IMAD

economic issues 2017

I.   Fiscal developments and policy

Written by: Aleš Delakorda, MsC; Lejla Fajić; Marko Glažar, PhD.

In collaboration with: Barbara Bratuž Ferk, MsC; Helena Mervic, Ana Tršelič Selan, MsC; Eva Zver, MsC.

II.   Allocative Efficiency and Productivity in Slovenia

Written by: Aleš Delakorda, MsC; Marko Glažar, PhD; Katarina Ivas, MSc; Rotija Kmet Zupančič, MsC; Janez Kušar, MsC; Urška Lušina.

In collaboration with: Tanja Čelebič, MsC; Matevž Hribernik, MsC; Mojca Koprivnikar Šušteršič; Mitja Perko; Jure Povšnar; Branka Tavčar; Ana Vidrih, MsC.

Since its first edition in 2007, Economic Issues has been dealing with topics that reflect IMAD's comprehensive approach to economic policy analysis or topics that require an economic policy response. This year's publication focuses on fiscal policy developments and policy as well as productivity in Slovenia.

Contents

Figures

Tables

I. Fiscal developments and policy

Summary

In the last few years the general government deficit has been gradually declining. Owing to the improvement in macroeconomic conditions, banking sector stabilisation and a mix of temporary and permanent measures, the deficit has been narrowing since 2013 and amounted to 1.8% of GDP in 2016. The trend of sharp debt increase recorded since mid-2008 also came to a halt in 2016. Favourable borrowing conditions due to the improvement in the economic situation have also enabled active debt management, with the average debt maturity lengthening further and borrowing costs declining; all of this is reflected in a falling implicit interest rate of public debt. Owing to the adopted measures, not only the cyclical but also the structural component of the budget deficit declined, totalling around 1% of GDP in 2016 according to IMAD's estimate; however, the temporary nature of some of the adopted measures indicates that a decline like this is neither lasting nor entirely sustainable.

The main policy orientation regarding further fiscal consolidation presented in the Stability Programme 2017 (SP2017) is a gradual easing of the austerity measures adopted during the crisis in circumstances of anticipated further improvement in macroeconomic conditions. The consolidation according to the SP2017 is based on a conservative estimate of revenue growth and a slower growth in expenditure than in revenue, resulting in the planned general government surplus and a structurally balanced general government budget by 2020. The projected revenue growth arises mainly from more favourable cyclical movements. The relaxation of measures in such circumstances is, however, reflected in a relatively strong increase in the main categories of expenditure (i.e. employee compensation and social benefits and transfers) and also results in the reinstatement of a number of automatic mechanisms that influence their growth.

The envisaged consolidation is surrounded by considerable risks. The planned lagging of expenditure growth behind revenue growth mainly relies on the gradual elimination of the temporary austerity measures in the area of earnings in the general government sector and social benefits and transfers, and their substitution by other systemic measures that have not yet been defined. The projections of the SP2017 are therefore partly based on assumptions regarding measures that have yet to be specified, particularly for the second part of the projection horizon (wage policy from 2018 onwards, substitute measures after the relaxation of some social receipts in 2019, higher revenue from compensation for the use of building ground after 2018); that may prove unsustainable over the long term (low growth in intermediate consumption); or are not realistic relative to the current situation (stagnation of employment in the general government). After the reinstatement of automatic adjustment mechanisms for some expenditures, no substitute measures for adjustment in the event of a worsening of economic conditions have yet been defined. Moreover, SP2017 projections include no structural measures for ensuring long-term sustainability of public finances. All this points to a risk to the continuation of sustainable fiscal consolidation and, together with the indicators of compliance with the rules of the Stability and Growth Pact (SGP), also to the risk of non-compliance with the rules from 2018. This was also pointed out by the Fiscal Council and the European Commission in their assessments of the SP2017. These warnings are particularly relevant in the situation where the Slovenian economy is moving into positive output gap territory, which could – were positive macroeconomic risks to materialise – require an even greater fiscal effort and hence an even faster achievement of the medium-term budgetary objective (MTO).

In IMAD's assessment, it would be prudent for Slovenia to take advantage of the period of favourable economic trends at home and internationally to consolidate public finances by more permanent structural adjustments. The removal of measures that have been containing expenditure growth in the general government sector in recent years – in the absence of proper mechanisms that would make it possible for Slovenia to take appropriate action over the medium term when economic growth will ease and the effects of demographic change will be more strongly felt – points to the need for Slovenia to firm up and formulate substitute systemic measures. They should focus particularly on the following areas:

- **Restructuring revenue and expenditure towards greater emphasis on development and efficiency.** On the revenue side, this could include a shift towards higher taxation of property and a further broadening of the tax and contribution bases. On the expenditure side, systemic rationalisations based on detailed overviews of expenditure at all general government levels will be required, as well as allocation of resources to priority areas that ensure economic efficiency and social justice.

- **Reforming social protection systems and adjusting them to demographic change.** Projections of age-related expenditure under a no-policy-change scenario point to the risk that this expenditure may increase relative to GDP soon after 2020. It is often overlooked that these projections already have an impact over the coming years, through their inclusion in the calculation of the medium-term budgetary objective that Slovenia is expected to achieve by 2020 (0.25% of GDP), which will affect the current fiscal and economic policy. The key challenge in reforming the social protection system will therefore be how to formulate a set of measures that will be fiscally sustainable while also preserving the quality of life.

- **Improving state asset management.** This would increase the profitability of state-owned assets and lower the risk of further recapitalisations with public funds.

- **Strengthening growth potential.** In addition to general macroeconomic effects, a prudent and coordinated selection of measures for a sustainable increase in medium-term economic growth would also strengthen fiscal revenue.

1 Targets and strategy for medium-term fiscal consolidation in the 2017 Stability Programme

In recent years general government deficit has been gradually declining. The general government deficit has been on a downward path since 2013; in 2015 it fell below 3% of GDP, whereby Slovenia corrected the excessive deficit and exited the corrective arm of the Stability and Growth Pact. In 2016 the deficit declined further, to 1.8% of GDP. According to IMAD's estimates, in addition to cyclical factors, almost half of the 2014–2016 improvement in the general government balance can be attributed to structural adjustment, as the structural deficit narrowed from more than 2% of GDP to almost 1% of GDP during this period. With this decline, Slovenia mostly fulfilled its commitments arising from the preventive arm of the Stability and Growth Pact. The deficit reduction also halted the trend of pronounced debt growth recorded since mid-2008. In 2016 the debt-to-GDP ratio dropped substantially, by 3.4 pps to 79.7% of GDP, which was also a consequence of a nominal reduction in debt, which totalled EUR 31.7 billion at the end of the year. The improvement in Slovenia's economic situation has facilitated active debt management under favourable borrowing conditions on international financial markets, with the average debt maturity lengthening further and borrowing costs declining; all of this is reflected in a decline in the implicit interest rate.

Figure 1: **General government balance, primary balance and structural balance**
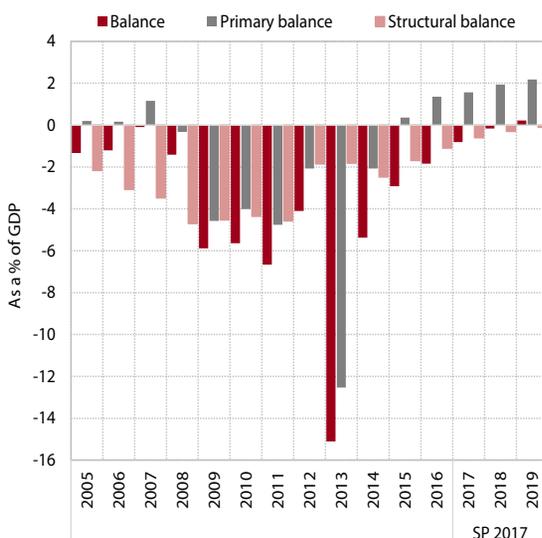
Source: SURS (2017). For 2017–2020 projections from the 2017 Stability Programme.

The Government is planning a continuation of fiscal consolidation, this at a pace pursuing the objective of achieving structural balance by 2020. The medium-term macroeconomic assumptions underlying the consolidation plan of the SP2017 are significantly more favourable than last year (see Box 1), although potential

growth is still expected to remain lower than before the crisis. The consolidation path envisaged in the SP2017 is thus based on moderate revenue growth and lagging expenditure growth, resulting in the planned general government surplus and a structurally balanced general government budget by 2020.[1] The average improvement of the balance over the programme period thus amounts to 0.6 pps per year, while the average improvement in the structural balance is 0.3 pps, which is similar to that in the SP2016, however with the balance outturn for 2016, which is more favourable than planned. The primary balance is expected to improve more slowly, by only 0.2 pps per year, which indicates a significant contribution of the decrease in debt-servicing costs to the convergence towards the medium-term fiscal objective.

The achievement of the SP2017 fiscal targets relies on favourable macroeconomic conditions and keeping expenditure growth lower than revenue growth, this amid a gradual removal of short-term expenditure measures. The increase in revenue largely stems from the expected further improvement in economic conditions in 2017–2020. The restructuring of tax burdens, which should have a favourable impact on economic growth, is also planned. According to the SP2017, this will include a reform of the system of property taxation and a new round of property valuation,[2] a reduction of administrative barriers, and further improvement in the efficiency of collecting taxes. Regarding general government expenditure, the main policy orientation of the SP2015 and SP2016 was the transfer of short-term measures into systemic legislation, but this is generally not taking place. The measures that were previously included in the Fiscal Balance Act (ZUJF), the Implementation of the Republic of Slovenia's Budget Act (ZIPR), and various agreements on measures to reduce expenditure on wages and other labour costs in the public sector are thus being gradually abolished, while the remaining ones are to be replaced by other systemic measures with comparable fiscal effects which have yet to be defined. Structural measures for ensuring the long-term sustainability of public finances are not included in the SP2017 projections, but the following are being prepared: i) the legislative framework for health reform and regulation of the long-term care system; ii) a document on the basis of the white paper on pensions,

---

[1] The SP2017, like the SP2016, retains the medium-term budgetary objective (determined as the budget balance in structural terms) at 0.0% of GDP. In its assessments of the SP2016 and NPR2016, the European Commission pointed out that the MTO chosen in the SP2016 was too low and recommended that Slovenia set an MTO that would be in line with the requirement of the SGP for the 2017–2019 period, i.e. +0.25% of GDP; a similar recommendation was repeated in the assessment of the SP2017 (EC, 2017a).

[2] After the adoption of the SP2017, the parties that form the government decided not to adopt the property tax act during this mandate. Therefore it is not clear whether they will adopt the new act on the mass valuation of property, which is the basis for calculating the property tax and for the increase in revenue from compensation for the use of building ground owing to the new round of property valuation envisaged in the SP2017.

Table 1: **Fiscal objectives of the 2016 and 2017 Stability Programmes**

As a % of GDP	SP 2016				2016	SP 2017			
	2016	2017	2018	2019		2017	2018	2019	2020
General government revenue	43.5	43.8	43.2	42.3	43.6	43.5	43.7	43.0	42.3
General government expenditure	45.7	45.4	44.3	42.7	45.5	44.4	43.9	42.8	41.8
Net lending/borrowing	-2.2	-1.6	-1.0	-0.4	-1.8	-0.8	-0.2	0.2	0.4
Primary balance	0.7	1.0	1.5	2.0	1.4	1.6	1.9	2.2	2.2
Structural balance	-1.5	-1.3	-1.0	-0.6	-1.1	-0.6	-0.3	-0.1	0.0
Consolidated general government debt	80.2	78.2	76.5	73.8	79.7	77.0	74.3	70.9	67.5

Source: 2017 Stability Programme, 2016 Stability Programme.

Box 1: **Macroeconomic assumptions of the medium-term consolidation plan in the SP2017**

The macroeconomic scenario of the 2017 Stability Programme, which is based on the Spring Forecast by IMAD, assumes acceleration of GDP growth relative to the last two years' movements. Since 2014 economic activity has been rebounding under the impact of stronger foreign demand and the improving competitiveness of Slovenia's economy; reflecting labour market recovery and a favourable investment climate, the contribution of domestic demand has also been rising in the recent period. Positive developments will also continue in this and subsequent years, with average real GDP growth expected to total 3% over the programme horizon. After last year's significant fall related to the transition to the absorption of EU funds from the 2014–2020 financial perspective, government investment is expected to increase again from 2017 onwards, which is also reflected in the slightly higher economic growth this year.

Table 2: **Macroeconomic assumptions for fiscal consolidation in the SP2016 and SP2017**

	2015	2016	2017	2018	2019	2020
GDP in EUR m (SP2016)	38,543	39,598	40,613	41,880	43,480	
GDP in EUR m (SP2017)	38,570	39,769	41,625	43,675	45,577	47,576
Nominal GDP growth, in % (SP2016)	3.3	2.7	2.6	3.1	3.8	
Nominal GDP growth, in % (SP2017)	3.3	3.1	4.7	5.0	4.4	4.4
Real GDP growth, in % (SP2016)	2.9	1.7	2.4	2.3	2.3	
Real GDP growth, in % (SP2017)	2.3	2.5	3.6	3.2	2.6	2.6

Source: SURS; IMAD (2016), IMAD (2017a).

---

which will include a set of guidelines for pension system development after 2020; and iii) stronger fiscal planning on the basis of the foreseen revision of the Public Finances Act.

Against the background of projected further improvement in macroeconomic conditions and with discretionary measures in place, general government revenue is expected to rise more slowly than GDP. The envisaged revenue growth mainly arises from *growth in tax revenues and revenues from social contributions*, which – given the favourable macroeconomic conditions – could be even higher than planned, according to our estimate.[3] Revenue projections are also influenced by discretionary measures, i.e. changes in personal income tax and corporate income tax adopted in 2016, which are planned to be fiscally neutral. Projections for the period after 2018 also predict an increase in revenue from compensation for the use of building ground owing to a new round of property valuations,

but this is still uncertain.[4] *Non-tax revenues* increase in the first two years of the SP2017 horizon and decline in the next two, which we estimate is mainly related to current assumptions for the absorption of EU funds.[5] Property income drops almost by half compared to 2016 over the four-year period, which reflects the SP2017 expectations of lower dividends amid the continuing sale of state-owned companies and may also be related to the expected decline in interest income under the assumption that interest rates remain low.

---

[4] After adopting the SP2017, the parties that form the Government decided not to adopt the real property tax act during this mandate. Therefore is not clear whether they will adopt the new act on the mass valuation of property, which is the basis for calculating this tax and for the increase in revenue from compensation for the use of building ground under the new round of property valuation envisaged in the SP2017.

[5] Judging by previous experience regarding the absorption of EU funds and the still present delay in the absorption of funds from the new financial perspective, the projections of this revenue flow are associated with uncertainties and are likely to change over the next years, which may also alter projections for certain expenditure categories.

---

[3] IMAD (2017b).

Figure 2: **Change in general government revenue and expenditure in the SP2017 in 2016–2020**
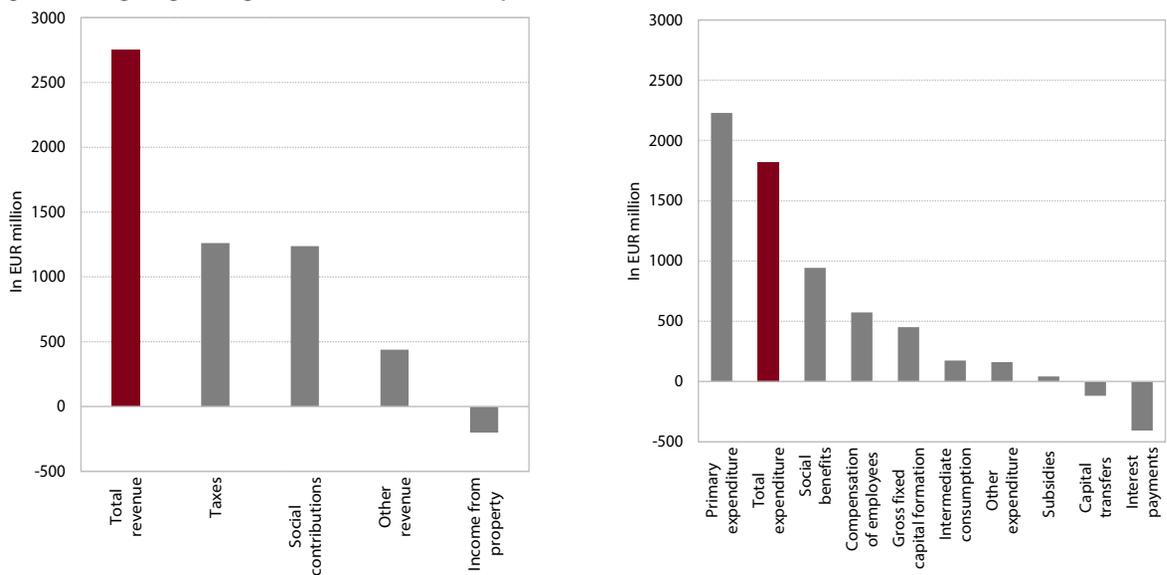
Source: 2017 Stability Programme.

The improved macroeconomic assumptions are also reflected in expenditure projections. Expenditure is significantly higher than in the SP2016. The nominal increase in primary expenditure in 2016–2020 thus significantly exceeds the decline in interest payments during this period, while the SP2016 envisaged primary expenditure growth to be approximately equal to the decline in interest expenditure in the projection horizon. *Social transfers and benefits* increase the most of all expenditure categories over the programme horizon. The growth of this expenditure, the bulk of which is pension expenditure, reflects the reinstatement of pension indexation in line with the provisions of the ZPIZ-2, the payment of the full annual pension allowance and legislative changes that are increasing expenditure in the area of social protection benefits.[6] On the other hand, the projections also retain measures that limit the growth of certain family benefits, though these measures may be relaxed amid favourable economic developments in the coming years and no substitute measures have been defined.[7] *Employee compensation* rises over the entire programme horizon, this fastest in 2017–2018, when it largely reflects[8] the wage policy agreements negotiated with the social partners. Wage

policy after 2018 has yet to be agreed.[9] Further loosening of the remaining austerity measures, which is not envisaged in the projections, poses a risk to the fulfilment of these projections, as does the rising employment in the general government sector. Specifically, following the relaxation of restrictions in early 2016, employment growth in the general government sector has exceeded pre-crisis levels (2,600 new jobs in 2016 compared with the average of 2,200 in 2005–2008). Relatively smaller increases than for social transfers and benefits and employee compensation are projected for other, more flexible, expenditure categories, which are to a great extent dependent on the absorption of EU funds from the 2014–2020 financial perspective – *investment and subsidies* thus strengthen particularly in 2017 and 2018. Growth in expenditure on *intermediate consumption*, which is below the anticipated inflation rates in the first two years, is expected to be relatively low over the total programme horizon. Expenditures that are set to decline over the programme period include interest payments and capital transfers. The decline in *interest payments* reflects the expected gradual stabilisation of nominal debt and the expected maturing of bonds with relatively higher interest rates and their swaps for bonds with lower rates (also because of active debt management[10]), which should also continue in the next years enabled by favourable economic conditions on international financial markets. Despite the lower US dollar debt exposure in the recent period, these projections are

---

[6] Legislative changes in the area of social benefits are expected to lead to an increase in the number of beneficiaries of income support, social assistance in cash and subsidies for school meals.
[7] According to the Parental Protection and Family Benefit Act, the relaxation of these measures is contingent on the achievement of 2.5% GDP growth amid a concurrent 1.3 pps increase in the employment rate for the age group of 20 to 64. According to the projections of the 2017 Spring Forecast (IMAD, 2017a), this condition should be fulfilled in 2017, while the financial implications of the relaxation would start to show in 2019 (estimated at around EUR 50 million per year).
[8] The inclusion of everything that was agreed for the entire public sector and doctors, together with rising employment, would result in even higher growth of employee compensation than planned for these two years.

---

[9] The payment of the collective supplementary pension insurance (KDPZ) premiums and holiday allowance has yet to be agreed upon for 2018, as have the payment of work performance bonuses and the timeline for promotion raises after 2018. The financial effect of the relaxation of these measures is estimated at around EUR 200 million per year.
[10] By the end of May 2017, Slovenia repurchased 47% of the more expensive US dollar debt portfolio and refinanced it with cheaper debt in euros; total USD debt thus now accounts for only 12.5% of state budget structure (MF, 2017).

Figure 3: **Projections of general government debt in the SP2017 and change in projections compared to the SP2016**
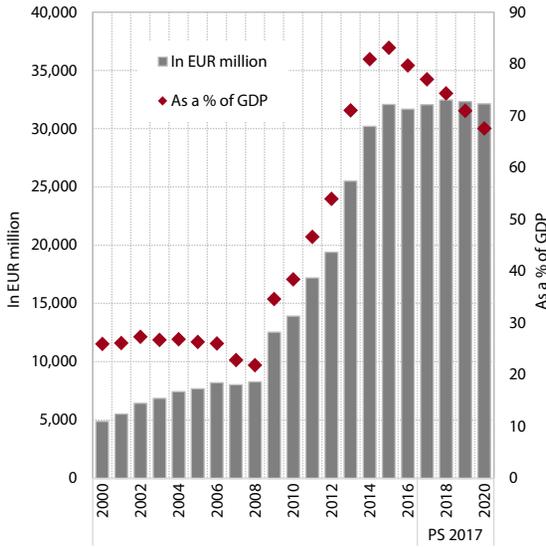
Source: SURS (2017), 2017 Stability Programme, 2016 Stability Programme.

associated with risks related to unpredictable currency movements.[11] We estimate that the envisaged decline in <u>capital transfers</u> over the programme horizon is mainly linked to the effect of BAMC transactions through debt-to-equity swaps in companies managed by the BAMC and these companies' recapitalisations. Expenditure projections according to SP2017 data also include certain one-off expenditures, which are not sufficiently specified, and costs related to migration, their total impact over the programme horizon being relatively high.[12]

The ratio of general government debt to GDP will be declining over the entire programme period according to SP2017 projections. In 2016–2020 the debt-to-GDP ratio will fall from 79.7% to 67.5%. This pace of decline is similar to that envisaged in the SP2016. The level of debt otherwise fluctuates around EUR 32 billion in 2016–2020. After the debt reduction of EUR 394 million in 2016, a further decline is projected only for the end of the period, in 2019 and 2020, when total debt declines by a solid EUR 300 million.

Positive contributions to the decline in the debt-to-GDP ratio will come from the primary surplus and GDP growth. The breakdown of contributions to the debt change (see Figure 4) over the projection horizon in comparison with previous years (2012–2016) shows

---

[11] Slovenia executed cross-currency swaps, as it was exposed to currency risks arising from the issue of USD-denominated bonds. In the government finance statistics according to ESA 2010 methodology, all interest should be recorded taking into account the current EUR/USD exchange rate on the day of the interest payment and not the fixed exchange rate agreed upon at the conclusion of the swap transaction (SURS, 2017).

[12] 0.4 pps in each of 2017 and 2018 and 0.3 pps and 0.2 pps in 2019 and 2020 respectively. According to the SP2017, these expenditures include migration costs, one-off expenditures due to denationalisation, investment dispute settlement and interest from liabilities to foreign-currency savers.
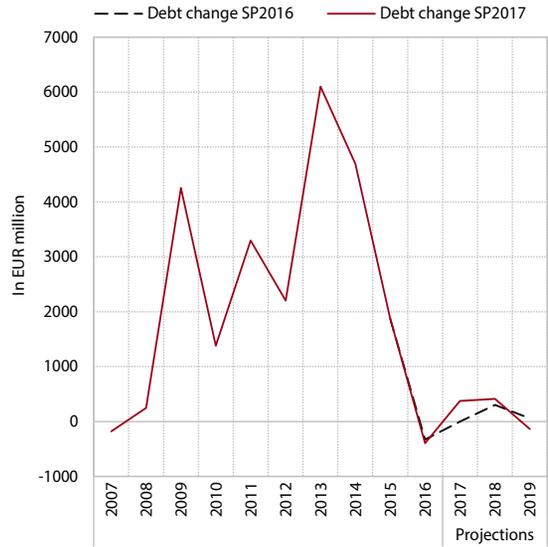
a shift towards a greater contribution of the primary balance; the contribution of economic growth will also be almost twice as high. Owing to the lowering of the implicit interest rate, the average annual contribution of interest will be around one third lower despite the debt increase in recent years. The positive contribution of economic growth will thus exceed the negative contribution of interest to the formation of debt for the first time since the crisis. Owing to the expected decline in pre-financing, the significant contribution of other factors, i.e. stock-flow adjustments, to debt growth will decline over the projection horizon.

Figure 4: **Breakdown of debt change in 2012–2016 and 2016–2020**
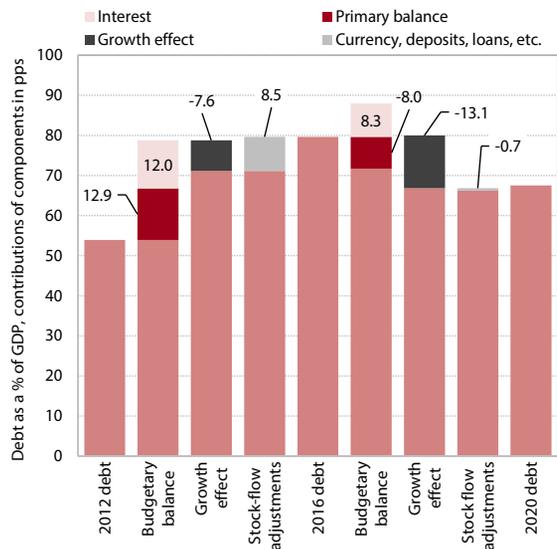
Source: SURS (2017), 2017 Stability Programme; calculations by IMAD.
Note: The figure shows debt, the change in debt and the components contributing to change. The contributions of individual components to the change in debt between two years are shown in pps. The stock-flow adjustments represent the adjustment of debt for deficit.

2 Assessment of the orientation and sustainability of fiscal policy

2.1 Assessment of fiscal consolidation measures

According to IMAD's estimate, fiscal consolidation in previous years was the result of a mix of permanent and temporary measures. In the last few years the general government deficit has been declining as a result of favourable macroeconomic conditions and the effect of permanent and temporary austerity measures.[13] After the banks' balance sheet repair, the impact of one-off factors also decreased significantly. In 2016 flexible categories of expenditure became a more important factor in the deficit decline amid a partial relaxation of austerity measures from previous years, which were not replaced with systemic measures. Investments, i.e. co-financing obligations related to the absorption of EU funds, dropped in particular. Capital transfers related to BAMC transactions were also significantly lower.[14]

The main policy orientation regarding further deficit reduction is a gradual phasing out of the remaining austerity measures in circumstances of the expected improvement in macroeconomic conditions. The decline in the general government deficit envisaged in the SP2017 reflects the lagging of expenditure growth behind revenue growth amid a gradual relaxation of austerity measures. The improvement in expected revenue growth compared to previous projections (in the SP2016) is mainly the result of more favourable cyclical movements. The phasing out of measures in these circumstances is reflected in a relatively strong increase in the main expenditure categories (employee compensation and social benefits and transfers; see Figure 5) and a reinstatement of a number of automatic mechanisms that contribute to their growth,[15] without

replacing them by instruments that would make it possible to adjust this expenditure if economic conditions deteriorated. The SP2017 projections are also partly based on assumptions regarding measures that have yet to be defined, particularly in the second period of the projection horizon (wage policy from 2018 onwards, substitute measures amid the possible relaxation of some social benefits in 2019, higher revenue owing to a new round of property valuation after 2018); may prove unsustainable over the long term (low growth in intermediate consumption); or are not realistic with regard to current developments (stagnation of employment in the general government sector). The risk associated with the removal of measures that have been containing the growth of general government expenditure in recent years – in the absence of proper instruments that would make it possible for Slovenia to take appropriate action over the medium term when economic growth eases – thus points to the need for concretisation and formulation of substitute systemic measures. It would be sensible to take advantage of the currently favourable economic trends at home and internationally to adopt such measures. They would prevent unsustainable growth in consumption in the future and ensure a further sustainable reduction of deficit already in the medium term, when we also expect a stronger impact of demographic factors. Such an impact is already being reflected in the falling number of working-age people, while in the period after 2020, social protection expenditure is also expected to increase as a share of GDP according to the no-policy-change scenario.

