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Executive Summary

Economic growth in Slovenia will be somewhat slower over the medium term compared to the last two years, but will remain higher than the euro area average: it will stand at 3.2% this year, and is expected to be just under 3% over the next two years. The more moderate GDP growth is attributable to a slight slowdown in foreign demand growth and a gradual shift into a more mature phase of the business cycle. The downside risks to economic growth are more pronounced and originate from the external environment.

Over the medium term, economic growth will remain broadly based and will be driven primarily by private consumption and investment. Both will be strongly dependent on labour market developments which will be characterized by slower employment growth and faster wage growth. The latter will slightly outpace productivity growth, which will lead to a deterioration in cost competitiveness if unit labour costs rise faster than those of trading partners. Rising labour costs and a shortage of qualified labour will also play a role in the ongoing growth of private sector investment in machinery and equipment. Such investments are necessary for a gradual transition to a less labour-intensive orientation of the Slovenian economy characterized by a higher level of productivity. The developments in the labour market will however strengthen household disposable income. This will support a slightly higher growth in private consumption and trigger a continuing demand for residential real estate. The fast-rising prices observed in the housing market in recent years are primarily indicative of a significant shortage of supply. As such, growth of residential private investment is expected to gradually strengthen over the projection horizon. The financing conditions remain favourable, and are continuing to support a solid growth in investment by the corporate sector in Slovenia. Economic growth will also continue to be supported by government investment: the disbursement of EU funds and the execution of major investment projects are expected to pick up their pace. Growth in government consumption over the projection horizon will be slightly lower than last year, primarily as a result of a slowdown in employment growth. Domestic demand will strengthen import growth, which will slightly outpace export growth throughout the projection horizon. Given the uncertainty in the international environment, export growth will be slightly slower than in previous years, but will remain favourable. These trade developments will lead to a gradual reduction in the current account surplus, which will nevertheless remain large even at the end of the projection horizon.

Under weaker pressure from the external environment, inflation as measured by the HICP will be slightly lower this year than last year, reaching 1.7%, and will fluctuate at around 2% over the next two years. As domestic demand remains solid and growth in unit labour costs increases slightly, core inflation will gradually rise, primarily on account of faster growth in services prices. At the same time moderate growth is also expected in prices of non-energy industrial goods, which, given the fierce competition between providers, will remain strongly dependent on price developments in international trade. The contribution of growth in energy prices to headline inflation will decline in line with the assumed developments in global oil prices.

The main risks accompanying the current projections originate from the external environment, and are on the downside for economic growth in Slovenia. The realisation of risks related to the escalation of geopolitical tensions and additional protectionist measures could slow foreign demand growth, which would be reflected in lower export growth and in a general deterioration of economic sentiment, which in turn would mainly drag on business investment activities. By contrast, the risks from the domestic environment remain on the upside, and relate primarily to the possibility of faster wage growth, which would facilitate a sharper increase in private consumption. Additional uncertainty surrounds government investment dynamics, which, in the wake of faster disbursement of EU funds and the intensified execution of major infra-

structure projects, could slightly outperform its current growth projections. The aforementioned stronger upward pressure on wages could also cause a slight increase in core inflation over the entire projection horizon. A further risk of higher inflation stems from developments in oil prices on international markets, which primarily depend on the global geopolitical situation.

Table 1: Macroeconomic projections for Slovenia, 2019–2021

								Projections					
	2012	2013	2014	2015	2016	2017	2018	2019		2020		2021	
								Jun.	Δ	Jun.	Δ	Jun.	Δ
Prices	*annual average % changes*												
HICP	2.8	1.9	0.4	-0.8	-0.2	1.6	1.9	**1.7**	-0.5	**2.0**	-0.3	**2.0**	-0.2
HICP excluding energy	1.8	2.0	0.7	0.4	0.6	1.1	1.4	**1.7**	-0.6	**2.2**	-0.4	**2.3**	-0.2
HICP energy	9.0	1.8	-1.4	-7.8	-5.2	4.7	6.0	**2.0**	0.6	**0.2**	0.3	**-0.2**	-0.1
Economic activity	*y-o-y growth rates in % (unless stated otherwise)*												
GDP (real)	-2.7	-1.1	3.0	2.3	3.1	4.9	4.5	**3.2**	-0.2	**2.9**	-0.1	**2.9**	0.0
Private consumption	-2.4	-4.1	1.9	2.3	3.9	1.9	2.2	**2.9**	0.5	**2.6**	0.4	**2.3**	0.2
Government consumption	-2.2	-2.1	-1.2	2.4	2.7	0.5	2.6	**2.1**	0.3	**1.7**	0.0	**1.6**	0.0
Gross fixed capital formation	-8.8	3.2	1.0	-1.6	-3.7	10.7	10.6	**6.5**	-1.3	**6.0**	-0.4	**5.7**	0.0
Exports (goods and services)	0.6	3.1	5.7	5.0	6.4	10.7	7.2	**5.5**	-1.1	**5.8**	-0.7	**5.7**	-0.2
Imports (goods and services)	-3.7	2.1	4.1	4.7	6.6	10.3	7.7	**6.2**	-0.8	**6.5**	-0.3	**6.1**	0.0
Contributions to real GDP growth	*in GDP percentage points*												
Domestic demand (excluding inventories)	-3.6	-2.1	1.0	1.4	1.9	3.0	3.6	**3.1**	0.0	**2.8**	0.1	**2.7**	0.2
Net exports	2.8	0.8	1.4	0.6	0.4	1.2	0.3	**0.0**	-0.3	**0.0**	-0.4	**0.1**	-0.3
Changes in inventories	-2.0	0.2	0.5	0.3	0.7	0.6	0.6	**0.0**	0.0	**0.0**	0.0	**0.0**	0.0
Labour market	*y-o-y growth rates in % (unless stated otherwise)*												
Unemployment rate (% of labour force)	8.9	10.1	9.8	9.0	8.0	6.6	5.1	**4.3**	-0.6	**4.1**	-0.5	**4.0**	-0.5
Total employment	-0.9	-1.1	0.4	1.3	1.8	2.9	3.0	**2.1**	0.9	**0.7**	0.0	**0.4**	0.0
Compensation per employee	-1.0	0.5	1.3	1.3	3.0	3.2	4.0	**5.1**	0.3	**5.3**	0.6	**4.7**	0.0
…Productivity	-1.8	0.0	2.5	1.0	1.2	1.9	1.5	**1.1**	-1.0	**2.1**	-0.2	**2.4**	-0.1
…Unit labour costs (ULC)	0.8	0.5	-1.2	0.3	1.8	1.3	2.5	**4.0**	1.4	**3.1**	0.8	**2.2**	0.0
Balance of payments	*y-o-y growth rates in % (unless stated otherwise)*												
Current account: in bn EUR	0.8	1.6	2.2	1.8	2.2	3.1	3.2	**3.3**	0.0	**3.2**	-0.2	**3.4**	-0.2
in % GDP	2.1	4.4	5.8	4.5	5.5	7.2	7.0	**6.7**	-0.1	**6.3**	-0.4	**6.2**	-0.4
Terms of trade*	-1.1	0.8	1.0	1.3	0.9	-0.5	-0.2	**-0.1**	0.0	**-0.1**	0.0	**-0.1**	0.0

**Based on deflators from National Accounts data.*
Δ: Difference between current projections and projections in Macroeconomic Projections for Slovenia, December 2018.
Source: Bank of Slovenia, Consensus Economics, Eurostat, JP Morgan, OECD Economic Outlook, SORS, ECB.

1 International Environment and External Assumptions

Global economic growth is projected to be slightly lower this year, primarily as a result of weaker growth in global industrial production and trade, but is expected to gradually strengthen over the medium term. There will be similar developments in GDP growth in the euro area, which is expected to strengthen to around 1.4% in the following years. The technical assumptions reflect a gradual fall in US dollar prices of crude oil and the depreciation of the euro over the projection horizon, and are based on information available by the cut-off date of 21 May 2019.

Global economic growth is projected to be slightly lower this year, primarily as a result of weaker growth in global industrial production and trade, but is expected to gradually strengthen over the medium term. Developments in global economic activity over the projection horizon are expected to depend primarily on a slowdown in growth in advanced economies as they move into a more mature phase of the business cycle, more moderate economic growth in China, and a gradual recovery in growth in emerging economies. Slightly lower GDP growth is projected for the euro area this year, primarily as a result of weaker foreign demand and numerous uncertainties at the global level (an increase in protectionist measures) and at the level of individual euro area countries (including the prospects of a no-deal Brexit). The gradual stabilisation of the situation in the external environment is expected to bring about a stronger growth to the euro area. Additional factors affecting the projected strengthening will be expansionary monetary policy, a buoyant labour market and looser fiscal policy. The assumptions with regard to foreign demand for Slovenia also reflect a slight deterioration in the external environment, where growth is expected to be lower than last year (3.1%), before strengthening to 3.8% in 2021 which is in line with the stabilisation of the situation in the external environment.

Table 2: Assumptions for factors from the international environment

							Assumptions		
	2013	2014	2015	2016	2017	2018	2019	2020	2021
	growth rates in % (if not specified otherwise)								
World (excluding euro area) real GDP	3.9	3.8	3.5	3.3	3.9	3.8	**3.3**	**3.6**	**3.6**
Real GDP growth in euro area	-0.2	1.4	2.0	1.9	2.5	1.8	**1.2**	**1.4**	**1.4**
Foreign demand for Slovenia	2.0	2.9	2.8	3.5	6.1	3.6	**3.1**	**3.4**	**3.8**
Oil price (in USD/barell)	108.8	98.9	52.4	44.0	54.4	71.1	**68.1**	**65.8**	**62.7**
Oil price (in EUR/barell)	82.0	74.5	47.2	39.8	48.2	60.2	**60.6**	**58.7**	**56.0**
Oil price (in USD/barell, annual percentage change)	-2.8	-9.1	-47.0	-15.9	23.5	30.7	**-4.1**	**-3.5**	**-4.7**
Exchange rate USD for EUR	1.33	1.33	1.11	1.11	1.13	1.18	**1.12**	**1.12**	**1.12**
Non-energy commodity prices	-5.3	-2.4	-16.7	-2.4	7.9	3.9	**-3.4**	**3.9**	**3.8**

Source: ECB, European Commission, Bank of Slovenia.

The technical assumptions suggest a gradual fall in US dollar prices of crude oil, and a weaker euro during the projection horizon. The assumptions for developments in primary commodity prices are based on market expectations on futures markets over a two-week period ending on the cut-off date.[1] The assumption for crude oil prices, which averaged USD 71.1 per barrel in 2018, is that they will fall to an average of USD 68.1 in 2019 and USD 65.8 in 2020, before stabilising at USD 62.7 in 2021. The prices of other non-energy primary commodities are assumed to fall significantly over the rest of the year, before evolving in line with global economic activity over the remainder of the projection horizon. The technical assumption for the euro exchange rate against the US dollar is that it will remain unchanged over the projection horizon at the average level prevailing in the two-week period ending on the cut-off date. This entails an exchange rate of USD 1.12 to the euro.

[1] The technical assumptions are based on information available by the cut-off date of 21 May 2019. The assumption for foreign demand in Slovenia and the external technical assumptions of medium-term projections of macroeconomic developments in Slovenia taken into account by the Bank of Slovenia within the framework of the ESCB, are based on the harmonised projection assumptions within the framework of the ESCB. For more on the methodology, see the latest release of ESCB projections online (https://www.ecb.europa.eu/pub/projections/html/index.en.html).

2 Projections

Economic growth in Slovenia will moderate as the economy gradually moves into a more mature phase of the business cycle, but will remain solid at levels around 3%. Growth will primarily be driven by private consumption and investment. Both will depend heavily on developments in the labour market, characterized by a decreasing unemployment rate and additional shortage of qualified workers, which firms will partly compensate for by investing in machinery and equipment. Such investment decisions will also be shaped by rising labour costs. On the other hand, wage growth will raise household disposable income, thus supporting a slightly higher growth in private consumption. In response to the situation on the residential real estate market, where demand strongly outstrips supply, further growth in residential investment is expected. The contributions to economic growth by government consumption and government investment will remain positive, but will decline slightly over the projection horizon. Given the deterioration in the international environment, growth in exports of goods and services will be slightly slower than in previous years, but will remain favourable. Strong domestic demand means that growth in imports of goods and services will outpace growth in exports during the projection horizon, which will lead to a gradual reduction in the current account surplus.

In the Bank of Slovenia's assessment, developments on the labour market will be significantly impacted by structural imbalances, which will strengthen over the projection horizon as the unemployment rate reaches historically low levels. Alongside slowing economic growth, which will reduce the need for new hires, this will additionally act as a brake on employment growth. Structural imbalances will increasingly shift negotiating power to workers, fostering wage growth increases due to the agreement between the government and the public sector trade unions, and the rise in the minimum wage.

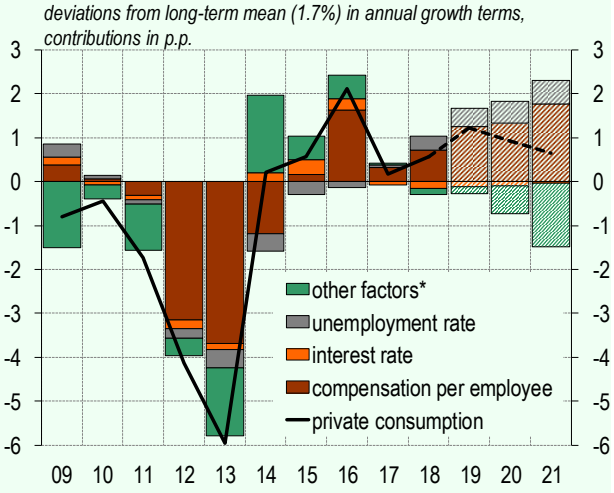
Due to weaker external factors, inflation as measured by the HICP will be slightly lower this year than last year, and will be largely attributable to inflationary pressures from the domestic environment. In the wake of stronger growth in private consumption and higher labour costs, services prices will rise noticeably, while the fall in prices of non-energy industrial goods will also come to an end after nine years. Domestic inflationary pressures will strengthen in the medium term, and will raise core inflation, which will slightly exceed overall consumer price inflation.

