers. They have eased antitrust policies in rural areas and plan to decrease the deposit reserve ratios for merged banks shortly.

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Appendix ALL Results

	2013	2014	2015	2016	2017
Mizuho Bank	1.000	1.000	1.000	1.000	1.000
Bank of Tokyo-Mitsubishi UFJ	1.000	1.000	1.000	1.000	1.000
Sumitomo Mitsui Banking Corporation	1.000	1.000	1.000	1.000	1.000
Resona Bank	0.583	0.626	0.652	0.632	0.683
Saitama Resona Bank	0.721	0.705	0.672	0.636	0.691
All City Banks	0.861	0.866	0.865	0.854	0.875

	2013	2014	2015	2016	2017
North Pacific Bank	0.651	0.419	0.450	0.430	0.469
Kirayaka Bank	0.408	0.380	0.354	0.298	0.424
Kita-Nippon Bank	0.393	0.381	0.365	0.311	0.458
Sendai Bank	0.392	0.387	0.393	0.368	0.514
Fukushima Bank	0.497	0.525	0.431	0.359	0.596
Daito Bank	0.406	0.416	0.401	0.367	0.661
Towa Bank	0.394	0.373	0.338	0.304	0.389
Tochigi Bank	0.363	0.376	0.386	0.343	0.383
Keiyo Bank	0.515	0.476	0.439	0.381	0.441
Higashi-Nippon Bank	0.423	0.412	0.392	0.355	0.459
Tokyo Star Bank	1.000	1.000	1.000	1.000	1.000
Kanagawa Bank	0.540	0.578	0.588	0.497	0.733
Taiko Bank	0.374	0.355	0.333	0.322	0.462
Nagano Bank	0.495	0.488	0.424	0.354	0.540
First Bank of Toyama	0.532	0.536	0.509	0.444	0.556
Fukuho Bank	0.375	0.339	0.328	0.277	0.621
Shizuoka Chuo Bank	0.487	0.482	0.488	0.481	0.671
Aichi Bank	0.358	0.335	0.328	0.301	0.376
Bank of Nagoya	0.334	0.320	0.319	0.290	0.368
Chukyo Bank	0.366	0.354	0.350	0.308	0.417
Daisan Bank	0.330	0.331	0.336	0.305	0.392
Kansai Urban Banking Corporation	0.485	0.451	0.411	0.354	0.387
Taisho Bank	1.000	0.997	0.900	0.812	0.921
Minato Bank	0.334	0.332	0.326	0.284	0.358
Shimane Bank	0.432	0.421	0.387	0.330	0.684
Tomato Bank	0.369	0.374	0.355	0.319	0.482
Momiji Bank	0.399	0.385	0.374	0.404	0.541
Saikyo Bank	0.555	0.543	0.466	0.457	0.597
Tokushima Bank	0.429	0.398	0.376	0.355	0.492
Kagawa Bank	0.455	0.419	0.390	0.359	0.463
Ehime Bank	0.418	0.420	0.386	0.346	0.458
Bank of Kochi	0.331	0.315	0.297	0.266	0.440
Fukuoka Chuo Bank	0.424	0.394	0.360	0.324	0.621
Saga Kyoei Bank	0.389	0.351	0.307	0.346	0.763
Bank of Nagasaki	1.000	1.000	1.000	1.000	1.000
Kumamoto Bank	0.379	0.366	0.377	0.344	0.492
Howa Bank	0.499	0.482	0.431	0.360	0.607
Miyazaki Taiyo Bank	0.372	0.377	0.350	0.323	0.516
Minami-Nippon Bank	0.504	0.485	0.464	0.398	0.541
Okinawa Kaiho Bank	0.396	0.349	0.329	0.280	0.510
Yachiyo Bank	0.327	0.318	0.303	0.278	0.393
All Regional Banks II	0.467	0.450	0.428	0.391	0.541

	2013	2014	2015	2016	2017
Hokkaido Bank	0.460	0.480	0.494	0.436	0.458
Aomori Bank	0.403	0.395	0.394	0.363	0.438
Michinoku Bank	0.435	0.425	0.410	0.357	0.439
Akita Bank	0.402	0.392	0.389	0.362	0.426
Hokuto Bank	0.379	0.395	0.405	0.332	0.461
Shonai Bank	0.471	0.462	0.456	0.378	0.517
Yamagata Bank	0.390	0.388	0.378	0.349	0.448
Bank of Iwate	0.440	0.428	0.420	0.372	0.440
Tohoku Bank	0.399	0.388	0.373	0.350	0.559
77 Bank	0.471	0.462	0.462	0.407	0.460
Toho Bank	0.397	0.415	0.419	0.367	0.430
Gunma Bank	0.456	0.460	0.466	0.438	0.476
Ashikaga Bank	0.400	0.423	0.459	0.427	0.468
Joyo Bank	0.452	0.456	0.453	0.406	0.444
Tsukuba Bank	0.343	0.336	0.328	0.299	0.379
Musashino Bank	0.413	0.392	0.383	0.344	0.418
Chiba Bank	0.573	0.572	0.581	0.533	0.576
Chiba Kogyo Bank	0.486	0.483	0.468	0.414	0.501
Tokyo Tomin Bank	0.392	0.402	0.381	0.362	0.448
Bank of Yokohama	0.642	0.654	0.666	0.585	0.644
Daishi Bank	0.414	0.407	0.409	0.377	0.432
Hokuetsu Bank	0.338	0.349	0.366	0.339	0.422
Yamanashi Chuo Bank	0.380	0.384	0.386	0.334	0.409
Hachijuni Bank	0.490	0.475	0.477	0.441	0.444
Hokuriku Bank	0.449	0.435	0.426	0.395	0.431
Bank of Toyama	0.774	0.837	0.717	0.580	0.854
Hokkoku Bank	0.411	0.421	0.411	0.363	0.454
Fukui Bank	0.387	0.360	0.344	0.309	0.393
Shizuoka Bank	0.770	0.694	0.718	0.689	0.720
Suruga Bank	1.000	1.000	1.000	1.000	1.000
Shimizu Bank	0.340	0.329	0.318	0.299	0.440
Ogaki Kyoritsu Bank	0.344	0.342	0.333	0.303	0.356
Juroku Bank	0.351	0.347	0.325	0.293	0.319
Mie Bank	0.321	0.322	0.306	0.278	0.410
Hyakugo Bank	0.393	0.367	0.359	0.338	0.399
Shiga Bank	0.427	0.415	0.407	0.393	0.470
Bank of Kyoto	0.401	0.399	0.381	0.327	0.387
Kinki Osaka Bank	0.369	0.401	0.378	0.351	0.465
Senshu Ikeda Bank	0.393	0.424	0.401	0.346	0.379
Nanto Bank	0.369	0.358	0.345	0.327	0.372
Kiyo Bank	0.410	0.403	0.387	0.344	0.402
Tajima Bank	0.383	0.377	0.371	0.335	0.526
Tottori Bank	0.423	0.425	0.387	0.335	0.494
San-in Godo Bank	0.537	0.516	0.514	0.473	0.522
Chugoku Bank	0.423	0.425	0.416	0.403	0.448
Hiroshima Bank	0.459	0.451	0.452	0.424	0.441
Yamaguchi Bank	0.545	0.570	0.545	0.474	0.586
Awa Bank	0.588	0.576	0.578	0.522	0.563
Hyakujushi Bank	0.388	0.374	0.375	0.333	0.404
Iyo Bank	0.541	0.520	0.468	0.406	0.458
Shikoku Bank	0.424	0.402	0.410	0.377	0.464
Bank of Fukuoka	0.603	0.571	0.579	0.541	0.585
Chikuho Bank	0.335	0.318	0.304	0.284	0.559
Bank of Saga	0.346	0.335	0.338	0.305	0.447
Eighteenth Bank	0.395	0.386	0.390	0.364	0.469
Shinwa Bank	0.389	0.373	0.374	0.340	0.450
Higo Bank	0.422	0.417	0.405	0.370	0.435
Oita Bank	0.368	0.372	0.380	0.356	0.445
Miyazaki Bank	0.402	0.412	0.425	0.403	0.485
Kagoshima Bank	0.357	0.361	0.371	0.357	0.411
Bank of The Ryukyus	0.463	0.457	0.441	0.409	0.509
Bank of Okinawa	0.555	0.534	0.518	0.455	0.569
Nishi-Nippon City Bank	0.485	0.453	0.483	0.416	0.446
Kitakyushu Bank	0.908	0.878	0.837	0.542	0.804
All Regional Banks	0.454	0.450	0.443	0.399	0.483

UDK 330.101.54:336.02:061.1EU

Financing conditions in the era of substantial monetary policy stimulus - are there still some gaps and how to address them?

*Debora Revoltella, Laurent Maurin and Simon Savšek**

This paper investigates impacts of improved financial conditions on corporate investment from a perspective of an EU firm, as captured by the European Investment Bank Investment Survey. Already previous research showed that substantial monetary policy stimulus had a paramount role in improving the investment and financial environment. At the same time, other instruments, such as the European Investment Plan for Europe, also played an important role. While it is clear that business cycle conditions improved due to these operations, it remains less clear how structural environment for investment in the EU was impacted. The survey confirms that some types of firms, such as young and innovative, still face relatively more challenges to finance their capital expenditure. Moreover, various indicators suggest that the European financial system is ill-suited to provide appropriate funding. European financial markets remain fragmented and there is a lack of equity, strengthening the case for more targeted and structural approach in supporting corporate investment.

JEL E22, E44, D22

There is more and more evidence that the EU upturn is weakening. Along the slowdown in economic activity, monetary policy expectations have shifted from tightening to loosening. Long-term rates have re-entered negative territories and reached levels below the minimums of mid-2016. While it is clear that monetary policy accommodation transmitted successfully to overall financial conditions and that the financial system has been made much more resilient compared to the pre-crisis period, it is less clear how the current European financial structure addresses the needs of the private sector, particularly the innovators.

A few phenomena are particularly important to highlight in this respect. It seems that European corporations still hoard cash and deposits, generally investing too little. On the one hand, heightened policy uncertainty under the influence of geo-political risks, such as trade wars and Brexit, can be one important contributor hindering corporate investment growth. On the other hand, structural impediments hinder further the investment activity in the EU. One worrisome factor in this respect is the rather modest investment in intangibles, which potentially requires different type of financing lacking in Europe. The second crucial factor is the lack of financial integration in Europe.

* Debora Revoltella, Laurent Maurin and Simon Savšek all European Investment Bank. This article follows closely the Chapters "Towards a financial system more supportive to EU corporate investment" and "The financing of corporate investment" in the forthcoming EIB 2019/2020 Investment Report. The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the EIB. Any remaining errors are the sole responsibility of the authors.

To elaborate on the above-mentioned facts and puzzles, we use extensively the 2019 edition of the European Investment Bank Investment Survey (EIBIS 2019). The survey confirms that particularly the young and innovative firms, which are the most promising, face biggest issues regarding financing. Moreover, given very accommodative monetary policy stance, various indicators suggest that the European financial system is ill-suited to provide appropriate funding. In this respect, we illustrate that the European financial markets and institutions remain fragmented and that there is a lack of equity.

Such an environment strengthens the case for a more targeted and structural approach in supporting corporate investment, as provided for example by the European Fund for Strategic Investment. Furthermore, other policies to support sustainable investment, particularly finalizing the Capital Markets Union, and engaging in pro-business market reforms, are key to support convergence and inclusive growth in the EU.

We start with the overall assessment of the macroeconomic environment in the EU. We move to the transmission of monetary policy actions to financial conditions in the second part. The third part highlights importance of improved financial conditions for corporate investment and identifies gaps. The fourth part elaborates on structural impediments, which cannot be tackled only by momentary policy. Last part concludes.

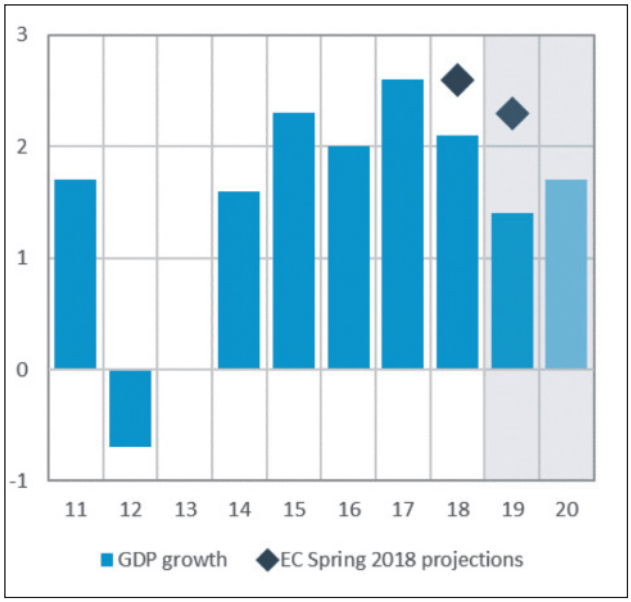
The macroeconomic environment in the EU

Since the middle of 2018 the upturn of economic activity in the EU continued, but weakened substantially. The EU real output decelerated, from an annual growth rate of 2.6% in 2017 to 2.1% in 2018. In the same year, economic activity was above its pre-crisis level by around 12% in real terms in the EU. Output was well above pre-crisis in the North and West (by 15%) and the Central and East (26%). Conversely, a gap remains in the South[1], of about 2%.

The headwinds intensified as the uncertainty shock passed through to the economy. Several sources of uncertainty are worth highlighting: the trade war, the tensions in the Middle East, financial stress in emerging markets and the Brexit, which is a big unknown particularly for the EU financial sector. As these shocks partly materialised, international institutions revised down their forecast for economic activity (Figure 1). From a projected growth rate of 2.3% in the EC Spring 2018 projections, EU real GDP growth in 2019 was revised down to 1.4% in the Spring 2019 forecast. Indicators of policy uncertainties, reached a peak in the beginning of 2019 and still remain elevated (Figure 2).