To ensure sustainable fiscal consolidation, the current temporary measures will have to be replaced by more permanent systemic measures in several areas, according to IMAD's estimate. These measures include, in particular, i) restructuring revenue and expenditure to support development-oriented priorities and increase efficiency. On the revenue side, such restructuring could involve higher taxation of property and a further broadening of tax and contribution bases, which is of particular importance in times of increased global uncertainty. On the expenditure side, it will be necessary to carry out systemic rationalisations on the basis of an in-depth review of expenditure at all levels of general government and to allocate resources to priority areas that ensure economic efficiency and social fairness. It is also necessary ii) to reform social protection systems and adjust them to demographic change, where the key challenge is how to formulate a set of measures that are fiscally sustainable while also preserving quality of life. The continuation of favourable borrowing conditions will provide an opportunity iii) to reduce the debt and interest burden through active debt management. iv) Improved asset management would also increase the

---

[13] The most important permanent measures include: an increase in the VAT rate and some other tax rate changes; legislative changes in the area of social transfers related to income and property; pension reform, which entered into force in 2013. Temporary measures have mainly affected wage and employment policies and social transfers and benefits (pensions). In recent years consolidation has also been carried out by containing expenditure on goods and services, but this was largely achieved by a linear approach rather than systemic reviews and measures.

[14] The impact of the BAMC as a government sector unit is pronounced particularly owing to the valuation of write-offs and debt-to-equity swaps in companies managed by the BAMC, which is recorded under capital transfers, which were very high in 2015.

[15] For example, when public servants' promotion raises were reinstated, the previous promotion system was retained, resulting in around 2% annual wage growth. The removal of austerity measures and anomalies in public-sector earnings is also reflected in the average earnings in the RS and thus spills

over into the indexation of pensions, as was the case when the new wage system in the public sector entered into force, whereby one-off effects of wage policy in the public sector have a permanent effect on other public expenditures.

Figure 5: **Differences in revenue and expenditure projections between the SP2017 and the SP2016**
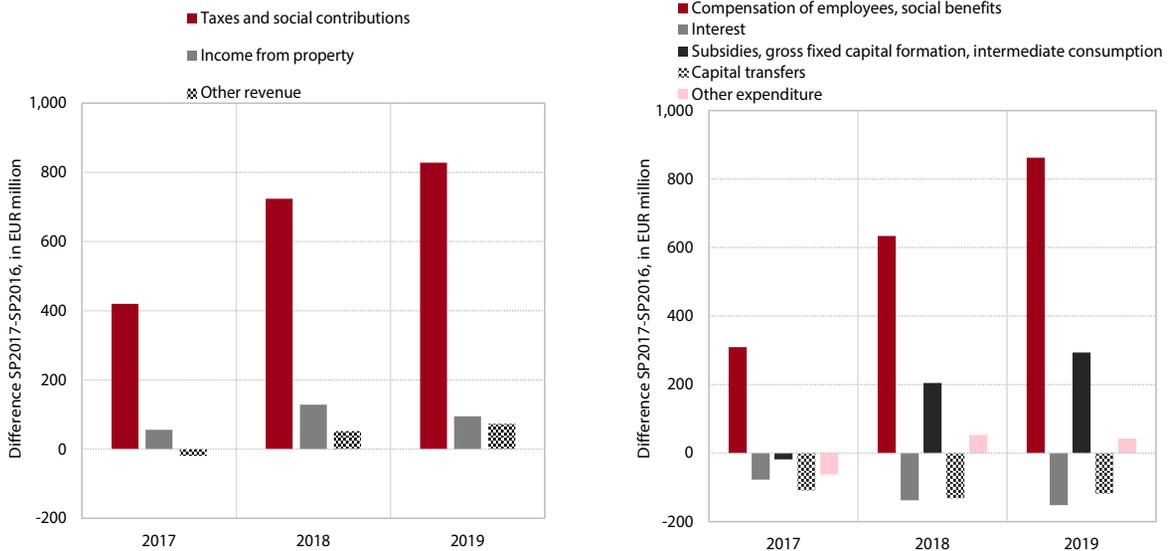
Source: SP2016; SP2017.

profitability of state-owned assets and lower the risk of further recapitalisations with public funds. Furthermore, v) the strengthening of growth potential is also important for increasing tax revenue. This will require a more effective institutional foundation for the functioning of the economy and a prudent and coordinated selection of measures for a sustainable increase in medium-term economic growth (see Chapter II – "Allocative efficiency and productivity in Slovenia").

The restructuring and consolidation of public finances would also benefit from a strengthening of the institutional framework, particularly through changes in the budgetary planning process, which would set up a more predictable medium-term policy framework. In this way, it would be possible to transform medium-term budgetary planning, establish an effective mechanism for determining the priorities of public spending and the medium-term policy framework, and adjust the budget-adoption procedure accordingly to move the focus of deliberations away from individual expenditure categories. This will be addressed by the amended Public Finances Act, which is currently undergoing public debate.[16] A significant role will also be played by the Fiscal Council, elected in March 2017, which could help formulate appropriate fiscal decisions for Slovenia and participate in broader discussions and determination of fiscal policy with the Fiscal Council at the EU level established in 2016.

2.2 Compliance with the requirements of the preventive arm of the Stability and Growth Pact

After bringing the general government deficit below 3% of GDP, Slovenia exited from the corrective arm of the Stability and Growth Pact into the preventive arm, which focuses on the medium-term budgetary objective (MTO) and therefore on the general government balance in structural terms. As of 2016, Slovenia has been subject to the rules of the preventive arm of the Stability and Growth Pact (SGP). Owing to methodological limitations, however, the estimates of compliance with these rules need to be interpreted with caution. The rules of the preventive arm of the SGP focus on the medium-term budgetary objective (MTO), which refers to the structural (and not just the actual) general government balance and the pace of convergence towards it (see Box 3). The structural balance is calculated using estimates of potential GDP and output gap, which are, however, highly volatile (see Box 5, Economic Issues 2016, and Figure 6). The indicators of compliance with the SGP rules that rely on these estimates should therefore be interpreted with caution and complemented by qualitative analysis.

---

[16] Government of the Republic of Slovenia (2016).

Box 2: **Assessing the plausibility of output gap estimates**

In view of the relatively low reliability of output gap estimates, the European Commission is trying to find additional indicators to complement estimates of the cyclical position of the economy made on the basis of uniform methodology prescribed in the SGP. The European Commission makes output gap estimates for all Member States using a production function.[1] Output gap estimates serve as the basis for assessing the cyclical position of the economy and play a vital role in the surveillance of Member States' fiscal policies, although they are frequently revised and thus relatively unreliable. Therefore they are not completely adequate for assessing the fiscal position. In autumn 2016 the Economic and Financial Committee therefore approved the use of the "plausibility tool" for checking the credibility of output gap estimates.[2] The European Commission used it for the first time in its overall assessment of Member States' draft budgetary plans at the end of 2016.

The indicator developed by the European Commission[3] should remedy certain deficiencies of the current output gap estimates. It is not meant to replace the role of output gap estimates in determining the economic cycle but to complement them by checking their plausibility. The indicator takes into account additional information on the position of the economy and is based on correlations between the output gap estimates and a set of indicators that also reflect the cyclical position of the economy in each Member State.[4] These correlations are used to calculate an "alternative" estimate of the output gap and the range within which the output gap is economically plausible (the plausibility range). A deviation of the output gap estimate obtained by the production function from the plausibility range suggests that the estimate may not be plausible[5] and requires additional verification. The main limitation of the new indicator is that it cannot be used in ex-ante estimates.[6]

The use of the new indicators has already raised doubts about the plausibility of output gap estimates for some Member States, but in most cases these doubts were dispelled by further analysis.[7] Slovenia is also one of the countries where deviations were found within the assessment of their draft budgetary plans on the basis of the autumn 2016 forecasts for 2016. The estimates of the output gap obtained using the production function methodology were outside the range determined by the "alternative" output gap estimates in 12 Member States,[8] which required a detailed analysis of their economic cycle. The "alternative" estimates deviated from the output gap estimates based on the production function approach in both directions. A lower "alternative" estimate, i.e. the output gap estimated in the alternative way is more negative than that obtained by the production function, could mean that the country is required to make a greater fiscal effort than is economically sensible. Such deviations were found in seven countries, including Slovenia. However, in the case of Slovenia, the deviation was detected only when the plausibility range was set more narrowly (which is referred to as a borderline case). In all countries with deviations except Finland, further analysis showed that the plausibility tool's results had no impact on the Commission's assessment of the budgets' compliance with the SGP rules for 2016.

---

[1] The methodology is presented in Havik *et al*., 2014.

[2] EC (2016c).

[3] Known as the plausibility tool. For more, see Hristov *et al*., 2017.

[4] In the currently applied version of the model, these indicators are the degree of capacity utilisation, the short-term unemployment rate, wage growth, barriers to demand according to the survey and lagged growth in GDP.

[5] Hristov *et al*., 2017.

[6] The plausibility tool can be used for future years only under the assumption that the plausibility range remains unchanged, which implies unchanged correlation between the additional indicators and the estimate made on the basis of the production function method.

[7] EC (2016c).

[8] Out of 27 Member States. Owing to the unavailability of data, an alternative output gap estimate for Ireland could not be made.

The European Commission also uses additional indicators and analysis to check the estimates of the phase of the economic cycle. One of the attempts to take into account additional indicators of the cyclical position of the economy is checking the plausibility of output gap estimates, a measure that was introduced by the European Commission in 2016. This approach also has its limitations, however, as it is appropriate only for estimates of the current cyclical position (see Box 2). The methodological discussions in the European Commission's working bodies on this topic therefore continue, and there have been a number of requests from EU Member States[17] for improving the methodology for calculating potential GDP growth and the output gap and the predictability of fiscal rules and for simplifying the rules.

IMAD's assessment of the fiscal policy stance in the next period is therefore not based solely on an interpretation of the technical calculations of SGP indicators. It is complemented by a qualitative analysis of measures that ensure a deficit reduction over the medium term (see section 2.1). This analysis reveals that the projected improvement in the actual balance is partly based on assumptions about measures that have not yet been specified and mainly involve a gradual elimination of temporary measures in circumstances of favourable economic growth, rather than new systemic measures that might ensure sustainable growth in general government expenditure.

An overview of the three indicators of compliance with the rules of the preventive arm of the SGP shows that fiscal consolidation will not be in compliance therewith throughout the period of the SP2017 projections (for more on SGP rules, see Box 3):

- ***Fiscal effort:*** According to SP2017 calculations, in 2017–2020 Slovenia will be in the normal phase of the economic cycle with regard to SGP rules (an output gap of ±1.5%) and among Member States with debt-to-GDP ratios above 60%. This means that it will be required to reduce its structural deficit by at least 0.6 pps of GDP per year.[18] The structural

effort envisaged in the SP2017 is below this value in all four years. The indicator measuring the average effort in two consecutive years is also lower than required. However, deviations are not significant, except in the average two-year indicator for 2019 and 2020. On the other hand, throughout the entire period the planned structural deficit complies with the minimum benchmark, which ensures that under normal cyclical conditions, the actual deficit remains below 3% of GDP.[19]

- ***The expenditure rule:*** IMAD's calculations on the basis of SP2017 data indicate a possibility of deviations in 2017 and 2019 but compliance of expenditure growth with permitted growth in the remaining years of the SP2017 projections. The deviation in 2017 is non-significant, but that in 2019 could be, according to the current projections. According to the cumulative two-year indicators, the deviation is not significant in any year of the SP2017 projections.

- ***The transitional debt rule:*** As regards debt reductions, special transitional arrangements apply for Slovenia in the three-year transition period of 2016–2018 following the abrogation of the excessive deficit procedure.[20] According to the transitional debt rule (the MLSA; see Box 2), the structural adjustment[21] in the remaining two years of the transition period will be appropriate. As debt is expected to increase slightly in these two years in nominal terms, also owing to the pre-financing of future liabilities, the appropriate reduction in the debt-to-GDP ratio will be mainly underpinned by higher GDP growth. The current projections for debt reduction indicate that in 2019 and 2020 Slovenia will also meet the rule that will apply after the end of the transition period.

---

[17] In 2016, an initiative of several Member States, including Slovenia, that – given the uncertainty regarding the output gap calculation – the output gap estimates taken into account in assessments should cover a longer forecast horizon (the Initiative of Member States to the European Commission, 2016; see also Box 5, Economic Issues 2016). In May 2017, an initiative of several Member States for improving the methodology of calculating the output gap (the Joint Letter of Ministers, 2017).

[18] Both SP2017 forecasts and IMAD forecasts indicate that the positive gap will approach the limit of 1.5%, at which level the annual requirement for the structural effort would increase to 1 pp.

[19] The minimum benchmark of the structural deficit, determined on the basis of forecasts from autumn 2016, is 1.4% of GDP in 2017 and 1.0% of GDP in 2018 (EC, 2017b, Appendix 2).

[20] See Box 4 on pp 18–19 in IMAD (2016).

[21] In calculating the MLSA, the stock-flow adjustment (an adjustment of debt for deficit) plays a significant role. As this data is not available in the SP2017, we assumed that it is equal to the entire difference between the estimated debt change and the deficit size. The difference between the debt increase and the cumulative deficit in 2017 and 2018 amounts to around EUR 400 million. If debt is not adjusted for the deficit, the required cumulative structural adjustment in 2017–2018 totals −0.6 pps instead of −0.4 pps.

Figure 6: **Comparison of the latest output gap estimates by institution (left graph) and the differences between spring 2016 and spring 2017 in the general government balance and the estimated structural balance and output gap (right graph)**
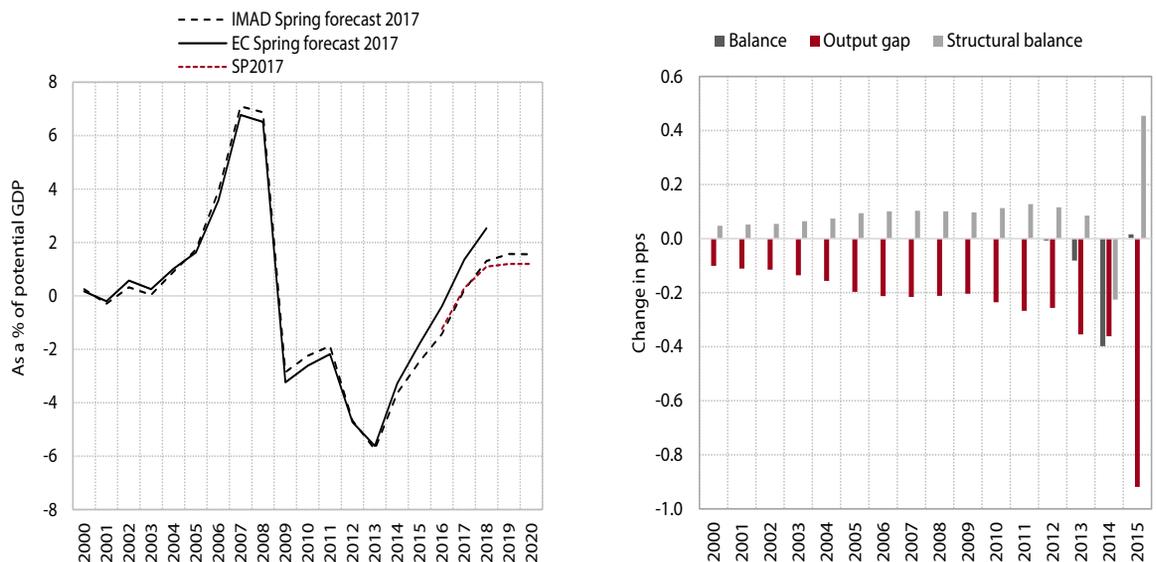
Source: Left graph: IMAD (2017a); EC (2017c); SP2017. Right graph: General government balance according to SURS data; IMAD's estimates of the output gap and structural balance.

Note: From the right graph it is evident that, according to the latest estimates (spring 2017), the output gap is more negative and the structural deficit mostly smaller than according to previous estimates (spring 2016). The largest difference is for 2015, when the estimate of the negative output gap is around 1 pp higher and the estimate of the structural deficit 0.5 pps lower.

Box 3: **Rules of the preventive arm of the SGP and the Fiscal Rule Act**

The preventive arm of the SGP focuses on the fulfilment of the medium-term budgetary objective (MTO).[1] The MTO, which refers to the structural balance, is based on the estimate of a country's progress in achieving medium-term fiscal sustainability and is set by the European Commission every three years[2] according to the following criteria: (i) it should provide a sufficient safety margin with respect to the 3% of GDP deficit limit, which is assessed on the basis of fluctuations in economic activity and elasticity of the general government balance with respect to the output gap; (ii) it should ensure sustainability or rapid progress towards the sustainability limit, which depends on the level of general government debt and costs arising from population ageing; and (iii) it should not be lower than −1% of GDP. The highest value among the criteria (i)–(iii) is set as the MTO.

Member States are expected to achieve their MTO or to at least ensure appropriate progress towards it. The pace of convergence, i.e. the fiscal effort, depends on the level of general government debt, the S1 indicator of medium-term fiscal sustainability[3] and the phase of the economic cycle. The structural effort is not required only in exceptionally difficult times, i.e. when economic activity declines or the estimate of the negative output gap is greater than 4%. The adjustment required increases with improvement in the economic situation or with a higher level of debt. It can also be higher than 1 percentage point of GDP if general government debt exceeds 60% of GDP, the estimate of the positive output gap is greater than 1.5% and economic growth exceeds potential GDP growth. The normal phase of the economic cycle is interpreted as an output gap of between −1.5% and +1.5%. In this case, a structural adjustment of 0.5 pps of GDP per year is required for Member States with debt-to-GDP ratios below 60%, or greater for those with debt levels above 60% of GDP (this is conventionally understood to be at least 0.6 pps of GDP[4]).

---

[1] In force since 1998 – Council Regulation (EC) No. 1466/97.

[2] A Member State's MTO must be at least at the level set by the European Commission.

[3] The S1 is one of the indicators for monitoring fiscal sustainability that are used in the EU budgetary surveillance framework (alongside the S0 and S2 indicators). The S1 is an indicator of medium-term fiscal sustainability; it shows the effort (expressed as the primary balance) required for a Member State to reach a 60% public debt-to-GDP ratio (the Maastricht Treaty reference value) by 2030. The calculation of the indicator takes into account the growth of ageing-related expenditure (pensions, health care and long-term care) up to 2030 (EC, 2016a). If the S1 is above 2.5, the risk is high.

[4] EC (2016b); Box 1.6.

Slovenia defined the method and the timeframe for implementing the concept of medium-term budgetary balance in the Fiscal Rule Act. The act stipulates that government budget revenues and expenditures shall be deemed balanced in the medium term without borrowing, if the structural balance of the general government in a single year is not lower than the minimum benchmark set in the ratified intergovernmental treaty regulating stability, coordination and governance in the Economic and Monetary Union, or, if it is in surplus or at least balanced in the medium term. In the period of convergence towards the medium-term fiscal objective, government budgets shall be regarded as balanced in the medium term if the structural balance approaches the MTO at a pace in line with SGP criteria as described above.

In the event of structural reforms or government investment, the rules regarding the achievement of the MTO also permit some deviations from the structural effort required.[5] By way of provisions regarding a possible temporary deviation from the MTO or from the adjustment path towards it, as specified in the communication on flexibility within the SGP rules,[6] the European Commission sought to boost the implementation of structural reforms and government investment without jeopardising fiscal sustainability. Structural reforms and investments may impede the fulfilment of fiscal targets in the short term, but if they have a positive effect on economic growth, their long-term impact on public finances is positive. During the period when the Commission allows deviations from the MTO, the actual general government deficit of the country must not exceed 3% of GDP and it must be ensured that the country will return to its MTO within a four-year period.

Another significant indicator of fiscal sustainability under the preventive arm of the SGP is the expenditure rule.[7] It was introduced as, owing to the large number of assumptions used, estimates of structural balance are uncertain and subject to revisions and as the deviation of the structural balance from the MTO is in fact determined precisely by expenditure, since revenue usually follows general economic activity. The calculation of the appropriate rate of expenditure growth excludes certain expenditure categories that cannot be influenced directly (such as interest payments, the cyclical component of unemployment benefits and spending on EU programmes financed by EU funds) and takes into account that government investment may fluctuate significantly in individual years.[8] Expenditure growth must not exceed potential GDP growth; in Member States that have yet to reach their MTO targets, it must be even lower, i.e. adjusted for the "convergence margin", which ensures compliance with the expenditure rule through appropriate structural adjustments.

The surveillance of public finances also involves monitoring the level of general government debt. According to the rules of the Fiscal Compact,[9] the general government debt of a Member State that is in the preventive arm of the SGP must decrease by 1/20th of the gap to 60% of GDP per year on average over a three-year period. For Member States (i) which were in the excess deficit procedure on 8 November 2011;[10] (ii) which are exiting from the corrective arm of the SGP; and (iii) whose general government debt is greater than 60% of GDP, a three-year transition period applies.[11] This gives them time to adapt their structural adjustments to a level that ensures compliance with the debt rule (which demands an average annual debt reduction of 1/20th) at the end of the transition period. During the transition period, the pace of debt reduction is assessed on the basis of the progress made towards the minimum linear structural adjustment (MLSA) required.[12]

---

[5] A deviation that does not jeopardise medium-term sustainability is also permitted if exceptional circumstances arise. The Commission indicated the possibility of using this provision for the costs of the increased migration flows (see EC, 2015b, p. 44, and EC, 2015c).
[6] Communication from the Commission COM (2015) 12 final, 13.01.2015.
[7] This does not apply for countries with fiscal positions better than the MTO.
[8] For more on this calculation, see EC (2016b).
[9] The Fiscal Compact has been binding on all euro area countries since January 2013. It is part of the intergovernmental Treaty on Stability, Coordination and Governance of the Economic and Monetary Union signed in 2012 by all EU Member States except the Czech Republic, the United Kingdom and Croatia (the latter acceded to the EU after the Treaty had been signed).
[10] When the amendments to the SGP (the "Six-Pack") were adopted.
[11] A three-year transition period applies from the year in which the criteria for exiting the excessive deficit procedure have been met. Slovenia is expected to be in the transition period in 2016–2018.
[12] For the calculation of this indicator, see EC (2016b): Annex 6.

On the basis of the overview of the above indicators and the measures planned, IMAD estimates that, under the assumption of the output gap and structural deficit as determined in the SP2017, fiscal policy would comply with the requirements of the preventive arm of the SGP at the beginning of the programme period. Towards the end of the period, however, the risk of deviations increases,[22] particularly considering:

- that some of the measures for attaining fiscal goals have yet to be defined;
- that one-off measures, which to a great extent contribute[23] to the structural adjustment envisaged in the SP2017 projections, have not been specified in detail; and
- the election cycle. The current SP2017 projections do not indicate a possibility of a significant deviation from the required consolidation in 2018, but analyses (for example the estimate of the fiscal response function in Box 5) indicate that fiscal policy in Slovenia, as in other countries, does not act systematically, i.e. is not actively reducing the primary deficit, in the period before elections.

The estimates of the state of public finances may be affected by the volatility of output gap estimates; nevertheless, according to the current output gap estimates, there may be a risk of deviations from SGP rules. Output gap estimates are uncertain owing to the revisions of input data (past data and forecasts) and changes in the parameters used in model-based calculations. Such changes may alter the estimate of the structural balance for Slovenia, compared to previous revisions of output gap estimates, by between −0.5 and +0.4 pps. The estimate of compliance with the expenditure rule (which also takes into account potential GDP growth) can also change, but this estimate is less volatile as it covers a longer horizon and owing to certain other characteristics of this indicator. This means that caution is required when interpreting the estimates of deviations that are currently shown based on the SP2017 analysis. Nevertheless, these estimates do give a signal to economic policy that Slovenia may be at risk of non-compliance with the SGP rules in the medium term and indicate a timeframe within which it is necessary to take appropriate action. They also show that if we acted now, these risks could be significantly reduced or even eliminated.

---

[22] The Commission's standard procedure in assessing stability programmes covers only the years t (the year of Stability Programme Amendments) and t+1. For a more medium-term perspective, we included the years t+2 and t+3 in our analysis on the basis of the available data.

[23] In some years, even more than half the structural adjustment.

2.3 Alternative indicators to assess fiscal position and fiscal stance

In the next few years fiscal policy will have a relatively neutral effect on economic activity. After a severe deterioration of the fiscal position in the pre-crisis years, when fiscal policy operation was strongly pro-cyclically expansionary, the significant shift towards a pro-cyclically restrictive orientation in 2012 reflected fiscal constraints related to Slovenia's commitments under the excessive deficit procedure and very limited access to financing. The orientation of fiscal policy has also been pro-cyclically restrictive in the last two years, which, amid the improved economic conditions, was mainly attributable to the gradual elimination of measures that have contained government spending since 2012. The deficit reduction envisaged in the SP2017 on the basis of the latest output gap estimates by IMAD indicates that fiscal policy will have a relatively neutral impact on economic activity in the next medium-term period during the transition of the economy into positive output gap territory (see Figure 7). According to the indicators of "fiscal space", i.e. room for manoeuvre for sustainable expansionary fiscal policy, and owing to its relatively high level of debt (which may increase further owing to demographic trends in the absence of appropriate action), Slovenia is ranked among the countries with limited potential for boosting their economies.[24] This is also corroborated by the analysis of fiscal space presented in Box 4.

Figure 7: **Assessment of the cyclical orientation of fiscal policy**
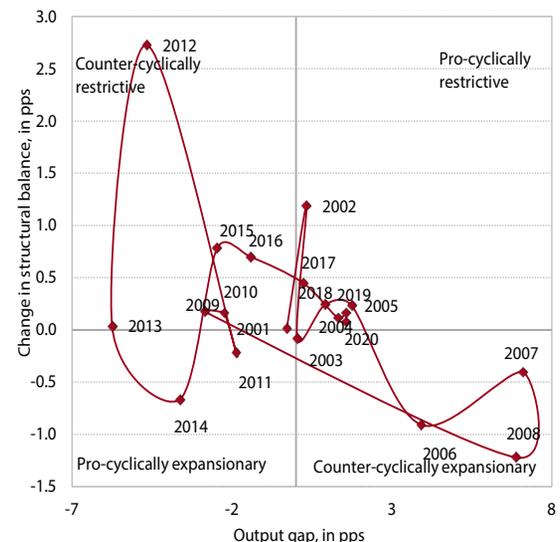
Source: Output gap according to IMAD's calculations; IMAD's calculation of the structural balance on the basis of SP2017 projections.

---

[24] IMF (2016); p. 17.

Owing to uncertainty surrounding the indicators prescribed by the SGP, we complemented the evaluation of the fiscal policy stance with additional calculations. The additional set of calculations used to assess the fiscal position indicates a similar picture to that shown by the indicators arising from the SGP and also offers no unequivocal conclusions on the appropriateness of the fiscal policy stance over the SP2017 horizon. Significant deviations from the reference values are observed only for certain indicators related to meeting the MTO, while there are no deviations (or at least no significant deviations) with regard to compliance with the adjusted expenditure rule or the debt rule.