2.1 Economic activity

Projections of economic activity growth in Slovenia remain favourable. Domestic demand will be the main engine of growth, encouraged above all by the situation on the labour market. This will strengthen growth in household disposable income, which will be reflected primarily in higher growth in private consumption and partly in a higher savings rate. In light of the uncertainty in the international environment, private-sector investment in machinery and equipment will mark a slower growth than in the last two years, while government investment will also contribute less to aggregate GDP growth compared to last year. Following last year's elections, government investment will remain relatively high this year, but its growth will slow slightly in the next two years. However, growth in government consumption will remain moderate over the projection horizon. All the aforementioned factors will strengthen growth in imports of goods and services, which will outpace growth in exports over the next three years. The latter will be slightly slower as growth in foreign demand slows, but will nevertheless remain favourable. Net exports of goods and services will consequently result in a negligible contribution to aggregate GDP growth in the coming years. As the Slovenian and the euro area economies gradually move into a more mature phase of the business cycle, economic growth is expected to be slightly slower during the projection horizon compared to previous years, but will remain encouraging, at levels around 3%.[2]

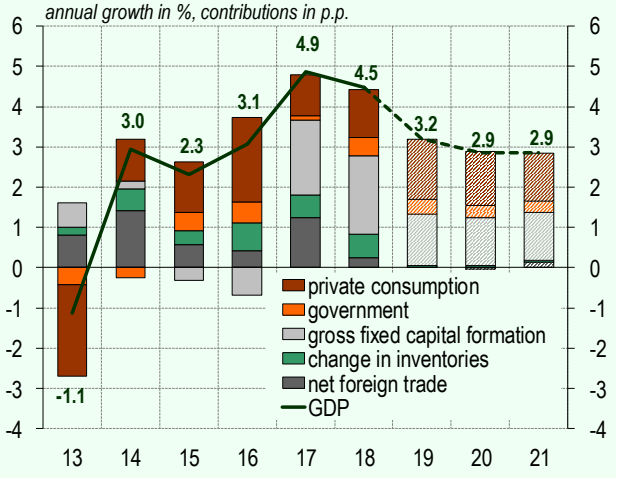
Private consumption will be the main factor of domestic demand over the projection horizon. The solid growth in household final consumption will mainly be driven by growth in disposable income, which will be attributable to slightly higher wage growth and also to continuing employment growth. The key factors shaping the profile of private consumption pertain to developments in the labour market, where the job vacancy rate remains relatively high while the unemployment rate is at historical lows, an indication of the shortage of qualified labour. An additional positive factor in this year's growth in consumption is the recent reduction in tax on annual leave allowance (which is now exempt from personal income tax and

Figure 2: Decomposition of private consumption growth



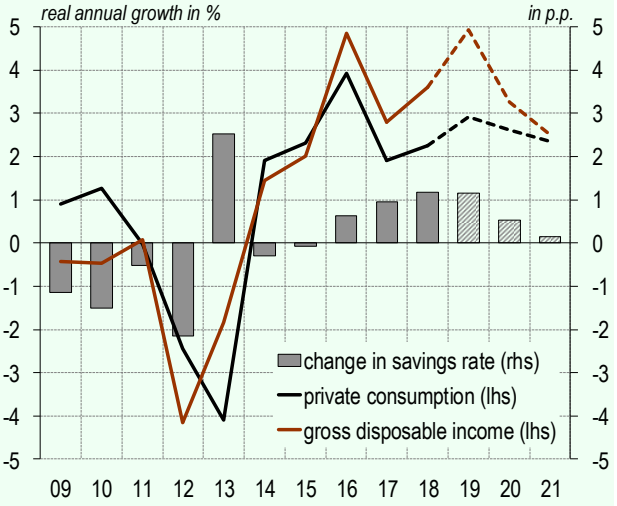
*Note: *Other factors refer to variables not included in the estimation.*
Source: SORS, Bank of Slovenia calculations.

Figure 1: Projection of expenditure contributions to GDP growth rate



Note: Due to rounding, sums of components may differ from aggregate values.
Source: SORS, Bank of Slovenia projections.

Figure 3: Private consumption, disposable income and savings dynamics projections



Source: SORS, Bank of Slovenia projections.

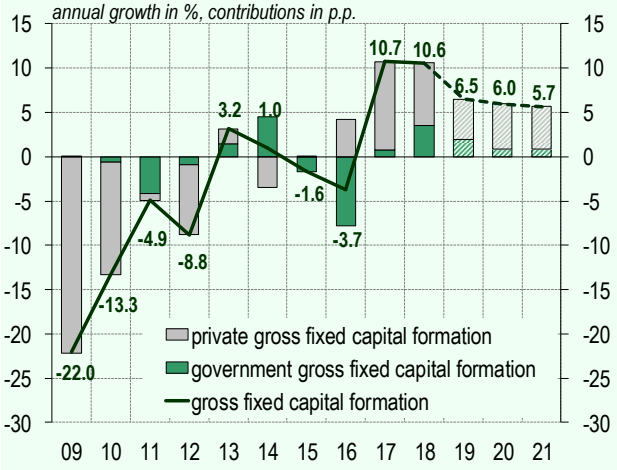
[2] A detailed analysis on business cycles is published in the December 2018 Macroeconomic Projections for Slovenia (Box 1).

social security contributions up to the level of the average gross monthly wage). Consumption will also be supported by further growth in consumer loans throughout the projection horizon. With the business cycle in a more mature phase and GDP growth easing, households are expected to remain cautious in their consumption decisions, which will gradually raise the savings rate. Private consumption growth will average 2.6% over the projection horizon, while the savings rate will rise from 15.1% of disposable income last year to 16.9% by the end of the projection horizon.

Growth in final government consumption will be lower throughout the projection horizon than last year, while the upward revision in this year's growth is attributable to an increase in employment growth relative to the previous projections. Real annual growth in government consumption is projected to average 1.8% over the projection horizon, slightly higher compared to the previous projections on account of an upward revision in this year's growth. The main factor in the high nominal growth in government consumption is the large increase in the average wage in the government sector.[3] This is largely attributable to the agreement reached at the end of last year between the government and the public sector trade unions.[4] Employment in the government sector is continuing to rise, although the year-on-year growth rate slowed slightly in the first quarter of this year according to the monthly indicators. A further slowdown is expected over the projection horizon, owing to limitations on the labour supply side. The growth in final government consumption is also attributable to expenditure on intermediate consumption and expenditure on social transfers in kind.

The situation in the external environment and in the domestic labour market will be the key factors shaping private-sector investment growth. The latter will remain solid over the projection horizon, albeit lower than in previous years. The slightly greater caution shown by firms in their investment activity will primarily be attributable to the slight increase in uncertainty in the economy caused by the unpredictable situation in the external environment, particularly in connection with rising protectionism. The latter is also being reflected in reduced assessments of (export) order books. In the wake of a stabilisation in the international trade situation and the gradual strengthening of foreign demand, moderate growth is expected in private-sector investment in machinery and equipment, which, given its high capacity utilisation, is a vital prerequisite for faster productivity growth in the Slovenian economy. This has been low in recent years, as economic growth was primarily based on employment which is expected to gradually moderate in the wake of faster-rising labour costs and a shortage of qualified labour. These are some of the key factors of why firms will increasingly opt to invest in new technology and the automation of production processes. Investment will also be

Figure 4: Projection of components' contributions to the growth of gross fixed capital formation



Note: Due to rounding, sums of components may differ from aggregate values.
Source: SORS, Bank of Slovenia projections.

[3] The average wage is calculated as compensation of employees per employee on the basis of national accounts figures.

[4] Growth in the average wage in the government sector will be particularly high this year. The following measures shape the profile of wage growth: (i) January's general rise in wages by one wage grade for all civil servants (with the exception of physicians, functionaries and directors), (ii) an additional rise in November by one wage grade for employees in positions higher than the 26th wage grade (other than the aforementioned exceptions), (iii) a rise in wages by one wage grade for individual positions (e.g. in September for class teachers, in November for nurses in intensive care and midwives in maternity wards), (iv) a rise in certain bonuses (e.g. for night work, for work on Sundays, for work on holidays and for shared working hours) from September, and (v) an increase in the annual leave allowance for civil servants (those receiving a base wage corresponding to the 18th wage grade or lower will receive EUR 1,050 and others will receive the minimum wage of EUR 886.63). Another wage rise of a further wage grade will be carried out in 2020 for positions that require a doctorate, a master's degree or a specialisation (other than the aforementioned exceptions), while the constraints with regard to payments for regular on-the-job performance and for increased workload will be removed from the middle of the year. In all years growth in the average wage will also be affected by civil service promotions. At the end of December, the government also signed an agreement with the police, which sets out special funding in the amount of EUR 15 million for increased workload for officers involved in a project for protecting the Schengen border and managing the flow of migrants.

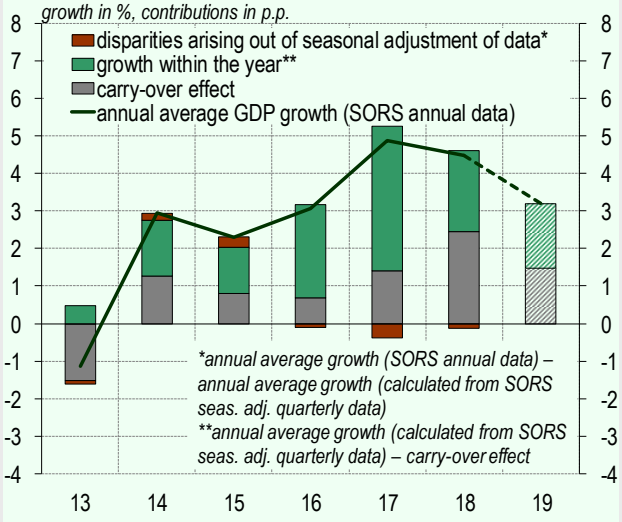
Box 1: Decomposition of GDP growth into growth within the year and a carry-over effect

Economic growth in Slovenia stood at 4.5% in 2018, down by 0.4 percentage points from the previous year. Despite the relatively high annual growth, the figures suggest that the increase in economic activity slowed significantly last year. This is confirmed by the quarterly growth rates, and also by the decomposition of GDP growth into growth within the year and the carry-over effect from the previous year.[1]

Developments in the external environment were the key factors slowing down the increase in economic activity in 2018, when average quarterly growth was down by 0.6 percentage points compared to 2017 (0.9% in 2018, compared with 1.5% in 2017). The weaker growth in several trading partners and the increased economic uncertainty slightly held back firms' investment activity in Slovenia, particularly of those strongly integrated into global supply chains. The deterioration in the international environment was also reflected in a slower - yet still favourable - growth in exports of goods and value-added in manufacturing compared with the previous year.

The decomposition of GDP growth in 2018 reveals that the slowdown in economic growth in Slovenia was slightly disguised by a relatively high carry-over effect from the previous year. This accounted for 2.5 percentage points of last year's GDP growth, the highest figure since 2007. In the wake of last year's slowdown, this year the carry-over effect will account for around 1.5 percentage points of GDP growth. The average quarterly growth in 2019 is expected to be similar to last year, while the decline in annual economic growth will primarily be attributable to the significantly lower carry-over effect from 2018.

Figure 1: Annual GDP growth in Slovenia, carry-over effect and growth within the year



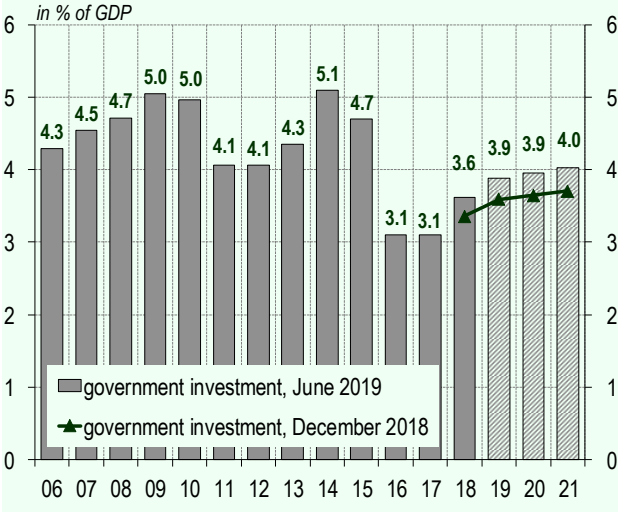
Source: SORS, Bank of Slovenia calculations.

[1] A detailed analysis on the concept of carry-over effect is published in the June 2018 Macroeconomic Projections for Slovenia (Box 1).

driven by favourable financing, as firms are now in a significantly better financial position than before the crisis. Their debt levels are significantly lower, while high retained earnings from previous years have given them a better financing structure. There will also be an increase in residential investment, which, given the buoyant labour market and the low interest rate environment, is being driven primarily by demand for new housing. The shortage of suitable housing and the excess demand relative to available supply have mainly been reflected in accelerated real estate prices in recent years.

Government investment will continue to support economic growth, and as a ratio to GDP will remain higher than in the euro area. Government investment increased by almost a quarter in nominal terms last year. Although government investment increased for the second consecutive year last year, in nominal terms and as a ratio to GDP it was still down from the levels observed in 2014 and 2015, when the main factor was the ending of the old EU financial framework. The estimates of annual growth in government investment remain unchanged from the previous projection round, which, given last year's higher realisation, entails higher investment in nominal terms. The increased disbursement of EU funds and the

Figure 5: Government investment



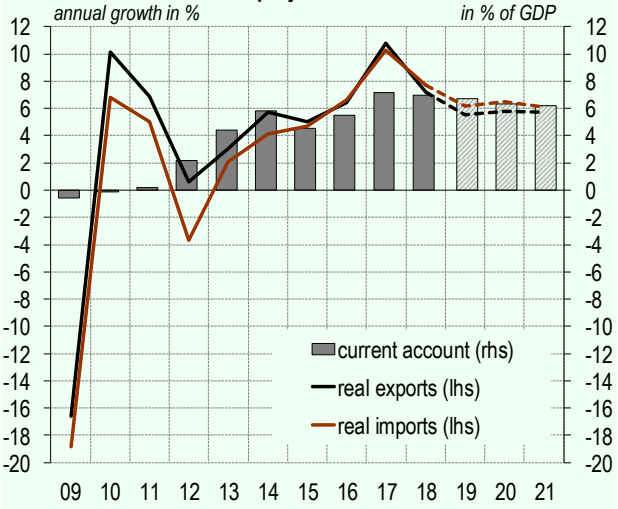
Source: SORS, Bank of Slovenia projections.

execution of major investment projects are also expected to be factors in the growth in government investment over the projection horizon. There have been large annual fluctuations in government investment in the past, which increases the uncertainty in the projections.

Growth in exports of goods and services will remain relatively high, despite the assumption of slightly slower growth in foreign demand.[5] The increased uncertainty in the external environment was observed already last year with declining assessments of export order books, which is also a reason for the reduced projection of this year's export growth. In the wake of a stabilisation in the external environment, in line with the assumption of growth in foreign demand, export growth will strengthen slightly in the next two years, although it will not reach the rates of previous years. Slovenia will continue to gain international market shares, albeit more slowly than in recent years, owing to the weaker cost competitiveness of the economy in the wake of faster increases in labour costs. Conversely, solid domestic demand will strengthen growth in imports of goods and services, which will outpace growth in exports throughout the projection horizon. This will be reflected in a gradual reduction in the current account surplus and in net exports making a negligible contribution to aggregate GDP growth.