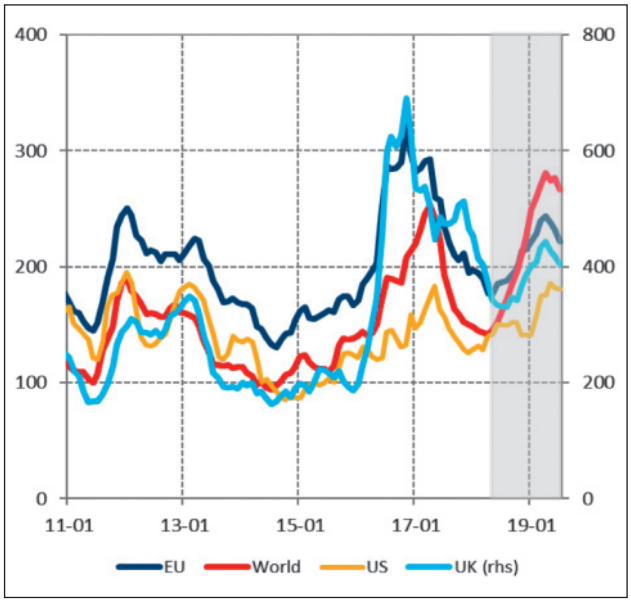
1 In this article, we use these terms consistently. North and West Europe (WN) includes Austria, Belgium, Denmark, Ireland, Germany, Finland, France, Luxembourg, Netherlands and Sweden; South Europe (S) refers to Cyprus, Greece, Italy, Malta, Spain and Portugal; Central and East Europe (CE) comprises Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

Figure 1 Annual real GDP growth in the EU and forecast revisions



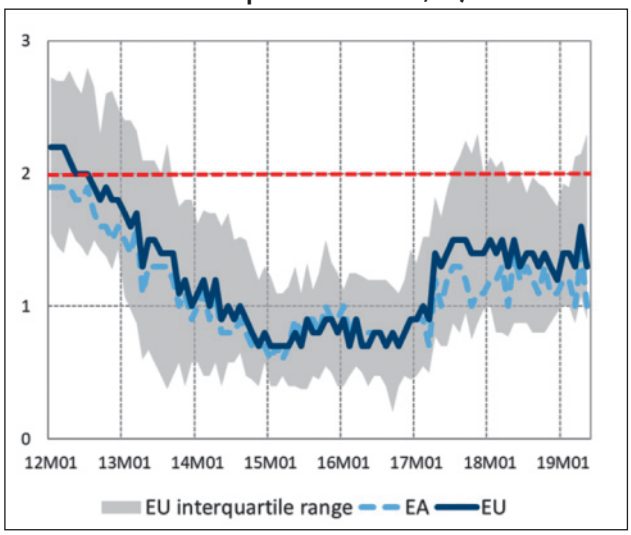
Source: ECON calculations based on Eurostat and European Commission. Note: The projection refers to the Spring 2019 EC forecast. The revisions are computed as differences compared to the Spring 2018 EC forecast.

Figure 2 Estimates of Policy uncertainty



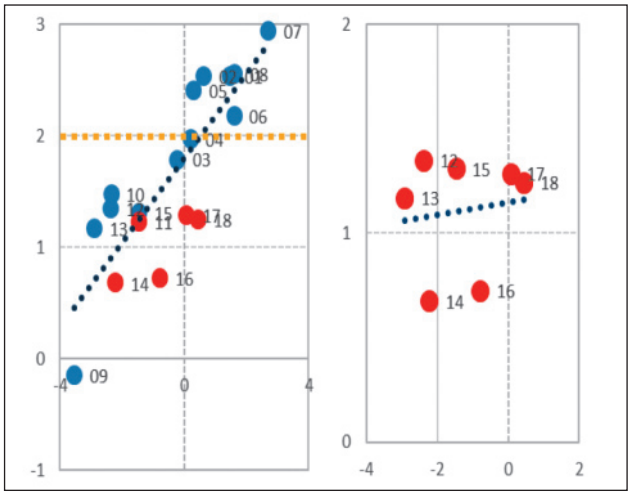
Source: Baker, Nicholas, Bloom and Davis at www.PolicyUncertainty.com Note: Three months moving average. The gray area portrays the period that has unfolded since the cutoff date of the previous Investment Report.

Figure 3 Annual Inflation (CPI excluding energy and unprocessed food, %)



Source: ECON calculations based on Eurostat.Note: Last record is April 2019.

Figure 4 Lagged output gap (x-axis, %) and annual inflation (y-axis, %)



Source: ECON calculations based on Eurostat and European Commission.Note: Output gap is measure as % of potential output. Inflation refers to GDP deflator.

Removing undue uncertainty is the first and foremost action to support investment and avoid a major slowdown in the EU. As shown by the EIBIS, uncertainty is one of the major factor impeding investment growth, an assessment shared across most EU economies. This finding is also supported by the recent empirical research. For instance, Ebeke and Siminitz (2018) focus on trade uncertainty and find that that the investment-to-GDP ratio is on average lower as the trade uncertainty increases.

At the same time, headline inflation remains weak across the EU and the euro area, somewhat below the ECB policy target. From 2012 to the beginning of 2015, the annual rate declined from around 2% to below 1%. It then remained almost unchanged until the beginning of 2017. Since then, the inflation rate has been evolving in a relatively narrow range, below 1.5% in the EU, and even lower in the euro area (Figure 3).

According to economic theory, inflation shares a positive relationship with the output gap. Figure 4 plots the relationship between annual inflation, measured by GDP deflator, and output gap estimates, lagged by one year. The period covers 2001-2018 and the current upturn that started in 2013 is portrayed with red dots (as well as separately in the right hand panel). Over the entire period since the beginning of 2000, the left hand panel reviles a clear positive relationship. According to it, a 1 p.p. reduction in the output gap is accompanied by an increase of 0.4 p.p. in the annual rate of inflation.

However, as the right hand chart in Figure 4 shows, the relation seems to have weakened since the beginning of the upturn.[2] In practical terms, changes in the output gap have recently hardly affected inflation since the beginning of the latest upturn. It is worth noting that low inflationary environment has been a phenomenon shared among a large number of advanced economies and therefore global factors must have played an important role in this respect (Jordà et al., 2019).[3] As responding to global developments with domestic policies might have been more difficult, we analyze the effectiveness of the ECB monetary policy on domestic financial conditions in the following part.

Monetary policy and financial conditions in the EU

Monetary policy in the euro area remains fairly accommodative. The reinvestment of the securities maturing in order to maintain the size of the ECB balance sheet, guaranteed an overall accommodative monetary stance in the euro area (Coeuré, 2019) even when the Asset Purchase Programme (APP) was temporarily terminated in December 2018. In fact, the ECB and the FED hold around 2.2 and 1.9 trillion euros of government securities, respectively, which is substantial when compared to the pre-crisis period and high even when compared to the GDP of both economies (Figure 5).

2 Over 2013-2018, the same estimation indicates an elasticity more than ten times lower, and an R squared of 2%. Obviously, this is an extremely simple relationship. However, the estimation over the entire period indicates an elasticity close to the values reported in the empirical literature (see Bobeica and Jarocinski, 2017), and an R square of 70%.

3 For further elaboration on this topic see for example Ciccarelli, M., & C. Osbat (editors): Low inflation in the euro area: Causes and consequences, Occasional Paper Series No. 181, January 2017.

Figure 5 Central banks' balance sheet (% GDP)

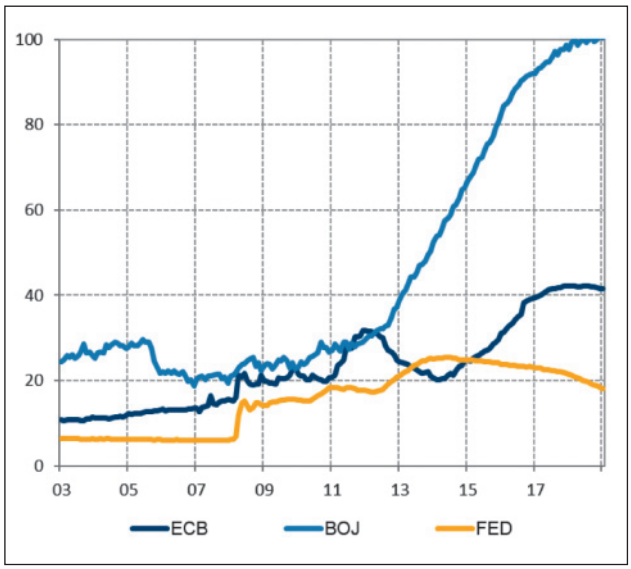
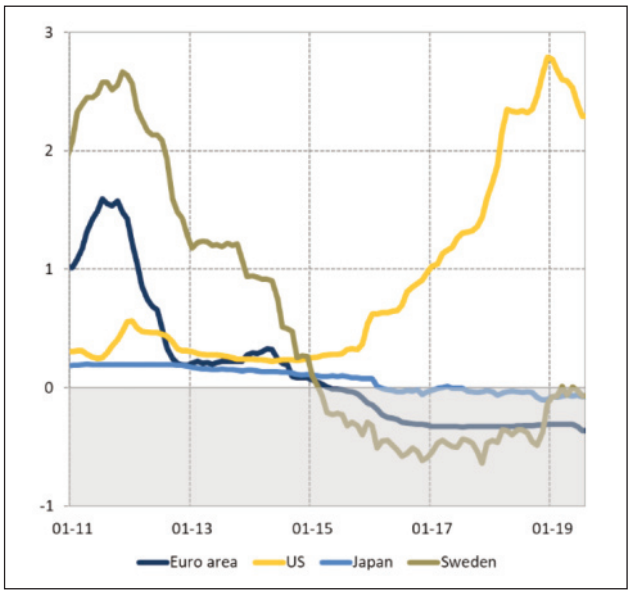


Figure 6 Short-term Interest rates (% p.a.)



Source: ECON calculations based on Thomson Reuters Datastream.

Throughout the year, monetary policy expectations have reversed and become more dovish, shifting from hikes to cuts on both sides of the Atlantic. In June 2018, the exit strategy was clarified by the ECB, and first hikes became expected by the middle of 2019. A year after, as the economy slowed down, the scenario did not unfold and more Targeted Longer-Term Refinancing Operations (TLTRO III) were announced in March, while a fully-fledged new easing package was announced in September.[4] Also the FED implemented the first cut in Fed fund rates for more than ten years in July 2019 and shifted its policy stance towards being more accommodative. With a deposit rate below zero for almost half a decade[5] and new monetary policy measures implemented, monetary conditions in the EU will become even more accommodative. As the short-term rates remain in negative territory or close to zero for the most of the advanced economies (Figure 6),[6] the question is how successful this easing has been for the rest of the financial system. We discuss this in the following paragraphs.

After removing the impact of monetary stance and controlling for the real macro-economic momentum, financial conditions continue to remain accommodative, thereby supporting economic activity, lending and investment in the EU. Even after marginal tightening during the year after the termination of the APP, they have been accommodative almost continuously since the beginning of 2013 (Figure 7).

The EU economy also re-entered a reinforced negative long-term yields environment, which re-entered negative territory in the second quarter of 2019 (Figure 8). On average in the EU, they declined by almost 100 bps in the year up to the third quarter of 2019. At ten years maturity, the German Bund and the French OAT reached record low yields in July 2019, of -40 and +19 bps, respectively. These returns are 20 to 30 basis points below the minimum yields recorded in the summer of 2016.

Apart from the ultra-low level of monetary policy rates and the impact of quantitative easing, negative long term yields for highly rated sovereigns reflect the scarcity of safe assets in Europe (Caballero et al., 2016).

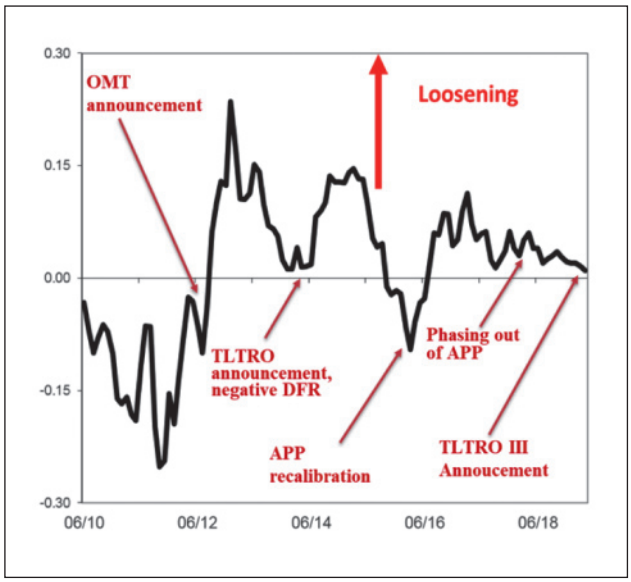
The current situation illustrates the need for a large pool of safe asset in Europe, especially in the euro area. For many financial sector participants, it is necessary to hold highly rated sovereign securities, which are very liquid, not capital costly and can be posted as a collateral without being discounted at an elevated haircut. Moreover, the demand for safer assets may have increased alongside uncertainty. On the other hand, the supply of highly rated debt has declined and more than 20% of the stock of euro area sovereign debt securities was removed from the market as a consequence of the ECB APP. These contrasted movements inflate the price of safe assets and deteriorate the return on it. In the following, we investigate how monetary policy, as well as overall financial accom-

4 The package consisted of four main elements; a) a 10 bp cut in the deposit rate, b) the introduction of Tiering with the exemptions of part of the excess reserves from the negative deposit facility rate, c) a new QE with monthly open-ended purchases of 20bns, d) a strengthened interest rate forward guidance.

5 See Praet et al. (2019) for a long-term perspective on ECB monetary policy since its inception.

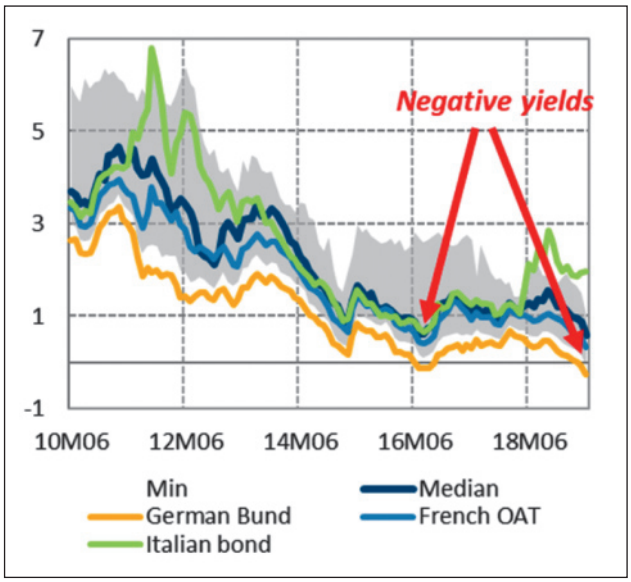
6 with the exception of the US.

Figure 7 Financing conditions index



Source: ECON computations based on Darracq-Pariès, Maurin, Moccero (2014).Note: Last record April 2019. see footnote.[7]

Figure 8 Long-term government bond yields in the EU (10 years, % per annum)



Source: ECON calculations based on Thomson Reuters Datastream.

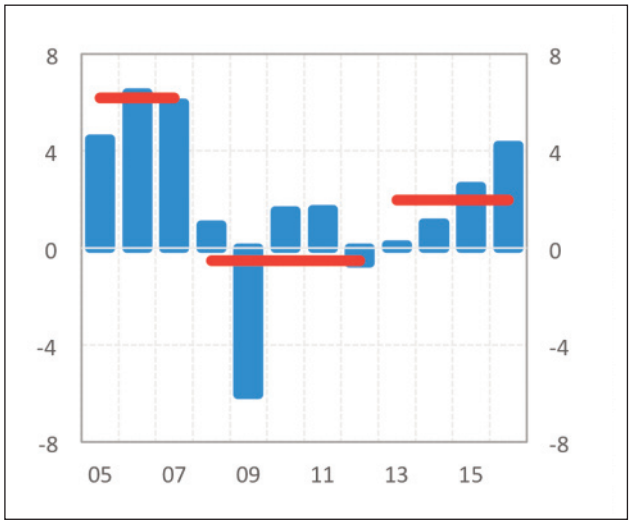
modation, translated into financing conditions for corporates, with an emphasis on their impact on investment activity.