– <u>Fiscal effort</u>: The complementary assessments of the structural effort do not give unequivocal results. Taking into account general government projections in the SP2017 and IMAD's estimates of potential GDP made on the basis of the production function method, the fiscal effort is smaller than that according to the SP2017 projections and a significant deviation already appears in 2018. The fiscal effort assessed without taking the potential GDP estimate[25] into account is sufficient over the entire programme horizon except in 2020. The estimates of the structural primary balance indicate that the bulk of structural deficit reduction is a result of the contraction of interest expenditure, as the surplus of the structural primary balance remains unchanged in 2017–2020.

– <u>We also assessed expenditure according to the proposed adjusted expenditure rule</u>,[26] which, in contrast to the SGP expenditure rule, does not treat EU-funded investments separately and includes debt correction.[27] This expenditure indicator shows relatively large fluctuations and deviations in individual years, which is mainly a consequence of the different treatment of EU-funded investments. Despite these fluctuations, the indicator of average expenditure growth in two consecutive years shows no deviations in individual years

– <u>The rule regarding a gradual reduction in general government debt</u>, which will begin to apply for Slovenia only after the expiry of the three-year transition period after the exit from the corrective part of the SGP, would be met. The average debt reduction in 2019–2020 (−3.4 pps of GDP)

significantly exceeds the reduction required (around −1.2 pps of GDP; annual debt reduction of 1/20 of the debt in excess of 60% of GDP). Similar conclusions can also be reached if the indicator for the average debt change over three years is taken into account.

2.4 Medium- and long-term sustainability of public finances

Medium- and long-term analyses point to risks to the sustainability of general government debt. The short-term sustainability of Slovenia's debt is not in question, which is also indicated by the values of the S0 indicator[28] calculated by the European Commission. However, both the European Commission and IMAD analyses of debt sustainability point to risks regarding the medium- and long term sustainability of debt,[29] which arise from the high debt incurred, pressures related to population ageing, and potential changes in other factors (for example adverse macroeconomic shocks, or guarantees and sureties being called) that may affect the level of debt.

Our analysis of medium-term debt sustainability takes into account the baseline scenario of the SP2017 and the 2017 Spring Forecast by IMAD. It[30] covers he 2016–2022 period, in which the fiscal aggregate projections for the period between the end of the SP2017 projection horizon and the end of the period analysed (2021–2022) were complemented on the basis of unit revenue and expenditure elasticities. The analysis shows risks to debt sustainability in the medium term. The risks are asymmetrically distributed, concentrated on the high

---

[25] Determined on the basis of the 5-year GDP average, taking into account data from the year t-2 to the year t+2. For years after 2020, we used the GDP growth rates for 2020.

[26] Claeys, Darvas and Leandro (2016).

[27] In calculating the adjusted expenditure rule, we also took into account (i) the proposed correction for the transition period, during which the general government deficit exceeds 2% of GDP (the permitted expenditure growth is reduced by 0.5 percentage points) and (ii) excessive debt correction (the allowed maximum expenditure growth is reduced by 0.02 times the difference between the debt-to-GDP ratio in the previous year and the 60% reference.

[28] The S0 indicator is designed for the early detection of fiscal stress and relies on several indicators of short-term fiscal trends and financial indicators.

[29] The results of the long-term debt sustainability analysis carried out by the European Commission (and presented by the S2 indicator) are largely based on the costs of population ageing (for more see EC, 2015a; EC, 2016a). The Debt Sustainability Analysis (DSA) shows the medium-term response of debt to the usual and standardised macroeconomic shocks.

[30] The debt sustainability analysis is carried out according to the procedure developed by the International Monetary Fund. The framework for the analysis is available at https://www.imf.org/external/pubs/ft/dsa/mac.htm. The alternative scenario of lower real GDP growth assumes one-half standard deviation shocks to real GDP growth in 2006–2016, taking into account the elasticities of inflation and interest rates to changes in GDP and in the primary balance of 0.25 and −0.25 respectively. Under this scenario, real GDP growth in 2018 and 2019 would be lower than 1% (under the baseline scenario, GDP would grow at rates close to 3%). The alternative scenario of deterioration in the primary balance is also based on a long-term deviation and interest rate elasticity that is equal to that for the shock to real GDP. Under this scenario, the total primary balance surplus in 2016–2022 would be approximately half that under the baseline scenario. The interest rate shock is a standard 200 bp deviation shock applied to the interest rate from the baseline scenario.

Figure 8: **Distribution of general government debt projections**

The coloured fields indicate the probability distribution (from darker to lighter shades) of the 10th–25th, 25th–50th, 50th–75th and 75th–90th percentiles of the debt ratio projections under the combined macroeconomic shock.
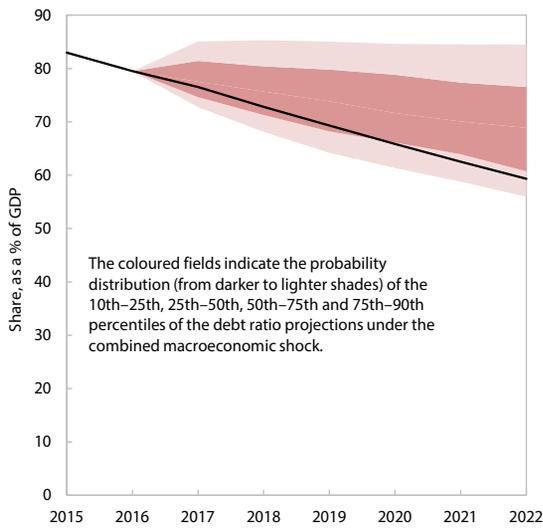
Source: IMF, framework for the analysis available at https://www.imf.org/external/pubs/ft/dsa/mac.htm; calculations by IMAD.

side of debt projections (see Figure 8). In the alternative scenarios, the risks to medium-term debt sustainability mainly arise from the possibility of lower economic growth and, to a lesser extent, a deterioration of the primary balance. In both cases, the debt level would not fall below 80% of GDP; in the event of a combined macroeconomic and fiscal shock, it could rise to around 85% of GDP. As the debt sustainability estimates in our analysis do not take into account the possibility of fiscal policy reaction to the assumed shocks, however, the estimates of the debt increase under these scenarios may be overstated.

The possibility of guarantees and sureties being called is another factor that may contribute to the increase in general government debt. The number of government guarantees and sureties that have been called in recent years is low, but this could change in the event of sudden GDP growth shocks. At the end of 2016 the stock of guarantees and sureties granted by the Republic of Slovenia amounted to EUR 6.8 billion (14.3% of GDP), which is approximately EUR 250 million[31] less than at the end of 2015. According to SP2017 projections, the stock of guarantees should decline further, to 3.7 billion or 7.7% of GDP by the end of 2020. Around 80% of all guarantees were given to domestic entities. Most of these – just over one third – were extended to the transportation and storage sector, primarily DARS d.d., and around one fifth to the financial and insurance sector, particularly the BAMC. Around one fifth involve guarantees to foreign international institutions, especially the EFSF,[32]

[31] The stock of guarantees was highest at the end of 2013 (EUR 8.3 billion or 23.0% of GDP).

[32] The European Financial Stability Mechanism or its successor, the European Stability Mechanism, the two funds intended for the provision of assistance to euro area countries in financial distress.

the programme that provided assistance to euro area countries during the recent crisis.

The key factor in ensuring long-term fiscal sustainability is adjusting social protection systems to demographic trends. Projections for Slovenia made by the Ageing Working Group at the European Commission[33] show an increase in age-related expenditure relative to GDP soon after 2020 in the no-policy-change scenario, which will have to be adressed by a comprehensive set of measures. In the recent period Slovenia has already adopted certain measures and strategic guidelines in these areas, but these will not suffice to reduce the risks to long-term fiscal sustainability anticipated by the new projections of the Ageing Working Group that are currently under preparation.[34] For the area of pensions, where the effect of ageing is greatest in Slovenia, the White Paper on Pensions was thus prepared in April 2016. It will serve as the basis for the working group set up by the Economic Social Council to prepare a set of guidelines for further development of the pension system. In the area of health care, certain individual measures have been adopted in the last few years, and these are improving access to services in some health programmes and increasing the

Figure 9: **Long-term projections of public expenditure on social protection systems, reference scenario, Slovenia**
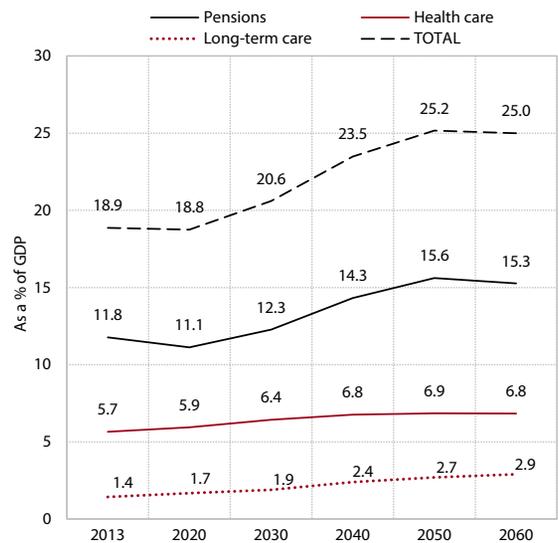
Source: EC (2015).
Note: Projections in the reference scenario of the Ageing Working Group (AWG). Public expenditure on health care is captured according to the methodology of the System of Health Accounts (SHA), including capital investments but excluding expenditure on long-term nursing care (0.86% of GDP). Long-term care expenditure (the medical and social components of expenditure according to SHA methodology; 0.98% of GDP) also includes disability allowances according to ESSPROS methodology (0.4% of GDP). The reference year for projections is 2012.

[33] EC (2015a).

[34] Within the Ageing Working Group at the EC, new expenditure projections are being made, which will also include the new 2015 population projections by Eurostat (see IMAD, 2017c) and will be released in 2018. In line with the methodology agreed, only those measures or laws that have been confirmed in the National Assembly can be included in the expenditure projections.

Figure 10: **Use of long-term projections within strengthened fiscal policy surveillance in the EU**

Long-term projections of age-related expenditure (released by the EU every three years)
Pensions, health, long-term care, education, unemployment

Assessment of medium- and long-term fiscal sustainability (every half year)	
S1 indicator	S2 indicator

Medium-term budgetary objective (MTO) and annual fiscal effort	EU country-specific recommendations (CRS) for pensions, health and long-term care

Source: Own scheme based on EC (2014) and EC (2016a).
Note: The scheme shows the impact of long-term projections on the calculation of the MTO and the formulation of recommendations, which in addition to these projections are also influenced by other factors.

efficiency of the health system.[35] In March 2016 Slovenia adopted the Resolution on the National Health Care Plan 2016–2025, which addresses key health and health care issues and defines priority tasks. On the basis of this Resolution, the Government has already proposed certain legislative amendments,[36] which will have to provide more long-term and sustainable solutions. The preparation of the Long-Term Care Act is also planned for 2017. Regarding broader social adjustments needed to cope with demographic change, a draft Strategy for a Long-Lived Society[37] was also drawn up in May 2017 and is currently undergoing public debate.

Demographic trends and related long-term projections of public expenditure also affect the calculation of the medium-term budgetary objective of the Government and the necessary structural adjustment by 2020. As a result of the high values of fiscal sustainability indicators, the medium-term budgetary objective, i.e. the targeted structural balance, is currently set higher for Slovenia

than for some other Member States, as a surplus of 0.25% of GDP (for factors affecting the MTO calculation see Box 3). Because of the high values of these indicators in 2015–2017, Slovenia also received EU country-specific recommendations on measures in the areas of the pension, health care and long-term care systems.[38]

Analyses and simulations made by IMAD, which are presented in detail in Economic Issues 2016,[39] show that to ensure long-term fiscal sustainability it will be necessary to design a comprehensive set of measures. According to these analyses, the measures for the adjustment of social protection systems can be subsumed under the following three areas:

(i)   expanding tax/contribution bases and thus revenue to ensure the long-term sustainability of funding;

(ii) ensuring the long-term sustainability of funding; and

(iii) encouraging people to work longer while strengthening health promotion and adjusting working conditions to the needs of older workers.

Analyses also show that the adjustment to demographic change can also be supported by structural reforms that increase productivity (see Chapter II – Allocative Efficiency and Productivity in Slovenia).

[35] In 2016 the Government allocated additional special-purpose funds to increase access to health services, which shortened the waiting times in some health programmes; for 2017 and 2018 a special government project for shortening waiting times and increasing the quality of health services was approved in April 2017. The measures aimed at increasing the efficiency of the health system include, for example, e-referrals, e-prescriptions and joint public procurement of medicines.

[36] In April 2017 the Government confirmed the draft Act Amending the Patient Rights Act and in May 2017 the draft Act Amending Health Services Act. In June it is expected to confirm the draft Act Amending the Medical Practitioners Act. At the beginning of 2017, the draft Act Amending the Health Care and Health Insurance Act was also put to public consultation and should be submitted to the Government for discussion by the end of June.

[37] IMAD (2017d).

[38] The likelihood of obtaining a recommendation is, in addition to fiscal sustainability indicators, also dependent on other specific indicators for individual areas (EC, 2014; Azzopardi–Muscal et al., 2015).

[39] IMAD (2016); Chapter: Response to demographic change and Appendix: Demographic change and its economic and social consequences.

Box 4: **Fiscal space**

Fiscal space is a relatively new method for assessing the possibilities for a more active role of fiscal policy in the economy. Using fiscal space, fiscal policy can boost short-term economic growth and, in particular, the long-term growth potential of the economy. The frequent calls in recent years from international institutions (the OECD, IMF and EC) on Member States to use the available fiscal space are, among other things, prompted by the low costs of funding in an environment of expansionary monetary policy and excess liquidity on international financial markets.[1] However, owing to the risk of additional shocks and implicit obligations (arising, for example, from the assumption of the debt burden of the private sector), and particularly because of the sensitivity of investors, especially in exceptional market conditions, fiscal policy should not use all available fiscal space.[2]

Fiscal space, which shows the extent to which general government debt can be increased without jeopardising fiscal sustainability, can be defined in several ways. The estimates of fiscal space are usually made on the basis of (i) the debt limit, which is based on the estimated fiscal reaction function;[3] (ii) various measures of tax revenues and their comparison with the level of debt; (iii) implicit liabilities, for example those related to population ageing;[4] and (iv) fiscal rules, such as the SPG rule, which sets the ceiling for acceptable general government debt at 60% of GDP. In our econometric analysis we used approach (i),[5] which defines fiscal space as the extent of the increase in general government debt that is still deemed sustainable by market participants and as the difference between the actual level of general government debt and the debt limit.[6] The debt limit cannot, however, be determined by quantitative methods alone but also depends on the current perception of market participants and market liquidity, which is another factor that should be taken into account in interpreting the econometric estimates of fiscal space.

Figure 11: **Estimates of fiscal space in Slovenia**
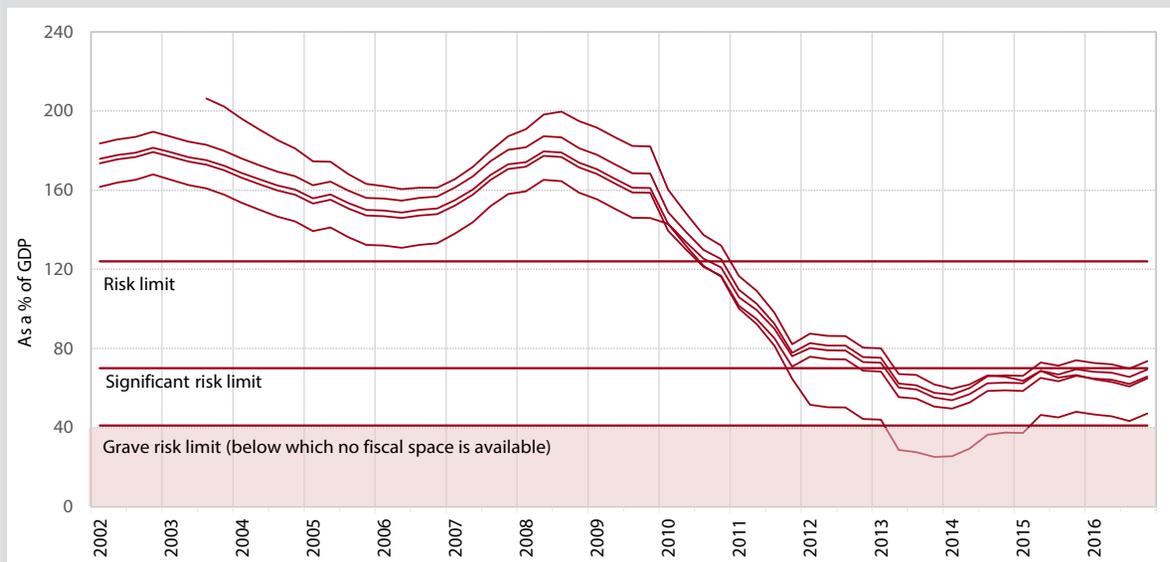
Source: Calculations by IMAD.
Note: Fiscal space is defined as the difference between the estimated debt limit and the actual level of debt. The figure shows several fiscal space estimates based on different specifications. Uncertainty of the estimated coefficients is also taken into account; the series in the span thus also take into account their (+1/−1) standard deviation. The risk limits are taken from Moody's analysis (2011).

[1] If the reduction in costs of funding coincides with a decline in economic growth, fiscal space does not increase.

[2] See, for example, Caruana, 2016.

[3] The approach used, for example, by Ghosh at al. (2011).

[4] Including the S1 indicator used by the European Commission to assess medium-term sustainability of public finances, which shows the primary balance required for a country to reduce general government debt to 60% of GDP within five years.

[5] We estimated the fiscal reaction function using the equation $PB_t = \alpha D_{t-1} + \beta D_{t-1}^2 + \gamma D_{t-1}^3 + \delta X_t + \varepsilon_t$ and used the estimated coefficients of the analysis described in Box 5 to solve the equation $(i_t - g_t)D_t = \alpha D_t + \beta D_t^2 + \gamma D_t^3 + \phi$. PB: primary balance; D: general government debt; X_t and φ: vectors of the remaining explanatory variables (vector φ also includes the coefficients of variables from Ghosh (2011), which did not prove statistically significant in the econometric analysis of the reaction function for Slovenia, for example current and future ageing costs); i and g: implicit interest rate and nominal GDP growth.

[6] All expressed as a share of GDP.

The estimates show that fiscal space in Slovenia is fairly limited, as it is in a range that, according to some indicators, does not allow the Government to play a more active role and boost the economy by further borrowing. We estimated fiscal space for Slovenia[7] on the basis of fiscal reaction functions (see Box 5), by means of which we calculated the limits of debt. In interpreting the results of the fiscal space estimates for Slovenia in Figure 11, it is necessary to take into account the uncertainties related to its calculation. The fiscal space shown in the figure was calculated on the basis of several specifications, taking into account uncertainties in the estimation of the coefficients in individual equations. With the actual debt close to 80% of GDP, the debt limit in 2016 was at a level around 150% of GDP according to most indicators, the size of fiscal space thus being around 70% of GDP. As the limit of grave risk is at a level of fiscal space of around 40% of GDP (see Figure 11), an increase in the debt-to-GDP ratio of around 30 pps[8] (to around 110% of GDP) could mean that Slovenia has no fiscal space available and its debt could be perceived by market participants as unsustainable. Both IMAD estimates and the estimates by Nerlich and Reuter (2015) indicate a similar size of fiscal space.[9] The estimates show that such fiscal space is fairly limited, one of the smallest in the euro area (see Nerlich and Reuter, 2015),[10] and in the range of significant risk on the risk-assessment scale.[11] The extension of the time series taken into account in our estimates compared with the Nerlich and Reuter analysis indicates a slight increase in fiscal space after 2013, facilitated by the improved borrowing terms, but in 2016 the increase in fiscal space came to a halt.

In the future, fiscal space could increase, but this will require prudent economic policy action. With the envisaged decline in the share of general government debt, the persistence of low borrowing costs, the expected further fall in the implicit interest rate and faster economic growth, fiscal space could increase slightly in the future. However, the increase could already be entirely cancelled out in the medium term by the effect of the expected rise in age-related expenditure. To be able to more actively influence economic activity, economic policy should therefore address those factors that could limit fiscal space in the future by taking measures that would also ensure the sustainability of fiscal policy over the medium and long term.

[7] A fiscal space estimate for Slovenia was also made by Nerlich and Reuter (2015) on the basis of a panel estimate of the fiscal reaction function for the EU-27 that was also calculated according to the methodology developed by Ghosh at al. (2011).
[8] An increase of such an order would account for half the increase in the debt-to-GDP ratio in the period of the crisis.
[9] At the same time, the order of magnitude of differences between the estimates is comparable with the differences in fiscal space estimates for selected countries presented by BIS (2016).
[10] On the basis of fiscal space analysis for Slovenia, the OECD (2016) recommends less expansionary fiscal policy.
[11] The estimate is released by Moody's at https://www.economy.com/dismal/tools/global-fiscal-space-tracker using the methodology according to Zandi (2011). According to these estimates, Cyprus, Greece, Italy and Japan have no fiscal space, while countries in the risk range include Portugal, Spain, Ireland, France and Belgium (Slovenia is not included in the analysis).

Box 5: **Estimating the response function of fiscal policy for Slovenia**

The high level of general government debt incurred requires a fiscal policy reaction; this can also be measured by fiscal response functions. Despite a four-fold debt increase during the crisis, the medium-term sustainability of debt is not in question, according to IMAD's estimate, except in the event of concurrent macroeconomic and fiscal shocks.[1] The shortcoming of the usual debt sustainability analyses (DSA) is that they do not take into account the possibility of fiscal policy reaction to the movement of debt, because of which the estimates of debt sustainability can overstate the level of debt in alternative DSA scenarios. For this reason, estimates of medium-term debt sustainability are therefore usually complemented by estimates of fiscal reaction functions,[2] which make it possible to assess the fiscal policy adjustment to changes in the level of debt or the selected macroeconomic aggregates. The seminal paper in this area (Bohn, 1998) finds that a sufficient condition for debt sustainability is that fiscal policy responds systematically to increases in debt by adjusting the primary balance. The main deficiency of this finding is that it assumes unchanged fiscal policy responsiveness over time, which is why some authors find this debt sustainability indicator insufficiently stable (for example Ghosh et al., 2011).[3] Fiscal policy reaction functions were estimated by the European Commission (Berti at al., 2016) in separate analyses for 13 old Member States and a panel analysis for 12 new Member States (including Slovenia). The Commission uses the coefficients of fiscal policy responsiveness obtained as a supplement to DSA estimates[4] for forecasting medium-term general government debt and assessing related fiscal risks.

The analysis for Slovenia shows the absence of a systematic fiscal policy response to the level of general government debt over the period analysed.[5] A comparison of the movements of the primary balance and the lagged debt[6] in a scatter diagram[7] (see Figure 12, left graph) shows that the relationship was not unidirectional, especially not in the area of a relatively low level of debt, and that the debt movement according to this indicator became sustainable (i.e. fiscal policy reacted to debt increases by reducing the primary deficit) only when the debt exceeded 60% of GDP.[8] In the scatter diagram we can define two areas, these divided by a strong deviation in 2013 and 2014 (a deficit increase as a result of the banks' balance sheet repair). Outliers excluded (see Figure 12, right graph), the relationship was somewhat closer to a relatively straight horizontal line over the entire period, which could indicate the absence of sustainable fiscal policy or, at best, an only gradual adjustment of the primary balance to the increasing debt. The polynomial function indicates an appropriate fiscal policy response – albeit less pronounced (i.e. less steep) than if outliers are excluded – already from the point when the debt approached 40% of GDP (2010), although this response was not fully unidirectional or consistent. The shallower slope of the polynomial function after the breakpoint in the latter case indicates a slower primary balance adjustment to debt increases on average throughout the period examined.

---

[1] See also Box 3 in IMAD (2016).

[2] The authors also use fiscal reaction functions alongside the additional debt sustainability indicator to complement the estimates of the reaction function of monetary policy and as an input for fiscal space analysis. For an overview of areas where fiscal reaction functions are used, see, for example, Checherita-Westphal and Ždarek (2015).

[3] To avoid this shortcoming, some authors calculate coefficients that change over time. Despite the short time series in the regression analysis, we estimated fiscal reaction function for sub-periods and used dummy variables in some specifications of equations.

[4] In the form of an alternative scenario with regard to the baseline scenario of DSA, which assumes the absence of fiscal policy response (Berti at al., 2016).

[5] In the analysis we took into account the period from the 1st quarter of 1999 to the 4th quarter of 2016.

[6] Four quarters, which represent the usual annual fiscal planning cycle.

[7] For a similar comparison for a panel of countries and data at the annual level, see Ghosh et al. (2011)

[8] This debt level approximately coincides with the period when the ZUJF entered into force after 2012.

Figure 12: **Primary balance and general government debt as a % of GDP, bank recapitalisations included (left graph) and excluded (right graph)**
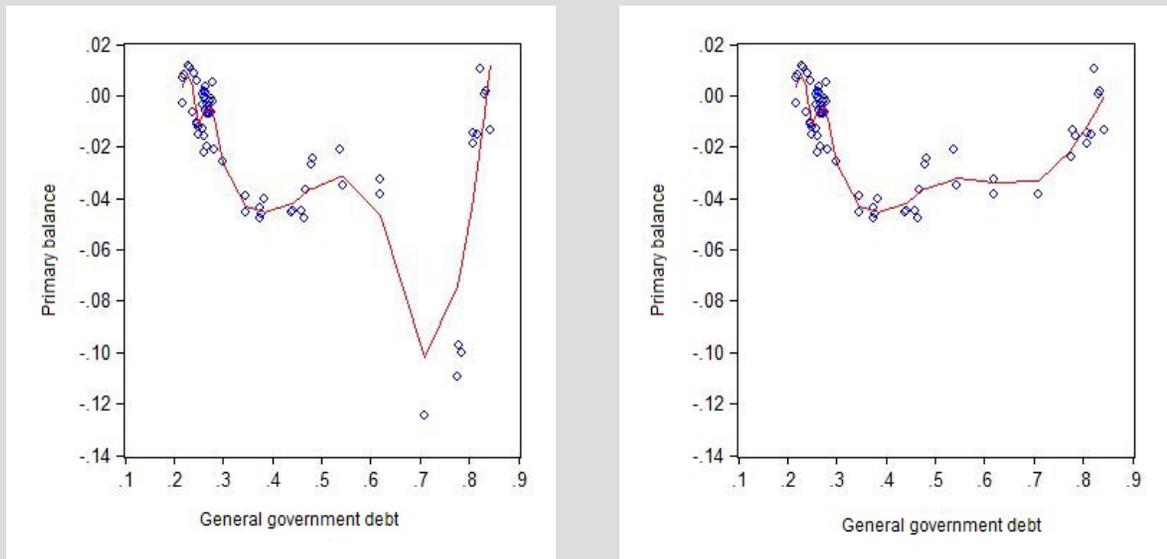
Source: SURS, calculations by IMAD.
Note: The figures show scatter diagrams of both variables; the points in the diagram are linked with the estimate of polynomial regression (with regard to the scatter diagram, we chose a quadratic function). Left: primary balance and debt, right: primary balance and debt excluding bank recapitalisations.Source: SURS; calculations by IMAD.

Long-term coefficients indicate an absence of correlation between the primary balance and general government debt or of a systematic fiscal policy response throughout the period, this particularly owing to the lack of response during the crisis.[9] Owing to the limited length of the time series, we used quarterly data (which is otherwise not optimal, as fiscal policy mostly responds to data changes at a lower frequency).[10] We tested the above-mentioned criterion of the systematic fiscal policy response by a regression of the primary balance against the lagged level of debt. As control variables we used variables that are commonly used in such analyses (for example Ghosh at al., 2011; Checcherita-Westphal and Žnidarek, 2015; Berti at al., 2016). The long-term coefficient of the relationship between the primary balance and debt, which does not take into account additional explanatory variables, is negative for the entire period and very small, but the coefficients indicate the existence of this relationship in shorter sub-periods. In the years both before and after the crisis, the relationship is positive and statistically significant, which indicates an active fiscal policy towards ensuring sustainable debt, while during the crisis the relationship is, on average, not statistically significant. The value of long-term coefficients is even slightly higher, but comparable with other analyses (see, for example, Bertl at al., 2016).