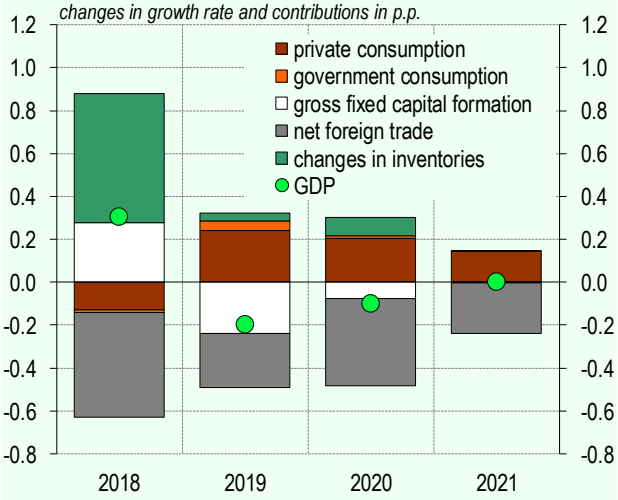
Compared with December, the economic growth projection has been revised downwards, while its structure has also changed. The uncertainty in the international environment is set to last longer than previously projected, which has been reflected in a lower assumption of foreign demand growth for this year and next year. The contribution of net trade to GDP growth will consequently be lower compared to the previous projections. Declining assessments of order books were manifested by an increased caution from firms in their investment decisions, which is reflected in lower projections for growth in private-sector investment, particularly in machinery and equipment. By contrast, the situation on the labour market will be characterized by strengthened household disposable income, and consequently, slightly faster growth in private consumption.

Figure 6: Current account, real exports and real imports projections



Source: SORS, Bank of Slovenia projections.

Figure 7: Revision of GDP projection by components



Note: Due to rounding, sums of components may differ from aggregate values.
Source: SORS, Bank of Slovenia projections.

[5] The importance of exports to the Slovenian economy has increased significantly in the last decade. Exports of goods and services amounted to 66.3% of GDP in 2008, while in 2018 this share increased to 85.3%. Export growth is also projected to be higher than GDP growth over the projection horizon, and its importance in the composition of GDP will consequently increase further.

Box 2: Correlation between soft indicators and real economic growth

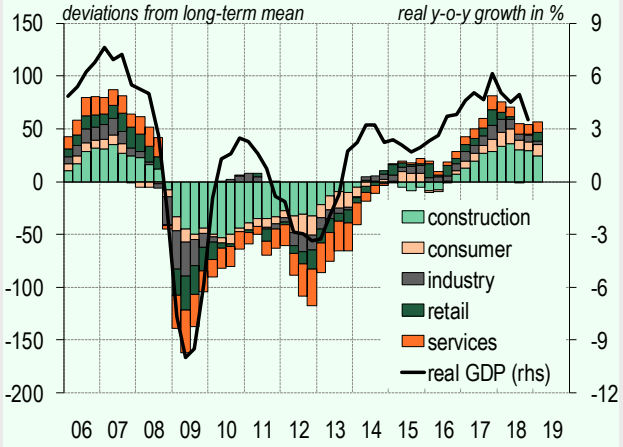
In Slovenia, quarterly national accounts' statistics become available only 60 days after the end of the quarter. In the meantime, so-called soft indicators are some of the key timely information available for assessing the current standing of the economy and for designing economic policy.[1] The Economic Sentiment Indicator (ESI) derived by the Statistical Office of Slovenia (SORS) as part of the Business Tendency and Consumer (BTC) surveys is one of the most commonly used soft indicators to assess the developments in the Slovene economic activity. The indicator is computed on a monthly basis, with the series for a particular month becoming available by the third week of the same month. It is broad-based and incorporates separate confidence indicators across main sectors, i.e. manufacturing, services, retail and construction as well as results stemming from the consumer survey, which accounts for the consumer confidence indicator.[2]

Figure 1 confirms that the ESI shows a reasonable degree of co-movement with year-on-year growth of real GDP. The latter depicts a similar dynamic also relative to sub-indicators assessed in deviations from their long-term average as shown in Figure 2. At a first glance, the indicators seem to be an acceptable alternative depiction of economic activity dynamics in Slovenia; however, in the absence of official data, it is important to assess what the indicators signal regarding economic activity dynamics. Do soft indicators lead real economic activity, i.e. signal short-term economic developments or do they depict a rather coincident relationship and portray the current standing of the economy? Figure 1 and Figure 2 show that the ESI seems to have been coincident and at times leading real GDP growth prior to 2014, but depicts a lagging behaviour in recent periods, which seems to hold also for the sub-indicators. However, in order to have a quantifiable and formal assessment of these observations, both correlations and short-term forecasts have been computed. While correlations quantify the co-movement of the indicator with the respective series, short-term forecasts assess forecasting power of indicators subject to a baseline model, i.e. they measure how close on average the forecasts using the indicators are to the realizations of the reference series (e.g. GDP, industrial production). An ideal indicator should at best

Figure 1: Economic sentiment indicator (ESI) and real GDP growth

Note: Real GDP growth is presented in year-on-year growth terms, while Economic Sentiment Indicator (ESI) is presented in original values (levels). Both series are seasonally adjusted.
Source: SORS, Eurostat, Bank of Slovenia calculations.

Figure 2: Confidence indicators across sectors and real GDP growth



Note: Real GDP growth is presented in year-on-year growth terms, while indicators are presented in deviations from their long-term mean. All series are seasonally adjusted.
Source: SORS, Eurostat, Bank of Slovenia calculations.

Table 1: Correlation coefficients

	GDP (year-on-year growth)		GDP (quarter-on-quarter growth)	
	1999–2018	2008–2013	1999–2018	2008–2013
Economic Sentiment Indicator (ESI)	0.87	0.90	0.63	0.65
Construction Confidence Indicator	0.78	0.49	0.54	0.11
Consumer Confidence Indicator	0.72	0.33	0.54	0.25
Industry Confidence Indicator	0.78	0.88	0.63	0.78
Retail Confidence Indicator	0.84	0.89	0.51	0.35
Services Confidence Indicator	0.83	0.74	0.56	0.26

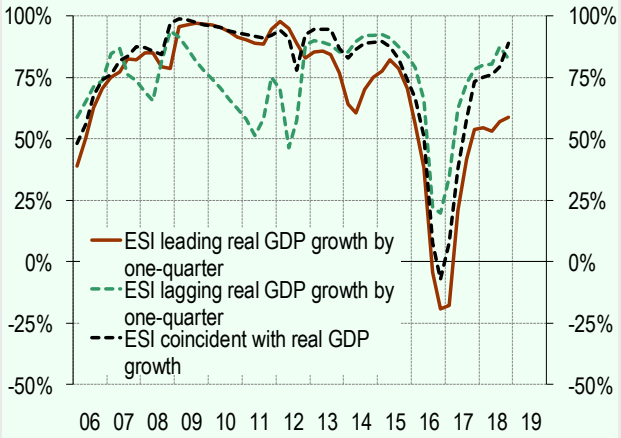
Source: SORS, Eurostat, Bank of Slovenia calculations.

lead or co-move with the reference series and on average account for significantly lower forecasting errors relative to a baseline model.

Correlation coefficients, taking account of both year-on-year and quarterly growth rates, are calculated between individual confidence indicators and real GDP growth for two sample periods: the extended sample (1999 to 2018), and the narrow sample pertaining to the economic crisis (2008 to 2013). As observed in Table 1, the indicators coincide much better with the trajectory of year-on-year real GDP growth than with the trajectory of quarterly real GDP growth. The variation of correlation coefficients across the samples suggests that the relationship between the indicators and real activity growth is not necessarily constant, and is stronger during the crisis period for the main indicators such as ESI and industry confidence indicator. This is in line with empirical findings, which suggest that relevant survey data entail better co-movement (and nowcasting power) with real economic activity during times of recession than during times of stability (Ghysels & Marcellino, 2018).

Even though, coefficients of correlation can be informative in assessing the co-movement of two series, they do not explicitly take into account the time component, which may be important in observing how the relationship of indicators in relation to the reference economic series varies with time. Figure 3 illustrates the moving correlations of year-on-year real GDP growth and the ESI. The moving correlations are based on 12-quarter moving-windows for the period Q1 1999 – Q4 2018. While in the pre-crisis period the ESI did relatively well in leading year-on-year real GDP growth, the dynamics seem to have changed markedly after the crisis, in particular in the last period. As observed also in Figure 1, while the ESI hinted acceleration throughout 2015-2016 followed by a slight deceleration in 2017, real GDP growth in turn moderated during the former period and accelerated in the latter period, accounting for the notable inverse relationship depicted with moving correlations in Figure 3. The developments in this period can partly be explained by the dynamic of government investment growth, which was high in 2014, mainly on account of the ending of the European financial framework and the electoral cycle, making a significant contribution to higher real GDP growth, but then declined significantly in 2016. Following 2017, the co-movement of the two series has resumed but has changed, with ESI depicting a strong lagging relationship. While the correlation of next quarter's year-on-year real GDP growth to current quarter's ESI stood at approximately 80% on average before 2015, this relationship has diminished to just above 50% in the recent period.

Figure 3: Moving correlations between real GDP growth and economic sentiment indicator (ESI)



Note: Correlations are calculated over 12-quarter moving-windows with real GDP in y-o-y growth terms and ESI in levels. Both series are seasonally adjusted.
Source: SORS, Eurostat, Bank of Slovenia calculations.

Even though the computed correlations suggest a weaker co-movement of ESI and year-on-year real GDP growth, an additional assessment was made using recursive forecasting models based on simple bivariate regression.[4] The forecasting performance of these models is evaluated relative to an autoregressive model of year-on-year real GDP growth with a single lag (AR(1)). Diebold-Mariano tests[5] were conducted on the basis of the calculated root mean square forecast error

Table 2: RMSFE of forecasts for GDP growth (year-on-year)

	2008Q1 – 2013Q4		2014Q1 – 2018Q4	
	t	t + 1	t	t + 1
Economic Sentiment Indicator (ESI)	0.804	0.800**	1.631**	2.046***
Construction Confidence Indicator	1.220	1.382***	1.019*	1.575**
Consumer Confidence Indicator	1.571**	1.520***	2.359***	3.107***
Industry Confidence Indicator	1.040	1.074	1.419**	1.581**
Retail Confidence Indicator	0.927	1.322**	2.513***	3.066***
Services Confidence Indicator	0.615**	0.982	2.034**	2.679***

*Note: RMSFE are computed relative to an AR(1) baseline model. *, **, *** refer to significance at 10%, 5% and 1% level, respectively, for Diebold-Mariano tests against the AR(1) baseline model.*
Source: Bank of Slovenia calculations.

(RMSFE) to assess whether the forecasting power of the models using soft indicators has a statistically significant difference to that of the AR(1) baseline model. The analysis was conducted for two periods: the economic crisis (2008 to 2013), and the post-crisis period (2014 to 2018), as insufficient data is available for analysis of the pre-crisis period. As observed in Table 2, during the crisis period the ESI model performed better than the baseline model for both nowcasting and one-quarter ahead forecasting of year-on-year real GDP growth, with the latter significant at 5% confidence level. Among the sub-indicators, the retail and services indicator models seem to have performed better than the baseline model, with services indicator model outperforming the baseline model also for one-quarter ahead forecasting of year-on-year real GDP growth. The other indicators, however, did not outweigh the forecasting power of the AR(1) model. For the recent period, accounting for the upturn in economic activity in Slovenia, all indicator models perform significantly worse relative to the baseline model in terms of both nowcasting and one-quarter ahead forecasting of year-on-year real GDP growth. This is in line with the initial observations and the moving correlations assessed earlier, which show most soft indicators tend to be at best coincidental with economic activity, if not lagging, which has been rather prevalent in the recent quarters.

The results show that the forecasting power of the soft indicators in question for nowcasting (and forecasting) real GDP growth diminished in the recent period. While for real GDP growth, the indicators depict a diminished forecasting power in the recent period, we assess how well the indicators perform in forecasting the year-on-year growth of other reference series, such as industrial production, retail turnover, turnover in other private-sector services, private consumption and private-sector investment. The assessment was made for the same two periods as in the case of the forecasting of year-on-year real GDP growth. As is evident from Table 3, the models including the industry confidence indicator and the retail confidence indicator were slightly more accurate than the AR(1) baseline models during the crisis period in forecasting developments in industrial production and also year-on-year growth in retail turnover. Given that the weight of the industry confidence indicator in the ESI is 40%, the model using the ESI is also more accurate than the AR(1) baseline model in forecasting developments in industrial production. By contrast, the models using the consumer confidence indicator and the services confidence indicator perform worse than the baseline models in forecasting the reference variables, i.e. real private consumption and private-sector investment and turnover in services.

Table 3: RMSFE of forecasts for other variables for sample period 2008Q1 – 2013Q4

	Industrial production		Retail trade		Services trade		Private consumption		Private investment	
	t	t + 1	t	t + 1	t	t + 1	t	t + 1	t	t + 1
Economic Sentiment Indicator (ESI)	0.841	0.822*	1.003	0.8604	1.279	1.249**	2.070***	2.090***	1.387**	1.401**
Consumer Confidence Indicator							1.221	1.160*	1.758**	1.749***
Industry Confidence Indicator	0.930	0.896								
Retail Confidence Indicator			0.747*	0.864						
Services Confidence Indicator					1.018	1.071				

*Note: RMSFE are computed relative to an AR(1) baseline model. *, **, *** refer to significance at 10%, 5% and 1% level, respectively, for Diebold-Mariano tests against the AR(1) baseline model.*
Source: Bank of Slovenia calculations.

Table 4: RMSFE of forecasts for other variables for sample period 2014Q1 – 2018Q4

	Industrial production		Retail trade		Services trade		Private consumption		Private investment	
	t	t + 1	t	t + 1	t	t + 1	t	t + 1	t	t + 1
Economic Sentiment Indicator (ESI)	0,970	1,327**	1.047	1,118	1,275*	1,414**	0,786	0,889	1,225**	1,230***
Consumer Confidence Indicator							1,196*	1,368***	1,396***	1,579***
Industry Confidence Indicator	1,367**	1,690***								
Retail Confidence Indicator			1,302*	1,530**						
Services Confidence Indicator					2,250***	2,578***				

*Note: RMSFE are computed relative to an AR(1) baseline model. *, **, *** refer to significance at 10%, 5% and 1% level, respectively, for Diebold-Mariano tests against the AR(1) baseline model.*
Source: Bank of Slovenia calculations.

In the second period, the forecasting errors of the models using the BTC indicators are significantly larger than in the AR(1) model. The results nevertheless show that the model including the ESI is still slightly more accurate than the AR(1) baseline model in forecasting year-on-year growth of industrial production and private consumption, but the difference is not statistically significant.

In general, these results suggest that soft indicators computed from survey data can be informative in assessing real GDP growth and other reference series for Slovenia, even if after the crisis they seem to lag the dynamics of real economic variables. Caution should therefore be exercised with regard to findings on the basis of this information. Nevertheless, given their timeliness, soft indicators can be useful for assessment of conjunctural and short-term developments of real economic activity when evaluated in conjunction with other relevant indicators, such as hard indicators, in short-term forecasting models. Models including a combination of different high-frequency hard and soft data usually perform better than the models included in this analysis.

References:

- Diebold, F. X., & Mariano, R. S. (1995). Comparing Predictive Accuracy. Journal of Business & Economic Statistics, 253-263.
- European Commission. (2017). European Business Cycle Indicators. European Economy Technical Papers, Technical Paper 017.
- Ghysels, E. and Marcellino, M. (2018). Applied Economic Forecasting Using Time Series Methods. New York: Oxford University Press.
- Statistical Office of the Republic of Slovenia. (2018). Methodological Explanation - Business Tendency and Consumer Surveys. Ljubljana, Slovenia.