7 The financial condition indicator is the common component of a large set of series on quantities and financial costs related to EU economies and available monthly. In a first step, the series are filtered from their reaction to monetary policy and activity. In the second step, principal component analysis is used to summarise the information contained in the dataset (Darracq-Pariès et al., 2014). The index is dimensionless, of zero mean over March 2003–June 2019.

Corporate financing and investment

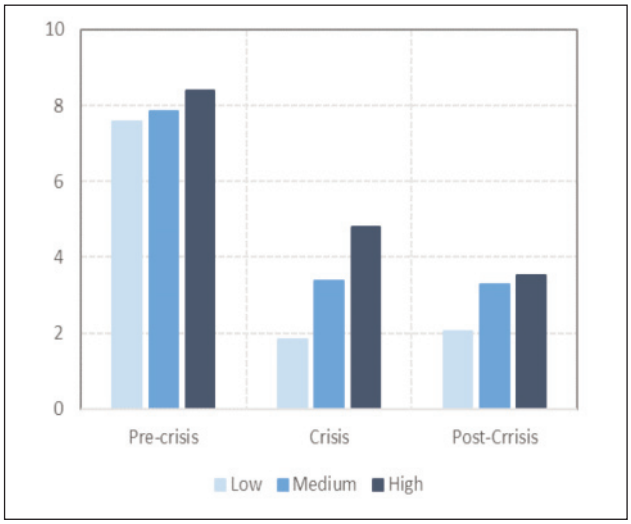
In the EU, firms tend to finance their investment activities predominantly through internal sources. According to the EIBIS, internal funds or retained earnings, such as cash or profits, account for 62% of financial sources used for investment of the average firm, while external sources contribute 35%. A small part of the investment capital is sourced through intra-group funding such as loans from a parent company (3%). The fact that firms meet the bulk of their financing needs through internal sources is not specific to the firms in our sample, but rather a general characteristic of firms' financing mixes. This reflects the pecking order theory of corporate finance: a firm uses internal funds first and only borrows when such funds are insuffi-

Figure 9 Median annual sales growth (median, annual growth, %)



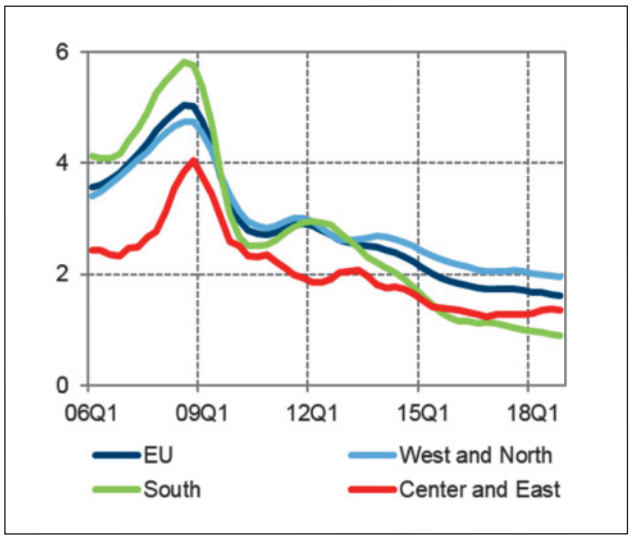
Source: ECON calculations based on the EIBIS-ORBIS matched sample. Note: last record 2016. The horizontal lines report the averages over the pre-crisis, crisis and upturn periods.

Figure 10 Sales growth (average annual change, conditioned by indebtedness level, %)



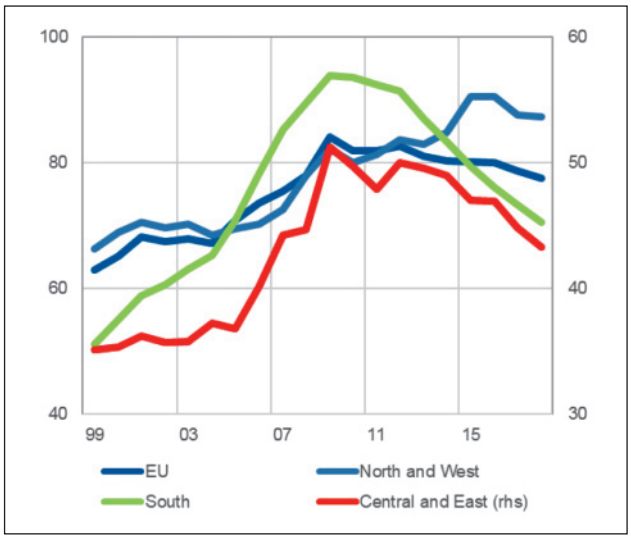
Source: ECON calculations EIBIS-ORBIS based on the matched sample. Note: the indebtedness ratio - average of deciles (1-3, 4-6 and 7-9).

Figure 11 Indebtedness cost (% GDP)



Source: ECON computations based on EUROSTAT.

Figure 12 Corporates´ indebtedeness (loans and securities, % of GDP)



Source: ECON computations based on EUROSTAT.

cient. This also implies that SMEs rely even more on internal funding.

With internal sources being of such an importance, it is crucial to investigate deeper the capacity of European firms to generate these sources. To illustrate this, we plot in Figure 9 the annual increase in corporate sales. On average, since the median increase in sales went down from 6.2% pre-crisis to -0.5% during the crisis it rebounded to only 1.9% during the upturn. However, latest record suggests a marked acceleration.[8] Interestingly, when conditioned on their indebtedness levels, sales growth seem to be higher for companies that were more indebted (Figure 10). It seems that, at least to some extent, that debt is used to finance production capacity and enable corporations to fuel higher demand, highlighting the importance of a proper financing mix.

This also implies that after interest expenses paid, net income is by the definition lower for more indebted corporates. As such, the current low interest rate environment remains supportive of corporates´ income. Indeed, after taking into account the reduction in net interest expenses and besides the muted recovery in sales, the recovery in net entrepreneurial income is stronger. At the EU level, entrepreneurial income grew from a pre-crisis average of 8%, a crisis average of 1% and an upturn average of 5%.[9] At the same time, lower cost of finance have helped to reduce indebtedness costs across the European regions (Figure 11) and alleviated the debt burden, where some cross-regional heterogeneity still persists (Figure 12).

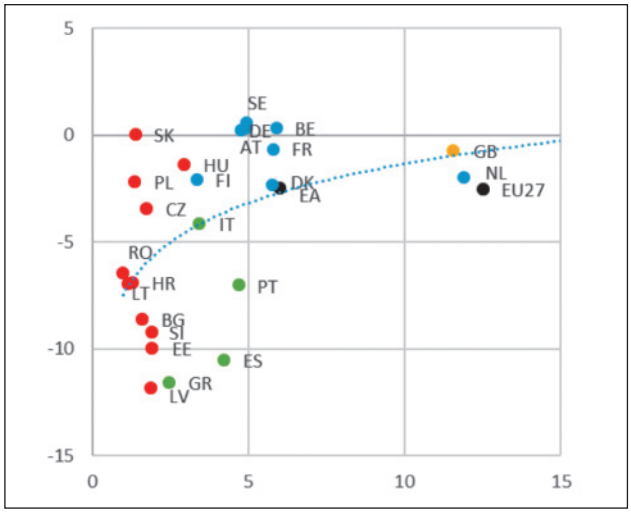
Regarding the importance of the financing mix for investment growth, it is important to note that economies with a larger financial system seem have recorded a quicker rebound in investment. Figure 13 plots the change in the investment share since the crisis in relation with the average size of the financial sector across EU economies. The investment share is pro-cyclical: in downturns, investment grows below output while in upturn, it grows at a faster pace. Furthermore, it remains constant on average over cycles. Following the crisis, the rebound in the investment share was quicker in economies with a larger financial system, either because the decline was not been as pronounced or because the recovery was stronger. Hence, the increasing relationship depicted in Figure 13 suggests that a larger financial system can support a faster recovery in investment, or a less pronounced fall in capital expenditure. This suggests that a larger and more developed financial sector contributes to dampening the amplitude of business cycles.

On the other hand, there is some evidence that finance seem to be more of an obstacle in more bank dependent economies. Figure 14 puts in perspective the two indications for each EU economy. From this simple regression, it follows that each percentage point increase in the bank dependence is accompanied by a 0.9 p.p. rise in the proportion of company reporting finance as an obstacle to investment. Overall, this simple relation suggests that weaker financing development, traditionally associated with more bank dependence, tend to generate more financial frictions and more impediments to investment, calling for a somewhat different financing mix in Europe.

8 The three periods, pre-crisis, crisis and upturn, will be considered consistently. They refer to respectively 05-07, 08-12 and 13 to the last record 2016.

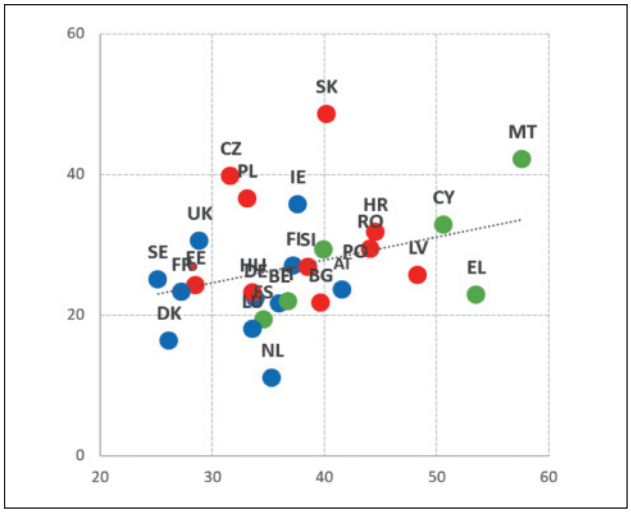
9 According to Eurostat, Sectoral accounts data.

Figure 13 Size of the financial sector (x-axis, % GDP) and change in the investment share (y-axis, in p.p.)



Source: ECON calculations based on EUROSTAT.Note: Change in the investment share from pre-crisis (05Q1-08Q3) to the upturn (13Q1-18Q4). The change in the investment share is measured as corporates´ investment to GDP in nominal terms, during the upturn period compared to the pre-crisis period.

Figure 14 Bank dependence (x-axis, %) and finance as an obstacle (y-axis, %)



Source: EIBIS 16, 17, 18 and BIS.Note: x-axis reflects bank dependence, the share of loans over loans, debt and equities from the BIS. The y-axis reports the proportion of firms reporting finance as an obstacle to investment, based on the EIBIS and averaged over 16-19. Firms reporting a minor obstacle are weighted by half those reporting a major obstacle.

The need for a structural change in the financing mix offered

Calling upon a proper financing mix in the EU is, however, easier said than done. On the one hand, European companies remain very reluctant to equities. Figure 15 reports the percentage of firms that would like equity finance to play a larger role in their funding. According to the EIBIS, it is the case for less than 1 corporations over 50 in the EU and this finding is relatively homogenous across regions. There are several reasons for that, among which the elevated cost, the existence of a tax bias in favour of debt, the fear of being dilulted and lose control and the lack of financial literacy seem to be the most pressing.[10] On the other hand, also European households favour cash and deposits at the expense of equities. In comparison to the US, the biggest differences in household financial wealth occur in cash and deposits as well as holdings of shares and debt securities. Cash and bank deposits amount to 30% of total EU households' assets, compared to 12% in the US. Conversely, equity and debt securities in Europe reach a share of 21%, compared to 41% in the US. The risk aversion of European households, the cultural habit to allocate savings to banks, and other differences between the two regions (e.g. tax treatment, financial development, banks' credit policy) are the main factors behind this development.[11]

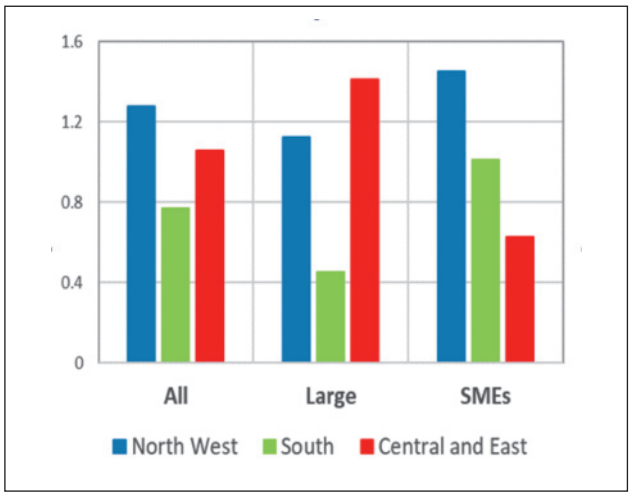
Due to a growing number of firms investing in intangibles, bank based financial system seems to be ill-suited to support generation of sufficient R&D. Figure 16 plots the share of corporate R&D spending in the EU economies in relation to a measure of bank dependence, the share of corporate bank loans in the external financing of corporates. The clear decreasing relationship suggests that banks may not be the most suitable institutions to finance R&D. The literature also provides some support of this evidence. For example, Allen and Gale (1999) show that bank-based systems can be associated with less lending to innovative companies due to the higher risk involved. The relationship is not as clear however: banks have a relative advantage in processing information more efficiently. The advantage is exacerbated when information costs become high. While it follows from the recent vintages of the EIBIS that the overall access to finance is not among the most prominent impediment to firm investment, clear bottlenecks remain. In particular, smaller and younger firms, as well as innovative firms and firms with a higher investment share in intangibles, are the most constrained. This is worrisome because access to finance problems can have long-lasting effects on firm competitiveness. If firms are credit constrained in a critical moment of time, such as emergence of new technological opportunities, this can have enduring effects, as economies of scale and winner-takes all tendencies put them at a disadvantage. Specifically, the EIB recent research[12] suggests that

10 For more details, see Chapter 6 in EIB (2018).

11 For more details, see Chapter 5 in EIB (2019).

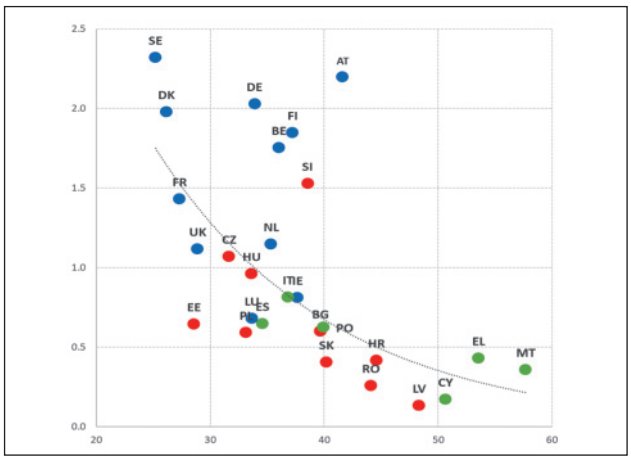
12 To make this point, in a forthcoming working paper, we interact an exogenous funding shock with sectorial robotisation activities. See Brutscher, P.B. and Saidi, F. (forthcoming).