Regression analysis with the inclusion of additional explanatory variables that can affect fiscal developments indicates a stable response of the primary balance to debt, on average, over the whole estimation period. The analysis was made on the basis of specifications used in similar analyses and two different econometric approaches. The coefficient of fiscal policy responsiveness is in the interval between 0.04 and 0.12, with the concentration of results around 0.05, which is comparable to the results of similar analyses.[11] Taking into account additional explanatory variables, the average (positive) response of the primary balance to debt thus indicates sustainable fiscal responsiveness over the entire period. The results also show that, on average, fiscal policy operated pro-cyclically in the entire period, as the output gap coefficient is negative. Given the negative value of the expenditure gap coefficient, the pro-cyclicality was also expressed through expenditure. One of the variables used to explain the movement of the primary balance was a dummy for elections,[12] but it did not prove statistically significant, which leads to the conclusion that before the elections, in contrast to the average for the entire period, fiscal policy did not react consistently to the movement of debt.

---

[9] In the total regression analysis, we – including on the basis of the graph in Figure 12 – eliminated from the primary balance the impact of bank recapitalisations (SURS data – main general government aggregates, various releases).

[10] Some other studies also rely on quarterly data – see Berti et al. (2016, pp. 7–8). In order to imitate the annual fiscal policy cycle as much as possible, we used four-quarter moving averages in our analysis; in analysing the correlation between explanatory and dependent variables, four-quarter lags are mostly used.

[11] For an overview of the results of econometric analyses of fiscal policy response functions, see Checcherita-Westphal and Ždarek (2015). The values of the coefficient in the panel analysis of fiscal response functions in new Member States (Berti et al., 2016) according to different specifications are in the interval [0.03–0.07].

[12] We assigned it the value of 1 in the four quarters before each parliamentary election in the period analysed.

Appendix I: Compliance with the requirements of the preventive arm of the Stability and Growth Pact and additional indicators

Table 1: **Compliance with the requirements under the preventive arm of the SGP in the Stability Programme 2017 horizon**

	2016	2017	2018	2019	2020	Note/source
General government balance	-1.8	-0.8	-0.2	0.2	0.4	SURS; SP 2017
Primary balance	1.4	1.6	1.9	2.2	2.2	SURS; SP 2017
MTO					0.0	SP 2017
Structural balance	-1.1	-0.6	-0.3	-0.1	0.0	SP 2017
General government debt	79.7	77	74.3	70.9	67.5	SURS; SP 2017
Adjustment towards the MTO						
Structural effort	0.8	0.5	0.3	0.3	0.1	SP 2017
Required structural effort	0.6	0.6	0.6	0.6	0.6	SGP
Deviation	0.2	-0.1	-0.3	-0.3	-0.5	IMAD calculation
Structural effort (2 years)	0.6	0.7	0.4	0.3	0.2	SP 2017
Required structural effort (2 years)	0.6	0.6	0.6	0.6	0.6	SGP
Deviation	0.0	0.0	-0.2	-0.3	-0.4	IMAD calculation
Minimum required structural balance (MB)	-1.7	-1.4	-1.0	-1.0	-1.0	SGP (Vade mecum 2017)
Difference between the structural balance and the MB	0.6	0.8	0.7	0.9	1.0	SGP (Vade mecum 2017)
Expenditure rule						
Expenditure growth (real)	-0.1	2.1	-1.2	3.9	0.9	SP 2017, IMAD calculation
Threshold growth in general government expenditure (nominal)	0.4	1.3	1.3	1.3	1.2	SP 2017, IMAD calculation
Deviation (as a % of GDP)	-0.2	0.3	-1.0	1.0	-0.1	SP 2017, IMAD calculation
Average two-year deviation (as a % of GDP)	0.6	0.1	-0.3	0.0	0.4	SP 2017, IMAD calculation
Compliance with the debt rule						
Debt measures in the transition period:						
Baseline scenario (constant structural balance)	79.7	76.8	77.6			SP 2017, IMAD calculation
- cyclically adjusted debt			76.7			SP 2017, IMAD calculation
- ex-post measure of debt			77.9			SP 2017, IMAD calculation
- ex-ante measure of debt (2 years)			72.6			SP 2017, IMAD calculation
The required structural adjustment with regard to:						
- cyclically adjusted debt	0.0	-0.3	0.0			SP 2017, IMAD calculation
- ex-post measure of debt	0.3	0.5	0.5			SP 2017, IMAD calculation
- ex-ante measure of debt (2 years)	-0.1	0.4	0.8			SP 2017, IMAD calculation
MLSA	-0.1	-0.3	0.0			SP 2017, IMAD calculation
Deviation of the structural adjustment	0.9	0.8	0.3			SP 2017, IMAD calculation
Required debt reduction (1/20 of the surplus over 60% in t-1)				-0.7	-0.5	SP 2017, IMAD calculation
Deviation from the required debt reduction				-2.7	-2.9	IMAD calculation
memo:						
Output gap	-1.2	0.3	1.1	1.2	1.2	SP 2017
Output gap	-0.4	1.4	2.5			EC, Spring forecasts 2017
Output gap	-1.4	0.2	1.3	1.6	1.6	IMAD

Source: IMAD.

Table 2: **Risks to the compliance with the requirements of the SGP**

	2016	2017	2018	2019
General government deficit	YES	YES	YES	YES
Medium-term budgetary objective		NO	NO	NO
Structural adjustment		YES	NO+	NO-
Expenditure rule		NO+	YES	NO-
Debt reduction		YES	YES	YES

Source: IMAD.
Note: YES: the SGP rule is met; NO: the SGP rule is not met; NO+: the rule is not met, the deviation is not significant; NO–: the rule is not met, the deviation is significant.

Table 3: **Alternative indicators of the fiscal stance**

	2016	2017	2018	2019	2020	Note/source
MTO						
Structural balance	-1.2	-0.5	-0.4	-0.3	-0.2	SP2017 deficit; IMAD output gap
Structural effort	0.5	0.6	0.1	0.2	0.1	IMAD calculation
Structural effort (2 years)	0.7	0.6	0.4	0.1	0.1	IMAD calculation
Structural balance	-0.7	-0.5	-0.3	0.0	-0.1	SP2017 deficit; IMAD-HP
Structural effort	0.6	0.2	0.2	0.3	-0.1	IMAD calculation
Structural effort (2 years)	0.7	0.4	0.2	0.2	0.1	IMAD calculation
Structural effort without the output gap estimate	1.4	0.9	0.5	0.4	0.1	SP2017 deficit; IMAD output gap (5 years)
Structural effort without the output gap estimate (2 years)	1.1	1.1	0.7	0.5	0.3	
Difference between the structural balance and the MTO	-0.9	-0.4	-0.1	0.2	0.3	Condition for invoking the clauses
Structural primary balance	2.2	1.8	1.8	1.9	1.9	SP 2017, IMAD calculation
Change in structural balance	0.7	-0.4	0.0	0.1	-0.1	SP 2017, IMAD calculation
Expenditure rule						
Adjusted expenditure rule*	1.0	1.3	3.5	1.4	3.4	* according to: Claeys, Darvas and Leandro (2016).
Allowed adjusted expenditure growth	2.0	2.3	2.4	2.4	2.5	* according to: Claeys, Darvas and Leandro (2016).
Deviation	-1.0	-1.0	1.1	-1.0	0.9	IMAD
Average 2-year deviation	-0.3	-1.0	0.0	0.0	-0.1	IMAD
Expenditure according to the SP with regard to potential growth	-1.7	0.0	-3.6	1.5	-1.7	SP 2017
Expenditure according to the SP with regard to potential growth	-1.1	0.5	-3.1			EC, Spring forecasts 2017
Expenditure according to the SP with regard to potential growth	-1.5	0.2	-3.3	1.6	-1.6	IMAD
Debt						
Debt – change	-3.5	-2.7	-2.7	-3.4	-3.4	SURS; SP 2017
Debt – reduction, centred, 3 years (t-1 to t+1)	-1.3	-3.0	-2.9	-3.2		SP 2017, IMAD calculation
Debt – reduction, past 3 years (t-2 to t)	2.9	-1.3	-3.0	-2.9	-3.2	SP 2017, IMAD calculation
Required debt reduction (1/20 of the surplus over 60% in t-1)	-1.2	-1.0	-0.9	-0.7	-0.5	SP 2017, IMAD calculation
Contribution of the snowball effect to debt change, of which:	0.5	-1.1	-1.5	-1.1	-1.1	SP 2017, IMAD calculation
- Interest expenditure	3.0	2.4	2.1	2.0	1.8	SP 2017, IMAD calculation
- Effect of GDP growth	-2.0	-2.8	-2.4	-1.8	-1.7	SP 2017, IMAD calculation
- Effect of inflation	-0.5	-0.8	-1.2	-1.2	-1.2	SP 2017, IMAD calculation
memo:						
Output gap	-1.2	0.3	1.1	1.2	1.2	SP 2017
Output gap	-0.4	1.4	2.5			EC, Spring forecasts 2017
Output gap	-1.4	0.2	1.3	1.6	1.6	IMAD
Output gap, 5-year GDP average	2.9	2.8	2.9	2.9	2.7	IMAD 5-year averages
Potential growth	1.6	2.1	2.4	2.4	2.6	SP 2017
Potential growth	1.0	1.6	1.9			EC, Spring forecasts 2017
Potential growth	1.4	1.9	2.1	2.3	2.5	IMAD
Potential growth, 5-year GDP growth average	-0.6	0.0	0.3	0.0	-0.1	IMAD 5-year averages

Source: IMAD

Literature and sources

Azzopardi-Muscat, N., Clemens, T., Stoner, D. Brand, H. (2015). EU Country Specific Recommendations for health systems in the European Semester process: Trends, discourse and predictors. Health Policy 119 (2015) 375-383.

Berti, K., Colesnic, E., Desponts, C., Pamies, S., Sail, E. (2016). Fiscal reaction functions for European Union countries. European Economy. Discussion Papers 028. Brussels: European Commission. Obtained at: https://ec.europa.eu/info/sites/info/files/file_import/dp028_en_2.pdf.

Caruana, J. (2016). The slippery fiscal space. BIS Representative Office for the Americas Speech, Mexico City 30 November 2016. Basel: Bank for International Settlements. Obtained at: http://www.bis.org/speeches/sp161216.pdf.

Checherita-Westphal, C., Ždarek, V. (2015). Fiscal reaction function and fiscal fatigue in the Euro Area. Mimeo. Obtained at: http://www.euroframe.org/files/user_upload/euroframe/docs/2015/conference/Session%202/EUROF15_Checherita-Westphal_Zdarek%20revised.pdf.

Claeys, G., Darvas, D., Leandro, A. (2016). A proposal to revive the European fiscal framework. Bruegel policy contribution. Issue 2016/07. Brussels: Bruegel. Obtained at: http://bruegel.org/wp-content/uploads/2016/03/pc_2016_07.pdf.

EC – European Commission. 2014. Identifying fiscal sustainability challenges in the areas of pension, health care and long-term care policies. European Economy. Occasional Papers 201 10/2014. Obtained at: http://ec.europa.eu/economy_finance/publications/occasional_paper/2014/pdf/ocp201_en.pdf.

EC – European Commission. (2015a). The Ageing Report: Economic and budgetary projections for the EU Member States (2013–2060). European economy 3|2015. Pridobljeno na http://ec.europa.eu/economy_finance/publications/european_economy/2015/pdf/ee3_en.pdf.

EC – European Commission. (2016a). Fiscal Sustainability Report. Obtained at: https://ec.europa.eu/info/sites/info/files/file_import/ip018_en_2.pdf.

EC – European Commission. (2016b). Vade mecum on the Stability and Growth Pact. 2016 edition. Institutional paper 021. Obtained at: http://ec.europa.eu/economy_finance/publications/eeip/pdf/ip021_en.pdf.

EC – European Commission. (2016c). Communication from the Commission: 2017 Draft Budgetary Plans: Overall assessment. COM(2016) 730 final. Brussels: European Commission.

EC – European Commission. (2017a). Assessment of the 2017 Stability Programme for Slovenia. Obtained at:

https://ec.europa.eu/info/sites/info/files/24_si_sp_assessment.pdf.

EC – European Commission. (2017b). Vade Mecum on the Stability and Growth Pact. 2017 Edition. Obtained at: https://ec.europa.eu/info/sites/info/files/ip052_en_0.pdf.

EC – European Commission. (2017c). Spring 2017 Economic Forecast. Obtained at: http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm.

Ghosh, A.R., Kim, J.I., Mendoza, E.G., Ostry, J.D., Qureshi, M.S. (2011). Fiscal fatigue, fiscal space and debt sustainability in developed countries. NBER Working paper series. Working Paper 16782. Cambridge: National Bureau of Economic Research.

Government of the Republic of Slovenia. (2016). Predlog zakona o javnih financah (Draft Act Amending the Public Finance Act). EVA 2022-1611-0120. Obtained at: http://www.mf.gov.si/fileadmin/mf.gov.si/pageuploads/zakonodaja/ZJF_-JO_29_1_2016.pdf.

Havik, K., Mc Morrow, K., Orlandi, F., Planas, C., Raciborski, R., Röger, W., Rossi, A., Thum-Thysen, A., Vandermeulen, V. (2014). The production function methodology for calculating potential growth rates & output gaps. European Economy. Economic Papers 535. Brussels: European Commission.

Hristov, A., Raciborski, R., Vandermeulen, V. (2017). Assesment of the plausibility of the output gap estimates. European Economy. Economic Brief 025. Brussels: European Commission.

IMAD – Institute of Macroeconomic Analysis and Development. (2016). Economic Issues 2016. Obtained at: http://www.umar.gov.si/fileadmin/user_upload/publikacije/izzivi/2016/EkonomskiIzzivi2016.pdf.

IMAD – Institute of Macroeconomic Analysis and Development. (2017a). Spring Forecast of Economic Trends 2017. Obtained at: http://www.umar.gov.si/fileadmin/user_upload/napovedi/pomlad/pomladanska_2017/majska_2017_za_splet1.pdf.

IMAD – Institute of Macroeconomic Analysis and Development. (2017b). Okrepljeno gospodarsko aktivnost spodbuja vedno več dejavnikov (Stronger economic activity boosted by more and more factors). Obtained at: http://www.umar.gov.si/novice/novice/obvestilo/news/okrepljeno-gospodarsko-aktivnost-spodbuja-vedno-vec-dejavnikov/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=64f5252cbe91c9359f6dff2ac9adb5a0.

IMAD – Institute of Macroeconomic Analysis and Development. (2017c). Slovenian Economic Mirror 2/2017. Obtained at: http://www.umar.gov.si/fileadmin/user_upload/publikacije/eo/2017/2-2017/EO_0217-splet_novo.pdf.

IMAD – Institute of Macroeconomic Analysis and Development. (2017d). Strategija dolgožive družne. Osnutek (Strategy for a Long-Living society. Draft). Obtained at: http://www.umar.gov.si/fileadmin/user_upload/publikacije/kratke_analize/Strategija_dolgozive_druzbe/Osnutek_SDD_april_2017_prava_verzija.pdf.

IMF (2016). Fiscal Monitor: Acting Now, Acting Together. April 2016. Washington D.C.: International Monetary Fund. Obtained at: http://www.imf.org/en/Publications/FM/Issues/2016/12/31/Acting-Now-Acting-Together.

MZ – Ministry of Health. (2016). Resolucija o nacionalnem planu zdravstvenega varstvo 2016–2025 – Skupaj za družbo zdravja (Resolution on the National Health Care Plan 2016–2025 – Together for a healthy society. Obtained at: http://www.uradni-list.si/1/objava.jsp?urlid=200872&stevilka=3163.

MF – Ministry of Finance (2017). Slovenija javni dolg znižuje hitreje, kot to predvidevajo pravila o dolgu (General government debt in Slovenia has been diminishing at faster pace than it is provisioned by the Stability and Growth Pact Debt Rule). Obtained at: http://www.mf.gov.si/si/medijsko_sredisce/novica/article/3/3204/.

Nerlich, C., Reuter W.H. (2015). Fiscal rules, fiscal space and procyclical fiscal policy. Working Paper Series No. 1872. Frankfurt am Main: European Central Bank. Obtained at: https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1872.en.pdf.

OECD (2016). Using the fiscal levers to escape the low-growth trap. OECD Economic Outlook. Volume 2016 Issue 2. Paris: OECD Publishing. Obtained at: http://www.oecd.org/eco/public-finance/Using-the-fiscal-levers-to-escape-the-low-growth-trap.pdf.

Pobuda držav Evropski komisiji (The Initiative of Member States to the European Commission). (2016). Obtained at: http://estaticos.expansion.com/opinion/documentosWeb/2016/03/31/Cartadeficitestructural.pdf.

Program stabilnosti – dopolnitev 2016 (Stability Programme – Amendments 2016). Government of the Republic of Slovenia. (2016). Obtained at: http://www.mf.gov.si/fileadmin/mf.gov.si/pageuploads/EU_semester/2016-04-28_PS_2016F.pdf.

Program stabilnosti – dopolnitev 2017 (Stability Programme – Amendments 2017). Government of the Republic of Slovenia. (2017). Obtained at: http://www.mf.gov.si/fileadmin/mf.gov.si/pageuploads/EU_semester/2017-5-22-PS_2017-cistopis_po_seji.pdf.

Skupno pismo ministrov (The Joint Letter of Ministers). (2017). Obtained at: http://www.mef.gov.it/inevidenza/documenti/Joint_letter_FR_IT_PT_SP.PDF.

SPOROČILO KOMISIJE Evropskemu parlamentu, Svetu, Evropski Centralni banki, Evropskemu ekonomsko-socialnemu odboru, Odboru regij in Evropski investicijski banki, COM(2015) 12 final. Kako čim bolje izkoristiti prožnost v okviru obstoječih pravil Pakta za stabilnost in rast (COMMUNICATION FROM THE COMMISSION to the European Parliament, the Council, the European Central Bank, the Economic and Social Committee, the Committee of the Regions and the European Investment Bank, COM(2015), 12 final). Making the best use of the flexibility within the existing rules of the Stability and Growth Pact). Strasbourg, 13.1.2015. Obtained at: http://ec.europa.eu/transparency/regdoc/rep/1/2015/SL/1-2015-12-SL-F1-1.PDF.

SURS – Statistical Office of the RS. (2017). Aprilsko poročilo o presežnem primankljaju in dolgu (April excessive deficit procedure report, Slovenia, 2013–2016, forecast 2017. Obtained at: http://www.stat.si/StatWeb/News/Index/6630.

Zandi, M., Cheng, X., Packard, T. (2011). Fiscal space – special report. Moody's Analytics. Obtained at: https://www.economy.com/mark-zandi/documents/2011-12-13-Fiscal-Space.pdf

Allocative Efficiency and Productivity in Slovenia

Summary

Slovenia's GDP per capita is approximately one fifth lower than the EU average, the gap being mainly due to lower productivity. By enhancing productivity and with policies ensuring a more equal distribution of income, Slovenia could improve the standard of living and welfare of its population. Productivity as a driver of material welfare will gain importance in the future due to the expected contraction of the working-age population (as a consequence of demographic change). While Slovenia had been closing the gap behind the most productive economies in the previous decade, the slower productivity growth following the crisis no longer suffices for a faster convergence to the average level in the EU. Enhancing productivity is a challenge for all sectors. Manufacturing industries have in fact reduced their gap with the EU the most since the crisis; but the progress made by services, knowledge-based services in particular, has been more modest. The subdued productivity growth during and after the crisis has been attributable not only to cyclical but also to structural factors, which are indicated particularly by a significant fall in the contribution of total factor productivity to labour productivity growth.

An improvement in total factor productivity could be significantly enhanced by a more efficient allocation of production factors. The results of empirical analysis show that total productivity could increase considerably were production factors (labour and capital) allocated more efficiently. The extent of the improvement would be comparable with the results for countries similar to Slovenia in terms of development. The efficiency of the allocation of production factors in Slovenia deteriorated further after 2005 and began improving only after 2013. The lower efficiency or a worsening of efficiency in the period before and during the crisis was typical particularly for service activities, which may also be related to the lower level of internationalisation, a lack of competition and higher regulatory barriers to the efficient functioning of companies in this sector.

The main barriers to productivity in Slovenia are the institutional framework and knowledge-related factors. The factors affecting productivity are divided into factors within businesses and those in the external environment. The latter refer to the conditions of allocation or the efficiency of distribution of production factors among companies. Slovenia has made significant shifts in this area in the last two decades, but the improvements were insufficient to be able to keep pace with the adjustments made by its main trading partners. The barriers in the area of knowledge are related to the insufficient ability of companies to keep pace with technological progress. They are a consequence of the education system not being sufficiently adjusted to labour market needs, and the lack of willingness among managers to tackle the challenges and introduce modern technologies.

Economic policy can directly affect productivity, particularly via factors in the business environment, while its effect on factors within businesses is indirect and occurs with a longer lag. Long-term structural measures can contribute the most to the elimination of factors that impede the optimal allocation of production factors. Given the deficiencies identified, the priority measures of Slovenian economic policy in terms of productivity enhancement should be focused on knowledge, innovation and the institutional framework. These are the key areas that can help increase productivity over the longer term. The current conditions of stable economic growth support the introduction of structural changes in these areas,[*] as appropriate policy measures could turn the cyclically boosted kick-start of the economy into structural long-term based growth.

---

* See also the analysis Assessing the Effects of Some Structural Measures in Slovenia (IMAD, 2016).

1 Introduction

Productivity is a driver of economic growth and usually explains the bulk of cross-country variation in economic development and in standards of living. It is reflected in higher value added generated as a consequence of a more effective combination of inputs stemming from new ideas, and from technological as well as non-technological innovations such as innovations in organisation and processes of work. Higher productivity fosters competitiveness, which, supported by policies ensuring an even distribution of income, can make it possible to improve the living standards and welfare of the population. Slovenia lags significantly behind more developed countries in terms of productivity, and hence in GDP and income per capita. With regard to the expected contraction of the working-age population as a consequence of demographic change, productivity as a driver of GDP growth and the standard of living will gain importance in the future.

Productivity gaps between countries are not only a consequence of differing productivity at company level, but also of differences in the efficiency with which capital and labour are distributed across companies. In addition to investment in knowledge and R&D – the most frequently cited measure for enhancing productivity – it is also vital to create a business environment with minimum barriers to the allocation of production factors across companies. Studies show that an efficient reallocation of production factors across companies explains more than half of productivity growth over a long-term horizon.

Our analysis aims to estimate the impact of allocative efficiency on productivity in Slovenia. According to the methodology used, an efficient allocation of available resources (labour and capital) means that there are no barriers in the economy to the reallocation of production factors from less to more productive companies. The analysis is based on a calculation of the dispersion of total factor productivity across companies, assuming that if production factors are optimally distributed across companies within a given sector, marginal products of these companies are equalised. While such an assumption is a theoretical concept, the results of the analysis nevertheless make it possible to conclude that a more efficient allocation of production factors could significantly contribute to productivity growth in Slovenia; this is similar to the findings of studies for countries comparable to Slovenia in terms of development.

The analysis consists of four sections in addition to the introduction. In the second we examine some basic facts on productivity in Slovenia. This is lower than the average productivity in the EU and during the crisis the gap widened further, not only as a result of cyclical but also structural factors, which, among other things, hamper total factor productivity growth. In the third section we therefore present the results of empirical analysis, which shows that a more efficient allocation of production factors could make a significant contribution to total factor productivity growth, especially in the service sector. Productivity growth could be enhanced both by factors operating within companies and those in their environment. Productivity growth factors and their developments in Slovenia are presented in the fourth section of the analysis. On the basis of findings in the fourth section, we conclude the analysis with a final section proposing certain measures that could be taken to increase productivity and thus the competitiveness of the Slovenian economy and, consequently, the standard of living.

2 Basic facts about productivity in Slovenia

Slovenia ranks among EU Member States with medium GDP per capita; its lag behind the most developed countries is related to lower productivity. In 2015 productivity[1] expressed in purchasing power standards was around one fifth lower than the average productivity in the EU and explained the entire development gap with the EU as measured by GDP per capita. The employment rate, the other component that affects GDP per capita alongside productivity, was at the level of the EU average despite the decline during the crisis and despite the relatively low rate of employment of some population groups (young and older people). Slovenia ranks ahead of most new and behind most old EU Member States in both economic development and productivity.

Productivity growth since the crisis no longer suffices for a more rapid convergence to the EU average. After average annual productivity growth amounted to approximately 3.5% in 2000–2007, it came to a halt in 2008–2013[2] and then reached 1.4% in 2014–2016. Between 2000 and 2016 Slovenia's productivity gap with the EU thus declined only by around 5 pps (measured in GDP per employee), the bulk of convergence having been achieved by 2005. With some other new EU Member States (with an otherwise lower baseline level) making significantly more progress in the same period, Slovenia's advantage over these countries decreased significantly. After 2007 the average annual productivity growth in Slovenia also fell behind that in a number of Member States with comparable productivity, as well as some Member States with higher productivity.

---

[1] This chapter deals with labour productivity.
[2] The average annual real growth in this period was -0.2%.
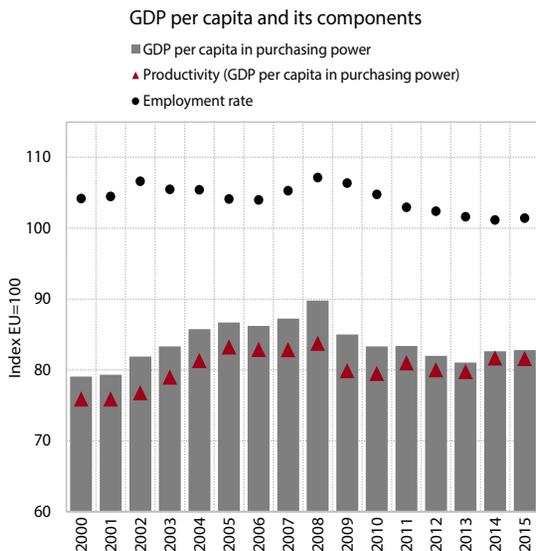
The bulk of Slovenia's productivity gap with the EU average is a consequence of lower productivity at the level of economic sectors; only a small part of the differences is due to economic structure. With the workforce mainly moving from less to more productive sectors, the structure of the economy has been gradually approaching the EU average in the last few years. In 2015 only around 5% of the productivity gap with the EU average could thus be explained by differences in structure, compared with 10% in 2000.[3] With a fairly similar economic structure, Slovenia still has a significant productivity gap at the level of economic sectors.[4] In manufacturing the productivity gap is widest in some more technologically intensive industries,[5] i.e. those which in the most developed and highly innovative economies usually achieve the highest levels of productivity. In services, which represent the non-tradable part of the economy, productivity levels are difficult to compare internationally due to the absence of sector-specific prices. A comparison in current prices shows significant productivity gaps with the EU average in predominantly knowledge-intensive (information and communication, professional,

---

[3] The calculation is based on the breakdown of the economy into 10 sectors (SKD A, BCDE, F, GHI, J, MN, OPQ, RST). A breakdown into fewer (or more) sectors would bring different results.
[4] Studies (Bartelsman et al., 2013; Hsieh and Kenlow, 2009) find that differences in productivity levels across countries are to a great extent due to differences in company performance within individual sectors and not only the sectoral structure of the economy.
[5] According to the latest data for 2014, productivity in all medium- and high-technology industries (the manufacture of ICT equipment; the manufacture of machinery and equipment n.e.c; the chemical industry; the manufacture of motor vehicles; the manufacture of other transport equipment; the manufacture of electrical equipment; the manufacture of pharmaceutical products) lagged more behind the EU average than the manufacturing sector as a whole.