[1] In addition to the so-called soft (survey) indicators, numerous other high-frequency indicators are used in monitoring current developments in the economy and in computing short-term forecasts, including data on industrial production, retail turnover, turnover in other private-sector services, payments, and other financial indicators. This analysis focuses solely on the significance of soft factors.

[2] The Economic Sentiment Indicator is a weighted indicator computed by assigning fixed weights to sector-specific and consumer confidence indicators. This statistical research is co-financed by the European Commission and is an internationally comparable part of European statistics. For more information on the methodology for preparing data on business tendencies and consumer opinion (in English), see: https://www.stat.si/StatWeb/File/DocSysFile/8063/28-001-ME.pdf.

[3] The short-term forecast relates to the forecast of year-on-year real GDP growth during the current quarter (t) and the forecast of year-on-year growth in the next quarter ($t+1$) using information available in the current quarter (t).

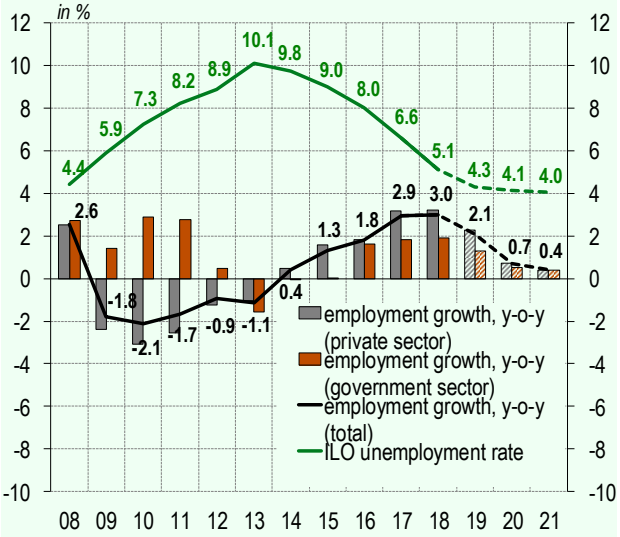
[4] The bivariate forecasting model is defined as $y_t=\beta_0+\beta_1 I_t+\beta_2(I_t-I_{t-1})+\varepsilon_t$, where y_t is the reference variable, and I_t is the indicator, following European Commission (2017). The estimations have been undertaken for both an expanding and a rolling-window, but the results presented throughout the analysis pertain to the rolling-window estimation only, which results in roughly the same conclusions as the expanding window estimation but entail lower forecasting errors.

[5] Diebold-Mariano tests, as presented in Diebold and Mariano (1995), are used to assess statistical differences between errors in forecasting models.

2.2 Labour market

Employment growth will slow sharply over the projection horizon, in the wake of a more moderate economic growth and increasing structural imbalances on the labour market. As a result of a carry-over effect, employment growth is expected to remain high this year in excess of 2%, before slowing to less than 1% in the next two years. The structural imbalances on the labour market are evidenced by the large proportion of employers who are facing a shortage of workers with the required skills and knowledge, the lower number of people transitioning from unemployment to employment, the increasing hiring of foreign workers, and the high job vacancy rates. Although the survey data for the coming months show signs of slower growth in employment ex-

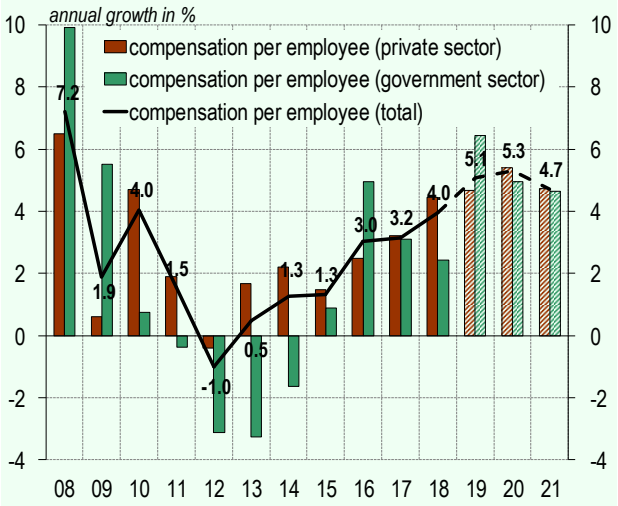
Figure 8: Employment and unemployment



Source: SORS, Bank of Slovenia projections.

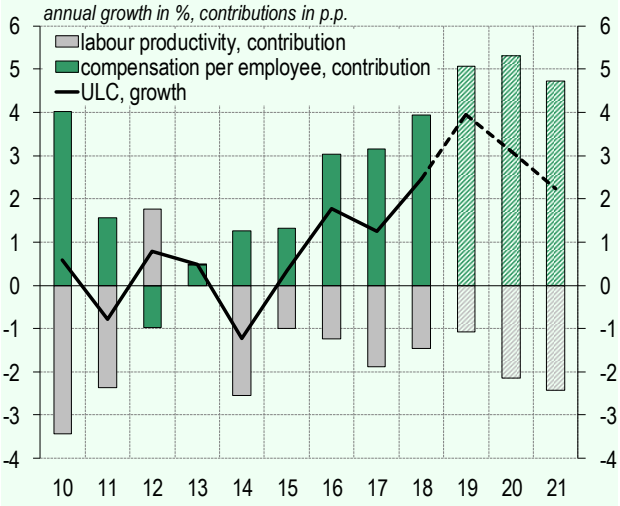
pectations, the level remains relatively high in the majority of sectors. In the wake of the falling unemployment rate, which will reach historically low levels, the structural imbalances on the labour market are expected to strengthen over the projection horizon and will hinder further employment growth, while firms will continue to address them by hiring foreign workers. In addition, employment growth is projected to slow during the projection horizon, on account of the slowdown in economic growth and the resulting reduced need for new hires, and on account of the rise in labour costs. During the projection horizon, the agreed rise in the minimum wage will bring a larger increase in labour costs in labour-intensive sectors with a higher proportion of workers with below-average pay, where employment growth has been most pronounced in previous years. According to the monthly figures, sectors with below-average wages accounted for more than 70% of the aggregate growth in the persons in employment in the first quarter of this year.[6] The projection for this year's employment growth has been revised upwards from the December projections, on account of the high realisation at the end of last year and the resulting larger carry-over effect, and on account of the favourable employment expectations.

Figure 9: Nominal compensation per employee growth



Source: SORS, Bank of Slovenia projections.

Figure 10: ULC growth decomposition



Note: Due to rounding, sums of components may differ from aggregate values.
Source: SORS, Bank of Slovenia projections.

Wage growth during the projection horizon will be higher than in the previous years, driven mainly by a rise in the minimum wage, the wage agreement between the government and public sector trade unions, and structural imbalances. The Bank of Slovenia expects wage growth to average 5% over the projection horizon. Wage growth in the private sector will be heavily influenced by the Act Amending the Minimum Wage Act, which was adopted in December of last year.[7] Under the new law, the minimum wage was raised by 5.2% in January of this year, reaching EUR 886.63 gross, and will be raised by a further 6.1% in January of next year, reaching EUR 940.58 gross.[8] Other factors facilitating the wage growth increase will be the growing structural imbalances on the labour market, which will strengthen workers' negotiating power, thereby putting upward pressure on wages, and, to a lesser extent, an increase in the number of working days. By contrast, wage growth will be held back by reduced inflation expectations and the uncertainty in the international environment, which will increase efforts to maintain cost competitiveness. Wage growth in the government sector during the projection horizon will stem

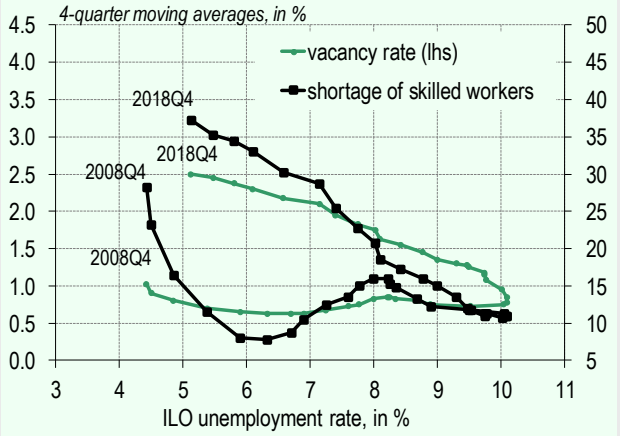
[6] Detailed overview on the employment trends is published in the December 2018 Macroeconomic Projections for Slovenia (Box 2).
[7] Official Gazette of the Republic of Slovenia, No. 83/2018.
[8] At that time all bonuses set out by laws, regulations, and collective agreements, bonuses for on-the-job performance, and bonuses for commercial performance will be excluded from the definition of the minimum wage. In the Bank of Slovenia's assessment, this will have a significant impact on wage growth in the following year. Under the new law, as of January 2021 the calculation of the minimum wage will be based on a formula where the minimum remuneration for full-time work will have to exceed the calculated minimum cost of living on the range of 20% to 40%. The rise in the minimum wage will also have an impact on the payment of annual leave allowance, which by law must amount to at least the minimum wage.

Box 3: Illustration of the situation on the Slovenian labour market using the Beveridge curve

The Beveridge curve depicts the relationship between the unemployment rate and the job vacancy rate.[1] Its movement can be driven by economic cycles or by structural imbalances on the labour market. During a period of recession, when the creation of new jobs slows, the curve moves right and down because of the rising unemployment rate and the declining job vacancy rate, while during a period of economic growth the shift is in the opposite direction. Similar shifts in the curve can be observed in the event of structural imbalances on the labour market, which can be attributable to a shortage of qualified labour, the institutional environment, or the structure of the labour force. When the structural imbalances worsen and vacancies can no longer be filled by reducing unemployment, the curve shifts upwards at a similar unemployment rate, and vice-versa when structural imbalances diminish.

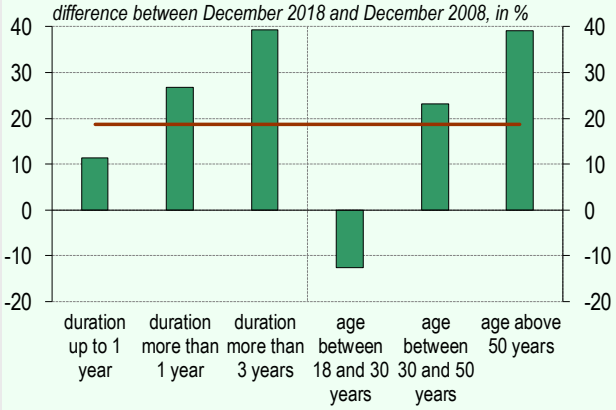
The movement of the Beveridge curve could be an indicator of imbalances on the Slovenian labour market, where firms are facing a shortage of qualified labour.[2] There was a discernible move right and down after 2008, in the aftermath of the economic crisis, which brought a rise in the unemployment rate and a fall in the job vacancy rate, where the rightward shift was more pronounced because of the greater increase in the unemployment rate. Since 2014 there has been a discernible move left and up, as the job vacancy rate has begun to rise during the period of recovery, while the unemployment rate has fallen. The job vacancy rate in the final quarter of last year was 1.5 percentage points higher than a decade earlier, while the unemployment rate was similar. This is primarily attributable to the high number of vacancies, of which there were more than 17,000 in the final quarter of last year, up by just over 12,000 compared to a decade earlier. This provides at least partial confirmation of structural imbalances on the labour market, which are being evidenced in the shortage of qualified workers and in the structure of unemployment. Unemployment in December 2018 was higher than in December 2008, but the long-term unemployed and older people accounted for larger shares of the total. These two groups generally find it harder to gain employment, which could slow the filling of vacancies in the future.

Figure 1: Beveridge curve



Note: The vacancy rate reflects the share of job vacancies in all posts combined, all posts being the sum of vacant and occupied posts. Shortage of skilled workers reflects the share of firms in manufacturing, which are facing the shortage of skilled workers.
Source: SORS, Bank of Slovenia calculations.

Figure 2: Comparison of the unemployment structure in the last decade



Note: The figure illustrates the difference in the structure of unemployment between December 2018 and December 2008. There were 18.6% more unemployed persons in December 2018 than in December 2008, which is depicted by the red line.
Source: Employment Service, Bank of Slovenia calculations.

References:

- Bova E., Tovar Jalles, J. and Kolerus, C. (2016). Shifting the Beveridge Curve: What Affects Labor Market Matching? IMF Working Paper, WP/16/93.

[1] In April 2013, the Labour Market Regulation Act abolished the mandatory notification of vacancies at the Employment Service for all employers other than the public sector and firms under majority government ownership. Between April 2013 and the end of 2014 the figures were no longer complete, for which reason the SORS has conducted independent surveying of vacancies since the first quarter of 2015. The sample includes all business entities with at least one employee whose principal registered business activity was in one of the Sectors B to S. As a consequence, the breaks in the time series mean that the figures before and after 2015 are not fully comparable. With the aim of increasing the explanatory power of the results, Figure 1 includes the relationship between the surveyed unemployment rate and the shortage of qualified workers in manufacturing, which shows similar movements.

[2] Similar issues were addressed in part in the January 2019 issue of Economic and Financial Developments, and in a special section in the October 2018 issue of Economic and Financial Developments.

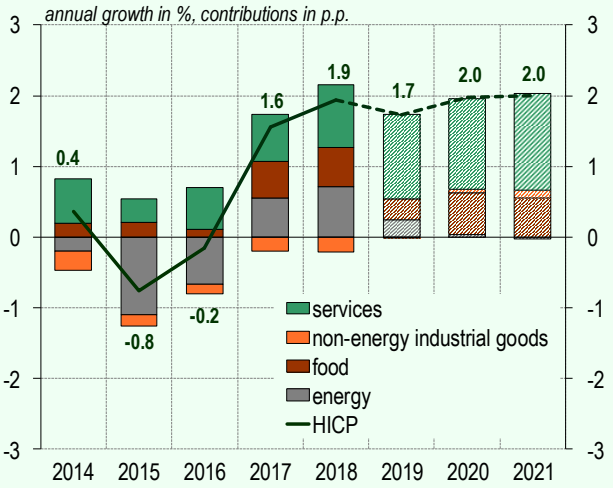
primarily from the agreement reached at the end of last year between the government and the public sector trade unions, and, to a lesser extent, from the new Minimum Wage Act.[9] The wage growth projections for 2019 and 2020 have been revised upwards from the December projections. This year's rise in wage growth in the government sector is attributable to higher realisation, the government's agreement with the police unions, higher annual leave allowance payments, and the new Minimum Wage Act. The last is also the main factor for the increase in wage growth in the private sector. Higher wage growth could see a deterioration in the cost competitiveness of the Slovenian economy in 2019 and 2020 relative to the December projections, as wage growth will significantly outpace productivity growth.