Figure 15 New equities as a preferred source of finance by corporates (% of respondents)



Source: EIBIS16, 17 and 18. Note: Based on the question Q36: which type of finance would you like to play a larger role? New Issued equity.

Figure 16 Share of loans in external finance (x-axis, %) and corporate R&D spending (y-axis, as % of GDP)



Source: ECON computations based on EUROSTAT and BIS. Note: both indicators are averaged over 2015-2017.

firms that face worse access to finance also charge markedly lower mark-ups several years down the road when they face robotisation processes in their sector.

Conclusion and policy considerations

In this article, we tentatively evaluate the effectiveness of monetary policy measures for the financial system and their impact on corporate investment. Drawing upon the latest vintage of the EIBIS, we confirm that financial conditions are continuously improving, largely owing to monetary policy. At the same time, we emphasise that the current financial system is ill-suited to provide efficient funding to some types of firms, particularly the smaller-ones and enterprises investing heavily in R&D. Given the dependence of the European economy on SMEs and the dormant potential that firms that invest heavily in R&D carry, it is of paramount importance to tackle the remaining obstacles. First and foremost, monetary policy cannot and should not be the only player in town. Relying on other, more targeted instruments, such as the European Fund for Strategic Investment, and counting on structural and fiscal policies is crucial to generate sustainable level of investment in Europe.

At the same time, we provide some descriptive evidence that a number of the obstacles are more structural in nature. Therefore, to support further the investment growth, and even more innovation and technological changes, corporates need more long-term funding and risk taking appetite. This can be provided by long-term investors, such as pension funds and insurers and, particularly for companies of smaller size, private equity and venture capital investors. Finally, looking at the low integration of financial markets in Europe, further progress on Capital Markets Union and finalising the Banking Union should be a priority in the coming years.

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Macroeconomic stabilisation in the euro area: A role for development banks?

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Development banks could play a role in the macroeconomic stabilisation framework of the euro area in the absence of a common fiscal stabilisation mechanism and with limited discretion of national fiscal policies. Counter-cyclical stabilization of credit flows on Member State level through national development banks makes economic sense because of pro-cyclical behaviour of the financial system, which stems from market failures. Review of empirical studies confirms that development banks and, more broadly, public banks behaved counter-cyclically (or at least less pro-cyclically) than private banks during the last financial crisis. Any systematic consideration of counter-cyclical development banking on Member State level should also take into account EU regulatory constraints, in particular state aid rules, and operational constraints of development banks, in particular their financial and human resource capacity. To avoid potential pitfalls of government ownership, development banks should also be operationally independent and adhere to sound development banking practices in the conduct of a counter-cyclical strategy.

JEL E63, G21, O16, O25

1. Introduction

Development banks played a stabilizing force in the recent financial crisis. In many EU countries, they increased their financial activities at a time of scarcity of private resources during the first stage of the crisis (Wruuck, Schildbach & Hoffmann, 2015). In the second stage of the crisis, they were also central to the implementation of the Investment plan for Europe, the main EU non-monetary stimulus measure (Mertens & Thiemann, 2018; Mertens & Thiemann, 2019). Their newly acquired counter-cyclical credentials coincided with a general resurgence of interest in development banking due to longer-term structural challenges (in particular, economic adjustments to climate and technological change), rising protectionism, and a more balanced view on the role of government in industrial policy (Wade, 2012; Stiglitz, Lin & Monga, 2013; Mazzucato & Penna, 2016; Griffith-Jones, Ocampo & Castro, 2017).

This turn of events poses an interesting question: should development banks play a systematic role in the macroeconomic stabilization framework of the euro area in addition to their traditional structural role? The article addresses this question by outlining the economic rationale for counter-cyclical development banking with a specific relevance for the euro area, which lacks a fiscal counterpart to the single monetary policy.

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The rest of the article is structured as follows. Section II explains the theoretical background of counter-cyclical development banking. Section III reviews empirical evidence of past counter-cyclical behaviour of development and public banks. Section IV addresses the question of counter-cyclical development banking on Member State level in the context of euro area macroeconomic stabilization framework. Section V presents regulatory and operational constraints of a counter-cyclical development banking strategy and additional caveats related to government involvement in finance. Section VI concludes.

2. Theoretical foundation of counter-cyclical development banking

Development banks are a diverse group of specialised public financial institutions that are not profit oriented, but instead pursue broad socio-economic goals based on an explicit legal mandate within the remits of financial sustainability (De Luna-Martinez & Vicente, 2012). Their founder and owner is usually the government with a view to provide financial resources (mostly long term loans) and non-financial services (counselling and advisory services) to market segments, sectors, and regions that are underserved by the regular financial system due to market imperfections (Bruck, 1998). In operating terms, they pursue their mandate through direct (Tier 1) lending to final beneficiaries, indirect (Tier 2) lending through other financial intermediaries (mostly commercial banks), or a combination of both (De Luna-Martinez et al., 2018). Some also act as export-credit agencies, providing export credit and insurance (Dinh & Hilmarsson, 2014). Economic rationale of development banks is based on the notion of market "failures" or "gaps" of the regular financial system. Whereas the government deals with several types of market failures through financial regulation and supervision,[1] direct government involvement in financial intermediation through development banks is warranted due to three specific types of failures: borrower-lender information asymmetries, positive externalities, and imperfect competition. These market failures have a structural and a cyclical component.

2.1 Structural component of market failures

The structural component refers to the well-established finding that some economic agents and activities are better served by the financial system than others. Borrower-lender information asymmetries can lead to credit rationing and excessive risk premiums for informationally opaque borrowers (Stiglitz & Weiss, 1981; Stiglitz, 2000). This problem is particularly acute in specific market segments, such as the small and medium sized enterprises (SMEs), young enterprises, and research and innovation activities (Beck, Demirgüç-Kunt & Maksimovic, 2008; Lee, Sameen & Cowling, 2015). Information asymmetries can also originate from the risks and uncertainties related to the foreign markets where the borrowers operate (Evans & Oye, 2001). Similarly, imperfect competition among financial intermediaries can lead to credit rationing or even financial exclusion of certain client types or geographic locations (Yeyati, Micco & Panizza, 2004). Positive externalities result in suboptimal financing of activities where net social benefits exceed net private benefits. A typical example is diffusion of new technologies with positive externalities, such as renewable energy or electric cars, which may not be commercially attractive in the early stages of adoption, but may be socially beneficial and even profitable in the long run (Mazzucato & Penna, 2015). Positive externalities can also occur due to network effects, which are common during far-reaching technological leaps (industrial revolutions). These leaps often require coordinated financing of a broad range of activities that enable the paradigm shift (Gerschenkron, 1962; Rosenstein-Rodan, 1961; Murphy, Shleifer & Vishny, 1989). However, such financing may fail to materialise due to coordination problems of the financial system and institutional inertia of the existing technological paradigm (Perez, 2003). Finally, underdeveloped financial systems or insufficient preparedness of projects for financing can also act as important bottlenecks for development (Bruck, 1998).
The above-described structural market gaps of the financial system that hold back sustainable growth opportunities and technological progress are the primary focus of development banks. Their value-added can be maximised when they address these market gaps not only through their own financial activities, but also act as catalysts to attract additional resources of the financial system.

2.2 Cyclical component of market failures

The cyclical component of market failures stems from the observation that the size of market gaps expands and contracts over the business cycle because of the pro-cyclical nature of the financial system. In recessions, asymmetry of information between lenders and borrowers grows larger, leading to rising borrowing costs and restrictions. The last crisis was a typical

1 In particular, negative externalities due to systemic risk and lender-depositor information asymmetries, addressed through capital, liquidity, recovery and resolution regulation, deposit insurance, safety nets and supervision.

example of such pro-cyclicality with a build-up of leverage in the years preceding the crisis (Hume & Sentance, 2009), followed by severe credit tightening during the crisis (Ivashina & Scharfstein, 2010; Santos, 2010; Lane, 2012).

On macroeconomic level, financial system amplifies the initial cyclical impulses stemming from changes in productivity (financial accelerator) or monetary policy (credit channel) through changes in collateral values, corporate net worth, and the external financing premium (Benanke & Gertler, 1989; Bernanke & Gertler, 1995). Higher collateral values and corporate net worth in combination with mark-to-market valuation encourage banks to lend during expansions, while lower valuations inhibit bank lending during recessions. These dynamic interactions can lead to large and persistent fluctuations in output and asset prices (Kiyotaki & Moore, 1997). Coordination problems further slowdown the transition of the financial system from contraction to expansion, as banks fail to internalise the social benefits of coordinated lending in the negative phase of the business cycle, which could stimulate recovery and restore bank profitability (Yeyati, Micco & Panizza, 2004; Yeyati et al., 2007).

At the microeconomic level, credit cycles may also be explained by competitive pressures faced by financial intermediaries, which can lead to endogenous credit booms and busts (Gorton & He, 2008). Another possible explanation could also be distorted risk perceptions of banks by excessive optimism in good times and pessimism in bad times (Borio, Furfine & Lowe, 2001). Financial regulation can also exacerbate pro-cyclicality due to shifting and dynamic nature of risk which is hard to accurately capture in credit ratings and risk weights. This allows banks to conduct regulatory arbitrage and conform to the capital adequacy ratio by loading up on under-priced risks during lending booms and liquidating risky assets, once these risks are recognised in credit ratings and risk weights (Marinč, Mrak & Rant, 2012). Some recent changes in banking regulation (Basel III)[2] seek to mitigate this pro-cyclicality, but their actual effectiveness will not be tested until the next crisis.

The impact of the financial system's pro-cyclicality is more significant for those market segments that already face structural financing gaps, such as the SMEs. This occurs because the onset of recession triggers a so-called flight to quality (Bernanke, Gertler & Gilchrist, 1996). Empirical evidence shows that financial constraints during the crisis forced the SMEs to rely more heavily on peer-to-peer loans and commercial credit as a source of working capital finance (Kaya & Schildbach, 2014; Carbó-Valverde, Rodríguez-Fernández & Udell, 2016). Campello et al (2011a & 2011b) showed that SMEs used credit lines more often than large listed companies and, at the same time, paid higher risk premiums for those credit lines. Campello, Graham & Harvey (2010) further documented that companies facing greater financial constraints in times of crisis planned deeper cuts in investment, technology expenditures and employment compared to financially unconstrained firms. An important problem during the euro area crisis was also the fragmentation of credit conditions between the Member States, with SMEs in particular facing greater financial constraints in countries hit hardest by the financial crisis (Holton, Lawless & McCann, 2013; Kaya & Schildbach, 2014).

The above-described pro-cyclical behaviour of the financial system that exacerbates existing structural market gaps and leads to excessive losses of output and employment provides the economic rationale for counter-cyclical development banking. In order to pursue such a strategy, development banks would have to expand their activities during economic downturns and contract them during upswings.

3. Empirical evidence of counter-cyclical development bank behaviour

Analysis of development bank lending behaviour during the last financial crisis confirms that they reacted counter-cyclically and increased their lending activity in many countries (Wruuck, Schildbach & Hoffmann, 2015). The 2012 World Bank survey of 90 development banks from 61 countries showed that development banks on average experienced a 36-percent increase in loan portfolios during the early stages of the crisis (from 2007 to 2009), with about a quarter of surveyed banks posting loan growth rates in excess of 50 percent. This is well above the 10-percent increase in private bank credit for the countries surveyed during the same period (De Luna-Martínez & Vicente, 2012). Furthermore, 56 percent of development banks in the follow-up 2017 World Bank survey also saw considerably higher growth of their loan portfolios between 2010 and 2015 compared to the average domestic credit growth by the financial sector (De Luna-Martínez, 2017). Using econometric analysis, Brei & Schclarek (2017) found robust evidence that development banks in Latin-American and the Caribbean countries acted countercyclically over the 1994 to 2014 period com-

2 In particular, dynamic capital requirements, increased granularity of risk weights, reduced automatic reliance on credit ratings, and greater restrictions in the use of internal ratings based approach to capital adequacy.

pared to domestic and foreign private banks.

Whereas empirical studies of development bank lending behaviour are scarce, further insight into counter-cyclical provision of credit can be gained from the studies focusing on the behaviour of public banks (a wider concept that includes all state-owned banks, not just development banks). Micco & Panizza (2006) showed that, on average, public bank lending is as much as 50 percent less pro-cyclical than private (domestic and foreign) bank lending. Similar conclusions can be drawn from Brei & Schclarek (2013) who found that state-owned banks increased lending growth rates in response to financial crises, while lending growth of private banks decreased. Brei & Schclarek (2015) also theoretically showed that state-owned banks lend more to the real economy in times of crisis than private ones, which reduce their lending activity in order to maintain liquidity. Bertay, Demirgüç-Kunt & Huizinga (2015) discovered that lower pro-cyclicality of public banks is associated with good governance, with state-owned banks in high-income countries displaying particularly significant counter-cyclical behaviour. Additional reasons for countercyclical behaviour of public banks may also lie in their distinct objectives in addition to profit, such as mitigation of credit crunches and negative spillovers to the real economy, and in more stable access to financial resources (both in terms of capital and liquidity) in times of financial crisis (Brei & Schclarek, 2017). Corroborating this finding, Behr, Foos & Norden (2017) showed that banks with a public mandate and focus on a sustainable provision of financial services that deviates from a pure profit motive have proven to be less cyclical in lending to SMEs.

4. Implications of the macroeconomic stabilization framework in the euro area for countercyclical development banking

In addition to presented economic arguments and empirical evidence, which speak in support of a counter-cyclical role of development banks, a careful consideration of counter-cyclical development banking in the European monetary union context should also take into account the euro area macroeconomic stabilization framework, which relies primarily on monetary and fiscal policies. Entrusting Member State development banks with counter-cyclical objectives is socially beneficial for the monetary union if it helps mitigate the shortcomings of the existing framework.

Monetary policy was used extensively in the euro area during the last financial crisis to ensure financial and macroeconomic stabilization. The ECB employed a wide array of non-conventional measures to this end, which targeted four specific problems: the interbank market failure, the sovereign debt market crisis, financial fragmentation of the euro area, and a general economic weakness, characterised by persistently low inflation and low growth. These problems were addressed by a combination of liquidity providing measures to the banking system,[3] stimulation of banks towards lending,[4] and asset purchase programmes (Gregorič & Rant, 2014).[5]

Some measures, particularly those aimed at the banking system, can be considered as a systemic alternative of the early ad-hoc financial stabilisation measures by the Member States, including early responses of national development banks, which focused primarily on provision of bank funding.[6] Evolution of non-conventional monetary policy tools in the euro area during the crisis therefore diminished the need for a counter-cyclical national development bank response for liquidity purposes.