Figure 1: **GDP per capita and productivity**

GDP per capita and its components

■ GDP per capita in purchasing power
▲ Productivity (GDP per capita in purchasing power)
● Employment rate

Productivity in purchasing power standards

■ 2008 ■ 2015 — 2000

Source: Eurostat; calculations by IMAD.
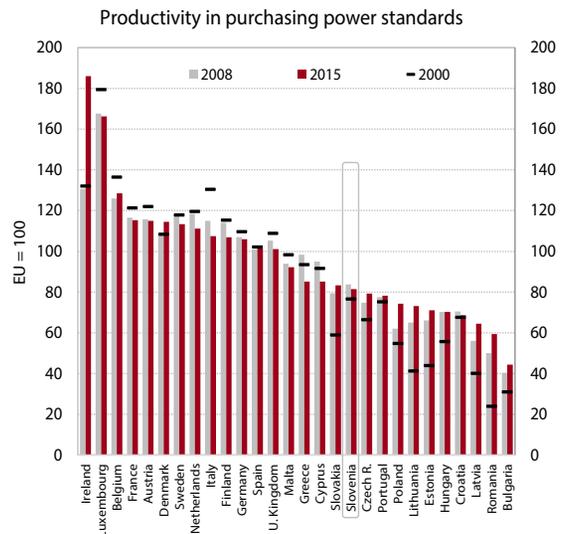
Figure 2: **Productivity growth in EU countries relative to the baseline productivity level**
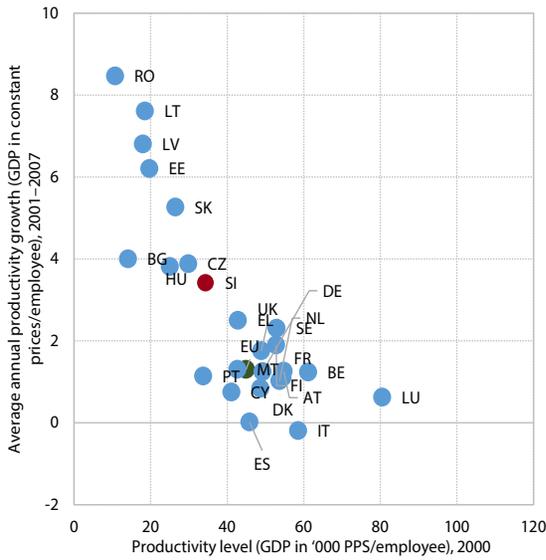
Source: Eurostat; calculations by IMAD.
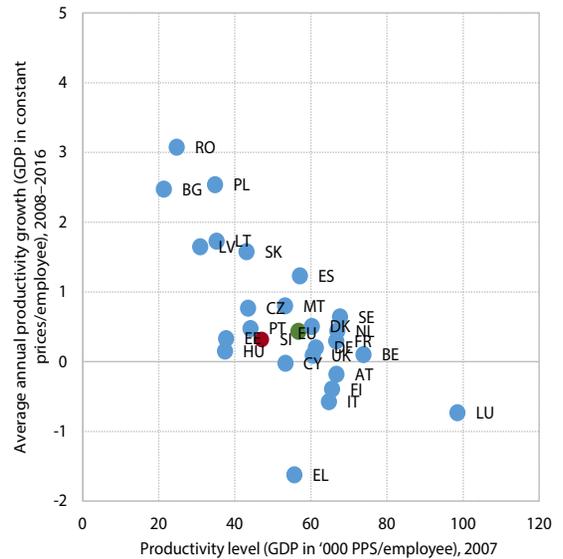
Figure 3: **Labour productivity, Slovenia**
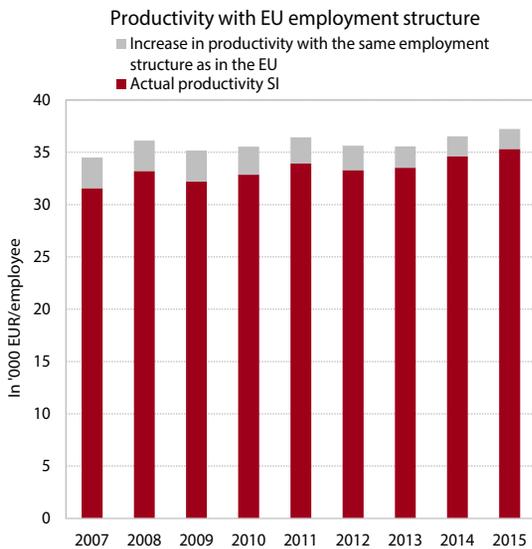
Source: Eurostat; calculations by IMAD.
Note: The right figure includes activities of the business sector (OECD definition); industry (BCDE), construction (F), trade, transportation and tourism (GHI), information–communication activities (J), financial (K) and professional, scientific and technical (MN) services.
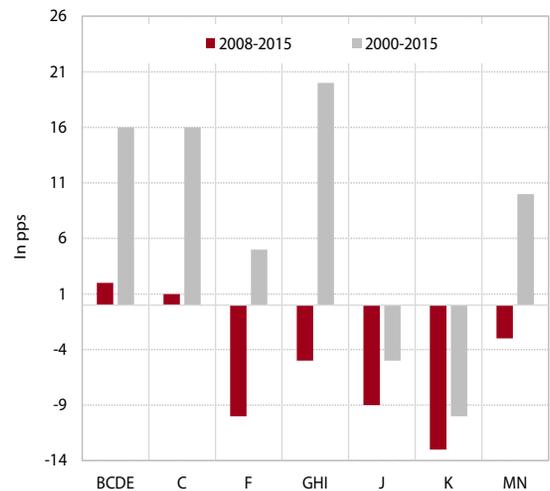
scientific and technical) and financial services. Although these differences could be partly attributable to different price levels across countries, we estimate that they may also be due to lower real value added per employee in these sectors (whether owing to lower efficiency or different structure of individual sectors). This is also indirectly implied by some other indicators, such as the low rate of innovation activity in service activities[6] and the dominance of small, usually less productive enterprises.[7] Their productivity level is also

relatively low in comparison with some new EU Member States which otherwise have lower productivity of the total economy than Slovenia. Moreover, service activities, particularly those based on knowledge, have been closing the gap with the EU more slowly than manufacturing activities,[8] which is also linked to their predominant orientation to the domestic market, which has been recovering more slowly from the crisis than export markets.

---

[6] See Development Report 2017 (IMAD, 2017a).

[7] In the euro area, in 2008–2013 the average productivity of small enterprises stood at 90% and of large enterprises 130% of the average productivity of the entire corporate sector (ECB,

2013).

[8] In information and communication activities the gap also widened over the longer period of the last fifteen years (2000–2015).

Figure 4: **Breakdown of labour productivity growth into intra- and inter-sectoral contributions (left) and contributions of sectors to productivity growth (right), Slovenia**

Contribution of inter- and intra-sectoral components
to productivity growth in the economy

Sectoral contributions to productivity growth

- Inter-sectoral component
- Intra-sectoral component

- Agriculture (A)
- Industry (B–E)
- Construction (F)
- Market services (G–N, R–T)
- Public services (O–Q)
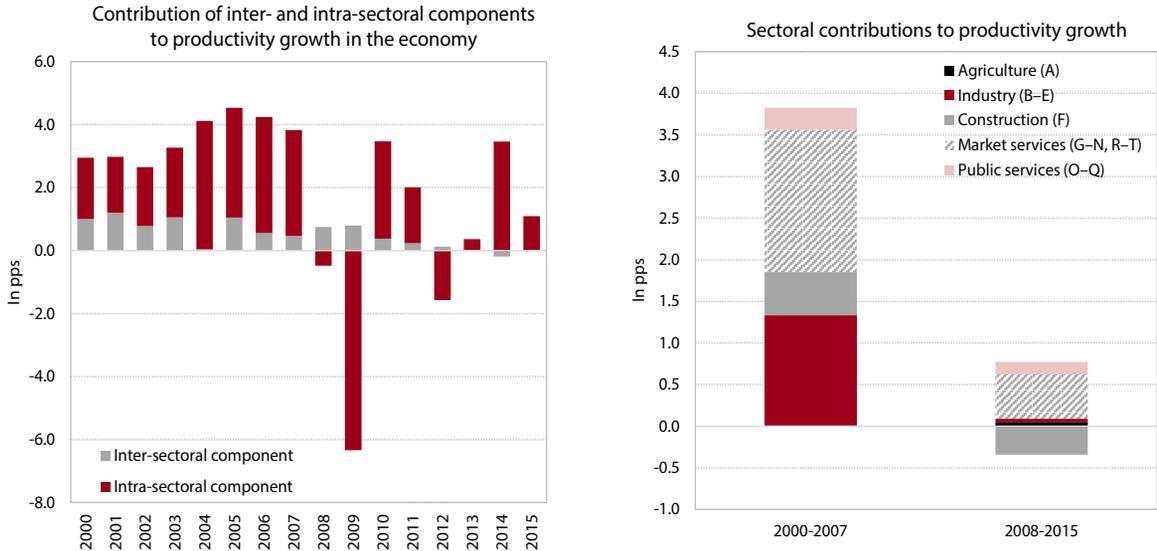
Source: SORS; calculations by IMAD.

Figure 5: **Breakdown of labour productivity growth trend into the contributions of capital and total factor productivity**

Slovenia

Euro area

- Capital per unit of labour ■ Total factor productivity
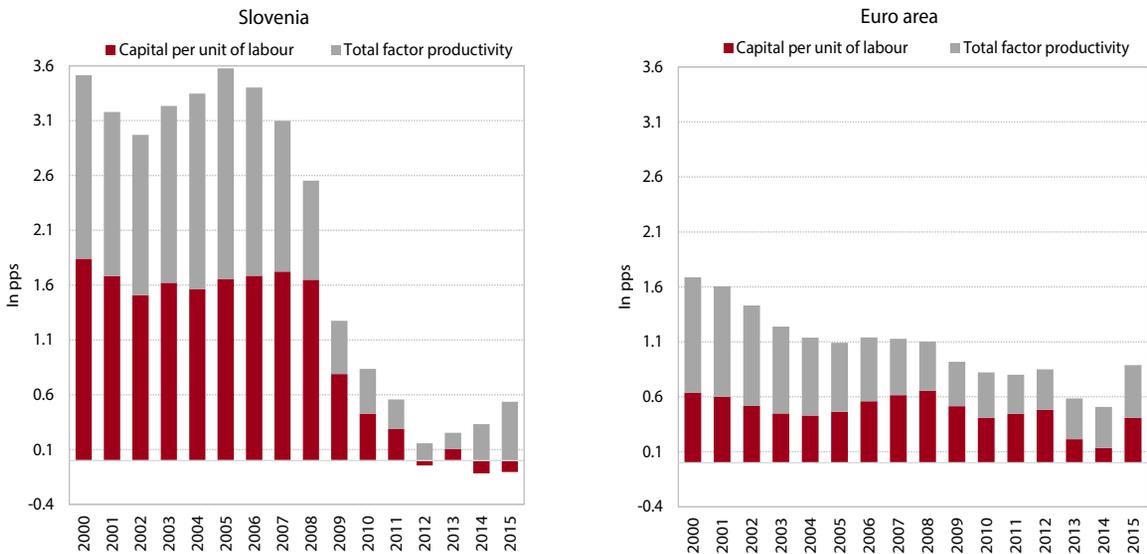
Source: Calculations by IMAD.

Since the end of the economic crisis (after 2013) productivity growth has mainly been based on the improvement of productivity within sectors. Specifically, the reallocation of labour to more productive sectors, typical for the pre-crisis period and the first years after the onset of the crisis, has slowed significantly, as has, in turn, the contribution of the inter-sectoral component to total productivity growth. A more detailed overview of developments within industry and market services shows that productivity growth in industry and some traditional market services (transportation and trade) has been a consequence of improved efficiency within sectors (intra-sectoral productivity growth). In contrast,

the share of employed persons[9] has been rising in knowledge-intensive services[10] (a positive contribution of the inter-sectoral component to productivity growth). These services otherwise attain above-average productivity at the level of the economy as a whole, but it is not rising (a negative contribution of the intra-sectoral component). This is also consistent with the above-mentioned findings, according to which the productivity gap with the EU average rose precisely for some knowledge-intensive services.

---

[9] A consequence of employment growth in these activities.
[10] ICT (SKD J); professional, scientific and technical activities (SKD M).

Figure 6: **Comparison of the upper and middle deciles of companies (in terms of real labour productivity)**

Real productivity (value added per employee)

Ratio of the upper to the middle decile, 2015
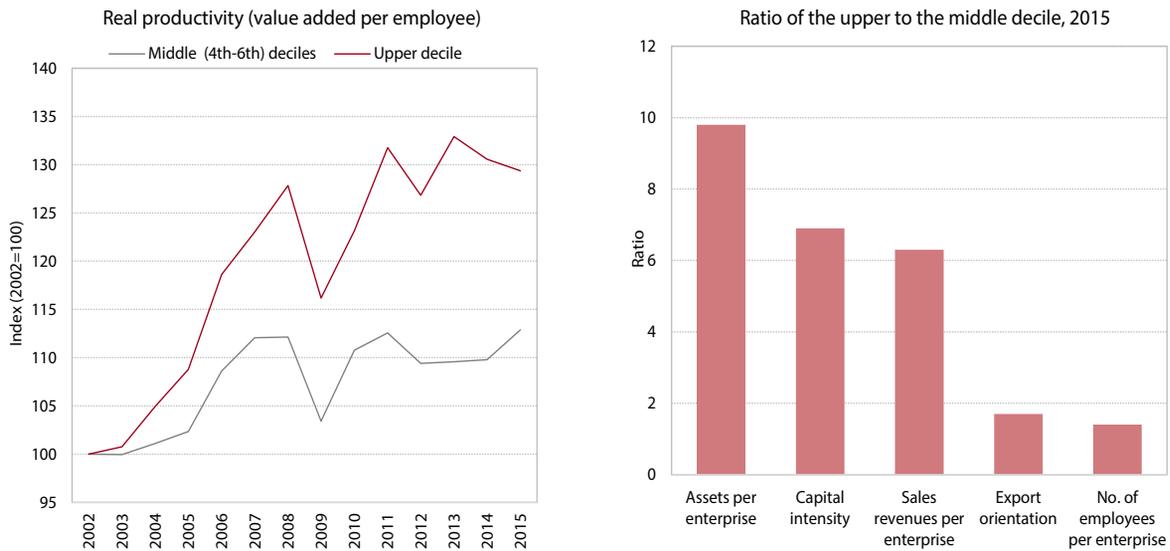
Source: Calculations by IMAD on the basis of AJPES data.
Note: The analysis covers companies that have more than five employees and no negative, missing or zero values of real value added. Total productivity of individual deciles is the weighted average of productivity of individual companies from a given decile. The bottom decile is not included due to its volatility and small size. Real productivity is defined as the ratio of value added in reference year prices to the number of employees. The reference year is 2002. Value added is deflated by implicit deflators of the statistics of national accounts available at the level of sections (2-digit activity code) of the Standard Classification of Activities.

The modest productivity growth in Slovenia is attributable to both cyclical and long-term structural factors. The breakdown of the labour productivity growth trend into the contribution of capital and total factor productivity[11] reveals a significant decline in the contribution of capital during the crisis, which also remained well below the pre-crisis level in subsequent years. We estimate that it was affected not only by the cyclical decline in investment, but also structural factors such as the misallocation of capital before the crisis, when owing to easy access to funding, financial resources were also allocated for less productive purposes. A sub-optimal allocation of capital before the crisis is also evident from the substantial changes in the contributions of individual sectors to productivity growth before and after the crisis (for example, positive developments in construction and financial services turned into negative contributions to total productivity growth with the onset of the crisis). After 2007 the contribution of total factor productivity also decreased considerably. It should reflect the impact of all other factors but capital, but is usually associated with longer-term structural factors that affect innovative activity and corporate dynamics.

Not even the most productive companies have been able to maintain the pre-crisis pace of productivity

growth since the crisis; their medium-term potential for faster growth could be limited by the fact that only half of these companies are from technologically more intensive and knowledge-based sectors. While before the crisis the upper decile of companies (according to productivity achieved) was the main driver of total productivity growth, in 2008–2015 its growth slowed notably and was similar to the average for the middle deciles.[12] The characteristics of companies from the upper decile are significantly higher capital intensity and greater size, but also an export orientation in comparison with companies from the middle decile. However, only half of these companies are from high- and medium-high-technology industries or knowledge-intensive services, which are generally more innovation-active. It could therefore be concluded that in Slovenia the high productivity of companies of the upper decile is often based on capital intensity rather than high innovation activity, which is one of the key factors of sustainable and rapid enterprise growth and value-added creation.

---

[11] An increase in capital is a consequence of investment in tangible (such as equipment, machinery, infrastructure, etc.) and intangible assets (such s software, R&D). Total factor productivity increases as a result of higher efficiency (of labour or equipment) owing to improved technologies and/ or production processes (Promoting productivity and equality, OECD, 2016).

---

[12] The average of the 4th–6th deciles.

3 Analysis of the impact of the efficient allocation of production factors on productivity in Slovenia

Many studies show that efficient allocation of production factors has a significant effect on productivity and, consequently, economic growth and the level of development. They find that total factor productivity depends not only on the efficiency of individual companies or sectors, but also on the distribution of production factors across companies and sectors. More productive companies usually spend more on innovation than their less productive counterparts and are more able to attract efficient production factors, while less efficient companies are forced to become more productive or exit from the market. Productivity thus plays a decisive role in companies' survival on the market (Syverson, 2011). Individual studies estimate that reallocation of production factors can explain more than half of productivity gains over a longer time horizon.[13] They also reveal than in many countries the distribution of production factors had already been deteriorating before the global economic crisis, which slowed productivity growth.[14] In this context, the OECD points particularly to the misallocation of financial flows in the pre-crisis period.[15]

An inefficient allocation of production factors could also be a significant factor behind low productivity in Slovenia. Similarly to some other euro area countries which, according to studies, could significantly increase productivity through better allocation of production factors, Slovenia faced a significant slowdown of productivity growth during the crisis. The deterioration of allocative efficiency in Slovenia during the crisis seems to have been mainly a consequence of misallocation of capital.[16] Slovenia is also characterised by a significant role of the state in the economy.[17] This can lead to market distortions, which hamper the reallocation of production factors across companies.

The many imbalances in the structure of labour supply and demand may reduce particularly the efficiency of the allocation of labour. The results of our quantitative analysis indicate that Slovenia could significantly increase productivity by improving allocative efficiency.[18] Allocative efficiency had started to decline after 2005, deteriorated the most in 2012–2013 and then started to improve. The lower efficiency or a deterioration of efficiency in the period before and during the crisis was relatively more pronounced in the service sector, which could be related to the relatively greater heterogeneity of this sector, but also to the lower level of internationalisation of service activities, a lack of competition and higher regulatory barriers.

3.1 Methodology

We analysed the efficiency of the distribution of available production factors and its effect on total factor productivity (TFP) in Slovenia using the methodology developed by Hsieh and Klenow. The Hsieh and Klenow model (hereinafter HK; 2009, 2013)[19] is a standard model of monopolistic competition with heterogeneous companies, which not only differ in their productivity levels, but also face different barriers to efficient distribution of available production factors. This causes differences between companies in terms of marginal products of labour and capital and generally translates into lower TFP. The extent of misallocation of production factors can thus be measured by the width of the observed gaps in the values of marginal products of different production factors across companies.

The efficiency of the allocation of available resources was calculated using the Cobb-Douglas production function with constant returns to scale:

$$Y_{si} = A_{si} K_{si}^{\alpha_s} L_{si}^{1-\alpha_s}, \tag{1}$$

where i denotes the company, s denotes the sector, Y refers to the real product, A is the parameter of a company's total factor productivity (TFP),[20] L is nominal costs of labour or the average number of employed persons on the basis of hours worked in the accounting period, K is fixed assets and $1-a_s$ is the average share of labour costs in the value added of the sector in a certain period.[21]

---

[13] For example, Baily et al. (1992) for the US or Barnett et al. (2014) for the UK.

[14] For example, Dias et al. (2015) and Calligaris et al (2016).

[15] *The global productivity slowdown, technology divergence and public policy: a firm-level perspective* (OECD, 2016). See also Gamberoni et al. (2016a) for the analysis of misallocation of production factors in the euro area, where capital misallocation plays the most important role, particularly in services (the efficiency of labour allocation has not been changing significantly).

[16] The results of the analysis of Central and Eastern European countries (Gamberoni et al., 2016b) show that Slovenia is one of the countries that experienced the fastest deterioration in the efficiency of capital allocation in the pre-crisis period among the EU Member States that are part of the euro area. The efficiency of labour allocation also deteriorated in Slovenia in the same period, yet to a significantly lesser extent.

[17] This shows not only in a large share of state ownership in the economy, but also in the significance of state aid and subsidies to the corporate sector.

---

[18] Optimal allocation of production factors is a theoretical concept that cannot be realised in practice (the theoretical framework relies on a complete elimination of misallocations). The results should therefore be treated with a great deal of caution.

[19] The predecessors of this analysis in the theoretical framework are Restruccia and Rogersion (2008), who showed that the negative contribution of inefficient allocation of available production inputs to TFP can be significant.

[20] A_{si} or TFP_{si} shows the product a company can obtain by available production inputs.

[21] in our analysis, 2002–2015.

A company's physical productivity A_{si}[22] is not directly measureable, so it can be expressed as:

$$A_{si} = \frac{TFPR_{si}}{P_{si}} = \frac{1}{P_{si}} \frac{P_{si} Y_{si}}{K_{si}^{\alpha_s} L_{si}^{1-\alpha_s}}, \qquad (2)$$

where $TFPR_{si}$ denotes revenue productivity of the company[23] and P_{si} is the company-specific price. Assuming monopolistic competition, physical productivity of the sector ($TFPQ_s$) can be expressed as:

$$TFPQ_s = A_s = \left[\sum_{i=1}^{M_s} \left(A_{si} \frac{\overline{TFPR_s}}{TFPR_{si}} \right)^{\sigma-1} \right]^{\frac{1}{\sigma-1}}, \qquad (3)$$

where σ is the elasticity of substitution across companies' goods.[24]

The efficiency of allocation of available production factors across companies

Assuming a logarithmic normal dispersion of A and TFPR and under the condition of equal costs of capital within the sector, equation (3) can be written as:

$$lnTFPQ_s = \frac{1}{\sigma-1} ln \left(\sum_{i=1}^{M_s} A_{si}^{\sigma-1} \right) - \frac{\sigma}{2} var(lnTFPR_{si}). \quad (4)$$

The movement of aggregate productivity is affected by: (1) *TFPQ* of *individual companies*, which shows the extent of the increase in a company's TFPQ and hence total TFPQ (the first term to the right side of the equation) if new technologies and business practices are used; and (2) the *efficiency of the reallocation of available production factors across companies*, which is hampered by various barriers (the second term to the right side of the equation). Allocative efficiency is thus lower when there is greater variance of revenue productivity.

The impact of allocative efficiency on total productivity

If production factors are efficiently allocated, revenue productivity across companies within a sector is equalised. Using equation (3), the efficient level of a sector's physical productivity $TFPQ_S^*$ can thus be expressed as:

$$TFPQ_s^* = \left[\sum_{i=1}^{M_s} (A_{si})^{\sigma-1} \right]^{\frac{1}{\sigma-1}}.$$

The impact of allocative efficiency on productivity is measured by the ratio of actual to optimal productivity. Using a Cobb-Douglas aggregator, the ratio of actual production to production with optimal allocation of production factors can be written as:

$$\frac{Y}{Y^*} = \prod_{s=1}^{S} \left[\sum_{i=1}^{M_s} \left(\frac{A_{si}}{A_s} \frac{\overline{TFPR_s}}{TFPR_{si}} \right)^{\sigma-1} \right]^{\frac{\theta_s}{\sigma-1}},$$

w h e r e θ_s is the share of a sector's value added in t o t a l value added of the economy (part of the economy).

In the *baseline model* we *(1)* used labour costs as labour, *(2)* set the parameter of the elasticity of substitution between goods (σ) to 3[25] and *(3)* allowed changes in the weights for industries (θ_s).

Alternative models, i.e. models used to check the robustness of results, differ from the baseline model with regard to the use of constant or variable weights and (1) different variables representing labour (the number of workers instead of labour costs as in the baseline model),[26] (2) different values of σ, and (3) exclusion of extreme values (1% and 2%) in the tail ends of the distribution

$$\left(ln \left(\frac{TFPR_{si}}{\overline{TFPR_s}} \right), ln \left(\frac{A_{si}}{A_s} \right) \right)$$

of physical or revenue productivity of companies

$$\left(ln \left(\frac{TFPR_{si}}{\overline{TFPR_s}} \right), ln \left(\frac{A_{si}}{A_s} \right) \right)^{27}.$$

3.2 Data

Our analysis is based on data for companies collected by the Agency for Public Legal Records and Related Services (AJPES) for the 2002–2015 period. In line with the established practice for microdata analysis, we excluded **1)** companies with missing, negative or zero values of variables for: *i) value added; ii) capital; and iii) labour costs;* **2)** companies with fewer than 5 employees; **3)** companies belonging to the following sectors according to the Standard Classification of Activities: *i) Agriculture and hunting, forestry, fishing (A); ii) Mining (B); iii) Financial and insurance activities (K); iv) Activities of head offices (part of M activities); v) Public administration and defence; vi) Compulsory social security (O); vii) Education (P); xiii) Human health and social work (Q); and ix) Activities of extraterritorial organisations and bodies (U)*; **4)** companies with extreme values of revenue and physical productivity (i.e. TFPR and TFPQ values below the 2nd and above the 98th percentile with regard to the year and activity at the two-digit classification level); **5)** activities at the two-digit level of the Standard Classification of activities which included fewer than 50

---

[22] Productivity in the sense of the volume of produced goods and services.

[23] Productivity in the sense of nominal revenue from produced goods and services.

[24] In the existing literature, sigma mostly takes the values 3, 5 or 10.

[25] This value is also taken into account in comparable analyses for other countries. In checking the robustness of the calculations of baseline models, some authors (for example Dias et al., 2016) take into account higher values for this parameter, determined on the basis of more recent estimates (the values for the euro area of around 5 for the whole economy, or around 7 for the manufacturing and around 4 for the service sector).

[26] In the baseline model we use labour costs to represent labour, as differences between companies in labour costs or earnings per worker in a certain period may mainly reflect differences in hours worked and human capital per worker.

[27] With regard to the year and industry.

companies on average in 2002–2015 (after we excluded companies according to 1)–4)); **6)** Warehousing and support activities for transportation, which is an extremely heterogeneous sector. The final sample for analysis consists of 16,943 companies with an average six-year time-horizon (106,247 units). The analysis covers 37 activities (see the list in Appendix 2).

3.3 Results of the analysis

Looking at changes in allocative efficiency, we distinguish between three periods in Slovenia after 2002. To a great extent they coincide with the dynamics of the business cycle, in particular developments before and after the crisis, and thus also with demand developments.[28] Between 2002 and 2005 allocative efficiency did not change significantly, but after that it was rapidly deteriorating up until 2012. Since then it has improved slightly. These dynamics are very similar to the dynamics of aggregate TFP for Slovenia, which could thus to a certain extent be explained precisely by the inefficiency of production factor allocation.