2.3 Inflation

Inflation will be slightly lower this year than last year due to weaker pressures from the external environment, and will reach 2% over the next two years as domestic inflationary pressures strengthen. Average year-on-year inflation as measured by the HICP is projected to reach 1.7% this year, down by 0.2 percentage points from last year. Under weakened pressures from global commodity prices, the slowdown will be attributable to smaller contributions from food and energy prices. By contrast, domestic components of inflation will be stronger than last year, which will result in core inflation outpacing headline inflation. Most notably, in the wake of strong domestic demand and faster growth in labour costs, there will be significant rises in services prices, which will contribute more than two-thirds to headline inflation. Domestic inflationary pressures will strengthen over the next two years, and will be the main driver of inflation. The narrowest core inflation indicator will gradually rise to reach 2.2% in 2021, while headline inflation will stand at 2.0% due to a smaller contribution from energy prices in 2020 and 2021.

The contribution by energy prices will decline in line with the assumed developments in global oil prices. Following the sharp fall in euro oil prices at the end of last year and the resulting fall in prices of motor fuels, energy prices made only a small contribution to inflation

Figure 11: Projection of contributions to inflation by components



Note: Due to rounding, sums of components may differ from aggregate values.
Source: SORS, Bank of Slovenia projections.

[9] A detailed description of the impact of the agreement between the government and the public sector trade unions is given in Footnote 4 on page 11.

in the first quarter of this year, despite the positive contribution by energy prices other than motor fuels. Given the base effects of last year's high growth in oil prices, growth in prices of motor fuels is expected to be low in the remainder of the year, while the contribution by energy prices will turn negative by the end of the projection horizon, in line with the assumption for growth in oil prices.

The contribution from food prices will be small this year, but will strengthen next year. Year-on-year growth in food prices was just 0.6% in the first quarter of this year, owing to last year's fall in global food commodity prices and import prices of food, and the year-on-year fall in domestic producer prices of agricultural products. Year-on-year growth in food prices will strengthen in the second half of the year in line with the external assumption for food commodity prices, while further upward pressure could come from a poor harvest, given the unfavourable weather conditions in April and May. Year-on-year growth in food prices will average 2.6% over the next two years, underpinned by rising food commodity prices and higher labour costs.

Strengthened domestic inflationary pressures will lead to significant rises in services prices, which will raise core inflation. Given the broadly based growth in services prices in the first third of this year, wage growth is expected to have a more pronounced impact on services inflation as early as this year. The 3.2% rise in services prices will be attributable to both: increased domestic demand and the rise in labour costs. In line with the sharp rise in labour costs and the robust private consumption, year-on-year growth in services prices will increase throughout the projection horizon, reaching 3.7% in 2021.

After falling for nine years, prices of non-energy industrial goods will be unchanged overall this year, before slowly rising in 2020 and 2021. The growth will largely be attributable to domestic factors, whose impact is limited, given the tradable nature of these products. In addition, it is assumed that production costs will be increased further by slightly higher global prices of commodities other than oil, while growth in prices of non-energy industrial goods will also be affected by the gradual rise in import prices of these products. Given the strong competition, firms in the sector will still largely absorb their rising labour costs and material costs by reducing margins, for which reason only low growth in prices of non-energy industrial goods is expected over the projection horizon.

In line with lower expectations for economic growth, the headline and core inflation projections have been revised downwards from December. This year's downward revision is largely a result of inflation developments in the first four months of this year, which were lower than expected. The projection of growth in food prices is 1.1 percentage points lower, on account of a lower assumption for food commodity prices, although the revision was limited by higher excise duties

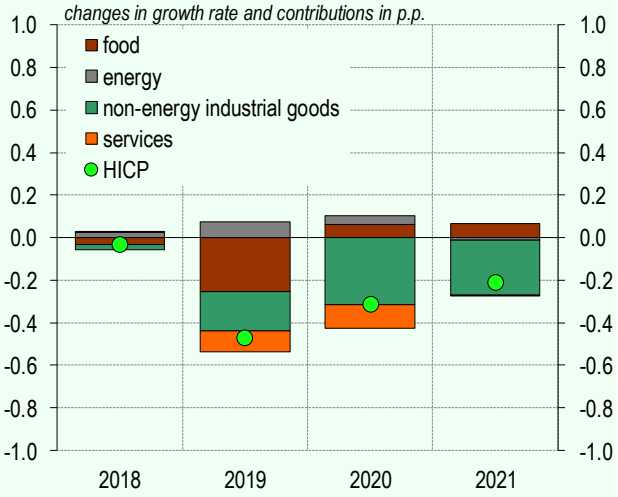
Table 3: Inflation projections

						2019		2020		2021	
	2014	2015	2016	2017	2018	Jun.	Δ	Jun.	Δ	Jun.	Δ
	average year-on-year growth in %										
Consumer prices (HICP)	0.4	-0.8	-0.2	1.6	1.9	**1.7**	-0.5	**2.0**	-0.3	**2.0**	-0.2
food	0.8	0.9	0.5	2.2	2.4	**1.4**	-1.1	**2.7**	0.3	**2.5**	0.3
energy	-1.4	-7.8	-5.2	4.7	6.0	**2.0**	0.6	**0.2**	0.3	**-0.2**	-0.1
non-energy industrial goods	-1.0	-0.6	-0.5	-0.7	-0.8	**0.0**	-0.6	**0.2**	-1.1	**0.4**	-0.9
services	1.8	0.9	1.6	1.8	2.4	**3.2**	-0.3	**3.5**	-0.3	**3.7**	0.0
Core inflation indicators (HICP)											
excluding energy	0.7	0.4	0.6	1.1	1.4	**1.7**	-0.6	**2.2**	-0.4	**2.3**	-0.2
excl. energy and unprocessed food	0.9	0.4	0.6	0.9	1.1	**1.7**	-0.5	**2.1**	-0.5	**2.2**	-0.3
excl. energy, food, alcohol and tobacco	0.6	0.3	0.7	0.7	1.0	**1.8**	-0.4	**2.0**	-0.7	**2.2**	-0.4

Δ: Difference between current projections and projections in Macroeconomic Projections for Slovenia, December 2018.
Source: SORS, Bank of Slovenia.

on tobacco products. Growth in energy prices has been revised slightly upwards, on account of the higher assumption for euro oil prices relative to December, and high contributions by energy prices other than motor fuels. Core inflation excluding food and energy prices has been revised downwards for the entire projection horizon, primarily on account of the slightly lower economic growth projections and lower expectations with regard to global commodity prices.[10]

Figure 12: Revision of inflation projection by components



Note: Due to rounding, sums of components may differ from aggregate values.
Source: SORS, Bank of Slovenia projections.

[10] Eurostat, which calculates special aggregates of the HICP from detailed data on price developments, switched in 2019 to aggregation on the basis of the five-digit European Classification of Individual Consumption according to Purpose (ECOICOP). This provides for more detailed classification of individual price indices among the aggregates of energy, services, non-energy industrial goods, processed food and unprocessed food. With the introduction of the new aggregation, the indices of all separate aggregates were revised for the period as of January 2017, while the data before 2017 remains unchanged, and is based on the calculation under the four-digit Classification of Individual Consumption by Purpose (COICOP). In the case of the Slovenian data, the change in classification did not have a significant impact on the special aggregates of energy, services or non-energy industrial goods. The food aggregate also remains unchanged, but there were discernible changes in the processed food and unprocessed food aggregates.

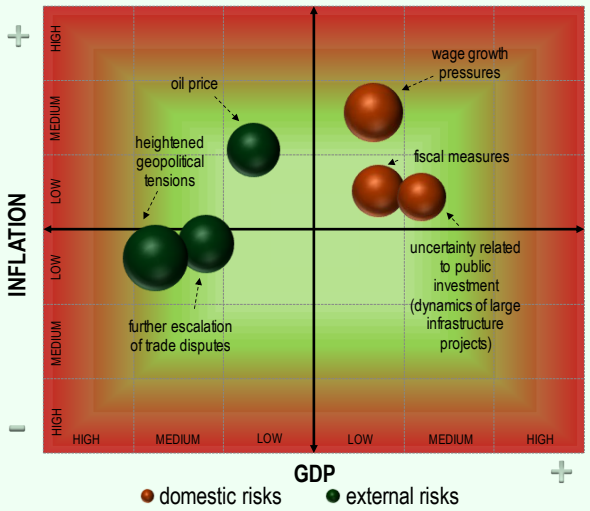
3 Risks and Uncertainties

The risks surrounding the current projections for economic growth and inflation are more pronounced. The largest risk to growth comes from external factors related to the further increase in protectionism and to geopolitical tensions. These could reduce growth in foreign demand, which would have an adverse impact on firms' export and investment activities. The higher oil prices that might be driven by geopolitical tensions could raise inflation via higher energy prices for households and higher operating costs for firms. The risks from the domestic environment could strengthen economic growth, while also increasing the upward pressure on prices. Faster wage growth as a result of the pass-through from the minimum wage rise and the wage increases in the public sector into other wages could also raise the pressure on core inflation.

The risks related to the economic growth projections are on the downside. Similarly to the December projections, the most pronounced downside risks to growth relate to the international trade situation, particularly the ongoing rise in protectionism. The worsening of the trade dispute between China and the US is slowing international trade, which could have an indirect impact on Slovenia via falling demand in major trading partners.[11] The risks related to the geopolitical situation, such as the potential for a no-deal Brexit, the deterioration in the economic situation in Italy and relations between the EU and Russia, could have an additional adverse impact on the economic climate in Slovenia, which could reduce growth in corporate investment. The risks from the domestic environment remain primarily on the upside, and come from increased upward pressure on wages and potential fiscal policy measures that could further encourage an increase in private consumption. The upside risks also relate to growth in government investment, which could be higher than current expectations.

The risks surrounding the inflation forecast are on the upside. Of the risks from the external environment, the most pronounced remains the risk of higher oil prices caused by geopolitical tensions in oil-producing countries. Higher oil prices on the global market would directly raise energy prices for households, and would also increase costs for Slovenian firms, which could be passed through into slightly higher prices of products and services. By contrast, inflation could be slowed by a fall in foreign demand owing to potential geopolitical tensions and rising protectionism. The risks from the domestic environment relate primarily to a potential increase in wage growth as a result of the pass-through from the minimum wage rise and the wage increases in the public sector into other wages. A stronger pass-through of this type could lead to faster growth in labour costs for firms, and slightly faster growth in household private consumption, both of which would be reflected in inflation slightly outpacing its current expectations.

Figure 13: Risks to projections



Note: Circle size indicates probability of risk realisation.
Source: Bank of Slovenia estimate.

[11] An estimate of the impact of the potential decline in foreign demand on the Slovenian economy is presented in detail in Box 4.

Box 4: Assessment of the impact of a decline in foreign demand on economic growth in Slovenia

This box presents an analysis of various scenarios of a decline in foreign demand for Slovenian products. Foreign demand is a significant factor of growth in the Slovenian economy. This is evident from Figure 1, which illustrates the comovement between fluctuations in year-on-year growth in foreign demand for Slovenian exports and growth in real GDP in Slovenia. The simultaneous movement of the two macroeconomic variables is no surprise, as Slovenia is a small open economy, which is vitally dependent on macroeconomic developments in its major trading partners. This raises the question of the impact of a slowdown in activity in the external environment on the Slovenian economy. Developments in the main trading partners also represent a significant risk in the preparation of the medium-term projections for Slovenia. The analysis shows that a decline in foreign demand would be mostly reflected in a decline in growth in net exports and gross fixed capital formation.

Figure 1: Real GDP and foreign demand for Slovenia

Source: SORS, ECB, Bank of Slovenia calculations.

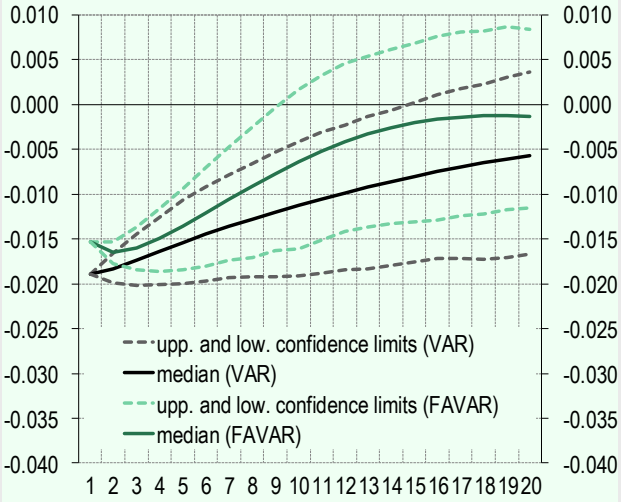
Analysis of the Slovenian economy's integration into the international environment and the pass-through of adverse developments in the external environment into the domestic economy is based on the use of vector autoregression (VAR; Sims, 1980) and factor-augmented vector autoregression (FAVAR; Bernanke, Boivin & Eliasz, 2005).[1] The quarterly data for Slovenia used in the VAR model include foreign demand for Slovenian exports, real GDP, final household consumption (national concept), gross fixed capital formation, and real imports and exports of goods and services. The analysis covers the period from Q1 1999 to Q4 2018. The fact that all of the observed macroeconomic variables are integrated of order one allows the use of logarithmic transformations in the estimation of the model, while the lag length in the VAR system is determined using the Schwarz information criterion.[2] The robustness of the results obtained using the VAR model is confirmed in further analysis of impulse responses by the means of a two-factor FAVAR model. The factors utilized in the FAVAR are obtained from the available quarterly data for Slovenia, where a two-step methodology is used to ensure that the factors are independent of the other variables in the model as presented in Bernanke et al (2005). A structure based on Cholesky decomposition is used to analyse the transmission of a shock in foreign demand to the Slovenian economy using the VAR and FAVAR models.

The simulation of an adverse shock in foreign demand (one standard deviation shock) shows the responses for 20 quarters, which are in line with economic theory, as the aforementioned shock causes a decline in real GDP and its major components. The impact of an adverse change in foreign demand is slightly stronger in the case of gross fixed capital formation and real imports and exports of goods and services, while the impact on household final consumption is slightly smaller. As a result of the long-term recovery in foreign demand after the initial shock, most of the macroeconomic variables slowly return to their long-term equilibrium. Additional analysis with the FAVAR model shows that the differences in the responses between the models are small over the short term, which confirms that the VAR model contains a sufficient number of variables (estimates of parameters are unbiased from this perspective).

The presented impulse responses also allow to analyse various scenarios, where the focus is on scenarios of the replication of two specific periods in past growth in foreign demand, namely the period associated with the shock of the global economic crisis (Q3 2008 to Q2 2009), and the period associated with the shock of the euro area debt crisis (Q3 2012 to Q4 2012).