Unlike monetary policy, fiscal policy in the euro area is decentralised. The lack of a euro area fiscal stabilisation function has long been considered an important deficiency of the monetary union. The main economic argument for fiscal risk-sharing stems from the desirability of mitigating asymmetric shocks in a monetary union (Mongelli, 2002). Whereas U.S. studies showed that as much as 10 to 30 percent of asymmetric shocks to individual U.S. states are offset by changes in fiscal flows through the federal budget, such centralised stabilisation in the euro area is practically non-existent (for review, see Kletzer & Von Hagen, 2000). Instead, the Eurozone mostly relies on Member States' fiscal policies for stabilisation. However, recent changes to the EU and euro area fiscal rules have substantially constrained the available fiscal discretion of Member States (Heinemann, Moessinger & Yeter, 2018).[7] The

3 Fixed rate full allotment policy, expanded collateral eligibility, substantially expanded longer term refinancing operations, and emergency liquidity assistance (for the most troubled banking systems).

4 Negative deposit facility rate policy and targeted longer term refinancing operations.

5 Securities market programme, outright monetary transactions, covered bond purchase programme, and expanded asset purchase programme (consisting of public sector, corporate sector, asset backed securities and covered bond purchase programmes). Government and (to a lesser extent) bank bonds dominated asset purchases by the Eurosystem through the above-mentioned programmes.

6 At the outbreak of the financial crisis, several Member State development banks provided funding to their national banking systems using their privileged market access, supported by the government guarantee. This in turn substantially increased the size of their balance sheets.

7 Changes adopted through the »Six-Pack« legislation, »Two-Pack« legislation, and the »Treaty on Stability, Coordination and Governance« strengthened the corrective and preventive arms of the Stability and Growth pact, with expanded and stricter application of sanctions for violations of fiscal rules and a greater focus on medium-term fiscal objectives and public debt (in addition to deficit). They also installed more automatism into the fiscal adjustment process, turned it into a subject of national law, and strengthened surveillance of national fiscal policies both on the EU

euro area is therefore faced with an unfavourable fiscal policy set-up for a monetary union where the lack of a euro area fiscal stabilization mechanism is combined with strict budget rules on Member State level. Such set-up could curtail the overall attainable level of stabilization, which may be relevant in severe asymmetric downturns. This presents an important argument in favour of counter-cyclical provision of credit through development banks on Member State level as a complement to fiscal stimulus.
The European Commission acknowledged that development banks could play a systematic counter-cyclical role in the EU by entrusting the implementation of the Investment plan for Europe, the EU's main non-monetary stimulus measure during the second stage of the crisis, to the European Investment bank with a supporting role of national promotional banks (European Commission, 2015).[8] In a similar manner, national development banks could also play an independent counter-cyclical role on the Member State level by stabilising the flow of credit to the real economy in times of asymmetric downturns, thereby reducing the need for fiscal stimulus.

5. Limitations of counter-cyclical development banking

In the EU, potential scope of counter-cyclical development banking on Member State level is limited by regulatory and operational constraints. Additionally, adherence to sound development banking practices may further curb the domain of counter-cyclical lending.
Due to their government ownership and liabilities guarantee, Member State development banks have a competitive advantage over private banks and are bound by EU state aid rules with the aim of preventing market distortions. These rules provide Member State development banks with three distinct possibilities for designing financial products with an element of state aid. The first possibility is to act in accordance with the General Block Exemption Regulation (GBER), which covers aids in the areas of recognised market failures, such as SMEs, research, development & innovation, vocational training, environmental protection, and regional aids. The scope of GBER has expanded in recent years. The second possibility is to act in accordance with De Minimis Regulation, which allows an exception for small state aids (up to EUR 200,000 per undertaking over a three-year period). Any financing with a state aid element provided under GBER or De Minimis regulations is considered compatible with EU internal market rules and exempt from ex-ante notification to the European Commission. The third possibility is that financial products with a state aid element do not meet the criteria of the above mentioned regulations. In this case, development banks must analyze and demonstrate the existence of a market gap and notify the European Commission for ex-ante approval of the product. Additionally, development banks can also design financial products without a state aid element, in accordance with the "market economy investor" principle. In this case, they must act on the same terms (pari passu) as a private investor.
Since the purpose of counter-cyclical development banking is to alleviate cyclically induced credit constraints in the market (both in terms of quantity and price), any development bank measures towards this end fall under the scope of state aid. To ensure efficiency and timeliness, which are important qualities of stabilization policy, development banks should therefore design counter-cyclical measures in accordance with GBER or De Minimis regulations. This in practice means acting counter-cyclically in the areas of structural market gaps, where development banks already operate.
In operational terms, a counter-cyclical development banking strategy on Member State level requires a sufficient financial capacity of national development banks. In order to maintain this capacity, they may have to maintain a certain amount of liquid reserve assets to allow their quick reactivation in times of a crisis. Even more importantly, they would also have to maintain favorable market access during the crisis to be able to scale up their activities. Given their government backing, this access is closely linked with market access of the government, which proved to be a problem for some governments during the euro area crisis. Counter-cyclical development banking therefore works best in combination with prudent fiscal and structural policies, which enable governments and development banks to maintain high credit ratings. Development banks also require an exit strategy from counter-cyclical measures, since these measures need to be scaled back once the crisis subsides and financial system resumes its normal functions.
Another operational issue for counter-cyclical activities is sufficient human resource capacity and flexibility. This is particularly relevant if development banks conduct a substantial part of counter-cyclical activities through direct (Tier 1) lending to final beneficiaries, which is more human resource

level (through the European Semester) and the Member State level (through newly established fiscal councils). While these changes were designed to ensure sound fiscal policies that may lend more room to automatic fiscal stabilisers, they substantially constrain Member State discretion, which may be needed in a severe asymmetric downturn.

8 The European Commission is also pushing for a gradual establishment of a euro area fiscal stabilisation mechanism. This path, however, appears to be riddled with political setbacks without a clear end in sight.

intensive, as opposed to indirect (Tier 2) lending, where they can rely on the expertise of commercial banks.
Relative importance of Tier 1 development bank activities for stabilization in the euro area may increase as a result of a low interest rate environment and substantially expanded arsenal of non-conventional monetary policy measures, which reduce the attractiveness of Tier 2 development bank lending for commercial banks.
Finally, any attempt of counter-cyclical development banking needs to consider the downsides of government ownership of banks. Numerous studies have shown that government's attempts to address market failures may backfire due to government failure, which may be the result of either incompetence or corruption. In support of this argument, empirical studies mostly confirm worse business performance and politically motivated decisions by state-owned banks (La Porta, Lopez-de-Silanes & Shleifer, 2002; Sapienza, 2004; Dinç, 2005; Jackowicz, Kowalewski & Kozłowski, 2013). A prudent counter-cyclical strategy therefore necessitates adequate safeguards in corporate governance practices to minimise political pressure. In particular, development banks should be operationally independent, run professionally in accordance with sound development banking practices and pursue counter-cyclical interventions on a financially sustainable basis (Smallridge & de Olloqui, 2011; Rodríguez et al., 2013).

6. Conclusion

Counter-cyclical development banking in the euro area is relevant in light of the flaws of the existing euro area macroeconomic stabilization framework. In particular, the absence of a common fiscal stabilization mechanism in the euro area in combination with limited discretion of national fiscal policies due to strict budget rules create an unfavorable environment for mitigation of asymmetric shocks on Member State level. Development banks could help to address this shortcoming through counter-cyclical provision of credit.
Economic arguments lend support to the concept of counter-cyclical development banking. The size of structural market gaps of the financial system, which provide economic rationale for development banking, expands and contracts over the business cycle because of the pro-cyclical nature of the financial system. By expanding their role in recessions and scaling it back in upswings, development banks could help stabilise the flow of credit and smooth the business cycle, reducing the need for fiscal stimulus. By acting counter-cyclically in the areas of recognised market failures, they could address the structural and cyclical components of market failures at the same time, increasing long run growth opportunities along the way. Empirical evidence shows that development banks (and more broadly, public banks) in fact behaved counter-cyclically or at least less pro-cyclically than the private sector during the last financial crisis.
Any future consideration of counter-cyclical development banking in the euro area also needs to take into account regulatory and operational constraints. Counter-cyclical measures have to comply with EU state aid rules. Development banks also need financial and human resource capacity and flexibility to pursue a counter-cyclical strategy. Finally, they should remain operationally independent and adhere to sound development banking practices in order to avoid the pitfalls of government ownership and political interference.

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UDK 336.71

Bank Business Model Assessment A Quantitative Approach

*Simon Jazbec**

The current business models of banks are facing changes. With unprecedented long-lasting low interest rate environment putting pressure on their profitability, continuously increasing post crisis regulatory requirements imposed by supervisors and regulators, the advent of fintechs and other innovative technologies, and the ongoing process of consolidation, the banking landscape is going through irreversible transformations. It thus comes as no surprise that supervisors are gearing up for upcoming changes by focusing on business model assessment from different angles. One of the paramount building blocks of such analysis is the development and use of advanced quantitative tools that enable users to better understand current business models and monitor their future developments in a forward-looking manner.

JEL G21

1. Introduction

Most quantitative approaches used by supervisors are commonly focused on assessing different risks (i.e. risk-based approach). Indeed, the Bank of Slovenia's (BoS) Bank Business Model Assessment (BBMA) tool is no different. The first step in understanding such approaches is thus to define what kind of risks need to be assessed. In case of banks the business model risk can be defined as the bank's inability to generate adequate profit and growth in the course of its business as an inherent fact of the institutions business model and not because of a specific risk. This definition, although being a bit convoluted, points out several perspectives:

- The definition is focused on both future profitability and future growth of the institution.
- The risk is not measured only through achievement of growth and generation of income, but both have to be adequate. The adequateness is gauged in a relative sense, since the institutions interact in a competitive market with several exogenous factors having a direct and indirect impact.
- The risk is not primarily focused on individual classical banking risks (e.g. credit risk, liquidity risks, etc.) but is focused on inherent features that describe the business model of the bank. Nonetheless, the channels through which the business model risk is eventually manifested are often a mixture of classical risks.

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- The inherent features can range from general macroeconomic and market developments, to more specific cases such as business decisions that include pricing of products, risk concentrations and planed strategies (either unrealistic or inadequate).
- Most often, the risk is measured by assessing the banks viability and sustainability, since both are ultimately the culmination of a number of business model specific developments. A good tool, however, has to have the capability to decompose both into granular building blocks in order to identify relevant risk drivers.

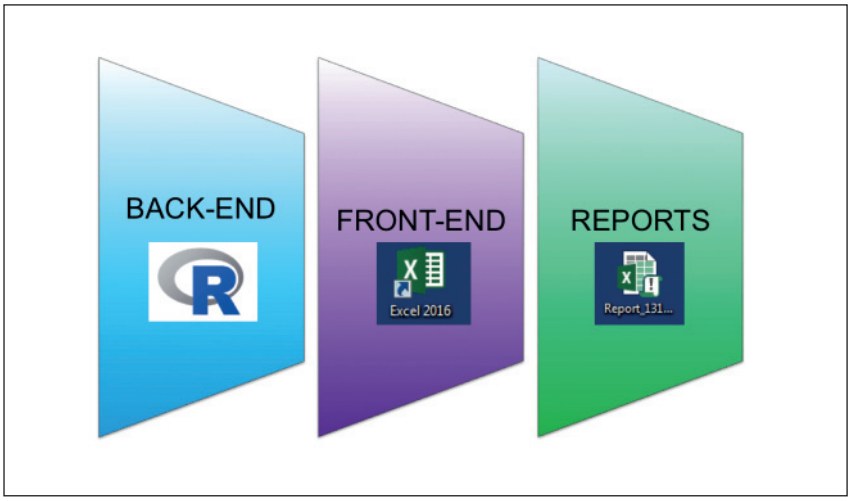
Business model assessment is thus a wholesome process (combination of qualitative and quantitative approaches) that enables the supervisor to understand the functioning of the institution on a forward looking basis.

II. Technical aspects of the tool

From a technical perspective, the tool has been designed in such a way that it optimally fits in the BoS infrastructure as well as covers the operational aspects of supervisory activities. It is composed of three parts: the back-end ("brains behind the tool"), front-end (the tool control panel) and the final results in the form of Excel based reports. Organisationally the tool is under the management of tool experts (back-end, front-end); while the reports are prepared for the end-users (bank custodians and analysists).

The back-end has the data preparation function utilizing all available and relevant supervisory data of the BoS (Chapter IV). This technical module also contains the forecasting methodology composed of different kinds of models (Chapter V). It also performs the clustering calculation used for benchmarking purposes (Chapter VII).

Figure 1: Technical composition of the BBMA tool (author's own representation).



Although this part is highly automatized, the results go through a detailed quality assurance process before being accepted as final reports (Chapter IX).

The front end is the "control panel" of the tool designed in such a way that all the end users (in terms of technical knowledge and software availability) may use the tool, given the proper clearance and training. The main objective of the tool is to generate bank level reports that contain both historic and forecasted figures of balance sheet items, P&L statement and KPIs for each individual bank (chapters VI and VIII). The reports are completely aligned with other sources of supervisory data, have a "toy model" functionality[1] and allow multilateral use[2].

III. Framework

In terms of its construction, the BBMA tool has a very strong stress testing (ST) framework resemblance, although only focusing on the baseline calculation and its extensions[3]. To better understand its components and functioning it is thus important to identify how the tool fits into the world of stress testing.

The below figure represents a schematic chart explaining how the BBMA tool (yellow block) is located in relation to other classical stress testing concepts. The Y-axis determines the theoretical precision of each type of stress tests, i.e. the higher position on the axis denotes greater (theoretically) possible precision achieved by the simulation. Meanwhile the X-axis measures how much the supervisor is involved in the process, i.e. the further position is on the right the more the supervisor is participating in the exercise.

- Pure bottom-up ST are at position zero in terms of involvement (the entire simulation is completely under the control of the bank). At the same time, this allows the bank to reach (at least in theory) the highest possible precision of the calculations[4].
- In reality the before mentioned pure bottom-up stress test are a

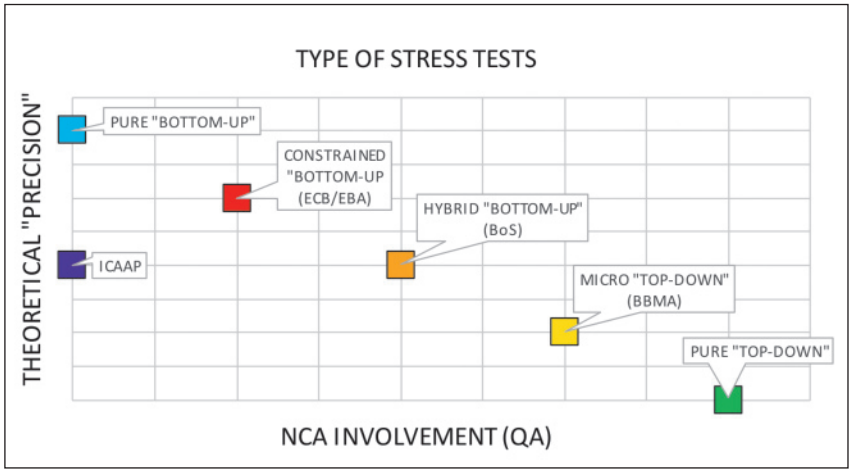
1 Recalculations can be performed in real time by changing conditions and parameters, overriding forecasts, adjusting relationships and imposing expert-judgment based overrides.