Figure 7: **Inefficient allocation of production factors in Slovenia (TFP gains if production factors were optimally allocated)**
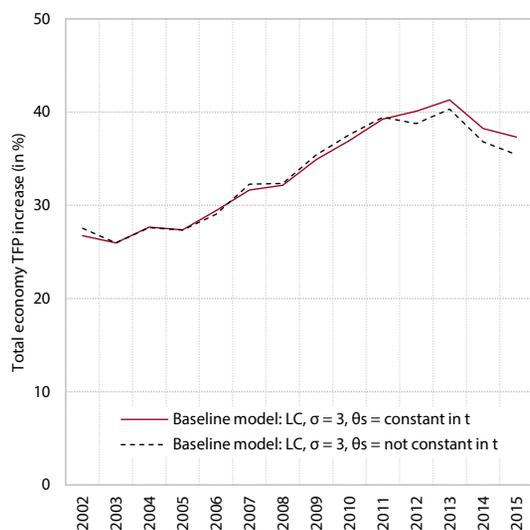
Source: Calculations by IMAD on the basis of AJPES data.
Note: The figure shows estimates of possible productivity gains if production factors were optimally allocated. The figure shows values for the baseline specification of parameters, in which the weights of activities change (dotted line) or do not change (full line).

---

[28] Although productivity is a concept that is usually related to supply-side factors, some analyses show that productivity can also be affected by demand (for example, Syverson, 2011). For more on the effect of the standstill in investment on productivity see Wren-Lewis (2017). Companies can respond to higher demand in various ways, depending on market conditions and the structure of the market where they operate: they may 1) raise prices; ii) employ additional production factors; or iii) try to increase productivity of existing production factors, which can however usually be achieved only over a longer term. Combinations of these responses are also possible. Some authors (for example Gamberoni et al., 2016) point to the significance of uncertainty of demand.

The contribution of aggregate TFP to potential output growth is around half of that in 2002–2005 according to current estimates.[29] Based on analysis of some larger countries in the euro area, Gamberoni et al. (2016 a) also find that in the periods of rapid growth before a crisis allocative efficiency usually deteriorates. An increase in efficiency that follows the crisis is mainly attributed to the fact that the crisis usually causes a final collapse of companies that are not able to survive, as among them less productive companies predominate.

The analysis also finds differences in the movements of allocative efficiency across individual activities in the period observed. The efficiency of allocation and its dynamics were worse in service activities than in manufacturing. Before the crisis both sectors experienced a similar deterioration in allocative efficiency, but with the onset of the crisis in 2008 the deterioration in services continued while in manufacturing it came to a halt. The differences in the impact of allocative efficiency on productivity between manufacturing and service activities thus increased during the crisis. Since 2013 allocative efficiency in service and manufacturing activities has been improving, but was still lower in 2015 in both sectors than at the onset of the crisis, and lower than in the years of stable economic growth (2002–2005).[30] The relatively lower allocative efficiency in the service sector is also characteristic of other countries. According to some analyses,[31] the gaps in allocative efficiency or in productivity growth between sectors are mainly due to different productivity shocks (for example, technological progress or innovations), differences in company size (a larger number of smaller, generally less productive companies in the service sector), lower responsiveness of prices in the service sector (a lower level of competition), higher labour adjustment costs (for example, owing to stronger regulation of professions) and a larger share of informal activity in service activities. The lower efficiency of the allocation of production factors in the service sector can also be due to the greater heterogeneity of individual activities.[32]

The results of our analysis serve as a guide and depend on factors that were taken into account in the calculations. These include the inclusion (or exclusion) of outliers in the total set of data, a large number of assumptions and the methodologies used. In addition to the baseline model for assessing the impact of allocative efficiency on total factor productivity, we also

---

[29] See the Spring Forecast of Economic Trends, March 2017 (IMAD, 2017b).
[30] In contrast to the estimate for Spain (IMF, 2015), according to which efficiency increased after the crisis in comparison with the period before the crisis.
[31] For example, Dias et al. (2015) and Calligaris et al (2016).
[32] According to our analysis, the extremely low efficiency of the distribution of production factors is characteristic only of a smaller number of activities in individual sectors: in services, retail and wholesale trade stand out, while in manufacturing, this is the case for the manufacture of metal products and electrical equipment.

Table 1: **Inefficiency of the allocation of production factors in Slovenia in manufacturing and service activities, in %**

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	Manufacturing														
	Baseline model														
σ=3	L=LC; θs constant	18.8	16.4	19.1	19.5	19.9	20.7	21.9	22.7	21.2	21.3	21.8	25.1	23.4	21.9
	θs not constant	18.9	16.6	19.1	20.1	19.8	20.9	21.9	22.9	21.1	21.4	21.6	25.1	23.6	21.8
	Alternative model														
σ=3	L=EMP; θs constant	27.2	23.7	26.6	24.2	26.3	30.2	30.4	32.1	27.9	28.0	28.4	33.2	30.4	30.0
	θs not constant	27.3	24.5	26.6	24.8	26.3	30.8	30.3	32.5	27.9	28.1	28.0	33.2	30.3	29.5
	θs not constant	33.6	29.2	36.5	36.3	34.2	37.6	39.0	38.9	37.9	39.1	39.3	45.9	40.1	39.7
	θs not constant	51.7	44.4	55.4	45.3	44.9	56.3	57.0	59.2	50.1	50.4	51.9	62.7	53.4	54.9
	Service activities														
	Baseline model														
σ=3	L=LC; θs je konstantna	33.3	34.0	34.8	33.9	37.4	40.9	40.8	45.3	50.8	55.2	56.3	55.5	51.1	50.8
	θs not constant	35.3	34.3	35.0	34.0	37.3	41.5	40.3	44.3	50.6	54.5	54.1	53.6	49.1	47.7
	Alternative model														
σ=3	L=EMP; θs constant	51.9	53.1	53.7	54.3	59.0	61.7	62.3	68.2	70.7	73.3	74.9	75.4	67.7	71.4
	θs not constant	54.4	53.1	54.0	54.5	58.7	62.4	61.8	65.9	71.2	72.9	72.5	73.1	65.1	66.0
	θs not constant	62.2	60.5	60.1	55.9	63.2	71.6	66.5	69.3	83.3	90.5	91.1	88.8	80.3	79.6
	θs not constant	99.7	95.4	100.0	92.0	111.7	110.8	112.0	116.7	127.7	127.3	128.7	129.7	112.6	119.7

Source: Calculations by IMAD on the basis of AJPES data.
Note: The table shows estimates for different specifications of parameters. The estimates indicate potential total factor productivity gains in individual activities if production factors were optimally distributed.

Figure 8: **Inefficient allocation of production factors in Slovenia (TFP gains if production factors were optimally allocated) in manufacturing and service activities**
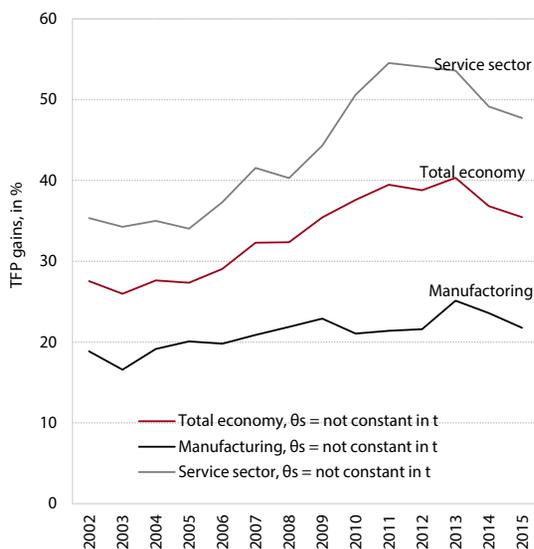
Source: Calculations by IMAD on the basis of AJPES data.
Note: The figure shows the estimates that indicate a possible increase in total factor productivity in the whole economy or in an individual activity were production factors optimally allocated. The values for the baseline specification of parameters are shown, in which the weights of activities change.

used alternative models, where different assumptions regarding the constancy of weights, the elasticity of the substitution between goods and different variables determining the production factor of labour were taken into account. The calculations obtained on the basis of alternative parameters, which are shown in

Table 1 and Appendix 3, otherwise indicate some deviations regarding the level, but no significant deviations regarding the extent of allocative efficiency changes from findings derived from the baseline model. Relatively larger deviations in results can be seen for service activities, which indicates a lower reliability of the calculated absolute values of the impact of allocative efficiency on productivity in this sector.[33]

An inefficient allocation of production factors is estimated to have a significant impact on productivity and economic activity. Total factor productivity could be significantly higher if production factors were optimally distributed across the analysed sample of companies. In view of the large number of assumptions used, the dynamics of the obtained estimates of allocative efficiency are important in particular, less so the estimate of the increase in productivity itself. The estimates of the baseline version of parameter specification indicate that in 2015 total factor productivity could have been around 40% higher, had production factors been optimally allocated (in service activities around 50% higher and in manufacturing around 20% higher). If in 2015 allocative efficiency in services had been raised to the level of allocative efficiency in manufacturing, Slovenia's GDP would have increased by around 10% according to the basic version of parameter specification.[34] Equalising

---

[33] Detailed results for the whole economy, obtained by alternative models, are shown in Appendix 3.

[34] It should again be noted that optimal allocation of production factors is a theoretical concept that is almost impossible to achieve in practice; the estimate of its impact on GDP is therefore likely overrated. The impact of equalisation of

allocative efficiencies in service and manufacturing activities in 2008 could have increased GDP by around 6%. In both cases Slovenia would have closed around half of its development gap with the EU average that existed in individual years. Given the possible deviations of parameters used, these estimates are conservative and the increases in GDP owing to the improvement of allocative efficiency could have been even greater.[35]

The order of magnitude of the impact of an efficient allocation of production factors on productivity in Slovenia is comparable with that in similarly developed countries. The estimates of the extent of the impact of allocative efficiency on total factor productivity for other countries are also to a great extent dependent on the assumptions and methodologies used. We can nevertheless assess that the orders of magnitude are similar, as the estimates of the impact of allocative efficiency on productivity (measured by GDP per capita) for countries that are similar to Slovenia in terms of development range between 30% and 50%.[36] The order of magnitude of the estimates for less developed countries is significantly higher, for example around 130% for China and around 90% for India (Hsieh and Klenow, 2009):

4 Drivers of productivity in Slovenia

In the empirical part of the analysis we assessed the impact of allocative efficiency on total factor productivity; in this part we identify factors that could cause misallocations and thus reduce productivity. Productivity is affected by a number of factors, which should be dealt with separately by sets, although the sets are intertwined. We distinguish between factors operating within a company and those in their environment (see for example Syverson, 2011 and Adler et al., 2017). Low TFP growth can reflect a company's inability to exploit available production factors and combinations thereof, or barriers that prevent the reallocation of production factors from less to more productive companies. External factors affect productivity particularly through changes in the conditions for the reallocation of production factors across companies (i.e. their efficient allocation). Internal and external productivity factors are connected through knowledge, which determines technological progress and a company's ability to exploit it, and the institutional organisation and infrastructure, which determine the environment for business operations. In the following sections we are therefore going to pay equal attention to factors that can affect allocative efficiency and productivity. Based on the results of analyses for other countries and regular IMAD analyses, we will also point to factors that influence allocative efficiency and productivity in Slovenia.

An overview of factors that determine the efficiency with which production factors are allocated in Slovenia shows a predominant influence of institutional factors, but productivity is also held back by knowledge factors. In the last two decades Slovenia has made significant shifts towards improving the institutional framework for business operations, but the improvements were insufficient to keep pace with the adjustments made by countries that are Slovenia's main trading partners, especially in the period of extremely rapid technological progress and globalisation. The barriers in the area of knowledge are related precisely to the insufficient ability to keep up with technological progress. They arise from the education system not being sufficiently matched with labour market needs and managers' unwillingness to face risks and challenges and implement modern technologies. With the intensification of demographic change, these issues may become even more severe. In the future, demographic change may also increase the barriers to allocative efficiency in manufacturing, particularly in labour-intensive activities, although currently the largest number of barriers to optimum allocation remain in the service sector.

allocative efficiency of production factors in services and manufacturing on GDP is calculated as $(1,508/1,209)^{0.449}$, the values in the fraction being coefficients of TFP gains as a result of the reallocation of production factors in services (numerator) and manufacturing (denominator) activities; 0.449 is the share of service activities in the total value added of the sample used in the analysis. For a similar calculation see Dias et al., 2016.

[35] By around 3 pps in 2015 with a change in the coefficient of the elasticity of substitution from 3 to 5 in manufacturing and service activities alone. That the estimate is conservative is evident from the results of all alternative models or parameter specifications, as they show an even lower allocative efficiency than the results of the basic model (see Table 1 and Appendix 3).

[36] See for example Dias et al. (2016) for Portugal, Calligaris et al. (2016) for Italy and Benkovskis (2015) for Latvia.

Figure 9: **Productivity drivers**
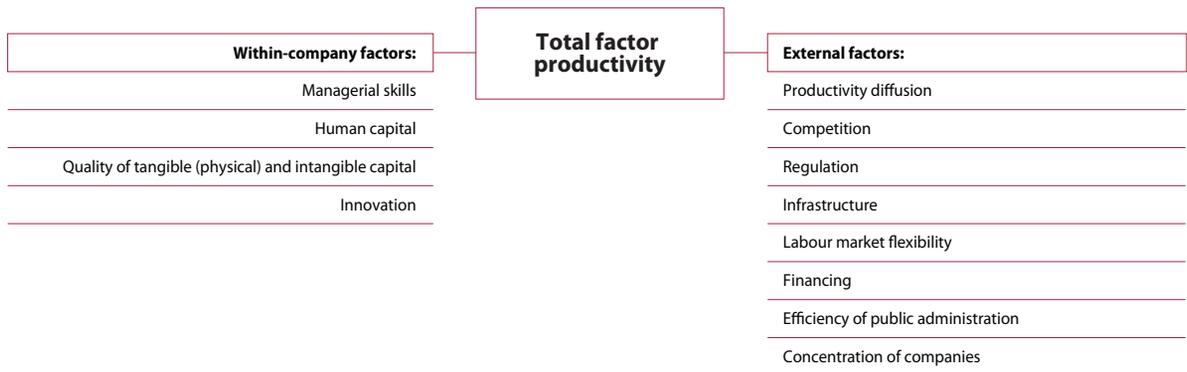
Source: Adapted from Adler et al. (2017).

Figure 10: **Assessment of factors that affect allocative efficiency in Slovenia**
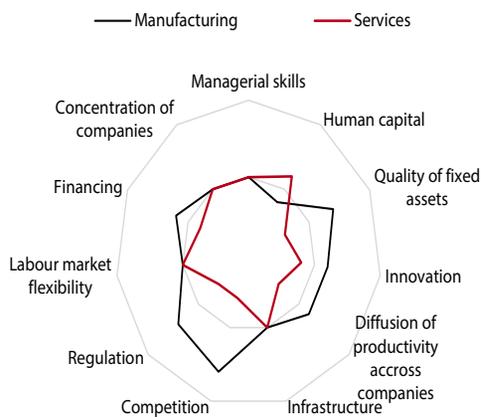
Source: IMAD estimates.
Note: The estimates are a combination of expert estimates and indicator values for individual factors presented in the text below, or of their unweighted averages if more than one estimate is available. If no specific indicators are available for an individual activity, the same values are assigned to the given factor in both activities. A greater distance from the baseline for a given factor reflects its greater contribution to the efficiency of the allocation of production factors.

4.1 Within-company factors

The main within-company factor of productivity is knowledge. Knowledge can pertain to experience (including intuition) of the management, experience and qualifications of workers, their ability to use modern technologies, as well as expenditure on research and development, which are related to innovation capacity through worker creativity. Among internal factors that determine the efficient use of knowledge in the context of its impact on productivity, some authors also point to the organisational structure of companies, which is based on 'social capital', i.e. the culture of relations and trust within and between different levels of employees. The study by Bloom et al. (2009) thus shows that the predominantly decentralised organisation of Anglo-Saxon and Northern European companies explains a significant part of differences in these countries'

productivity in comparison with Southern European countries.[37]

Managerial skills

Managers determine the productivity of their companies by coordinating how available production factors are used in production processes. Based on surveys in several advanced and emerging economies, Bloom and Van Reenen (2010) find that good managerial practices are positively related to several performance indicators, including productivity.[38] The same surveys also reveal that the quality of management practices deteriorates if competition on the product market is weak, i.e. with the lack of incentives for improving the quality of management practices in a company and with the persistence of closed ownership (in the case of family-owned companies), although the latter is not necessarily related to productivity. Similar conclusions were also reached by Bertrand and Schoar (2003), who find a positive correlation between managers' education and business results, and Mas (2008), who shows that productivity is also affected by the quality of relations between managers and employees. Another of the channels through which successful management raises productivity is its willingness and ability to adopt and use modern technologies (Bloom et al., 2012).

Managerial skills in Slovenia

Some estimates (GEM 2015, 2016) indicate that managerial and business education in Slovenia is at a level that ensures appropriate qualifications for starting and developing a new enterprise. However, according to the

---

[37] Analyses for Slovenia (Verle et al., 2012) reveal that Slovenian companies mostly have a hierarchical organisational structure, although transitions into more flexible forms can also be observed.
[38] In this context, Lucas (1978) makes an interesting point, showing diminishing returns to managers' skills. These determine that in the equilibrium where better managers are employed in larger companies, labour productivity is equal across all companies.

Figure 11: **Managerial skills in Slovenia, Slovenia's rankings among EU Member States according to various indicators**
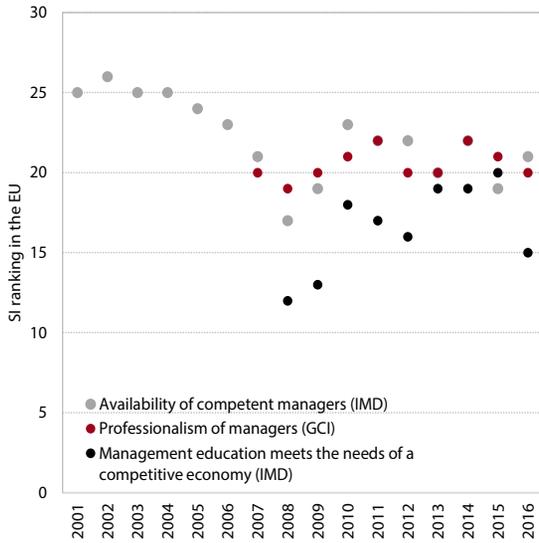
Sources: GCI – Global Competitiveness Indicators (several years' editions, World Economic Forum); IMD – IMD World Competitiveness Yearbook (several years' editions, IMD).
Note: GCI: Slovenia's rankings within the EU (28 countries); IMD: Slovenia's rankings within the EU excluding Cyprus and Malta (26 countries).

results of internationally comparable competitiveness surveys (IMD, various years), Slovenia ranked lowest on the indicator of availability of appropriately qualified managers during the entire period for which data are available, and was at the lower end of EU Member States throughout the period. The reliability or the level of professionalism of management is also evaluated as relatively low. In the period analysed, Slovenia scored highest on the indicator of managers' education, which meets the demands of a competitive economy, but it is precisely this indicator that deteriorated the most during the crisis.

Human capital

The contribution of employees to productivity depends on several factors, including the consequences of population ageing. The quality of human capital is influenced by the level of education, training, skills, human resource management and experience and the duration of employment at the company. This is corroborated by a number of analyses (for example, Ilmakunnas et al., 1999 and Fox and Smets, 2011). The quality of human capital of the active population is also affected by the length of unemployment spells.[39] Some analyses (for example Lie and Westelium, 2016) point to a negative correlation between population ageing and total factor productivity.[40] Similarly, in an analysis for EU Member States Aiyar et al (2016) find that an increase in the share of workers aged 56–64 has a statistically

[39] E.g. Nichols, 2013 or Laureys, 2014.
[40] There is an inverted U-shaped productivity pattern among age groups, with those aged 40–49 being the most productive (the estimates were made for Japan).

significant negative effect on total factor productivity growth. At the same time, some analyses (for example Acemoglu and Restrepo, 2017) indicate that the ageing of the population can boost investment in automation of the production process and reduce the need for labour input (low-skilled labour in particular), which in turn increases productivity.

Human capital in Slovenia

The share of adults with tertiary education in Slovenia exceeds the EU average, and so do the participation of adults in lifelong learning and the share of science and technology graduates. However, the share of tertiary-educated adults in the private sector (where manufacturing industries predominate) is relatively low. Moreover, tertiary graduates are insufficiently equipped with skills for successful work in the digital society and the labour market is characterised by mismatches in the level of education, field of education and skills (Development Report 2017). During the crisis the long-term unemployment rate in Slovenia rose and exceeds the EU average, which is contributing to the deterioration of human capital. Moreover, current demographic trends and expectations for Slovenia indicate potential factors of a further widening of Slovenia's productivity gap with the EU average in the future. Specifically, according to the panel analysis by Aiyar et al., 2016, Slovenia is one of the EU Member States expected to see the largest decline in productivity growth (by around one fifth) owing to the intense change in the demographic structure.

Figure 12: **Literacy, numeracy and digital skills of the working-age population, 2012 and 2015 respectively**
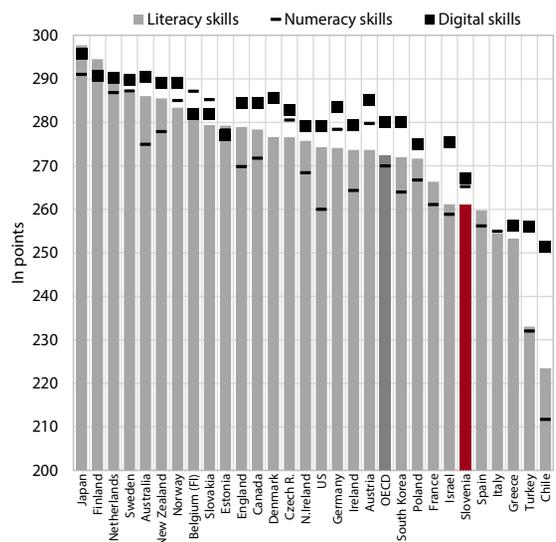
Source: OECD, PIAAC, 2012 and 2015.
Note: The first round of the PIAAC survey (data for 2012) covered the following OECD countries: Australia, Austria, Belgium (Flanders), Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Japan, South Korea, the Netherlands, Norway, Poland, Slovakia, Spain, Sweden, England, Northern Ireland and the US. The second round of the PIAAC survey (data for 2015) included the following OECD countries: Slovenia, Chile, Greece, Israel, New Zealand and Turkey.

Innovations and digitalisation

Innovations affect productivity via several levels of business processes and are based, apart from on knowledge, increasingly on the quality of tangible fixed assets or digitalisation of companies. Although the term 'innovations' is usually used as a synonym for innovations in new products, it can be extended to process innovations and organisational and marketing innovations, which are becoming increasingly important for productivity growth (Peters et al, 2014). Results of analyses regarding the impact of product innovations are uniform, finding that a significant portion of productivity gains and increase in business volume and product range can be attributed precisely to this type of innovations.[41] However, with the transition to post-industrial society and the strengthening of the service sector, innovation in service companies will gain importance in the future (Peters et al., ibid.). The determinants of innovation are effective use of modern technologies and R&D expenditure, in addition to a qualified workforce. The quality of capital depends to a great extent on the use of information technology and R&D expenditure, which increases the importance of investment in intangible fixed assets.[42] The assessments of the quality of capital are relatively uncertain, particularly in a period of rapid technological development.[43] In the last few decades increased and more intensive use of information technology has been seen in the majority of sectors and countries. Productivity tends to increase at above-average rates both in sectors that produce information technology and in those where this technology is intensely used.[44]

Innovations and digitalisation in Slovenia

The share of R&D expenditure, which is one of the determinants of innovation activity, is above the EU average in Slovenia, but in recent years the number of researchers has been declining and their potential is not efficiently used. Innovation activity of enterprises in Slovenia is weak and has stagnated in the last few years. In the service sector it lags even more behind

the EU average than in manufacturing, the gap being particularly pronounced for small enterprises. Slovenian enterprises also lag behind the high degrees of digitalisation of the leading EU Member States in this field and the share of enterprises facing difficulties recruiting ICT specialists is approximately half higher than the EU average. The share of computer equipment in total fixed assets is around one third lower than the EU average, while the gap in software provision totals almost two thirds. Differences in the provision of fixed assets that support digitalisation can also be seen within activities (manufacturing activities lag more behind the EU average than service activities).

Figure 13: **Share of innovation-active enterprises in manufacturing* and services in 2012–2014, as a % of all enterprises**
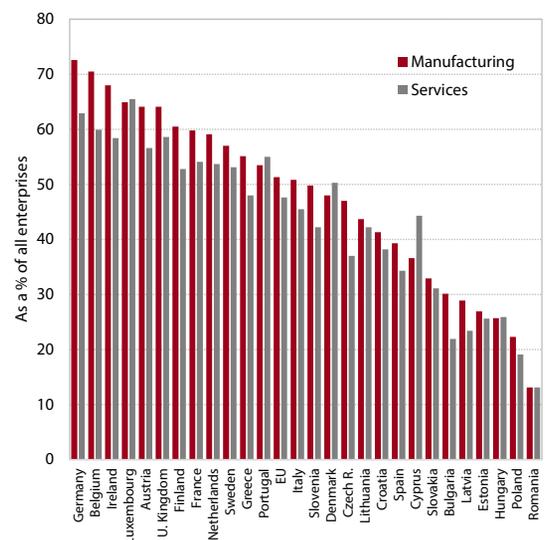
Source: Eurostat; calculations by IMAD.
Note: * Data for manufacturing for the EU average excluding Malta.

4.2 External factors

The common denominator of most factors that affect productivity from outside the company is the institutional framework. Factors from the environment do not have a direct impact on productivity. They work on companies by influencing their decisions regarding the use of production factors (their number and combinations, which keep changing constantly in a dynamic environment); at the aggregate level, they determine how production factors are being allocated within and between economic sectors. The institutional framework is primarily dependent on economic policy, which sets the rules and legislation governing the functioning of factor markets. At the same time, economic policy also sets limitations on some product markets, which, through related costs for companies and households, indirectly affect the availability of production factors. External factors of productivity thus also affect the efficiency of production factor allocation.

---

[41] See for example the country-specific analyses for the US (Foster et al., 2017) and Ireland (IMF, 2016).

[42] See for example the European Commission (2017). This can also include, for example, the quality of managers, which is addressed separately.

[43] Several analyses (summarised in Syverson, 2016) thus find that the decline in productivity, or its relatively slow growth, is mainly a consequence of errors in measuring production, which does not take sufficient account of technological progress.

[44] Some authors (van Ark et al., 2008) attribute the slow productivity growth in the EU precisely to the low production of IT products and its lower use or lower corporate investment in IT compared with the US. Meanwhile, some analyses (for example Bartelsmann and Doms, 2000) find that technology use and total factor productivity are correlated but the correlation between the two variables is not necessarily causal. More intensive use of advanced technology may also be related to other variables, such as human capital or managerial ability.