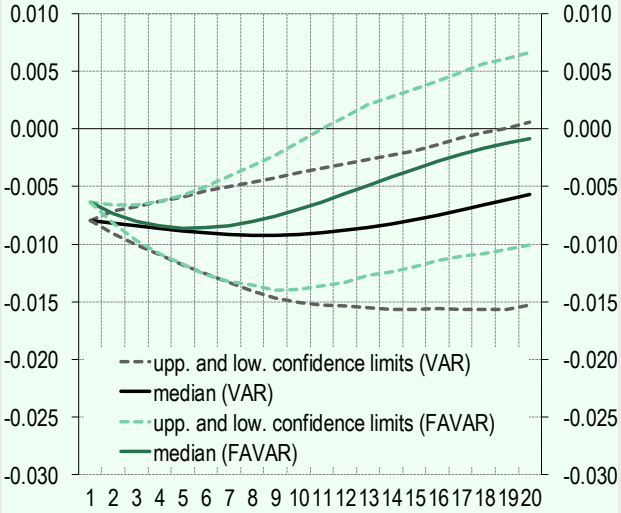
The first scenario illustrates the case of a 1% fall in foreign demand and the resulting response of real GDP and its components for a period of one year. The second and third scenarios illustrate the simulation of a shock (full and half of its value) from the period of Q3 2008 to Q2 2009, where the responses in macroeconomic aggregates are again presented for a period of one year. The final scenario gives the results of the simulation of the shock from the period of Q3 2012 to Q4 2012, where the responses in macroeconomic variables are presented for a period of two quarters. The re-

Figure 2: Response of foreign demand to foreign demand shock (1 standard deviation)



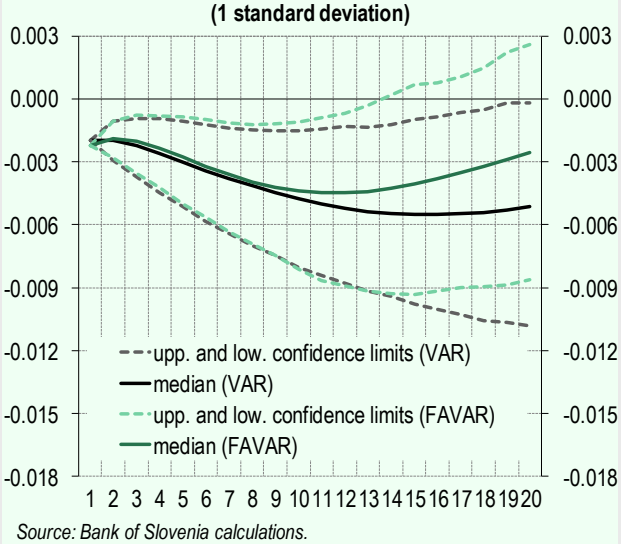
Source: Bank of Slovenia calculations.

Figure 3: Response of real GDP to foreign demand shock (1 standard deviation)



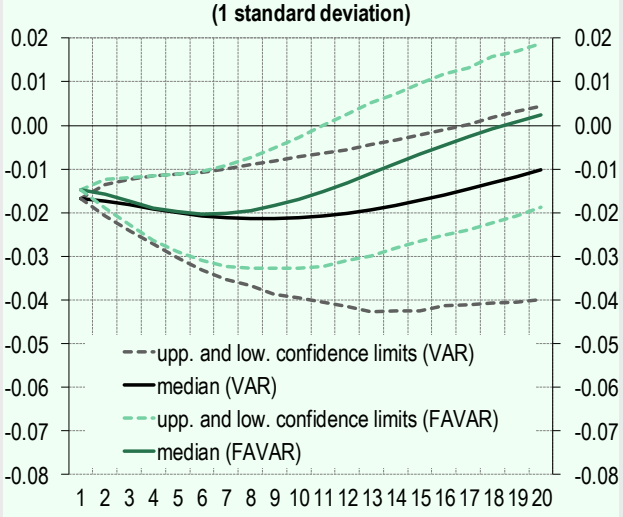
Source: Bank of Slovenia calculations.

Figure 4: Response of private consumption to foreign demand shock (1 standard deviation)



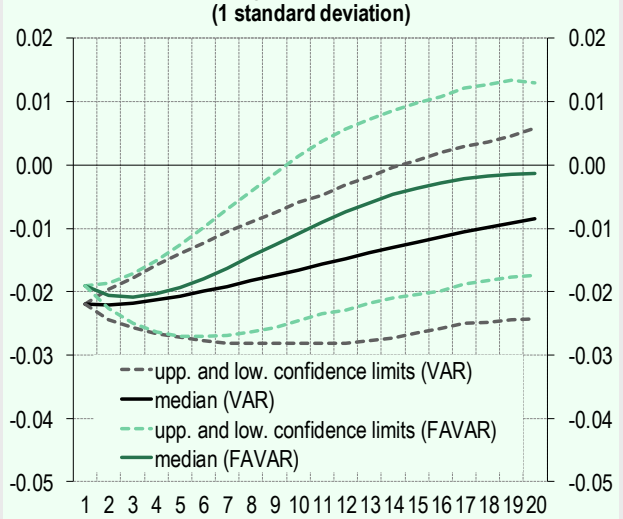
Source: Bank of Slovenia calculations.

Figure 5: Response of gross fixed capital formation to foreign demand shock (1 standard deviation)



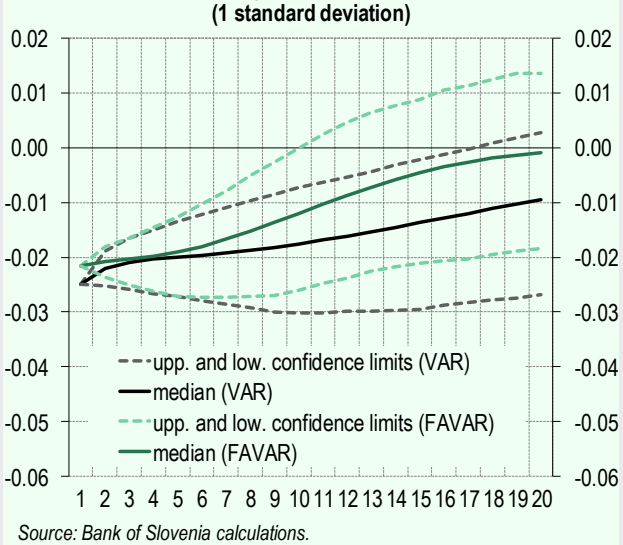
Source: Bank of Slovenia calculations.

Figure 6: Response of real exports of goods and services to foreign demand shock (1 standard deviation)



Source: Bank of Slovenia calculations.

Figure 7: Response of real imports of goods and services to foreign demand shock (1 standard deviation)



Source: Bank of Slovenia calculations.

sponses in the second and third scenarios confirm that the fall in foreign demand in the period of Q3 2008 to Q2 2009 was the main reason for the decline in growth in the macroeconomic variables in question in Slovenia. In the event of the repetition of an adverse shock of this type, the two models predict that the strongest impact would be on growth in real imports and exports of goods and services and on corporate investment activity, while the impact on private consumption and consequently on real GDP would be slightly stronger than was actually observed at that time. In size terms, the actual shock from the period of Q3 2012 to Q4 2012 is difficult to compare with results of the fourth scenario, which covers the same period. This is primarily because the euro area debt crisis had a larger impact on components of domestic demand, which is evident from the observed growth in real GDP, private consumption and gross fixed capital formation.[3]

The results in the form of impulse responses are additionally supported by a historical decomposition of the stochastic component of real GDP growth, which illustrates the importance of an individual shock in the explanation of cyclical fluctuations in domestic economic activity.

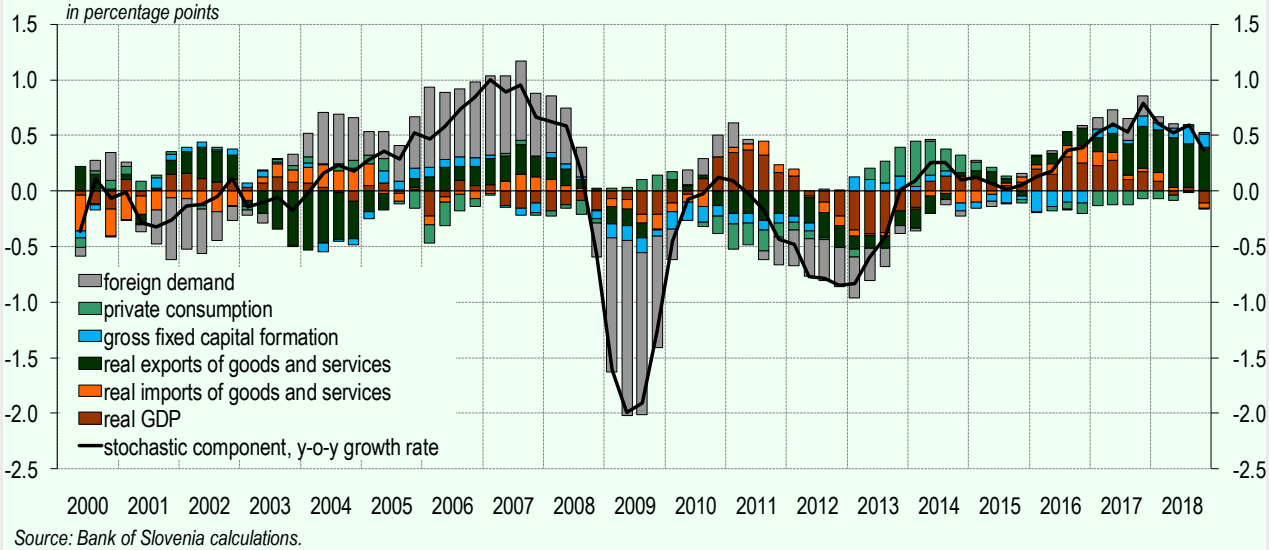
Figure 8 confirms the findings obtained with the scenarios discussed previously, and shows that the decline in year-on-year growth in real GDP in the period of Q3 2008 to Q2 2009 was primarily caused by an adverse shock in foreign demand. By contrast, the negative contribution of the shock in real GDP is more pronounced for the period of Q3 2012 to Q4 2012, which indicates an increase in the importance of shocks originating in the domestic environment.

Table 1: Impact of a foreign demand shock

Shock/Variable*		GDP	C	I	X	M
One percent shock**	VAR	-1.8	-0.5	-3.8	-4.6	-4.7
	FAVAR	-2.0	-0.6	-4.4	-5.3	-5.4
Shock 2008Q3–2009Q2**	VAR	-8.9	-2.4	-19.3	-23.5	-23.8
	FAVAR	-10.0	-2.8	-22.2	-26.8	-27.4
Shock 2008Q3–2009Q2 (half of its size)**	VAR	-4.5	-1.2	-9.6	-11.7	-11.9
	FAVAR	-5.0	-1.4	-11.1	-13.4	-13.7
Shock 2012Q3–2012Q4***	VAR	-0.7	-0.2	-1.5	-1.8	-1.9
	FAVAR	-0.8	-0.2	-1.7	-2.1	-2.2
Realization 2008Q3–2009Q2**		-9.8	-0.2	-27.1	-23.4	-25.9
Realization 2012Q3–2012Q4***		-1.7	-1.5	-2.1	0.4	-1.1

*Note: * GDP – real GDP, C – private consumption, I – gross fixed capital formation, X – real exports of goods and services, M – real imports of goods and services. ** Sum of q-o-q growth rates for a period of four quarters (one year). *** Sum of q-o-q growth rates for a period of two quarters.*
Source: Bank of Slovenia calculations.

Figure 8: Historical decompoisiton of stochastic component of real GDP



Source: Bank of Slovenia calculations.

Methodological note

The variables used in the VAR model are presented in the vector Z_t, below, where fd_t denotes foreign demand, x_t Slovenia's real exports of goods and services, m_t Slovenia's real imports of goods and services, i_t domestic gross fixed capital formation, c_t domestic private consumption and y_t Slovenia's real GDP. All the variables are in logarithms.

$$(1)\ Z_t = [fd_t, x_t, m_t, i_t, c_t, y_t]$$

The variables used in the FAVAR model are the same as those in the VAR model, except that the factors are added in the last place, which means that the vector Z_t has the form illustrated in (2).

$$(2)\ Z_t = [fd_t, x_t, m_t, i_t, c_t, y_t, \boldsymbol{F}_t]$$

Both of the models utilize one lag, which is in line with the Schwarz information criterion, while the VAR / FAVAR equation has the following form and is estimated by means of maximum likelihood estimation:

$$(3)\ Z_t = A_0 + \Phi_1 Z_{t-1} + \varepsilon_t$$

Equation (3) can also be rewritten in the following form,

$$(4)\ B_0 Z_t = A + B_1 \Phi_1 Z_{t-1} + \omega_t$$

where $\omega_t = B(L)Z_t - A$ and $B(L) = B_0 - B_1 L$. The normalised variance-covariance matrix of ω_t is calculated as: $\Sigma_\omega = E(\omega_t \omega_t') = \sigma^2 I_K$, which means that a maximum of K shocks (the length of vector Z_t) can be addressed, and that the structural shocks are uncorrelated. These conditions are not sufficient for model (4) to be called a structural model, as the shocks must also have a theoretical interpretation. Since B_0 is unknown, structural shocks cannot be obtained directly, but are retrieved by restricting matrix B_0 according to the principle of recursive identification. This means that the order of the variables in Z_t has an impact on the transmission of the shock, as the variables are classified in declining order according to their exogenous status.

The results of the VAR and FAVAR models with a different order of variables are in line with the results presented above, which demonstrates the robustness of the results to a change in the order of the variables in the model. Foreign demand is always in first place, thus taking account of the exogenous nature of the aforementioned variable for Slovenia. Further evidence of the exogeneity of foreign demand comes from the Granger causality test, the results of which are illustrated in Table 2. The results show that foreign demand is the only variable for which the presumption that it Granger causes other variables in the model cannot be rejected (taking account of a significance level of $\alpha = 0.05$).

Two factors obtained from 789 quarterly time series for Slovenia are used in the FAVAR model. In line with the two-step procedure presented in Bernanke et al (2005), in the first step all time series are standardised and cleaned of the influence of other variables used in the FAVAR model. Given the large number of time series relative to their length, a NIPALS (nonlinear iterative partial least squares) algorithm was used to obtain the factors (Wold, 1973). The aforementioned method obtains the main components through the decomposition $\boldsymbol{X} = \boldsymbol{TP}'$, where $\boldsymbol{X}$ is the entire panel of data from which the factors are obtained, the columns of matrix $\boldsymbol{T}$ represent the latent components, and the columns of matrix $\boldsymbol{P}$ represent the coefficients.

References:

- Bernanke, B.S., Boivin, J. and Eliasz, P. (2005). Measuring The Effects of Monetary Policy: A Factor-Augmented Vector Autoregressive (FAVAR) Approach. The Quarterly Journal of Economics, 127(3), pp 387-422.
- Sims, C.A. (1980). Macroeconomics and Reality. Econometrica, 48(1), pp 1-48.
- Wold, H. (1973). Nonlinear Iterative Partial Least Squares (NIPALS) Modelling: Some Current Developments. V P.R. Krishnaiah (ed), Multivariate Analysis, Vol III (pp 383-407). Academic Press, New York.

[1] A detailed description of the two approaches is given in the methodological note to the box.
[2] After reviewing several specifications, a VAR(1) model with one lag is used in the end.
[3] The euro area debt crisis shock had an origin in individual members of the euro area, which in the majority of cases does not have a stronger correlation with the dynamics in foreign demand. The simulation of the debt crisis shock via a decline in foreign demand thus to a certain extent neglects other more relevant transmission mechanisms.