2 Built in a modular fashion, the tool enables inclusion of specific top-down calculations or targeted models as well as incorporation of other in-depth bottom-up pieces of supervisory information not part of regular reporting.

3 Artificially constructed »what if« expansions of the baseline scenarios.

4 Use of own methodology, inclusion of all available data, dynamic balance sheet and the ability to develop more detailed/sophisticated models.

Figure 2: Different type of stress tests in terms of precision and supervisory involvement (author's own representation).



theoretical maximum that is seldom reached by the bank's internal ST such as ICAAP.

- The EBA/ECB SSM conducted supervisory stress tests are a form of constrained bottom-up calculations[5].
- The hybrid approach is in the last years used by the BoS for smaller Slovenian banks, for which the EBA methodology is too complex (the proportionality principle). This method offers simplifications and is further enriched with more top-down elements.
- On the other end, one can find pure top-down stress tests that are completely independent from the tested institution (besides leaning on the regularly reported data). The supervisor performs all calculations by using internal methodology. Due to data limitations, the modelling is usually performed at higher level of aggregation (e.g. system level forecasts).
- Finally, the BBMA tool is situated somewhere between the hybrid bottom-up approach and top-down stress test. The name "micro-top-down" is a good description of its position, since the calculations are almost entirely done by the supervisory based on regularly reported data. However, the "micro" component denotes that the calculations tend to be performed on very granular bank (product) level basis and are often combined with parameters taken for other bottom-up sources.

IV. Data

The data is the cornerstone of all quantitative based tools and analyses. Data limitations thus govern both the level of detail (granularity) and the complexity of modelling. On the other hand, a good data source can enable the supervisor to perform very detailed calculations that in some aspects can surpass bottom-up calculations. In building the BBMA database several data sources were assessed based on consistency, quality, time series length, granularity and level of detail[6]. The sources used include the Matrix (PORFI), ITS reporting and credit registry data, while the macro-economic scenarios are based on forecasts prepared by the BoS.

V. Modelling

A common misconception related to forward looking quantitative models (especially ST) is that they are predicting the future. In fact, the misunderstandings go so far as to claim that the adverse scenarios used in such simulations are a representation of future developments. Neither is true. The scenarios used in such simulations are at best (in case of baseline scenarios) educated[7] guesses about the future[8], while the adverse scenarios represent tail-end risk manifestations that are by definition severe but still probable.

Since predictions in complex and sometimes chaotic environments (such as economic systems), where fundamental laws of interaction are not always exactly known and all relevant effects cannot consistently be considered, are impossible, the models thus tend to maximize the forecasting accuracy. Forecasting is hence a means to make an educated guess of the future by applying all the available information up to the time present while leaning heavily on different statistical approaches. The choice of the approach (i.e. model) is always determined by taking into account the data limitations as well as the goals of exercise. In terms of modelling aspects considered in the BBMA tool, they can be summarised in three parts:

- The classical econometric models (equations) used are usually based on *ex-ante* relations either as part of the analysis or found in relevant literature. Finding the correct relation means performing statistical tests and subjecting the results to underlying economic rationale and restrictions.

5 Use of complex and conservative methodology and templates, static balance sheet assumption and strict QA process.

6 Besides regular reporting, only one additional report is requested from the banks – predefined summary template that gathers banks' own point-of-view based on their regular plans and strategies.

7 Based on historic figures and backed up by coherent statistical models.

8 In a continuous probability space (which is a good approximation of reality), such scenarios have the highest probability density, while the probability of exactly such events occurring is still small.

- The machine learning approaches used focus on not knowing the exact relations between variables (*ex post* relation definition), thus constructing a computer algorithm to continuously (i.e. each time the algorithm is ran) learn from the data and adapt/find the models. Some of the advantages of such processes are that they are dynamic and highly automatised, which means they are quick to adapt to new pieces of information[9]. Conversely, such approaches often lack economic rationale (predominately relying on pure statistics) and are not easy to interpret ("black box" approach).
- The last building block that is often superimposed on the previous two examples are the expert corrections. In some case, the data simply do not allow economically sound models to be constructed, while in other cases the "forecasts" are inherently meant to be overridden by the end users.

Before any of the forecasts are accepted in the report, they go through supervisory check-up composed of three stages: i) an algorithm constructed to detect outliers (compared to system and/or peers), ii) system correction algorithm that insures aggregate consistency and iii) expert judgement and corrections. After the models are imported into specific reports, the calculations further go through the process of calibration (explained in Chapter IX).

VI. Calculations

Calculations are the means of interconnecting different present (and historic) values and bridging them with their future evolution. In general, four types of calculations have been considered.

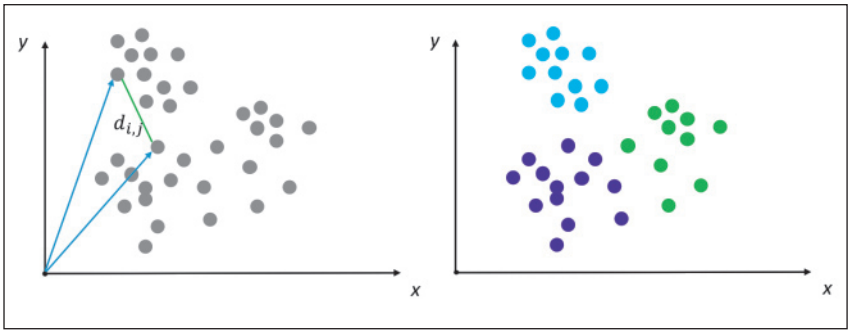
- Model forecasts: In case, the forecasts are modelled (e.g. new lending growth rates); the variables are applied on relevant historic figures. In reality, the construction of the balance sheet item developments is not just based on new lending growth rates, but has to take into account effects such as loan maturity profile (and amortisation) as well as other credit risk based effects.
- Expert-based models: In some cases, the supervisory database simply does not contain the level of detail required to accurately model a specific category or the item is subjected to specific (future) business decisions of the institution.
- Historic averages: In some cases, specific variables serve only as parameters in calculating the "what if scenarios" through manipulation of initial (default) values constructed from historic averages.
- Behavioural mechanisms: The model also contains behavioural mechanism embedded in its infrastructure. This means that some reactions (for example balance sheet adjustments) can happen automatically. A simple example is the manipulation of liquidity with regard to other balance sheet items, where this behavioural aspect can be viewed as a plug between assets (loans) and liabilities (deposits). Both quantities have different underlying factors governing their growth and are unevenly distributed between the banks within the system. The tool is constructed in such a way that it tries to keep a stable liquidity position (too little liquidity is risky, too much liquidity is expensive) based on historic averages by investing excess funds in for example government bonds (or selling the latter vice versa).

VII. Clustering

The idea of performing clustering analysis within the BBMA tool is threefold: (i) defining (separating) business models, (ii) detecting changes to business models (moving of banks from one cluster to another) and (iii) defining relevant peer groups for benchmarking purposes. In theory, clustering is a process of quantitatively and/or qualitatively separating a set of elements based on a specific metrics (characteristics).

For the sake of simplicity, let us show a simple two-dimensional example, where each grey dot represents a single bank with the X coordinate measuring the NPL ratio and Y-axis the banks' profitability (both in a single year). By defining a metrics for measuring the relative positions and applying a clustering method, one can separate the dots into subsets

Figure 3: The construction of clusters based on a two dimensional schematic example (author's own representation).



9 This plays a vital role when dealing with a large set of constantly evolving data or in cases where quick construction of large number of different models is paramount.

(clusters). In this schematic example, the interpretation is quite simple. The green dots represent high NPL banks with modest profitability, the purple dots low NPL banks with low profitability and blue dots low NPL banks with high profitability.
In theory, several variables (dimensions) are considered simultaneously in a multidimensional model. For example, business models can be defined by using size variables (separating banks into large and small entities), geographical characteristics (defining domestic and international banks), the ownership structure (for example separating the state owned and foreign owned banks), client base variables (e.g. the distinction between corporate or retail lenders), the source of funding (e.g. deposit and wholesale based banks) or the source of income (for example providing the distinction between lenders, universal banks and investment banks).

VIII. Reports

The main goal of the tool is the generation of bank level reports in form of Excel files. The reports are generated automatically; however, they have to go through a comprehensive approval process. This means that the reports are calibrated during special workshops hosting the end-users (bank custodians) and the BBMA tool experts. In the calibration phase, all forward-looking components are reassessed in terms of reliability, realism and inclusion of other relevant micro (bank specific) components.
The reports contain all relevant information in form of historic (up to five years) and future (up to three years) figures, both on quarterly basis. The main sheet (called the summary sheet) is composed of all relevant balance sheet figures, P&L statements and KPIs in form of tables and accompanied by user-friendly charts. The files furthermore contain several additional sheets with linked relationships between the variables so that any changes in the calculation are automatically refreshed in the report.
As mentioned in Chapter IV, Slovenian banks are requested to submit their plans and strategies on a predefined template based on the tool's summary sheet. The goal of this process is to completely align both outputs (the template's and tool's) in terms of structure and definitions. The end-user can therefore compare the bottom-up bank's view with the supervisory view with the aim of objectively assessing the banks business model. Furthermore, the micro top-down calculation enables the analyst to perform the testing of the underlying assumptions and ultimately provides a forward-looking assessment of viability and sustainability.

IX. Conclusion

The tool fundamentally serves three distinct purposes: (i) creating an independent supervisory point-of-view on future developments of each bank and its business model, (ii) understanding bank business models and their business plans and (iii) challenging those plans and strategies.
The first part is at its core a baseline top-down calculation calibrated by different micro components coming from either more detailed (satellite) models, a bank's own calculations and/or expert knowledge of a specific bank. The second part is focused on using the tool as an analysis platform that gives the end-user in-depth understanding of banks' business models, business plans and strategies. For example, if a bank reports a certain net interest income figure for the next few years and the tool provides a different figure, the user can use the tool to determine where the difference comes from. The differences can stem from (a) different transmission of macro environment onto crucial variables (modelling effect), (b) different views on future yield curves (outlook effect), (c) different evolution of balance sheet items (volume effect), (d) different pricing of specific products (price effect) and e) different valuation of credit parameters (risk effect). The identified differences can thus serve as a basis for part (iii)) where a constructive and quantitative based dialog between the supervisor and the supervised entity can be established.
Of course, the tool enables the supervisors to perform several other activities. For instance, supervisors can play with alternative scenarios ("what if" scenarios), can quantize the effects of business decisions (changes to portfolio, sale of items, introduction of new products, changes to pricing, and ultimately changes to the business model) as well as calculate the effects of mergers and consolidation.
The BBMA tool provides a rich set of new information supervisors can use when monitoring the business models of supervised banks, but the tool as such does not give any final answers. The final judgement is always an assessment that has to be a combination of different approaches (quantitative and qualitative) leaning on several sources of information.

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Internal documentation of the Bank of Slovenia

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Credit Growth After the Crisis: Evidence from Firm-Level Data.

*Arjana Brezigar Masten and Robert Zorko**

The purpose of this paper is to provide additional insights into the credit growth dynamic in Slovenia in the years following the onset of the global financial crisis. Our findings complement existing literature by linking firms' characteristics from standard business register data with information from the Survey on Access to Finance in Slovenia. Using a sample of Slovenian firms for the period 2003-2018, we analyse contemporary developments in credit growth and financing decision. In addition, credit allocation is tested with the dynamic function of credit growth allocation using a generalised method of moments (GMM). Findings show that post-crisis economic growth is less credit-dependent: after the severe deleveraging process, Slovenian corporate sector depends more on internal resources and to lesser extent on external funding, representing an important challenge for the banking system.

JEL E51, G30, G31, G32, O52

1. Motivation

Slovenia joined the European Union in 2004 and adopted the common European currency in the beginning of 2007. This new environment, characterised by a boundless access to a favourable wholesale financing, changed the model of Slovenian economic growth, in particular private investment, which became highly credit-dependent. However, crisis stalled the momentum. The interbank lending market froze and the growth model collapsed, resulting in a significant restructuring of the economy.

After years of subdued economic growth with pronounced deleveraging process of the corporate sector and recapitalisation of largest banks in 2013, the domestic economic and political uncertainties gradually diminished. The recovery was strongly supported by favourable developments in the external environment that boosted production in the export-oriented sectors.

The economic activity, measured as the y-o-y growth of nominal GDP, returned into positive territory in the middle of 2013 and remained robust and relatively solid onwards, averaging at around 5%. On the other hand, following several years of deleveraging process, credit growth to NFCs started to pick up only in mid-2017 but remained rather low (Figure 1).

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Therefore, it seems that the conditions in the economy changed during and after the crisis period and that bank lending is not as important of a financing source for economic activity, and financing of firms in particular, as it was a decade ago.

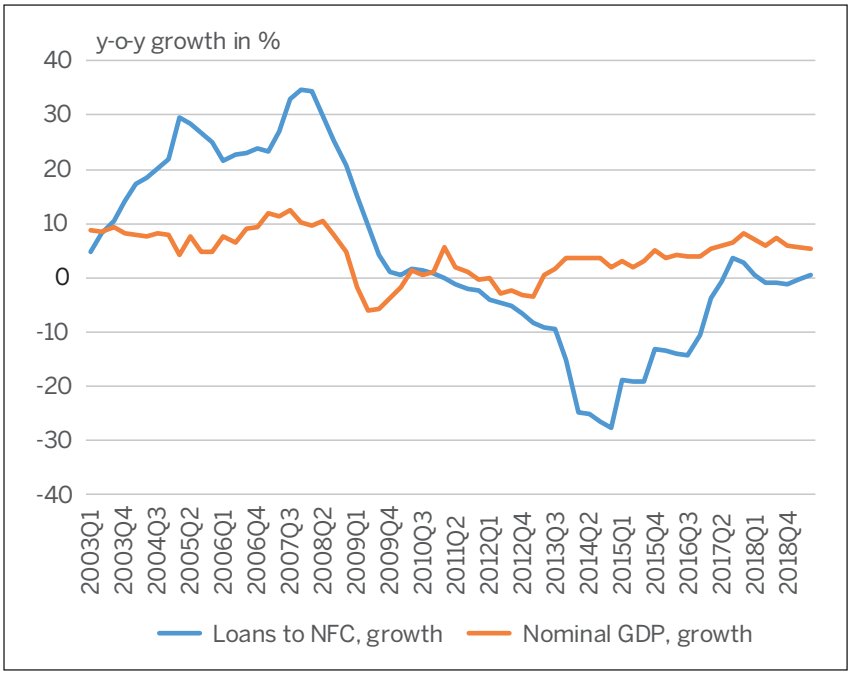
In this paper, we would like to (1) highlight a new economic setting, which reflects the impacts of the crisis and restructuring processes of the Slovenian corporate sector and (2) point out related challenges that the banking sector might face in the future. The analysis is based on firm-level data from Slovenian Business Register (AJPES database), and is complemented with the insights from an annual Survey on access to finance in Slovenia, conducted by the Bank of Slovenia and SID Bank.