Figure 14: **Productivity (real value added per employee*) in the upper and middle deciles (in terms of productivity)**
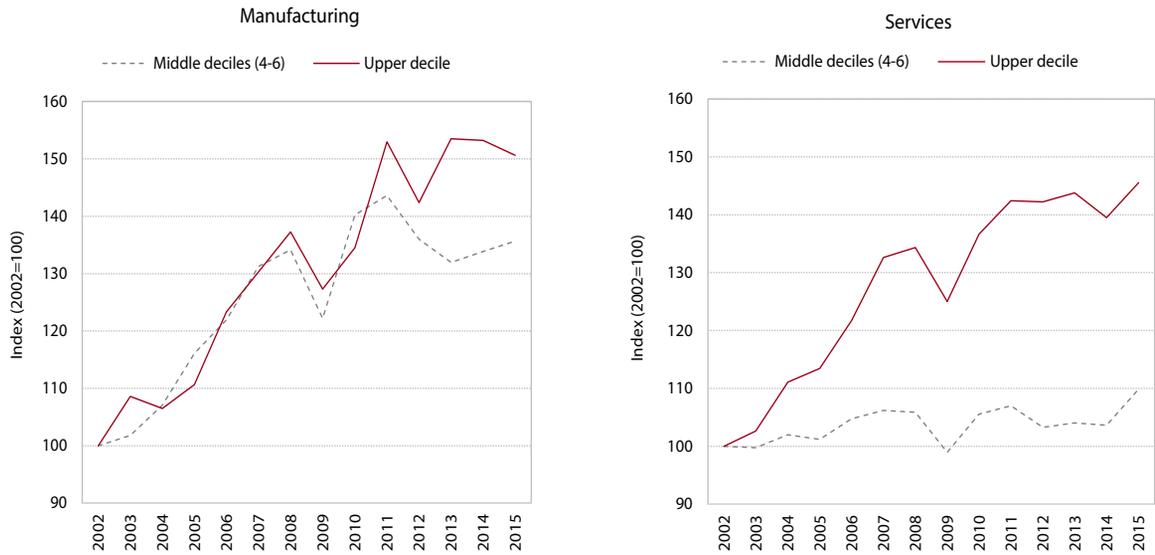
Source: AJPES; calculations by IMAD.
Notes: * Real productivity is defined as the ratio of value added in reference year prices to the number of employees. The reference year is 2002; value added is deflated by implicit deflators of the statistics of national accounts available at the level of sections (2-digit activity code) of the Standard Classification of Activity.

Diffusion of productivity across companies

The slow pace of diffusion of technological progress from the most productive companies to the rest is a global phenomenon, which is mainly due to the mismatch of skills and their inefficient allocation. Difficulties in the transfer of productivity gains from companies at the productivity frontier to other companies are of a global nature;[45] they are especially pronounced in the service sector (see for example Andrews et al., 2015). In a period of extremely rapid technological progress and digitalisation, these kinds of difficulty are a kind of paradox. The transfer of new global technologies is also slow because global technologies only diffuse to laggard companies once they have been adapted to country-specific circumstances by domestic frontier companies (Andrews et al., 2105).[46] The diffusion of positive effects of innovations is boosted by factors that affect productivity from within and outside companies. It can be increased particularly by the following measures (Draghi, 2017): i) investing in human capital and management skills; ii) investing in intangible assets; and iii) fostering business

dynamics. However, in formulating policies meant to enhance knowledge transfer and hence the diffusion of productivity gains, it should be ensured that the largest benefits from productivity gains remain in those companies that actually invest in productivity growth and not their imitators of followers.

The diffusion of productivity gains across sectors in Slovenia

On the basis of decile analysis it can be concluded that in Slovenia the productivity gap between companies in the upper decile and the rest had been widening particularly before the crisis. Before the crisis productivity gaps had been widening only in the service sector. In manufacturing, they appeared only a few years after the crisis and have remained small in comparison with those in services. The differences in dynamics and levels of productivity between the frontier and laggard companies may indicate either an inadequate diffusion from the frontier companies or an insufficient ability of the laggards to adopt new knowledge and technologies.

Infrastructure

Quality public infrastructure reduces the costs and increases the business performance of the private sector. Public infrastructure is important for almost all production processes[47] and enhances economic growth through the investment channel and its impact on TFP. It affects TFP by generating positive externalities for the private sector. Owing to these externalities, available production factors are more efficiently allocated and

---

[45] Nevertheless, Wren-Lewis (2017) finds that the lag in productivity growth is not necessarily a consequence of insufficient diffusion of productivity gains across companies but rather a standstill of investment in new technologies and the absence of innovations during the crisis in companies in the middle of productivity distribution. In contrast to companies at the productivity frontier, which did not even lower innovation activity significantly during the crisis, after the initial decline in demand these companies mainly reacted to renewed growth in demand by increasing the exploitation of existing (more and more out-of-date) capacities instead of investing in innovations and new capacities (the so-called 'innovation gap').
[46] The same authors also find that the insufficient diffusion is also due to the increasing differences in investment in intangible assets.

[47] Public capital (which includes public infrastructure) is nevertheless usually not taken into account as a separate input in production functions of the private sector (de Haan et al., 2007).

can be more efficiently used by companies. This in turn increases companies' profitability. Infrastructure thus affects companies in a similar way to institutional or regulatory factors, which are discussed in the following paragraphs, and also indirectly reduce costs. Analyses mostly reveal a positive correlation between infrastructure and total factor productivity of the private sector, but the positive contributions decrease with the level of a country's development. The correlation may also be inverse: high levels of development and productivity require additional infrastructure facilities and thus reflect a marginal propensity to consume public goods. Results at a sectoral level indicate that investment in roads, public buildings and water and sewer systems benefits particularly the manufacturing sector, while the benefits for agriculture are insignificant.[48]

Infrastructure in Slovenia

In terms of infrastructure density (particularly motorways, but also railways), Slovenia is among the best performing countries in the EU. However, it ranks slightly lower on some main international indicators[49] that also take into account the quality and availability of infrastructure. Among Slovenia's strengths, they highlight particularly the quality of electricity supply and good port infrastructure, and among its weaknesses, the availability of air passenger transport infrastructure and the relatively low number of mobile telephony subscribers compared with other countries in the EU.

Figure 15: **Development and quality of infrastructure (transport, electricity, telephony)**
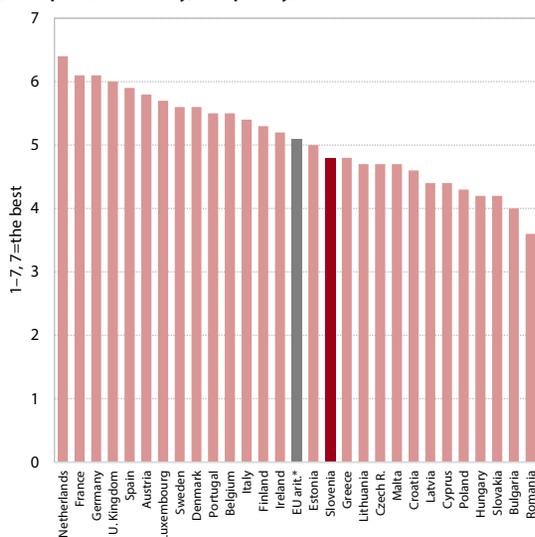
Source: World Economic Forum, The Global Competitiveness Report 2016–2017 (2nd pillar: Infrastructure); *arithmetic mean of the indicators for EU Member States.

[48] De la Fuente (2010). For an overview of literature on the correlation between infrastructure and productivity see for example Pereira and Andraz (2013).

[49] Global Competitiveness Index WEF (Infrastructure; ranking SI 39/138), Logistics Performance Index WB (Infrastructure; ranking SI 43/160), A New Global Index of Infrastructure IFW (Infrastructure - Transport, ICT, Energy; rankings SI 19, 20, 26/140).

Competition

Competition on product markets and competition from abroad stimulate companies to allocate production factors more efficiently. The adjustment of productivity in companies may pertain to already existing or potential competition. Competition is a mechanism that to a large extent determines the existence of companies on a particular market (or their exit), as market shares are usually increased by more efficient companies.[50] Competition determines the limit of efficiency a new company should achieve to be able to enter the market.[51] Furthermore, competition also stimulates existing companies to lower costs, expand the range of products or introduce new products (innovate) and distribute production factors more efficiently. Raising productivity may also involve higher costs, at least in the short run. Introducing new technology requires, for example, adjustment of production processes and training of employees. Owing to this type of cost, companies that are less exposed to competition (which applies to a greater extent to service sectors) may be less motivated to innovate or adopt new technologies and thus increase productivity.[52]

Competition in Slovenia

According to the available indicators,[53] Slovenia is in the group of countries with an institutional framework that makes it possible for authorities to react and prevent practices that run counter to the principles of competition. The indices of market concentration for service activities indicate a lack of competition on individual markets, particularly in some network

[50] For an overview of literature that confirms the positive correlation between the levels of competition and productivity, see for example Schiantarelli (2008).

[51] This holds particularly true for exporters, which have to increase productivity beyond a certain non-measurable value to be able to enter foreign markets, given the costs related to international trade (for example, the costs of collecting information on new markets, transport costs, the costs of hedging against exchange rate risks, the costs of marketing activities, etc.) (see ECB, 2017a). Particularly exporters must pay special attention to increasing productivity. For empirical confirmation of this connection on the basis of data for Slovenia see De Loecker (2007). Damijan et al. (2005) show that exporting *per se* does not warrant productivity gains, but that productivity is increased only by companies that export to developed countries.

[52] According to Vives (2007), in some circumstances, at least if a market has limited possibilities for expansion, increased competition may reduce companies' incentives for technological investment. If this is the case, the government must intervene through appropriate regulation. The results of some analyses (for example Autor et al., 2016) indicate that increased competition may decrease innovation: because of lower profits, companies are also forced to save by lowering R&D expenditure, which in turn reduces innovation and their prospects for long-term growth.

[53] For OECD indicators of product market regulation (PMR) see http://www.oecd.org/eco/growth/indicatorsofproductmarketregulationhomepage.htm.

(telecommunications, postal and rail freight services) and trade services (especially the entire chain of the sales of fuels, food, beverages and tobacco products). Slovenian companies are exposed to foreign competition to different extents; service companies in particular are lagging behind. While Slovenia is among the EU countries with above-average integration in global value chains through external trade, it is also among those with below-average integration through trade in knowledge-intensive services (ICT and professional, scientific and technical activities).

Regulation

Regulation of individual markets or professions creates conditions that affect productivity through indirect business costs, and is reflected in business dynamics. Inappropriate regulation pertains to barriers to the entry of companies to the market in general or to specific markets, protection of existing companies[54] and special requirements regarding the formal conditions that have to be met for work in some professions, which is characteristic particularly of service sectors.[55] Inappropriate market regulation also involves government interventions in the functioning of the markets[56] or an excessive share of state-owned companies. An OECD analysis (Andrews et al., 2015) shows that reduced regulation could decrease the productivity gap between some of the most and least regulated sectors by more than half. A high level of regulation can, among other things, be reflected in entrepreneurial dynamics, i.e. the dynamics of company birth and death in the sense of the Schumpeterian concept of 'creative destruction'. More recent analyses find a positive correlation between productivity and entrepreneurial dynamics as measured by new enterprise creation (see for example Bartelsmann et al., 2013 or Decker et al., 2016).[57] The entry of new dynamic

Figure 16: **Regulation of services (value of the indicator of product market regulation according to the OECD), 2013**

Source: OECD.
Note: Index scale 0 to 6 from least to most restrictive services.

companies stimulates innovation in existing companies, while the exit of unsuccessful (unproductive) ones releases production factors that are not efficiently used (Adalet Mc Gowan et al., 2017). The impact of regulation on productivity varies between sectors, being most disruptive in highly innovative sectors (Andrews and Cingano, 2012). In addition to regulation, the stability and predictability of regulatory arrangements also play a significant role in reducing the uncertainty of companies in making decisions with regard to the allocation of production factors.

Regulation in Slovenia

According to the majority of PMR indicators, Slovenia ranks among EU Member States in which productivity is not significantly impeded by regulation. The exception is certain excessively regulated sectors (particularly certain network and professional services) and state ownership in general and especially in network industries.[58]

---

[54] This includes different requirements for enterprises of different sizes, for example in the areas of labour or tax legislation, particularly the requirements for financial reporting and auditing (large enterprises being usually subject to greater scrutiny). Representing indirect subsidies for existing smaller, usually less productive, enterprises, such requirements may reduce the incentives for efficient enterprises to expand further once they have reached a certain size (see for example Garicano et al., 2013). On the other hand, excessively complex regulation can hurt particularly small enterprises, while simplifications can reduce their high fixed costs and increase their productivity (for example Dabla-Norris et al., 2017).

[55] In their analysis of the correlation between regulation and productivity, Arnold et al. (2008) stress that inappropriate service sector regulations affect productivity growth by hindering the reallocation of available resources towards the most dynamic and efficient companies.

[56] A typical example being subsidies or state aid. In the short term, such measures usually increase productivity, while in the long term, they reduce it as they mainly impede the growth of companies that have received such aid or make it difficult for new companies to enter the market (see for example Buera et al., 2013).

[57] Older analyses (Andersson, 2004) otherwise indicate that

the dynamics of company entry and exit have a positive, albeit relatively small effect on total productivity growth. The positive effect is mainly due to entering companies being more productive than exiting companies. The same analysis also shows that the aggregate productivity growth mainly relies on productivity growth in companies that have been present on the market for a longer period.

[58] Analyses on the basis of a larger sample of countries otherwise confirm productivity growth of companies after privatisation, but significant differences occur. Brown et al. (2006) thus estimate that as a result of privatisation, total factor productivity in Romania increased by 15%, while in Russia the effect of privatisation was slightly negative. Productivity tends to increase more in companies bought by foreign investors. IMF analysis (2016) finds that the correlation between foreign ownership and productivity is not necessarily positive, particularly if the parent companies keep their high value

Entrepreneurial dynamics, which reflects the degree of regulation, is relatively low in Slovenia, which is indicated by a relatively small share of high-growth enterprises, although the rate of enterprise births, according to which Slovenia belongs to the EU average, has started to rise again in the last few years after the decline during the crisis.

Labour market flexibility

Flexible factor markets facilitate a smooth transition of production factors and enhance productivity through their efficient distribution. The flexibility of factor markets is related to productivity gains by the same principles as the competition on product markets.[59] On competitive product markets consumers are free to choose among a variety of products from different suppliers. Flexible factor markets therefore tend to increase productivity by making it easier for companies to adjust to various shocks. Product market flexibility and factor market flexibility are complementary: when consumers choose between different suppliers, suppliers face increased demand and have to employ additional production factors or increase the productivity of the existing ones' to meet the needs. The fewer the barriers to the migration of production factors to more productive companies, the faster and more efficient the reallocations. Although literature generally confirms the correlation between the flexibility of factor markets and productivity,[60] the results are not quite uniform, especially for the production factor of labour. According to the analysis by Vergeer and Kleinknecht (2014), easier firing or high labour turnover may cause a decline in productivity owing to reduced investment in education and accumulation of company-specific knowledge and, for example, owing to workers being less willing to express independent opinions or ideas (for example, for fear of job loss; see also Kleinknecht, 2015). The significance of job stability and the negative impact of a high number of workers on temporary contracts was also highlighted by Draghi in the debate on how to boost innovation capacity (2017). Easy firing and hiring otherwise facilitate a rapid adjustment of companies to the changing demand for labour and its efficient reallocation.

Labour market flexibility in Slovenia

Although labour legislation in Slovenia is comparable with the EU average,[61] labour market segmentation with regard to the type of employment contract (temporary or permanent) remains high (particularly for young people) even after the change to labour legislation in 2013. The relatively high level of temporary employment makes it possible for companies to rapidly adjust to changes in the macroeconomic environment. On the other hand, labour market flexibility is limited by the mismatch between education/skills and labour market needs, as well as by a decreasing pool of available workers owing to the relatively high long-term unemployment rate and the low employment rate for some population groups.

Figure 17: **The indicator of protection of permanent workers against individual dismissal**
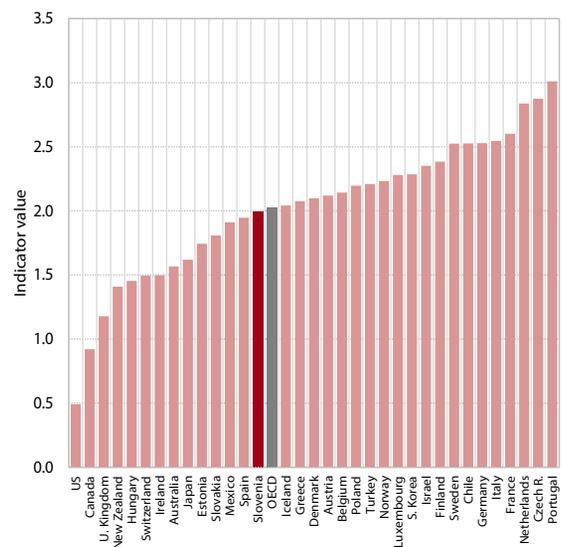
Source: OECD, EPR indicator.
Note: Labour market flexibility is often measured by the index of employment protection, although it is only one of its factors. The values refer to 2013, for Slovenia and for the UK to 2014. The OECD average is unweighted.

Financing

The efficiency of production factor allocation depends to a great extent on the structure and volume of funding. The global financial crisis exposed the importance of finance for productivity growth. In addition to the structure of financing, the question of financial cycles, which cause sub-optimal allocation of capital, also comes up in this context.[62] Inefficient allocation of financial resources in the period of increased integration in the EU in the years before the global financial and economic crisis is deemed to be one of the main reasons for the fall in productivity and economic activity in peripheral countries of the euro area (Dias et al., 2015). Over-indebtedness and a broken banking system are estimated to have almost halved the average productivity growth in countries that participated in the financial cycle (Borio, 2017). The IMF

---

production at home and leave lower value added operations to their subsidiaries, which in turn employ lower skilled workers and older technologies (which is particularly the case in small industrial plants).

[59] Factor market flexibility is the basic premise of the methodology used in our statistical analysis, in which we attempt to determine the efficiency of the allocation of production factors.

[60] For example, analyses recommending structural reforms that increase labour market flexibility (Canton et al., 2014).

[61] The EPR indicator (OECD) calculated using the unweighted EU

average excluding Great Britain.

[62] Financial cycles affect productivity through misallocation of production factors to low-productivity sectors such as construction. The negative effect of misallocations of production factors on economic activity is twice as large if a boom is followed by a financial crisis (Borio et al., 2015).

also finds that over-indebted companies suffered greater productivity losses during the crisis (Adler et al., 2017). As less productive companies – which usually employ a low-skilled workforce – tend to be more affected by a financial crisis, such crises may consequently also contribute to a more efficient allocation of production factors that increases productivity (Berton et al., 2017).[63] The typical bank-based structure of financing (which is characteristic of the EU, in contrast, for example, to the US) is not friendly to new, innovative and hence riskier young companies. Financial deepening should increase productivity growth,[64] while inefficiencies in allocating sources of finance across companies work particularly through inappropriate lending practices, collateral restraints and inefficient insolvency legislation (Heil, 2017). The impacts of such inefficiencies on productivity appear to be greater in less developed countries. Insufficient supervision of banks by the regulator and inappropriate assessments of companies' balance sheets by banks may result in bad loans and companies not being able to survive owing to low productivity and evergreening of loans;[65] collateral constraints are faced particularly by small companies, while inefficient insolvency legislation prevents less productive companies from leaving the market. The allocative efficiency of financial resources can also be impaired by fiscal policy, through preferential tax treatments of certain types of financing (for example debt over equity).[66]

Financing in Slovenia

In the years before and after the crisis, the financing of Slovenian enterprises reflected the typical financial cycle, which relied on bank loans. In the last few years, the financing of enterprises has been characterised by a greater dispersion of sources of finance and lower dependency on domestic banks, but these are still reluctant to extend loans to enterprises despite the improvement in lending conditions. The lack of alternative sources of finance and the limited access to bank loans affected particularly small enterprises. Furthermore, IMAD's analyses show that enterprises in the service sector were more indebted than those in manufacturing,[67] which is another factor that may have

contributed to the deterioration of allocative efficiency and hence the decline in productivity.

**The efficiency of government institutions**

A quality, reliable and predictable functioning of public administration provides an important framework for private sector operations. One of the characteristics of highly developed and productive economies is efficient public administration (European Commission, 2015); the correlation between efficient public administration and productivity is also corroborated by empirical studies (for example St. Aubyn, 2008).[68] Public administration and companies cooperate in various ways and in different circumstances, for example, in paying taxes, obtaining permits, registering companies, resolving disputes before courts, within public-private partnerships, etc. Efficient public administration is determined by a number of factors, which can contribute to a higher level of its services, such as the ability to predict future events, prompt adjustment of legislative proposals and changes in economic policy, a high-quality workforce, multifaceted interaction and collaboration between institutions, impartiality and unchallengeable enforcement of the rule of law (for example in the areas of judiciary, public procurement, corruption) and a high level of responsiveness (for example, European Commission, 2015). The responsiveness of public administration also shows in its ability to set priorities for action when unconventional solutions have to be sought – such as, for example, support for the SME sector in the period following the crisis (see for example European Commission, 2012). Furthermore, in the period of rapid digitalisation, public administration also faces a number of additional challenges that should be effectively addressed to ensure high-quality and cost-effective services.

The efficiency of government institutions in Slovenia

International indicators of competitiveness indicate that during the crisis Slovenia's institutional competitiveness also deteriorated significantly as a result of accumulated weaknesses in legislative, executive and judicial branches of the government. Slovenia is one of the countries that slipped on international institutional competitiveness scales relative to the period before the onset of the crisis. Results of international competitiveness surveys (IMD, WEF) point particularly to structural problems, including the low efficiency of public administration. The World Bank cites the speed of contract enforcement as one of the main barriers to doing business in Slovenia. According to the Doing Business report (World Bank),

---

[63] Gamberoni et al. (2016 a) otherwise find that this effect is only temporary.

[64] Some studies find that this holds true only up to a certain point of financial deepening (for example, IMF, 2015). At high levels of financial depth, the complexity of financial instruments, and therefore also the significance of appropriate supervision, increases. The negative effects of exogenously boosted financial deepening in southern European countries owing to the convergence of nominal interest rates upon the entry into the euro area (in the absence of properly functioning domestic financial markets) are confirmed by the study of Gopinath et al. (2015).

[65] 'Evergreening of loans' was one of the features that characterised the two 'lost decades' in Japan (from the onset of the real estate crisis in the 1990s up to now).

[66] E.g. IMF (2017).

[67] See for example Economic Issues (2014).

[68] Enhancing the efficiency of public administration is therefore also one of priorities of EU Member States, which are assessed by the European Commission within the framework of regular European semesters. Effective and high-quality public administration is also one of directly and indirectly defined goals of the European Investment and Structural Fund (ESIF).

Figure 18: **Indicators of government efficiency according to WEF (left) and IMD* (right), Slovenia's ranking among EU Member States**
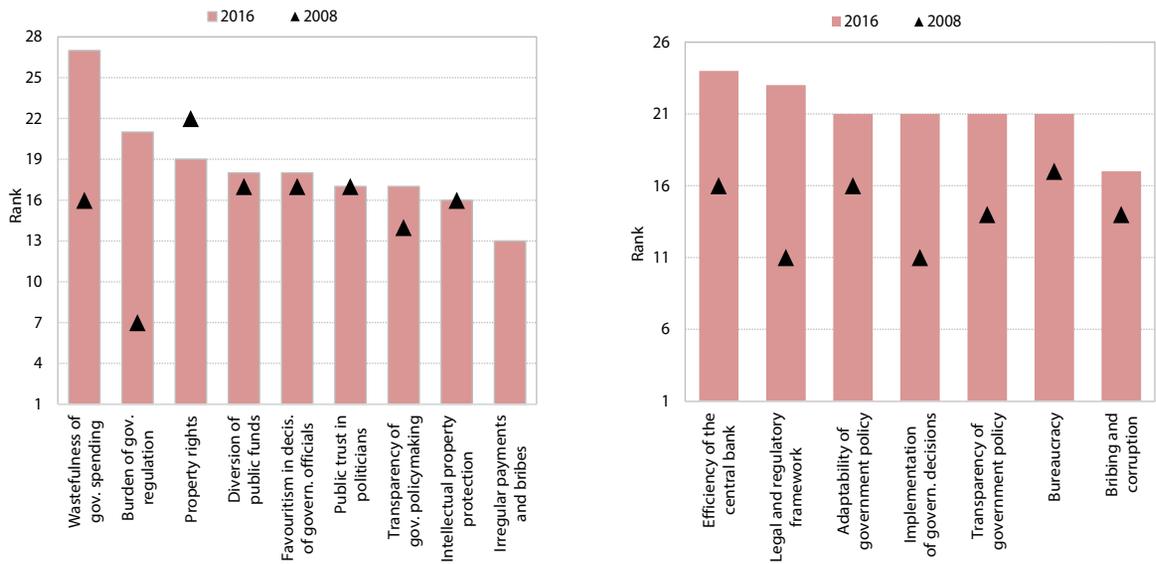
Source: WEF and IMD.
Note: * The IMD survey includes 26 EU countries (excluding Cyprus and Malta).

Slovenia has significantly reduced its gap with the best performing countries in the last few years, also owing to further implementation of the programme for reducing administrative barriers. In its annual survey the European Commission assesses that the efficiency of public administration in Slovenia should be increased particularly by reducing the number of laws and by-laws and the frequency of legislative changes.

Spatial concentration of companies

Allocative efficiency of production factors also increases with the density of companies in a small area. The impact of the distribution of companies on productivity was already discussed by Adam Smith in the Wealth of Nations (1776). Some analyses (for example Fontagne and Santoni, 2015; where the analysis was conducted for France) indicate that a significant portion of the reduced dispersion of productivity estimates for companies in different locations can be attributed to density.[69] In addition to greater availability of (public) services, better infrastructure and greater knowledge diffusion, denser urban and industrial areas also offer better access to a variety of production inputs, particularly labour,[70] and hence a better match between employers and employees. Denser areas are therefore characterised by lower misallocations of production factors and higher productivity.

Spatial concentration of Slovenian companies

Slovenian regions are among the smallest in the EU in both the number of enterprises and the number of people working in individual regions. The Osrednjeslovenska region is in the 6th decile of EU regions in terms of the number of enterprises, but the number of enterprises in the largest Slovenian region is around five times smaller than the average of the 10th decile of the EU.[71] A similar ratio also applies for the number of people employed in enterprises across regions. The lower level of productivity in Slovenia could thus also be due to dispersion and the small size of urban areas – even including the largest ones – in Slovenia compared with larger countries in the EU.

---

[69] Rather than for example migration of more productive companies to larger cities, which is also confirmed by Combes et al. (2012).

[70] Which usually also implies a higher concentration of a more educated workforce (Di Cataldo and Rodriguez-Pose, 2016.

[71] Eurostat data. The latest comparable data on regional entrepreneurial dynamics are available for 2010.

5 How to increase productivity in Slovenia

The results of the analysis of allocative efficiency in Slovenia and the overview of factors that may contribute to the misallocation of production factors and impede productivity growth in Slovenia offer a basis for reflection on possible economic policy measures. The main factors hampering a more efficient allocation of production factors are not cyclical, their elimination being therefore mainly dependent on long-term structural measures. Among the productivity factors presented in previous chapters, economic policy can directly influence particularly those in the business environment, while its impact on within-company factors is indirect and occurs with a greater lag.

With regard to the deficiencies identified, economic policy measures for increasing productivity in Slovenia should be focused on two areas – knowledge and innovation, and the institutional framework. We assess that these are the areas that could contribute to productivity gains over the longer term, although action should also be taken in other areas where deficiencies have been identified.[72] The current conditions of stable economic growth support the introduction of structural reforms in these areas,[73] which can turn cyclically boosted growth into structural long-term growth. In this context, it should be noted that certain economic policy measures focused on removing the barriers to efficient allocation of production factors may have a positive impact on productivity in the short term, but are not appropriate in the long term as they can reduce efficiency (see note 56).