Table 2: Results of the Granger causality test

Variable	FD	X	M	I	C	GDP
F-test	3.01	0.94	0.82	0.72	1.91	2.15
p-value	0.01**	0.46	0.54	0.61	0.09*	0.06*

*Note: *, **, *** refer to significance at the 10%, 5% and 1% level, respectively.*
Source: Bank of Slovenia calculations.

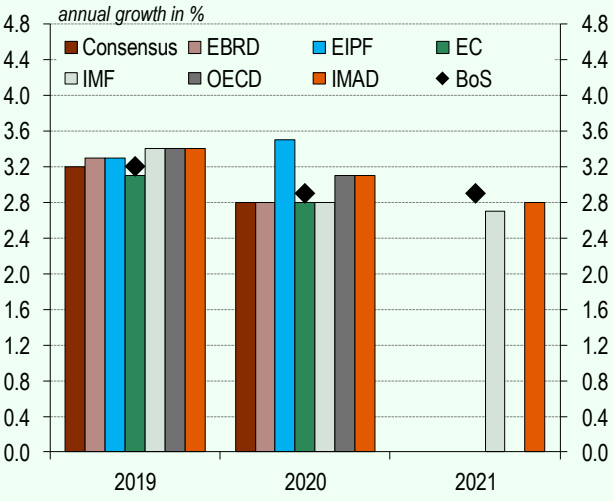
4 Comparison Between Institutions

The latest projections for the period of 2019 to 2021 suggest lower growth in economic activity, where domestic and foreign institutions are projecting growth in 2019 of around 3.3%, while the domestic institutions are slightly more optimistic than the foreign institutions when it comes to the remainder of the projection horizon. All of the institutions in question are projecting inflation at a level of around 1.6% in 2019, while the domestic and foreign institutions alike are expecting a gradual rise in inflation in 2020 and 2021. A comparison of projection accuracy between institutions reveals that the Bank of Slovenia was among the most accurate in projecting real GDP growth and growth in consumer prices in all the periods examined.[12]

4.1 Comparison of projections between institutions

The latest projections for the period of 2019 to 2021 suggest lower growth in economic activity, where domestic and foreign institutions are projecting growth in 2019 of around 3.3%, while the domestic institutions are slightly more optimistic than the foreign institutions when it comes to the remainder of the projection horizon. According to the most recent projections available, the highest economic growth projection for 2019 is by the IMF, the OECD and the IMAD (3.4%), followed by the EBRD and the EIPF (3.3%). The lowest projection for 2019 is by the European Commission, at 3.1%. The Bank of Slovenia projection of 3.2% is 0.1 percentage points lower than the average projection for 2019. The highest economic growth projection for next year is 3.5% by the EIPF, 0.5 percentage points above the average of all projections for 2020. This is followed by the OECD and the IMAD with 3.1%, while the lowest economic growth projection for 2020 of 2.8% was issued by Consensus, the EBRD, the European Commission and the IMF. The Bank of Slovenia projection is again 0.1 percentage points lower than the average projection for the year in question, at 2.9%. Projections for 2021 are

Figure 14: Comparison of GDP projections for Slovenia



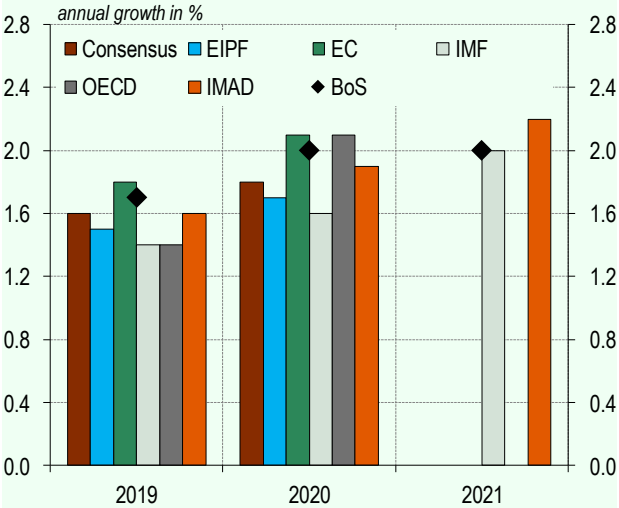
Source: Consensus Economics, EBRD, EIPF, European Commission (EC), IMF, OECD, IMAD, Bank of Slovenia.

[12] Eight institutions that produce macroeconomic projections for Slovenia are included in the comparative analysis of current projections of real GDP growth and consumer price inflation (seven institutions in the case of the latter): Consensus Economics, the European Bank for Reconstruction and Development (EBRD), the Economics Institute of the Faculty of Law (EIPF), the European Commission (EC), the International Monetary Fund (IMF), the Organisation for Economic Cooperation and Development (OECD), the Institute of Macroeconomic Analysis and Development (IMAD) and the Bank of Slovenia.

available from three institutions. The highest economic growth of 2.9% is projected by the Bank of Slovenia, followed by the IMAD and the IMF with 2.8% and 2.7% respectively.

All of the institutions in question are projecting inflation of around 1.6% in 2019, while the domestic and foreign institutions alike are expecting a gradual rise in inflation in 2020 and 2021. The highest inflation rate for 2019 of 1.8% is projected by the European Commission, while the lowest rates are projected by the IMF and the OECD, each at 1.4%. The Bank of Slovenia projection is 0.1 percentage points higher than the average projection for the current year, at 1.7%. The highest inflation projection for next year of 2.1% was issued by the European Commission and the OECD, 0.2 percentage points above the average projection for the year in question. This is followed by the rate of 2.0% projected by the Bank of Slovenia, while the lowest projection of 1.6% for 2020 is given by the IMF. Inflation projections for 2021 are available from three institutions, and all show similar expectations with regard to year-on-year price growth. The highest inflation rate of 2.2% is projected by the IMAD, followed by the Bank of Slovenia and the IMF with 2.0%.

Figure 15: Comparison of inflation projections for Slovenia



Source: Consensus Economics, EIPF, European Commission (EC), IMF, OECD, IMAD, Bank of Slovenia.

4.2 Comparison of projection accuracy between institutions

The accuracy of the real GDP growth and consumer price inflation projections over the 2001 to 2018 period is measured by comparing the statistical estimate or the observed value with the projections for the variables obtained in past periods.[13] The calculations cover the mean error (ME), the mean absolute error (MAE), the standard deviation (STDEV), the root mean square error (RMSE) and the standardised RMSE (SRMSE).[14] Only three of the institutions in question (the Bank of Slovenia, the European Commission and the IMF) released projections for the entire observation period. For the majority of the other institutions, projections are only available from 2004 (from 2009 for the OECD, and from 2011 for the EBRD). Given the great uncertainty at the outbreak of the crisis, the entire observation period excluding 2008 and 2009, and the period of 2009 to 2018 have been additionally included in the analysis.

On the basis of the MAE and RMSE, the most accurate economic growth projections for the 2001 to 2018 period were from the European Commission, the IMAD and the Bank of Slovenia, while the most accurate inflation projections were provided by the Bank of Slovenia, the IMAD and the SKEP unit.[15] In the economic growth projections, MAE ranged from 0.5 to 3.0 over the entire period, while RMSE ranged from 0.7 to 4.4.[16] The institutions were slightly more accurate in their inflation projections: the aforementioned indicators had narrower ranges, namely 0.2 to 1.5 for MAE and 0.3 to 1.9 for RMSE.

The most accurate economic growth projections over the entire period excluding 2008 and 2009 were those of the Bank of Slovenia, the European Commission and the IMAD, while the best inflation projections were by the Bank of Slovenia, the IMAD and the SKEP unit. Compared with the entire observation period, the

[13] In the examination of projection accuracy between institutions in the 2001 to 2018 period and in the various sub-periods, the first observed values and projections of variables are compared, whereby the projections selected are those that correspond most closely to the Bank of Slovenia's spring and autumn projections.
[14] For a detailed description of the statistical measures (in Slovene), see Cimperman and Savšek (2014): https://bankaslovenije.blob.core.windows.net/publication-files/PA_1_2014_Natančnost_napovedi_makroekonomskih_spremenljivk.pdf.
[15] SKEP refers to the analytical group at the Chamber of Commerce.
[16] The spring and autumn projections of all the institutions for the current year and next year are taken into account in the values given.

economic growth projections and the inflation projections during the selected period were slightly more accurate, as the exclusion of 2008 and 2009 eliminated the impact of the higher volatility, which was predominant in the early part of the crisis. In the economic growth projections, MAE ranged from 0.5 to 2.4 over the period in question, while RMSE ranged from 0.7 to 3.0. As in the above case, the institutions were again slightly more accurate in their inflation projections: the aforementioned indicators had narrower ranges than over the entire observation period (2001 to 2018), namely 0.2 to 1.4 for MAE and 0.3 to 1.9 for RMSE.

The OECD and the European Commission produced the most accurate economic growth projections over the 2009 to 2018 period, followed by the Bank of Slovenia and the IMAD, while the Bank of Slovenia, the IMAD and the OECD produced the most accurate inflation projections. The accuracy of the economic growth projections improved in comparison to the entire observation period (2001 to 2018): the intervals in MAE and RMSE narrowed markedly to range from 0.5 to 2.2 for MAE and 0.6 to 2.6 for RMSE. It was a similar case in the assessment of inflation projection accuracy: the intervals in the indicators were narrower than in the entire observation period, at 0.1 to 1.1 for MAE and 0.1 to 1.4 for RMSE.

Table 4: Basic accuracy measures of GDP growth projections, based on first available data

Real GDP	2001–2018			2001–2008			2009–2018			2008 and 2009			Excl. 2008–2009			2004–2018		
	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV
spring projections																		
current year																		
BS	0.0	1.2	1.9	0.4	0.9	1.1	-0.4	1.5	2.3	-3.4	3.4	3.8	0.4	0.9	1.1	0.0	1.4	2.1
Consensus	0.0	1.4	2.0	0.4	1.1	1.3	-0.4	1.7	2.4	-3.5	3.5	3.3	0.4	1.2	1.5	0.0	1.5	2.2
EBRD							0.7	1.4	1.6									
EIPF	-0.3	1.5	2.3	0.7	1.1	1.3	-0.8	1.6	2.6	-4.1	4.1	4.4	0.3	1.1	1.4	-0.3	1.5	2.3
EK	0.0	1.2	1.7	0.3	1.1	1.3	-0.2	1.4	2.0	-2.7	2.7	2.8	0.4	1.1	1.2	0.2	1.3	1.8
IMF	0.1	1.4	1.9	0.3	1.0	1.3	-0.1	1.7	2.3	-3.0	3.0	3.4	0.5	1.2	1.4	0.2	1.5	2.0
OECD							0.1	1.2	1.5									
SKEP	0.3	1.5	2.0	0.8	1.0	1.1	0.0	1.7	2.4	-3.1	3.1	3.6	0.8	1.2	1.3	0.3	1.5	2.0
IMAD	-0.1	1.3	1.6	0.2	1.0	1.2	-0.2	1.5	1.9	-2.5	2.5	2.3	0.3	1.1	1.3	0.1	1.3	1.7
next year																		
BS	-0.6	2.2	3.5	-1.2	2.5	4.6	-0.1	1.9	2.4	-6.3	6.3	8.1	0.1	1.6	2.1	-0.7	2.5	3.9
Consensus	-0.6	2.5	3.9	-1.4	2.9	5.1	0.0	2.2	2.7	-6.0	6.6	9.3	0.1	1.9	2.3	-0.6	2.7	4.1
EBRD							0.9	2.1	2.6									
EIPF	-0.7	3.0	4.5	-1.1	4.4	7.1	-0.5	2.2	2.7	-6.5	6.5	8.6	0.2	2.4	3.2	-0.7	3.0	4.5
EK	-0.6	2.3	3.5	-1.4	2.6	4.5	0.1	2.0	2.5	-5.6	6.3	8.9	0.1	1.7	2.1	-0.5	2.5	3.9
IMF	-0.6	2.2	3.5	-1.2	2.4	4.4	0.0	2.1	2.6	-5.8	5.8	8.2	0.1	1.7	2.2	-0.6	2.5	3.9
OECD							0.1	2.0	2.5									
SKEP	-0.6	2.6	4.0	-1.7	3.6	6.1	0.1	2.0	2.5	-6.3	6.3	8.6	0.4	2.0	2.3	-0.6	2.6	4.0
IMAD	-0.7	2.4	3.6	-1.4	2.6	4.6	0.0	2.1	2.6	-5.9	6.3	8.9	0.0	1.8	2.3	-0.6	2.6	4.0
autumn projections																		
current year																		
BS	0.1	0.7	0.8	0.2	0.6	0.7	0.1	0.7	1.0	-1.2	1.2	0.3	0.3	0.6	0.7	0.1	0.7	0.9
Consensus	0.0	0.8	1.0	0.0	0.7	0.9	0.0	0.8	1.1	-1.6	1.6	0.5	0.2	0.7	0.8	0.1	0.8	1.0
EBRD							0.6	0.9	0.9									
EIPF	-0.1	0.8	1.2	0.3	0.9	1.2	-0.3	0.8	1.2	-2.1	2.1	0.8	0.2	0.6	0.9	-0.1	0.8	1.2
EK	0.1	0.5	0.7	0.2	0.6	0.7	0.1	0.5	0.7	-0.8	0.8	0.1	0.3	0.5	0.6	0.2	0.5	0.7
IMF	0.1	1.0	1.3	0.2	0.8	1.0	-0.1	1.1	1.5	-2.1	2.1	1.8	0.3	0.8	1.0	0.1	1.0	1.4
OECD							0.2	0.5	0.6									
SKEP	0.3	0.8	1.0	0.0	0.8	1.0	0.4	0.9	1.0	-1.3	1.3	0.2	0.5	0.8	0.8	0.3	0.8	1.0
IMAD	0.0	0.6	0.8	0.0	0.6	0.8	0.1	0.6	0.8	-1.1	1.1	0.4	0.2	0.6	0.7	0.1	0.7	0.8
next year																		
BS	-0.4	2.0	3.4	-1.0	2.5	4.5	0.2	1.7	2.2	-5.9	5.9	8.1	0.4	1.5	1.9	-0.4	2.3	3.8
Consensus	-0.5	2.2	3.4	-1.3	2.6	4.4	0.3	1.8	2.3	-5.5	6.2	8.7	0.2	1.7	2.0	-0.4	2.4	3.8
EBRD							1.4	2.2	2.4									
EIPF	-0.7	2.5	3.9	-2.0	3.5	5.9	0.0	1.9	2.5	-5.9	6.3	8.8	0.1	1.8	2.3	-0.7	2.5	3.9
EK	-0.2	2.0	3.3	-1.0	2.4	4.3	0.4	1.6	2.1	-5.5	5.6	7.8	0.4	1.5	1.8	-0.3	2.2	3.6
IMF	-0.2	2.3	3.6	-1.0	2.5	4.5	0.5	2.2	2.7	-5.5	6.3	8.9	0.5	1.8	2.2	-0.2	2.6	4.0
OECD							0.4	1.7	2.1									
SKEP	-0.1	2.3	3.7	-1.3	2.9	5.2	0.8	1.9	2.2	-5.4	6.1	8.6	0.8	1.7	2.0	-0.1	2.4	3.8
IMAD	-0.5	2.0	3.3	-1.1	2.4	4.3	0.2	1.7	2.3	-5.4	5.9	8.3	0.2	1.5	2.0	-0.5	2.3	3.7

Source: Bank of Slovenia, Consensus Economics, EBRD, EIPF, European Commission (EC), IMF, OECD, SKEP, IMAD.