2. Indebtedness of the Slovenian corporate sector and credit growth dynamics over time

Slovenian firms entered the crisis highly indebted, with total debt[1] reaching historically highest level of almost EUR 70 billion in 2008 and 2009 (Figure 2). After the onset of the crisis and the sharp decline in interbank lending, the external sources for financing became very limited. Moreover, Brezigar Masten & Lušina (2011) show that, after 2008, banks became more attentive and selective in issuing new credit to the corporate sector. In 2018, total debt stood at around EUR 50 billion, almost EUR 20 billion lower than a decade ago (or 25% of the total debt of the corporate sector in 2008).

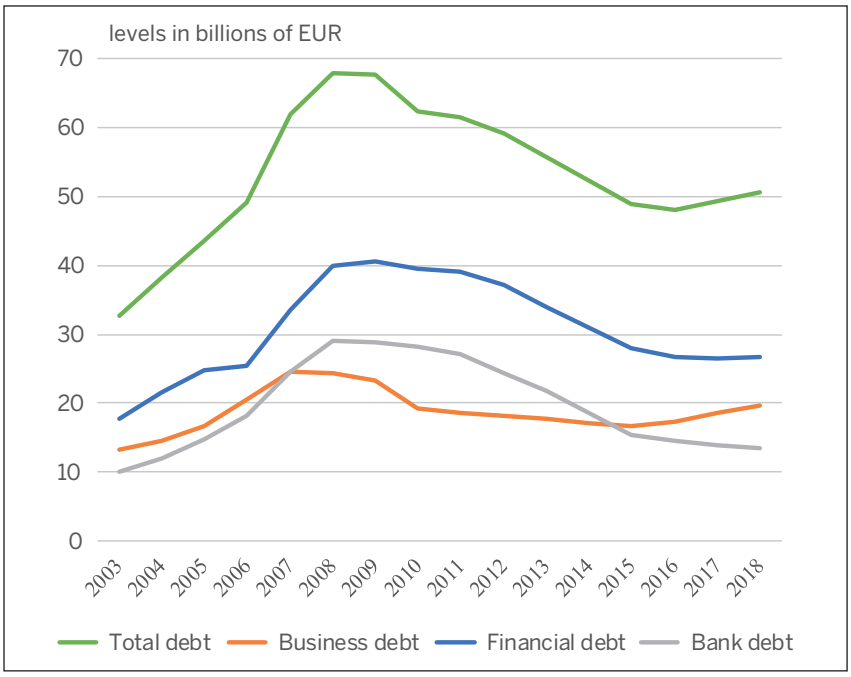
The main part of this deleveraging represents the decrease of financial liabilities to banks[2]. Bank debt of the Slovenian corporate sector has been reduced over the last decade by almost EUR 16 billion, i.e. half of the bank debt level in 2008. An important portion of the reduced bank debt is a consequence of exiting firms[3] that stopped operating, amounting to app. EUR 8 billion. On the other side, existing firms managed to reduce their lia-

Figure 1: Nominal GDP growth and credit growth to NFCsLoans



Source:SORS, Bank of Slovenia, suthors' calculations.

Figure 2: Indebtedness of the Slovenian corporate sector



Source: AJPES, authors' calculations.

1 Total debt = provisions and long-term accrued costs and deferred revenues + long-term liabilities + short-term liabilities + short-term accrued costs (expenses) and deferred revenues.

2 Bank debt = long-term financial liabilities to banks + short-term financial liabilities to banks.

3 For exiting firms, we follow the same methodology as explained in IMAD's short analysis on Indebtedness of Slovenian corporate sector (in Slovenian, Zadolženost podjetniškega sektorja), October 2018, p. 8: "exiting firm" stands for a firm, which did not disclose annual financial statements.

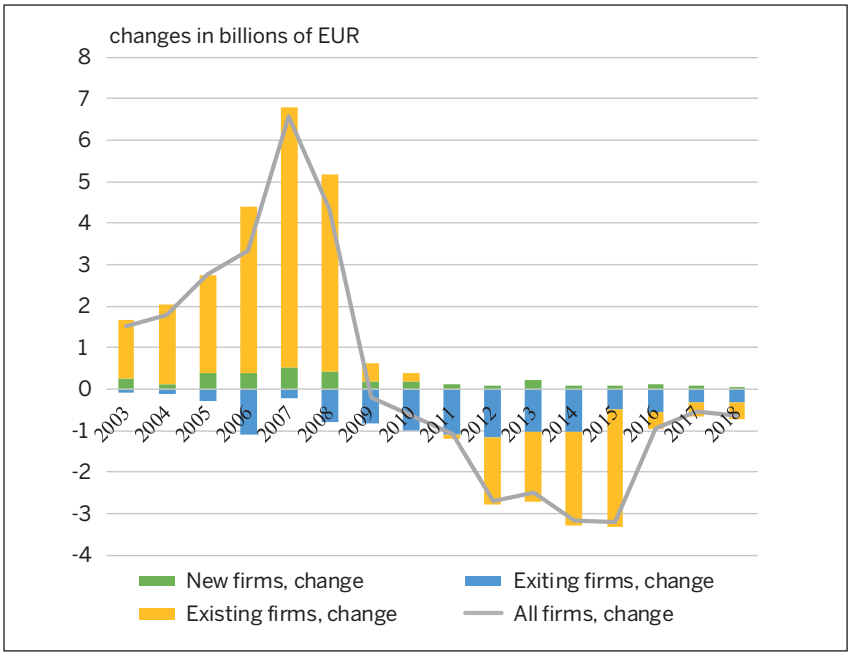
bilities to banks by around EUR 9 billion cumulatively from 2008 onwards. As of 2018, total liabilities of Slovenian corporate sector to banks amounted to around EUR 13 billion (Figure 3).

As a result, the share of bank debt in total financial debt[4] of corporate sector decreased from 35% in 2008 to around 25% in 2018, suggesting lower importance of bank debt as a financing source for firms in comparison to the pre-crisis period.

Main reason for this trend is related to the financial situation of the corporate sector, which is now in a much better shape than a decade ago. Actually, Brezigar Masten & Lušina (2011) show that the deleveraging process in Slovenia in the recent years has been widespread across the corporate sector, regardless of the export orientation, ownership structure, sector, age and size of the firms. However, some trends remain challenging.

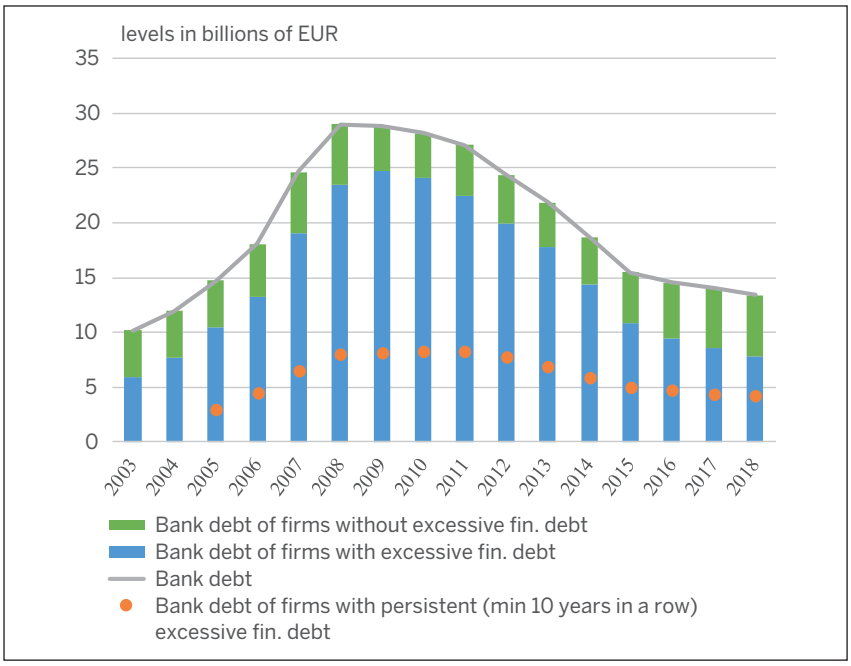
In fact, the concentration of bank debt remains high over the entire period 2004-2018 (Figure 5): 10 firms with largest bank debt hold almost one third of total bank debt of corporate sector and 50 firms around one half of total bank debt, suggesting high importance of a rather small number of companies for the banking system. In addition, a significant share of total bank debt is held by over-indebted firms[5]. These firms hold around EUR 8 billion of bank debt, representing almost 60 % of total bank debt of corporate sector (Figure 4). Furthermore, persistently over-indebted[6] firms hold almost one third of total bank debt. Bank debt of such firms has been the highest in 2010, accounting for around EUR 8 billion and has halved during the deleveraging period. However, the importance of persistently over-indebted firms is now higher than in the pre-crisis years. Such firms generate around 5.5% of total sales[7] of the Slovenian corporate sector. On the

Figure 3: Change of bank debt of the Slovenian corporate sector



Source: AJPES, authors' calculations.

Figure 4: Bank debt by indebtedness of firms



Source: AJPES, authors' calculations.

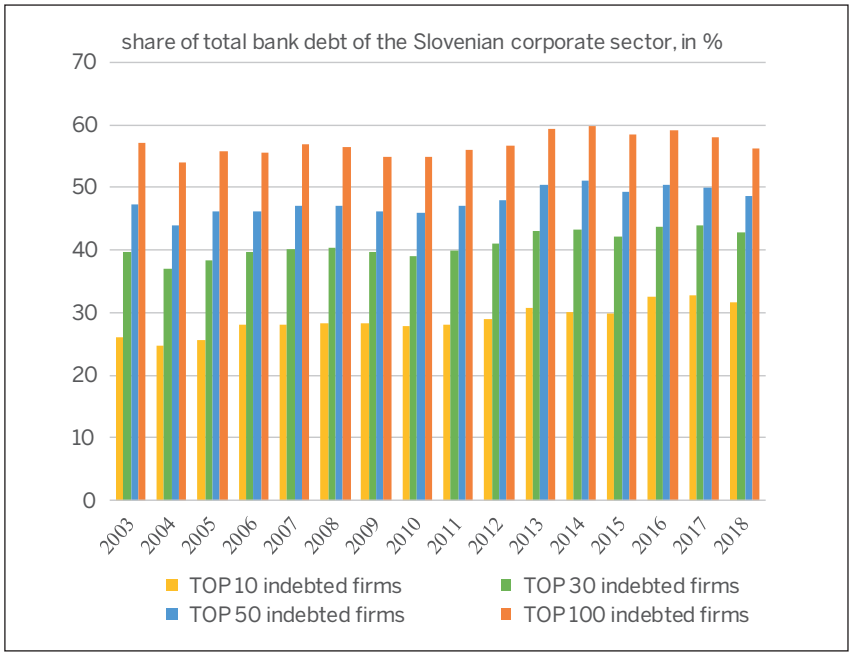
4 Financial debt = long-term financial liabilities + short-term financial liabilities.

5 Over-indebted firm refers to a firm 1) holding an "excessive financial debt" – ratio of financial debt (long-term financial liabilities + short-term financial liabilities) over EBITDA (net profit + depreciation) higher than 5 or 2) having negative EBITDA. For "Excessive financial debt", we follow the same methodology as explained in IMAD's short analysis on Indebtedness of Slovenian corporate sector (in Slovenian, Zadolženost podjetniškega sektorja), October 2018, p. 2.

6 Persistently over-indebted firm refer to a firm, which is considered as over-indebted for at least 10 years in a row. Therefore, data is available only from 2005 (max. 10 years of observations for a specific firm, since the AJPES provides data from 1995 onwards).

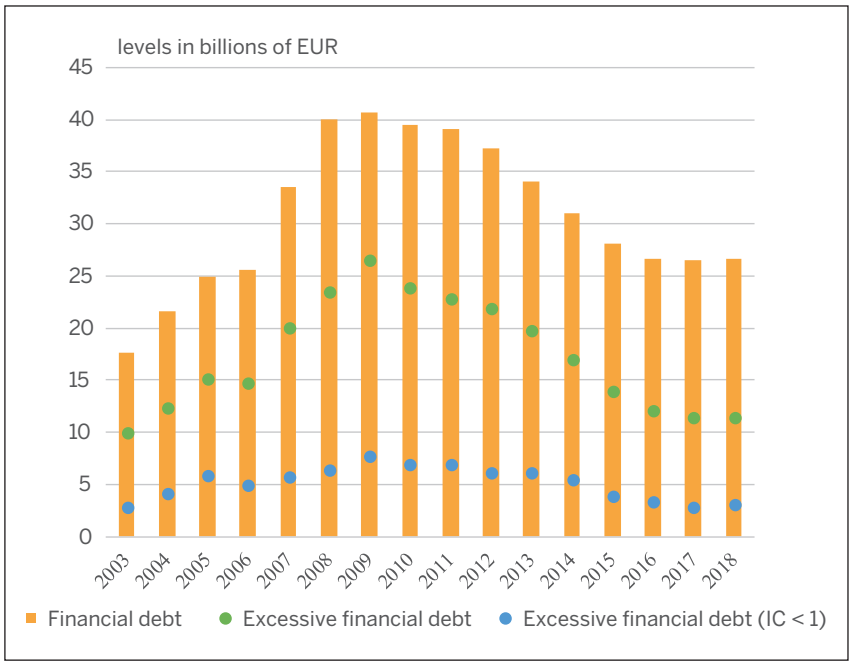
7 Total sales: net sales include net sales on the domestic market, net sales on EU market and net sales outside the EU market.

Figure 5: Concentration of bank debt



Source: AJPES, authors' calculations.

Figure 6: (Excessive) Financial debt of Slovenian corporate sector



Source: AJPES, authors' calculations.

other side, the importance of all over-indebted firms is decreasing over time and in 2018 represented around 20% of total sales of corporate sector. Nevertheless, excessive financial debt still represents more than 40% of total financial debt of Slovenian corporate sector, which is significantly lower than in the crisis period. Furthermore, more than 25% of excessive financial debt pertains to firms that have difficulties with the payment of interest on outstanding debt[8] (Figure 6). These firms nowadays employ around 3% of all employees in the corporate sector (more than 10% in 2009) and their total sales represent only 2% of total corporate sector sales (around 7% in 2009).