Knowledge forms the basis for long-term economic development. In the proper social conditions and working environment, it enables and fosters the creativity and innovativeness of employees. Especially in the circumstances of global competition and rapid digitalisation and automation of business processes, it is therefore necessary to ensure: i) a responsive educational system capable of predicting global trends to meet the new demands of the economy in the future, taking into account the anticipated structural and demographic changes in the domestic economy (which will increase the demand for highly educated technical job profiles, on the one hand, and the demand for service activities for satisfying the needs of the older population, on the other); ii) investing in knowledge or skills, which is essential at the primary, but also at the

managerial level, on-the-job training, which is becoming increasingly important particularly in the field of digitalisation, lifelong learning, which would also allow older workers to maintain competitiveness in the labour market, and additional training for the unemployed to be able to re-enter the labour market; iii) fiscal policy supporting investment in knowledge, on both the revenue side, for example, through tax relief or lower tax burdens in various forms, which would boost the recruitment of a more educated workforce in the private sector, and the expenditure side, for example through efficient expenditure on education; and iv) appropriate transfer and use of knowledge, particularly by increasing collaboration between the public research sector and enterprises.

Changes in the institutional framework involve a wide range of measures, which should facilitate a smooth and efficient functioning of the private sector. The institutional framework constitutes an extremely complex system of rules and institutions operating within the government sector and, among other things, oversees the implementation of these rules. The quality of institutions is important as it not only supports economic growth, but also increases the resilience of the economy, while the reforms on production factor markets contribute only to economic growth and, to a lesser extent, or only if accompanied by certain measures, to the resilience of the economy to shocks (Caldera Sanchez et al., 2016). Institutional adjustments that would allow a more efficient functioning of the economy should be focused especially on the non-tradable, predominantly service sector and on supporting smaller firms. Measures that would improve the quality of institutions and the institutional framework in Slovenia should be aimed at i) providing a more predictable, less complex and thus more transparent system of rules and regulations; ii) ensuring a more responsive, accountable and efficient public administration; iii) reducing administrative and regulatory barriers to the business sector, in particular to start-ups and small enterprises, and providing them – within acceptable risks – with the initial capital; iv) reducing restrictions on exercising certain professions and activities, which would increase competition on individual markets, particularly in the service sector, and have a positive impact on the integration of service activities (in particular business and knowledge-based services, which generate higher value added) in global value chains and, indirectly, on the productivity of other economic sectors. A change in the institutional framework also involves establishing independent institutions to monitor productivity movements and make suggestions for improvements in this area. By concentrating knowledge from this area, such institutions can also contribute to higher productivity (see Renda and Dougherty, 2017, and ECB, 2017b).

---

[72] The IMF (2017) distinguishes between short-term and long-term measures for increasing productivity. Among short-term measures, it suggests strengthening private investment, increasing the efficiency of government sector investment, restructuring private sector balance sheets and reducing uncertainties about future economic policies.

[73] See also the analysis Assessing the Effects of Some Structural Measures in Slovenia (IMAD, 2016).

Bibliography and sources

Acemoglu, D., Restrepo, P. (2017). Secular stagnation? The effect of aging on economic growth in the age of automation. NBER Working Paper No. 23077.

Adler, G., Duval, R., Furceri, D., Kilic Celik, S., Koloskova, K., Poplawski-Ribeiro. M. (2017). Gone with the headwinds: global productivity. IMF Staff Discussion Note SDN/17/04. Washington D.C.: International Monetary Fund.

Adalet McGowan, M., Millot, V. (2017). The walking dead? Zombie firms and productivity performance in OECD Countries. Economics department working papers no. 1372. Paris: OECD Publishing.

Andersson, L.F. Firm demography and aggregate productivity growth. Mimeo. Stockholm: Swedish Institute for Growth Policy Studies.

Andrews, D., Cingano, F. (2012). Public policy and resource allocation: evidence from firms in OECD countries. Economics department working papers no. 996. Paris: OECD Publishing.

Andrews, D., Criscuolo, C., Gal, P. (2015). Frontier Firms, Technology Diffusion and Public Policy: Micro Evidence from OECD Countries. Paris: OECD Publishing.

Andrews, D., Criscuolo, C., Gal, P. (2016). The global productivity slowdown, technology divergence and public policy: a firm perspective. Background paper to Lisbon global forum on productivity. Paris: OECD Publishing.

Arnold, J., Nicoletti, G., Scarpetta, F. (2012). Regulation, allocative efficiency and productivity in OECD countries: Industry and firm-level evidence. Economics department working paper no. 616. Paris: OECD Publishing.

Autor, D., Dorn, D., Hanson, G.H., Pisano, G., Shu, P. (2016). Foreign Competition and Domestic Innovation: Evidence from US Patents. NBER Working Paper No. 22879.

Aiyar, S., Ebeke, C., Shao X. (2016). The Impact of Workforce Aging on European Productivity. IMF Working Paper, 16/236. Washington D.C.: International Monetary Fund.

Barnett, A., Chiu, A., Franklin, J., Sebastia-Barriel, M. (2014). The productivity puzzle: a firm-level investigation into employment behaviour and resource allocation over the crisis. Working paper no. 495. London: Bank of England.

Baily, M.N., Hulten, C., Campbell, D. (1992). Productivity Dynamics in Manufacturing Plants. Brookings Papers: Miroeconomics.

Bartelsmann, E., Haltiwanger, J., Scarpetta, S. (2013). Cross-Country Differences in Productivity: The Role of Allocation and Selection. American Economic Review 103(1).

Bartelsman, E.J., Doms, M. (2000). Understanding productivity: lessons from longitudinal microdata. Finance and Economics Discussion Series 2000-19. Washington D.C.: Board of Governors of the Federal Reserve System.

Benkovskis, K. (2015). Misalocation of resources in Latvia: Did anything change during the crisis? Working Paper 5/2015. Riga: Latvijas Banka.

Berton, F., Mocetti, S., Presbitero, A., Richiardi, M. (2017). Banks, Firms and Jobs. IMF Working Paper No. 17/38. Washington D.C.: International Monetary Fund.

Bertrand, M., Schoar, A. (2003). Managing with style: the effects of managers on firm policies. The Quarterly Journal of Economics Vol. CXVIII, Issue 4.

Bloom, N. Sadun, R., Van Reenen, J. (2009).The Organization of Firms Across Countries. CEP Discussion Papers dp0937. Centre for Economic Performance. London: LSE.

Bloom, N., Van Reenen, J. (2010). New Approaches to Measuring Management and Firm Organization. CEP Discussion Papers dp0969. Centre for Economic Performance. London: LSE.

Bloom, N., Genakos, C., Sadun, R., Van Reenen, J., (2012). Management Practices Across Firms and Countries. NBER Working Papers 17850. National Bureau of Economic Research.

Borio, C., Kharroubi, E., Upper, C., Zampolli, F. (2015). Labour reallocation and productivity dynamics: financial

causes, real consequences. BIS Working Papers No 534. Basel: Bank for International Settlements.

Borio, C. (2017). Secular stagnation or financial cycle drag? Speech at the National Association for Business Economics, 33rd Economic Policy Conference 5–7 March 2017. Washington D.C.

Brown, J.D., Earle, J.S., Telegdy, A. (2006). The Productivity Effects of Privatization: Longitudinal Estimates from Hungary, Romania, Russia, and Ukraine. Journal of Political Economy 114(1) (February 2006): 61-99.

Buera, F.J, Moll, B., Shin, Y. (2013). Well-intended policies. Review of Economic Dynamics 16 (2013) 216–230.

Caldera-Sánchez, de Seres, A., Gori, F., Hermansen, M., Röhn, O. (2016). Strengthening Economic Resilience: Insights from the Post-1970 Record of Severe Recessions and Financial Crises. OECD Economic Policy Paper No 20. Paris: OECD Publishing.

Calligaris, S., Del Gatto, M., Hassan, F., Ottaviano, G.I.P., Schivardi, F. (2016). Italy's Productivity Conundrum. A Study on Resource Misallocation in Italy. European Economy Discussion Paper 030. Brussels: European Commission.

Canton, E., Ciriaci, D., Solera, I. (2014). The Economic Impact of Proffesional Services Liberalisation. Economic Papers No 533. European Economy. Brussels: European Commission.

Combes, P.P., Duranton, G., Gobillon, L., Puga, D., Roux, S. (2012). The productivity advantages of large cities: distinguishing agglomeration from firm selection. Econometrica, Vol. 80, No. 6 (November, 2012), 2543–2594.

Dabla-Norris, E., Misch, F., Cleary, D., Khwaja, M. (2017). Tax Administration and Firm Performance: New Data and Evidence for Emerging Market and Developing Economies. IMF Working Paper 17/95. Washington D.C.: International Monetary Fund.

Decker, R.A., Haltiwanger, J., Jarmin, R.S., Miranda, J. (2016). Declining Business Dynamism: Implications for Productivity? Hutchins Center Working Paper #23. Brookings.

de Haan, J., Romp, W., Sturm, J.-E. (2007). Public Capital and Economic Growth: Key Issues for Europe. International Seminar on Strengthening Public Investment and Managing Fiscal Risks from Public-Private Partnerships. Budapest.

Damijan, J.P., Polanec, S., Prašnikar, J. (2005). Does Exporting Increase Productivity? Firm Level Evidence from Slovenia. Manuscript.

De la Fuente, A. (2010). Infrastructures and productivity: an updated survey. Instituto de Análisis Económico, CSI manuscript.

De Loecker, J. (2007). Do exports generate higher productivity? Evidence from Slovenia. Journal of International Economics 73 (2007) 69–98.

Dias, D. A., Marques, C. R., Richmond, C. (2015). Misallocation and Productivity in the Lead Up to the Eurozone Crisis. International Finance Discussion Papers 1146. Washington D.C.: Board of Governors of the Federal Reserve System.

Dias, D. A., Marques, C. R., Richmond, C. (2016). A Tale of Two Sectors: Why is Misallocation Higher in Services than in Manufacturing?. IMF Working Paper 16/220. Washington D.C.: International Monetary Fund.

Di Cataldo, M., Rodriguez-Pose, A. (2016). What drives employment growth and social inclusion in EU regions. Discussion Paper Series, DP11551. London : Centre for Economic Policy Research.

Draghi, M. (2017). Moving to the frontier. Speech at the conference "Fostering Innovation and Entrepreneurship in the Euro area", Frankfurt am Main, 13 March 2017.

ECB (2013). Monthly Bulletin, July. Frankfurt am Main: European Central Bank.

ECB (2017a). Firm heterogeneity and competitiveness in the EU. ECB Economic Bulletin, Issue 2/2017. Frankfurt am Main: European Central Bank.

ECB (2017b). The slowdown in euro area productivity in global context. ECB Economic Bulletin, Issue 3/2017. Frankfurt am Main: European Central Bank.

Eurostat Portal Page. (2017). Luxembourg: Eurostat.

Euopean Commission (2012). Excellence in public administration for competitiveness in EU Member States. Brussels: European Commission.

Euopean Commission (2015). Quality of public administration: a toolbox for practioners. Brussels: European Commission.

Euopean Commission (2016). Council Recommendation on the 2016 National Reform Programme of Slovenia and Council Opinion on the 2016 Stability Programme of Slovenia.

Euopean Commission (2017). Quarterly report on the euro area. Vol. 16, No. 1. Brussels: European Commission.

Fontagne, L., Santoni, G. (2015). Firm Level Allocative Inefficiency: Evidence from France. CEPII Working Paper No 2015-12. Paris: CEPII.

Foster,L., Grim, C., Haltiwanger, J., Wolf, Z. (2017). Innovation, Productivity Growth and Productivity Dispersion. NBER Conference on Research in Income and Wealth.

Fox, J.T., Smeets, V. (2011). Does input quality drive measured differences in firm productivity? NBER Working Paper No. 16853.

Gamberoni, E., Giordano, C., Lopez-Garcia, P. (2016a). Capital and labour (mis)allocation in the euro area: some stylised facts and determinants. Working Paper Series No. 1981. Frankfurt: European Central Bank.

Gamberoni, E., Gartner, C., Giordano, C., Lopez-Garcia, P. (2016b). Is corruption efficiency enhancing? A case study of nine Central and Eastern European Countries. Working Paper Series No. 1950. Frankfurt: European Central Bank.

Garicano, G., LeLarge, C., Van Reenen, J. (2013). Firm Size Distortions and the Productivity Distribution: Evidence from France. NBER Working Paper No. 18841.

GEM 2015 (2016), editors Rebernik, M., Tominc, P., Crnogaj, K., Širec, K., Rus, M. (2016). Podjetništvo med priložnostjo in nujo (Enterpreneurship between Opportunity and Necessity). Institute for Entrepreneurship and Small Business Management, Faculty of Economics and Business, University of Maribor.

GEM 2016 (2017), editors Rebernik, M., Crnogaj, K., Širec, K., Bradač Hojnik, B., Rus, M. Tominc, P. (2016). Dinamika podjetniškega potenciala (Dynamics of Entrepreneurial Potential). Institute for Entrepreneurship and Small Business Management, Faculty of Economics and Business, University of Maribor.

Gopinath, G., Kalemli-Ozcan, S., Karabarbounis, L., Villegas-Sanchez, C. (2015). Capital Allocation and Productivity in South Europe. NBER Working Paper No. 21453.

Ha, T.T.D., Kiyoto, K. (2015). Misallocation, Productivity, and Trade Liberalization: The Case of Vietnamese Manufacturing. KEO Discussion Paper No. 134. Tokyo: Institute for Economic Studies, Keio University.

Heil, M. (2017). Finance and productivity: a literature review. Economics Department Working Papers No. 1374. Paris: OECD Publishing.

Hsieh, C.-T., Klenow, P. J. (2009). Misallocation and Manufacturing TFP in China and India. Quarterly Journal of Economics 124(4). 1403-1448.

Hsieh, C.-T., Klenow, P. J. (2013). Misallocation and Manufacturing TFP in China and India Correction Appendix. Obtained at: http://klenow.com/MMTFPAppendix.pdf.

Hsieh C.-T. (2015). Policies for Productivity Growth. Background Paper. Chicago: University of Chicago.

Ilmakunnas, P., Maliranta, M., Vainiomäki, J. (1999). The Roles of Employer and Employee Characteristics for Plant Productivity. Helsinki School of Economics and Business Administration, Working Papers W-223.

IMAD (2014). Economic Issues. Ljubljana: Institute of Macroeconomic Analysis and Development.

IMAD (2016). Assessments of the Effects of Some Structural Measures in Slovenia. Ljubljana: Institute of Macroeconomic Analysis and Development.

IMAD (2017a). Development Report. Ljubljana: Institute of Macroeconomic Analysis and Development.

IMAD (2017b). Spring Forecast of Economic Trends. Ljubljana: Institute of Macroeconomic Analysis and Development.

IMD (Institute for Management Development). World Competitiveness Yearbook, various yeabooks.

IMF (2015). Spain: selected issues. IMF Country Report No. 15/233. Washington D.C.: International Monetary Fund.

IMF (2016). Ireland: selected issues. IMF Country Report No. 16/257. Washington D.C.: International Monetary Fund.

IMF (2017). Fiscal Monitor: Achieving More With Less. Washington D.C.: International Monetary Fund.

Kleinknecht, A. (2015): How 'structural reforms' of labour markets harm innovation. Research Paper No. 6. Hans Boeckler Stiftung. Duesseldorf: Wirtshafts- und Sozialwissenschaftliches Institut.

Laureys, L. (2014). The cost of human capital depreciation during unemployment. Working Paper No. 505. London: Bank of England.

Liu, Y., Westelius, N. (2016). The Impact of Demographics on Productivity and Inflation in Japan. IMF Working Paper 16/237. Washington D.C.: International Monetary Fund.

Lucas, R.E. (1978). On the Size Distribution of Business Firms. The Bell Journal of Economics Vol. 9, No. 2.

Mas, A. (2008). Labour Unrest and the Quality of Production: Evidence from the Construction Equipment Resale Market. Review of Economic Studies (2008) 75, 229–258.

Nichols, N., Mitchell, J., Lindner, S. (2013). Consequences of Long-Term Unemployment. The Urban Institute. Washington DC.

Oberfield, E. (2013). Productivity and Misallocation During a Crisis: Evidence from the Chilean Crisis of 1982. Review of Economic Dynamics 16(2013). 100-119.

OECD (2015). The future of productivity. Paris: OECD Publishing.

OECD (2016). The Productivity–Inclusiveness Nexus. Paris: OECD. Council, C(2016)42/REV1.

OECD (2016). Chapter 2: Promoting productivity and equality: a twin challenge. OECD Economic Outlook. Issue 1, June. Paris: OECD Publishing.

Peters, B., Riley, R., Siedschlag, I., Vahter, P, McQuinn, J. (2014). Innovation and Productivity in Services:Evidence from Germany, Ireland and the United Kingdom. Papers WP480. Dublin: Economic and Social Research Institute (ESRI).

Pereira, A.M., Andraz, J.M. (2013). On the economic effects of public infrastructure investment: A survey of the international evidence. College of William and Mary Department of Economics. Working Paper Number 108.

Renda, A., Dougherty, S. (2017). Pro-productivity institutions: learning from national experience. OECD Productivity Working Papers No. 7. Paris: OECD Publishing.

Restruccia, D., Rogerson, R. (2008). Policy Distortions and Aggregate Productivity with Heterogeneous Plants. Review of Economic Dynamics 11(2008). 707-720.

Schiantarelli, F. (2008). Product Market Regulation and Macroeconomic Performance: A Review of Cross-Country Evidence. Manuscript.

St. Aubyn, M. (2008). Modernising Public Administration and Economic Growth. GPEARI Working Paper 001. Lisbon: Gabineto de Planeamento, Estrategia, Avalaiacao e Relacioes Internacionais.

Statistični podatki iz bilance stanja in izkaza poslovnega izida (različna leta)/(Statistical data from balance sheets and profit and loss statements (various volumes). Ljubljana: AJPES.

Syverson, C. (2011). What Determines Productivity? Journal of Economic Literature Vol. 49, No. 2.

Syverson, C. (2016). Challenges to Mismeasurement Explanations for the U.S. Productivity Slowdown. NBER Working Paper 21974.

Van Ark, B., O'Mahoney, M., Timmer, M.P. (2008). The Productivity Gap Between Europe and the United States:Trends and Causes. Journal of Economic Perspectives Vol. 22 No. 1 (Winter).

Vergeer, R. , Kleinknecht, A. (2014): Does labor market deregulation reduce labor productivity growth? A panel data analysis of 20 OECD countries (1960-2004). International Labour Review, 153(3), p. 365-393.

Verle, K., Markič, M., Kodrič, B. (2012). Kompetence slovenskih managerjev in organizacijska struktura (Competences of Slovenian managers and organisational structure). Organizacija, volume 45, issue 1.

Vollrath, D. (2014). Measuring Misallocation across Firms. The Growth Economics Blog. Obtained at: https://growthecon.wordpress.com/2014/09/25/measuring-misallocation-across-firms/.

Vives, X. (2007). Innovation and Competitive Pressure. University of Navarra Working Paper No. 634.

WEF (World Economic Forum). The Global Competitiveness Report, various yearbooks.

Wren-Lewis, S. (2017). https://mainlymacro.blogspot.si/2017/03/the-output-gap-and-innovations-gap.html; access 15.5.2017.

Appendices

Appendix 1
The methodology for calculating allocative efficiency

The analysis of the efficiency of the allocation of available production factors and its effect on total productivity (TFP) of the corporate sector, manufacturing and service activities in Slovenia is based on the methodology developed (and used for the first time) by Hsieh and Klenow (hereinafter HK; 2009, 2013).[1]

According to this methodology, an efficient allocation of available resources would mean that there would be no barriers in the economy to the reallocation of labour and capital from less to more productive companies. Marginal products of individual production factors and their remuneration would be equalised across companies. If this were the case, a stable equilibrium allocation would exist on the factor market, where the emergence of a shock, which would affect all firms in a given sector (exogenous shock), would cause differences between the values of marginal products of individual production factors, and hence reallocations of a given production factor from less to more productive companies until the remuneration of this factor would be equalised again.

The HK model (hereinafter 'HK'; 2009, 2013) is a standard model of monopolistic competition with heterogeneous companies, which not only differ in their productivity levels, but also face different barriers to efficient allocation of available production factors. This causes differences between companies in marginal products of labour and capital and generally translates into lower TFP. The extent of misallocation can thus be measured by the width of the observed gaps in the values of marginal products of different production factors across companies.

The efficient allocation of the available resources was calculated using the Cobb-Douglas production function with constant returns to scale:

$$Y_{si} = A_{si} K_{si}^{\alpha_s} L_{si}^{1-\alpha_s},$$

where i denotes the company, s denotes the sector, Y refers to the real product, A is the parameter of a company's total factor productivity (TFP),[2] L is nominal costs of labour or the average number of workers on the basis of hours worked in the accounting period, K is fixed assets and $1-a_s$ is the average share of labour costs in the value of the sector in a certain period.[3]

A company's physical productivity A_{si}[4] is not directly measurable, so it can be expressed as:

$$A_{si} = \frac{TFPR_{si}}{P_{si}} = \frac{1}{P_{si}} \frac{P_{si} Y_{si}}{K_{si}^{\alpha_s} L_{si}^{1-\alpha_s}},$$

where $TFPR_{si}$ denotes revenue productivity of the company[5] and P_{si} is the company-specific price. Assuming monopolistic competition, physical productivity of the sector ($TFPQ_s$) can be expressed as:

$$TFPQ_s = A_s = \left[\sum_{i=1}^{M_s} \left(A_{si} \frac{\overline{TFPR_s}}{TFPR_{si}} \right)^{\sigma-1} \right]^{\frac{1}{\sigma-1}},$$

where σ is the elasticity of substitution across companies' goods.[6] If production factors are efficiently allocated, revenue productivity across companies within a sector is equalised. An efficient level of physical productivity of a sector $TFPQ_S^*$ can thus be expressed as:

$$TFPQ_s^* = \left[\sum_{i=1}^{M_s} (A_{si})^{\sigma-1} \right]^{\frac{1}{\sigma-1}}.$$

The impact of allocative efficiency on productivity is measured by a ratio of actual to optimal productivity. Using a Cobb-Douglas aggregator, the ratio of actual production to production with optimal allocation of production resources can be written as:

$$\frac{Y}{Y^*} = \prod_{s=1}^{S} \left[\sum_{i=1}^{M_s} \left(\frac{A_{si}}{A_s} \frac{\overline{TFPR_s}}{TFPR_{si}} \right)^{\sigma-1} \right]^{\frac{\theta_s}{\sigma-1}},$$

where θ_s is the share of a sector's value added in total value added of the economy (part of the economy).

In the *baseline model* we used *(1)* labour costs as labour, *(2)* set the parameter of the elasticity of substitution between goods (σ) to 3[7] and *(3)* allowed changes in the weights of industries (θ_s).

---

[1] The predecessors of this analysis in the sense of the theoretical framework are Restruccia and Rogersion (2008), who showed that the negative contribution of inefficient allocation of available production inputs to TFP (for example, because of measures that work as subsidies to unproductive or taxes on productive companies) can be significant.

[2] A_{si} or TFP_{si} shows the product a company can obtain by available production inputs.

[3] In our analysis, 2002–2015.

[4] Productivity in the sense of the volume of produced goods and services.

[5] Productivity in the sense of nominal revenue from produced goods and services.

[6] In the existing literature, sigma mostly takes the values 3, 5 or 10.

[7] This value is also taken into account in comparable analyses for other countries. In checking the robustness of the calculations of baseline models, some authors (for example Dias et al., 2016) take into account higher values for this parameter, determined on the basis of more recent estimates (the values for the euro area of around 5 for the whole economy, or around 7 for the manufacturing and around 4 for the service sector).

Alternative models, i.e. models used to check the robustness of results, differ from the baseline model with regard to the use of constant or variable weights and: (1) different variables representing labour (the number of workers instead of labour costs as used in the baseline model),[8] and (3) exclusion of extreme values (1% or 2%) in the tail ends of the distribution

$$\left(ln\left(\frac{TFPR_{si}}{TFPR_s} \right), ln\left(\frac{A_{si}}{A_s} \right) \right)$$

of physical or revenue productivity of companies[9]

$$\left(ln\left(\frac{TFPR_{si}}{TFPR_s} \right), ln\left(\frac{A_{si}}{A_s} \right) \right).$$

Appendix 2
List of sectors included in the analysis of allocative efficiency

Manufacturing (C)	10	Manufacture of food products
	13	Manufacture of textiles
	14	Manufacture of wearing apparel
	16	Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials
	18	Printing and reproduction of recorded media
	20	Manufacture of chemicals and chemical products
	22	Manufacture of rubber and plastic products
	23	Manufacture of other non-metallic mineral products
	25	Manufacture of fabricated metal products, except machinery and equipment
	26	Manufacture of computer, electronic and optical products
	27	Manufacture of electrical equipment
	28	Manufacture of machinery and equipment n.e.c.
	29	Manufacture of motor vehicles, trailers and semi-trailers
	31	Manufacture of furniture
	33	Repair and installation of machinery and equipment
Water supply, sewerage, waste-management and remediation activities (E)	38	Waste collection, treatment and disposal activities, materials recovery
Construction (F)	41	Construction of buildings
	42	Civil engineering
	43	Specialised construction activities
Wholesale and retail trade, repair of motor vehicles and motorcycles (G)	45	Wholesale and retail trade and repair of motor vehicles and motorcycles
	46	Wholesale trade, except of motor vehicles and motorcycles
	47	Retail trade, except of motor vehicles and motorcycles
Transportation and storage (H)	49	Land transport and transport via pipelines
Accommodation and food service activities (I)	55	Accommodation
	56	Food and beverage service activities
Information and communication activities (J)	58	Publishing activities
	62	Computer programming, consultancy and related activities
Real estate activities (L)	68	Real estate activities
Professional, scientific and technical activities (M)	69	Legal and accounting activities
	70	Management consultancy activities (excluding activities of head offices)
	71	Architectural and engineering activities, technical testing and analysis
	72	Scientific research and development
	73	Advertising and market research
	75	Veterinary activities
Administrative and support-service activities (N)	78	Employment activities
	80	Security and investigation activities
	81	Services to buildings and landscape activities

Appendix 3
Results of alternative calculations of the efficiency of the allocation of production factors

Table: **Inefficient allocation of production factors in Slovenia in the entire economy (TFP gains if production factors were allocated optimally), in %**

		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	The entire economy														
	Baseline model														
σ=3	**σ = 3; L=LC; θs constant**	**26.8**	**26.0**	**27.7**	**27.4**	**29.4**	**31.7**	**32.2**	**34.9**	**37.0**	**39.3**	**40.1**	**41.3**	**38.2**	**37.3**
	θs not constant	27.5	26.0	27.6	27.3	29.0	32.3	32.4	35.4	37.6	39.5	38.8	40.3	36.8	35.4
	Alternative models														
σ=3	**L=EMP; θs constant**	**40.5**	**39.4**	**41.2**	**40.3**	**43.7**	**47.0**	**47.5**	**51.2**	**50.4**	**51.7**	**52.7**	**55.4**	**50.1**	**51.8**
	θs not constant	41.4	39.5	41.0	39.9	43.0	48.0	47.9	51.8	51.7	52.2	51.2	54.2	48.1	48.5
σ=5	**L=LC; θs constant**	**46.1**	**45.1**	**48.9**	**46.1**	**49.7**	**54.2**	**54.3**	**55.9**	**62.0**	**66.5**	**68.2**	**70.0**	**62.9**	**63.6**
	θs not constant	48.5	45.5	49.0	46.5	49.3	56.1	54.5	56.6	62.9	66.7	66.2	68.5	60.6	60.4
	L=EMP; θs constant	**73.8**	**70.0**	**78.6**	**68.8**	**79.3**	**82.8**	**86.7**	**91.3**	**89.2**	**90.2**	**92.9**	**99.2**	**86.1**	**93.7**
	θs not constant	76.1	70.4	78.6	68.6	78.2	85.4	87.2	91.8	91.6	90.7	90.9	97.3	83.0	87.8

Source: Calculations by IMAD on the basis of AJPES data.
Note: The table shows estimates for different specifications of parameters. The estimates indicate potential total factor productivity gains in the entire economy if production factors were optimally allocated.

economic issues 2017