Table 5: RMSE and SRMSE of GDP growth projections, based on first available data

Real GDP	RMSE						SRMSE					
	01–18	01–08	09–18	08 and 09	excl. 08–09	04–18	01–18	01–08	09–18	08 and 09	excl. 08–09	04–18
spring projections												
currenty year												
BS	1.8	1.1	2.2	4.3	1.2	2.0	0.5	0.7	0.6	0.5	0.5	0.5
Consensus	2.0	1.3	2.3	4.2	1.5	2.1	0.6	0.9	0.6	0.5	0.6	0.6
EBRD			1.6						0.4			
EIPF	2.3	1.3	2.6	5.1	1.4	2.3	0.7	0.9	0.7	0.6	0.6	0.6
EC	1.6	1.3	1.9	3.4	1.3	1.7	0.5	0.8	0.5	0.4	0.5	0.5
IMF	1.9	1.2	2.2	3.8	1.4	2.0	0.5	0.8	0.6	0.5	0.6	0.5
OECD			1.4						0.4			
SKEP	2.0	1.3	2.2	4.0	1.4	2.0	0.6	0.9	0.6	0.5	0.6	0.5
IMAD	1.6	1.1	1.8	3.0	1.3	1.7	0.5	0.8	0.5	0.4	0.5	0.4
next year												
BS	3.5	4.4	2.3	8.5	2.0	3.8	1.0	3.0	0.6	1.0	0.8	1.0
Consensus	3.8	5.0	2.5	8.8	2.3	4.0	1.1	3.3	0.6	1.1	0.9	1.1
EBRD			2.6						0.7			
EIPF	4.4	6.4	2.6	8.8	3.0	4.4	1.3	4.3	0.7	1.1	1.3	1.2
EC	3.5	4.4	2.4	8.4	2.1	3.8	1.0	3.0	0.6	1.0	0.9	1.0
IMF	3.4	4.3	2.4	8.2	2.1	3.8	1.0	2.9	0.6	1.0	0.9	1.0
OECD			2.4						0.6			
SKEP	3.9	5.7	2.4	8.7	2.3	3.9	1.1	3.8	0.6	1.1	0.9	1.0
IMAD	3.6	4.5	2.5	8.6	2.2	3.9	1.0	3.1	0.6	1.1	0.9	1.0
autumn projections												
current year												
BS	0.8	0.7	0.9	1.2	0.8	0.9	0.2	0.5	0.2	0.1	0.3	0.2
Consensus	1.0	0.8	1.0	1.6	0.8	1.0	0.3	0.6	0.3	0.2	0.3	0.3
EBRD			1.0						0.3			
EIPF	1.1	1.1	1.2	2.2	0.9	1.1	0.3	0.7	0.3	0.3	0.4	0.3
EC	0.7	0.6	0.7	0.8	0.7	0.7	0.2	0.4	0.2	0.1	0.3	0.2
IMF	1.3	1.0	1.5	2.5	1.0	1.3	0.4	0.7	0.4	0.3	0.4	0.4
OECD			0.6						0.2			
SKEP	1.0	0.9	1.0	1.3	0.9	1.0	0.3	0.6	0.3	0.2	0.4	0.3
IMAD	0.8	0.7	0.8	1.1	0.7	0.8	0.2	0.5	0.2	0.1	0.3	0.2
next year												
BS	3.3	4.3	2.1	8.2	1.9	3.7	1.0	2.9	0.5	1.0	0.8	1.0
Consensus	3.4	4.3	2.1	8.2	2.0	3.7	1.0	2.9	0.6	1.0	0.8	1.0
EBRD			2.6						0.7			
EIPF	3.8	5.6	2.3	8.6	2.2	3.8	1.1	3.8	0.6	1.0	0.9	1.0
EC	3.2	4.1	2.0	7.8	1.8	3.5	0.9	2.8	0.5	0.9	0.8	0.9
IMF	3.5	4.4	2.6	8.4	2.2	3.9	1.0	2.9	0.7	1.0	0.9	1.0
OECD			2.0						0.5			
SKEP	3.5	4.9	2.2	8.1	2.0	3.6	1.0	3.3	0.6	1.0	0.8	1.0
IMAD	3.3	4.2	2.2	7.9	1.9	3.6	1.0	2.8	0.6	1.0	0.8	0.9

Source: Bank of Slovenia, Consensus Economics, EBRD, EIPF, European Commission (EC), IMF, OECD, SKEP, IMAD.

Table 6: Basic accuracy measures of inflation projections, based on first available data

HICP/CPI	2001–2018			2001–2008			2009–2018			2008 and 2009			Excl. 2008–2009			2004–2018		
	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV	ME	MAE	STDEV
spring projections																		
current year																		
BS	0.1	0.4	0.5	0.3	0.5	0.6	-0.1	0.4	0.4	0.2	0.3	0.4	0.1	0.4	0.6	0.1	0.3	0.5
Consensus	-0.2	0.6	0.7	0.0	0.6	0.8	-0.3	0.6	0.7	-0.1	0.7	1.0	-0.2	0.6	0.7	-0.1	0.6	0.7
EIPF	0.1	0.6	0.8	0.4	0.5	0.6	-0.1	0.7	0.9	0.7	0.7	0.4	0.0	0.6	0.8	0.1	0.6	0.8
EC	-0.1	0.4	0.5	0.0	0.4	0.7	-0.1	0.3	0.4	0.2	0.2	0.1	-0.1	0.4	0.6	0.0	0.3	0.5
IMF	0.2	0.5	0.7	0.4	0.7	0.9	0.0	0.4	0.5	1.0	1.0	0.8	0.1	0.5	0.7	0.3	0.5	0.7
OECD							-0.2	0.4	0.4									
SKEP	-0.1	0.4	0.5	0.2	0.5	0.6	-0.2	0.4	0.5	0.1	0.2	0.3	-0.1	0.4	0.6	-0.1	0.4	0.5
IMAD	0.1	0.5	0.6	0.1	0.6	0.8	0.2	0.4	0.5	0.4	0.4	0.1	0.1	0.5	0.6	0.3	0.4	0.5
next year																		
BS	0.1	1.0	1.4	0.5	1.4	1.8	-0.2	0.7	0.9	-1.2	1.5	2.1	0.3	1.0	1.3	-0.1	1.0	1.4
Consensus	-0.4	1.1	1.5	0.0	1.5	2.0	-0.7	0.8	1.1	-1.6	1.6	1.3	-0.2	1.0	1.5	-0.4	1.1	1.5
EIPF	-0.1	1.5	2.0	0.9	2.2	2.7	-0.6	1.1	1.3	-2.1	2.1	0.0	0.3	1.4	2.0	-0.1	1.5	2.0
EC	-0.4	1.1	1.4	-0.4	1.5	1.9	-0.4	0.7	1.0	-1.2	1.3	1.8	-0.3	1.0	1.4	-0.2	0.9	1.4
IMF	-0.1	1.1	1.4	0.3	1.5	1.8	-0.5	0.7	1.0	-0.5	1.1	1.5	0.0	1.1	1.5	-0.1	1.0	1.4
OECD							-0.1	0.9	1.0									
SKEP	-0.3	1.0	1.4	0.2	1.5	2.0	-0.5	0.7	1.0	-1.2	1.5	2.1	-0.1	0.9	1.3	-0.3	1.0	1.4
IMAD	-0.1	0.9	1.3	0.2	1.2	1.6	-0.3	0.7	0.9	-0.9	1.4	2.0	0.0	0.9	1.2	-0.1	1.0	1.4
autumn projections																		
current year																		
BS	-0.2	0.2	0.3	-0.2	0.3	0.4	-0.1	0.2	0.1	-0.4	0.4	0.3	-0.1	0.2	0.3	-0.1	0.2	0.2
Consensus	-0.1	0.3	0.4	-0.2	0.4	0.5	0.0	0.2	0.2	-0.4	0.4	0.2	0.0	0.3	0.4	0.0	0.2	0.3
EIPF	0.0	0.3	0.4	-0.1	0.3	0.5	0.0	0.3	0.3	-0.3	0.4	0.5	0.0	0.3	0.4	0.0	0.3	0.4
EC	-0.2	0.3	0.4	-0.5	0.5	0.6	-0.1	0.1	0.1	-0.4	0.4	0.5	-0.2	0.3	0.4	-0.1	0.2	0.2
IMF	0.0	0.4	0.5	-0.1	0.5	0.6	0.1	0.3	0.4	0.0	0.4	0.6	0.0	0.4	0.5	0.0	0.3	0.4
OECD							0.0	0.1	0.2									
SKEP	-0.1	0.3	0.4	-0.2	0.3	0.4	0.0	0.2	0.3	-0.2	0.3	0.4	-0.1	0.3	0.4	0.0	0.2	0.3
IMAD	-0.2	0.3	0.4	-0.4	0.5	0.5	0.0	0.2	0.2	-0.4	0.4	0.4	-0.2	0.3	0.4	-0.1	0.2	0.3
next year																		
BS	-0.1	0.9	1.2	0.0	1.1	1.5	-0.2	0.8	1.0	-1.0	1.6	2.3	0.0	0.8	1.1	-0.1	0.9	1.2
Consensus	-0.3	1.0	1.4	-0.2	1.5	2.0	-0.4	0.7	0.9	-1.6	1.6	2.2	-0.1	0.9	1.3	-0.3	1.0	1.4
EIPF	0.1	1.2	1.6	0.3	1.7	2.4	0.0	0.9	1.2	-1.2	2.0	2.8	0.4	1.1	1.4	0.1	1.2	1.6
EC	-0.3	1.0	1.3	-0.4	1.4	1.8	-0.2	0.8	1.0	-1.2	1.6	2.3	-0.2	0.9	1.2	-0.2	1.0	1.3
IMF	-0.1	1.0	1.3	-0.1	1.3	1.6	-0.2	0.7	0.9	-0.9	1.5	2.1	0.0	0.9	1.2	-0.1	1.0	1.3
OECD							0.0	0.8	1.0									
SKEP	-0.3	1.1	1.4	-0.1	1.3	1.7	-0.5	0.9	1.1	-1.0	1.8	2.5	-0.2	1.0	1.3	-0.3	1.1	1.4
IMAD	-0.3	1.0	1.2	-0.2	1.2	1.6	-0.3	0.8	0.9	-1.2	1.8	2.5	-0.1	0.8	1.0	-0.2	1.0	1.3

Source: Bank of Slovenia, Consensus Economics, EIPF, European Commission (EC), IMF, OECD, SKEP, IMAD.

Table 7: RMSE and SRMSE of inflation projections, based on first available data

HICP/CPI	RMSE						SRMSE					
	01–18	01–08	09–18	08 and 09	excl. 08–09	04–18	01–18	01–08	09–18	08 and 09	excl. 08–09	04–18
spring projections												
current year												
BS	0.5	0.6	0.4	0.4	0.5	0.4	0.2	0.3	0.4	0.1	0.2	0.3
Consensus	0.7	0.7	0.7	0.7	0.7	0.7	0.3	0.4	0.6	0.2	0.3	0.4
EIPF	0.8	0.7	0.9	0.8	0.8	0.8	0.4	0.4	0.8	0.2	0.4	0.5
EC	0.5	0.6	0.4	0.2	0.5	0.4	0.2	0.3	0.4	0.0	0.2	0.3
IMF	0.7	1.0	0.4	1.1	0.6	0.7	0.3	0.5	0.4	0.3	0.3	0.5
OECD			0.4						0.4			
SKEP	0.5	0.6	0.5	0.2	0.5	0.5	0.2	0.3	0.4	0.1	0.2	0.3
IMAD	0.6	0.7	0.5	0.4	0.6	0.6	0.3	0.4	0.4	0.1	0.3	0.4
next year												
BS	1.4	1.8	0.9	1.9	1.3	1.3	0.6	0.9	0.8	0.6	0.6	0.8
Consensus	1.5	1.8	1.2	1.8	1.4	1.5	0.7	1.0	1.1	0.6	0.6	1.0
EIPF	1.9	2.6	1.4	2.1	1.9	1.9	0.9	1.4	1.2	0.6	0.8	1.2
EC	1.4	1.8	1.0	1.7	1.4	1.3	0.6	0.9	0.9	0.5	0.6	0.8
IMF	1.4	1.7	1.0	1.1	1.4	1.3	0.6	0.9	0.9	0.4	0.6	0.8
OECD			0.9						0.8			
SKEP	1.4	1.8	1.1	1.9	1.3	1.4	0.6	1.0	0.9	0.6	0.6	0.9
IMAD	1.2	1.5	0.9	1.7	1.2	1.3	0.5	0.8	0.8	0.5	0.5	0.8
autumn projections												
current year												
BS	0.3	0.4	0.2	0.4	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.1
Consensus	0.3	0.5	0.2	0.4	0.3	0.3	0.2	0.3	0.2	0.1	0.2	0.2
EIPF	0.4	0.4	0.3	0.4	0.3	0.4	0.2	0.2	0.3	0.1	0.2	0.2
EC	0.5	0.7	0.1	0.5	0.5	0.3	0.2	0.4	0.1	0.2	0.2	0.2
IMF	0.5	0.6	0.4	0.4	0.5	0.4	0.2	0.3	0.3	0.1	0.2	0.2
OECD			0.2						0.1			
SKEP	0.4	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.1	0.2	0.2
IMAD	0.5	0.6	0.2	0.5	0.5	0.3	0.2	0.3	0.2	0.2	0.2	0.2
next year												
BS	1.2	1.4	0.9	1.9	1.0	1.2	0.5	0.7	0.8	0.6	0.5	0.8
Consensus	1.4	1.8	1.0	2.2	1.2	1.4	0.6	1.0	0.9	0.7	0.5	0.9
EIPF	1.6	2.1	1.1	2.3	1.4	1.6	0.7	1.1	1.0	0.7	0.6	1.0
EC	1.3	1.7	1.0	2.0	1.2	1.3	0.6	0.9	0.9	0.6	0.5	0.8
IMF	1.2	1.5	0.9	1.7	1.1	1.2	0.5	0.8	0.8	0.5	0.5	0.8
OECD			1.0						0.8			
SKEP	1.4	1.6	1.2	2.0	1.2	1.4	0.6	0.8	1.0	0.6	0.5	0.9
IMAD	1.2	1.5	0.9	2.2	1.0	1.2	0.5	0.8	0.8	0.7	0.4	0.8

Source: Bank of Slovenia, Consensus Economics, EIPF, European Commission (EC), IMF, OECD, SKEP, IMAD.