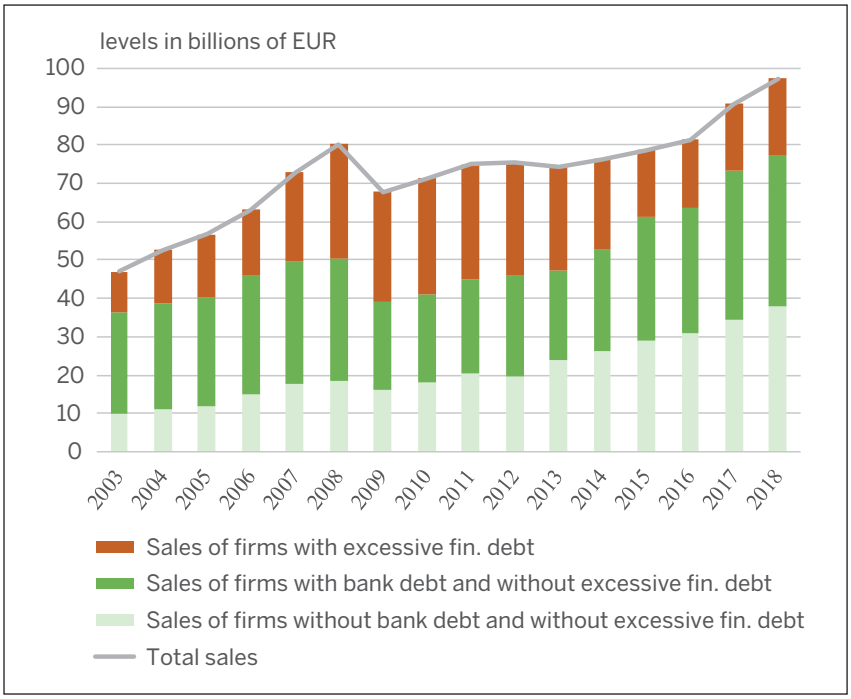
A new challenge for the banking system pertains to firms without any bank debt. In the literature, such pattern is identified as a "*zero-leverage phenomenon*" and describes the persistent financing policy of firms that rely completely on internal financing sources and do not seek any bank credit. The importance of such firms has been firstly investigated by Strebualev & Yang (2013) and additionally confirmed by other studies, e.g. Dang (2013), Bessler et al. (2013), Zirek (2014), Kokoreva & Ivanova (2016). The existence of the phenomenon is confirmed in both advanced and developing markets. Regarding the latter group, Kokoreva & Ivanova (2016) show that the percentage of unleveraged firms in developing countries accounts for approximately 20% of their total corporate sector, with – however – high heterogeneity across countries, i.e. from 8% in Bulgaria to 41% in Romania. Nevertheless, contemporary corporate structure policies can be supported largely by one of the most prominent economic theories investigating corporate capital structure, i.e. the pecking-order theory, which has been extensively analysed in finance literature and has its roots already back in the middle of previous century. Pecking-order theory has been introduced by Myers (1977) and Myers & Majluf (1984), who postulate that profitable firms – in general – prefer internal sources to external ones. In any case, it seems that zero-leverage phenomenon is of high importance for the entire economy, but in particular for the banking system. Regarding Slovenia, the importance of such firms has also increased significantly in the recent years. Such firms employ more than 40% of all

8 Interest coverage ratio = financial expenses for payment of interest / EBITDA.

employees in the corporate sector and their total sales represent around 40% of total corporate sector sales, almost 20 percentage points higher than in the pre-crisis years (Figure 7). The same numbers hold for the share of employees that such firms employ. The pool of potential borrowers is therefore shrinking, causing a risk for the future bank profitability and forcing banks to reconsider their current business models.

For the banking system the pool of firms with no liability to banks – in general – represents an important source of potential highly bankable borrowers that could increase credit demand. However, Strebulaev & Yang (2013) show that zero-leverage behaviour is a rather persistent phenomenon. A similar conclusion can be found also for the Slovenian case. Based on the results[9] from the Survey on the access to finance in Slovenia, which is conducted annually by the Bank of Slovenia and SID Bank, around 75% of firms without any bank debt do not seek for any external sources of financing. On the other side, this ratio is much lower for firms with existing liabilities to banks, averaging around 30%. Nevertheless, this is also increasing over time, which suggests alarming signals for the sector. The reasons behind the rationale of firms that do not seek a new credit are different. Based on the Survey results, firms without bank debt rely mainly on internal funds. The supply-side factors, such as high costs of external financing and high collateral requirements, have been much more evident during the crisis and in the first post-crisis years and have become less important lately. This latter phenomenon can be to some extent explained by the accommodative monetary policy of the European Central Bank and the consequent low-interest rate environment providing favourable financing conditions for the corporate sector. The reasons reported by the firms with existing liabilities to banks are slightly different. The importance of the supply-side factors is higher, where not only unacceptable collateral requirements and high costs of financing, but also a fear that the application for external financing sources will be rejected represent a decisive factor. However, like in the first group of firms, the importance of these factors has been lower in the last two years. Demand for external financing is limited mainly because of the availability of internal sources, and more cautiousness in the investment activities of such firms. Around 10% of firms with bank debt reported that they did not seek new financing because of the postponement of the investments. Consequently, trends in new bank credit growth reflect such contemporary models of corporate capital structure. Decomposition of new bank debt

Figure 7: Total Sales of the Slovenian corporate sector



Source: AJPES, authors' calculations.

9 Firms included in the Survey employ around 15% of all employees in the corporate sector in Slovenia and their net sales exceed 17% of total net sales of corporate sector. Sample of firms included in the Survey is distributed as follows: approximately 56% of all included firms represent micro firms, 24% small, 11% medium and 8% large.

Have you use / seek for an external source of financing in the corresponding year?						
Year	Firms with bank debt			Firms without bank debt		
	# of firms	Yes	No	# of firms	Yes	No
2012	207	80.2	**19.8**	165	24.2	**75.8**
2013	487	71.5	**28.5**	327	26.3	**73.7**
2014	436	72.2	**27.8**	366	28.1	**71.9**
2015	432	73.8	**26.2**	357	26.3	**73.7**
2016	556	65.1	**34.9**	455	21.1	**78.9**
2017	465	66.2	**33.8**	410	22.4	**77.6**
2018	470	60.6	**39.4**	423	20.3	**79.7**

Source: AJPES, Survey on the Access to Finance in Slovenia, authors' calculations.

What is the main reason that you did not use or seek for an external source of financing in the corresponding year?								
Year	Firms with bank debt							
	# of firms	Internal sources	Investment postponed	Process too complex	Costs too high	Collateral requirements not acceptable	Possibility of rejection too high	Other reasons
2012	41	**39.0**	**7.3**	2.4	17.1	**12.2**	4.9	17.1
2013	139	**33.1**	**9.4**	4.3	8.6	**15.8**	11.5	17.3
2014	121	**38.0**	**9.9**	8.3	5.0	**12.4**	5.8	20.7
2015	113	**44.2**	**6.2**	3.5	8.8	**14.2**	6.2	16.8
2016	194	**41.2**	**5.2**	4.1	7.2	**12.4**	5.2	24.7
2017	157	**48.4**	**10.8**	6.4	4.5	**7.6**	3.8	18.5
2018	185	**52.4**	**8.1**	5.4	3.2	**5.9**	4.3	20.5
Year	Firms without bank debt							
	# of firms	Internal sources	Investment postponed	Process too complex	Costs too high	Collateral requirements not acceptable	Possibility of rejection too high	Other reasons
2012	125	**61.6**	6.4	4.0	4.8	7.2	1.6	14.4
2013	241	**59.3**	4.6	4.1	6.2	8.3	3.7	13.7
2014	263	**57.0**	4.6	4.6	6.5	7.6	2.7	17.1
2015	263	**67.7**	3.8	1.9	4.9	8.0	2.7	11.0
2016	359	**64.9**	4.5	3.3	3.1	7.8	1.9	14.5
2017	318	**70.1**	3.8	3.8	1.9	6.6	3.8	10.1
2018	336	**72.9**	4.2	1.2	3.3	4.5	3.0	11.0

Source: AJPES, Survey on the Access to Finance in Slovenia, authors' calculations.

growth shows that new credit is allocated also to firms with an excessive financial debt, but to a much lower extent than in the pre-crisis period (Figure 8). This observation is in line with Brezigar Masten & Lušina (2011), who confirm more attentiveness and selectiveness of banks after 2008. Nevertheless, the share of new credit allocated to firms with excessive financial debt still represents around 50% of total new bank debt. In comparison to pre-crisis period, this share is much lower, but still represents a high risk for the banking system and could be an important source of concern for the future, in particular in conjunction with contemporary models of the corporate capital structure.

These developments might also reflect the so-called *credit misallocation,* in particular related to the roll-overs of credits to non-viable (zombie) firms. The literature on this topic is also rather vast. Concentrating only on the eurozone countries, several studies in the recent years, including Shivardi et al. (2017), Strotz et al. (2017), Acharya et al. (2019), Andrews & Petroulakis (2019), highlight the importance of such lending practices and study the economic consequences of a rise of so-called zombie firms, defined by Banerjee & Hofmann (2018) as "firms that are unable to cover debt servicing costs from current profits over an extended period". Regarding Slovenia, Banerjee et al. (2017) confirm the presence of a credit misallocation not only before but also during the crisis period. Some of the papers suggest that such credit misallocation is driven particularly by weak banks. In addition, some of these papers also suggest that such lending practices negatively affect also the healthier part of the corporate sector of the specific economy, in particular through the worsening of borrowing opportunities for non-zombie firms. Consequently, such developments usually lead to (1) investment misallocation (shown in Barbiero et al. (2018) by the uniform relationship between higher debt-to-asset ratio and lower investment), and (2) therefore higher output losses in general, in particular for bank-dependent economies. Banerjee & Hofmann (2018) additionally show that the share of zombie firms has increased markedly over time and that the phenomenon has nowadays become much more persistent (probability of a zombie remaining a zombie increased by around 30 p.p. in the last three decades). In this paper, lending to zombies is not analysed, however, the

presented results show that current trends in credit allocation may reflect some signs of such lending practices also in Slovenia. Therefore, it is crucial to further analyse post-crisis credit allocation in Slovenia and thus empirically confirm presented trends.

3. Empirical analysis: How has the financial crisis changed the credit allocation in Slovenia?

In the empirical part of the analysis, we estimate a dynamic function of credit growth allocation in Slovenia using a generalised method of moments (GMM). The empirical analysis replicates the previous estimation for the period 2003-2010, prepared by Brezigar Masten & Lušina (2011), who show that the profitability of firms became an important factor for the credit allocation by banks after the onset of crisis. The main purpose of the replicated estimation is to test whether latter trends are valid also for the post-crisis period.

Credit growth allocation is tested with the following equation on a sample of 12,667 firms with 74,519 observations in the period 2003 - 2018:

VARIABLES	**(1) $rKRE_t$**	(2) $rKRE_t$	(3) $rKRE_t$	(4) $rKRE_t$
$rKRE_{t-1}$	**-0.02*** **	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)
ROA_{t-1}	**-1.03**	-1.18	-1.42	-2.72
	(1.93)	(2.00)	(2.08)	(2.59)
$DK*ROA_{t-1}$	**8.11*** **	8.27***	8.72***	9.31***
	(1.93)	(2.01)	(2.09)	(2.67)
$DKpost*ROA_{t-1}$	**3.88***	3.56*	3.94*	5.21*
	(2.12)	(2.15)	(2.22)	(2.80)
DTA_{t-1}	**-2.01*** **	-2.28***	-2.38***	-2.53***
	(0.62)	(0.64)	(0.65)	(0.72)
$DK*DTA_{t-1}$	**2.98*** **	3.10***	3.22***	3.46***
	(0.64)	(0.66)	(0.67)	(0.75)
$DK_{post}*DTA_{t-1}$	**2.64*** **	2.76***	2.90***	3.09***
	(0.66)	(0.67)	(0.67)	(0.76)
DK	**-2.64*** **	-2.73***	-2.82***	-3.02***
	(0.50)	(0.51)	(0.52)	(0.60)
DK_{post}	**-2.43*** **	-2.51***	-2.63***	-2.79***
	(0.50)	(0.51)	(0.52)	(0.61)
size		0.18***	0.17***	
		(0.05)	(0.05)	
PMI in Manufacturing			0.0047**	
			(0.0019)	
$rKRE_{t-2}$				0.0009
				(0.0036)
Constant	**1.94*** **	2.02***	1.85***	2.34***
	(0.48)	(0.49)	(0.52)	(0.57)
Observations	**74,519**	74,519	74,519	59,830
Number of firms	**12,667**	12,667	12,667	10,283
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Source: AJPES, SORS, authors' calculations.

$$rKRE_{i,t} = \sum_{j=1}^{n} \alpha_j * rKRE_{i,t-j} + \beta_1 * DK + \beta_2 * DK_{post} + \beta_3 * ROA_{i,t-1} + \beta_4 * DK * ROA_{i,t-1} +$$
$$+ \beta_5 * DK_{post} * ROA_{i,t-1} + \beta_6 * DTA_{i,t-1} + \beta_7 * DK * DTA_{i,t-1} + \beta_8 * DK_{post} * DTA_{i,t-1} + \upsilon_i + \varepsilon_{i,t},$$

where $rKRE_{i,t}$ denotes real growth of bank debt of firm *i* in time *t* and *DK* and DK_{post} are two dummy variables referring to the crisis (2009 – 2013) and post-crisis period (2014 – 2018) respectively. $ROA_{i,t}$ and $DTA_{i,t}$ represent return on assets and total debt-to-asset ratio of firm *i* in time *t* respectively. The empirical analysis[10] confirms the trends presented in the previous chapter, which show that credit growth has been much lower after the onset of crisis in 2009 than before. It also confirms the findings of Brezigar Masten & Lušina (2011) who showed that during the crisis banks became more attentive and selective in credit growth allocation. Additionally, empirical analysis shows that the profitability of firms for the credit allocation by banks remains an important factor also in the post-crisis period, albeit to a somewhat lesser extent. This suggests that banks are nowadays more discerning than they were a decade ago. Results also depict that in the pre-crisis period higher credit growth pertained to less indebted firms. This pattern changed with the onset of the crisis in 2009.

Conclusion and policy implications

This paper shows that the economic conditions changed significantly during the recent crisis. Post-crisis economic growth is thus much less credit-dependent: after the severe deleveraging

10 The results of the dynamic panel-data estimation are rather robust, confirmed with several specifications of the function of credit growth allocation, which include also size category, PMI indicator of uncertainty in the manufacturing sector, etc. Nevertheless, results should be interpreted cautiously since the validity of the instruments has not been confirmed with the Sargan test due to large number of instruments, partly reflecting rather long time dimension. The results of the test for specification (1): Sargan $\chi^2(244) = 462.71$, prob. > $\chi^2 = 0.00$; Arrellano-Bond m1 = -16.97 (0.00), m2 = 0.89 (0.37).
For the empirical part of analysis all firms with less than 5 employees, having no (tangible) assets and being an outliers (taking into consideration ROA, DTA, credit growth rate and labour productivity) are excluded.

process, Slovenian corporate sector depends more on internal resources and to a lesser extent on external funding. The analysis, supported by the findings of the Survey on Access to Finance in Slovenia, shows that there is an increasing pool of firms without any bank debt on one side, but also a pool of highly indebted firms that have not reduced their indebtedness to the extent that is observed for the total corporate sector on another. In addition, the empirical analysis and estimates of dynamic function of credit growth allocation depict that banks have adjusted their credit allocation processes and became more selective after the onset of the crisis in 2009. However, in the recent years banking system has to face with new challenges, such as a loose monetary policy environment and contemporary models of corporate capital structure, where zero-leverage policy behaviour of firms seems to be a rather persistent phenomenon. Consequently, banks would need to not only remain attentive and selective in the credit allocation, but also thoroughly reconsider and potentially adjust their current business models.

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