

## II. Macroeconomic Outlook

**Global economic activity continues to recover with the contribution of the easing of pandemic measures, a faster vaccine rollout, and supportive economic policies.** Inflation rates are rising globally due to supply chain disruptions, recovery in global demand, and increasing commodity prices. Signs of revisions in monetary policy stance across advanced economies lead to volatility in portfolio flows towards emerging economies. Ongoing high levels of global indebtedness, particularly across real and public sectors, and repercussions of the emergence of new variants and the effects of climate change on the financial system are among the factors that should be closely monitored for global financial stability.

**Domestic economic activity remained robust in the third quarter of 2021.** The positive outlook in economic activity is attributed to the rebound in the services sectors and the strong rise in exports. Despite the negative impact of commodity prices through the import channel, the current account deficit settled on a marked downtrend on an annualized basis thanks to the contribution of the increase in tourism revenues. Following a decline in external financing needs and the rise in other investment flows, the CBRT reserves increased to its pre-pandemic levels. The strong course of economic activity has been mirrored positively in the labor market and budget indicators. Consumer and producer inflation are largely shaped by temporary factors, while core inflation indicators have recently decelerated, yet remained high.

## II.1 International Developments

**Global economic activity continues to recover thanks to the easing of preventive measures that are taken against the pandemic, a faster vaccine rollout and supportive economic policies all over the world.**

The speed of the vaccine rollout, the course of the pandemic, and variations in policy implementations cause a differentiation between advanced economies (AEs) and emerging market economies (EMEs) in terms of the speed of economic recovery (Chart II.1.1). With the revival of activity in services sectors in particular, global economic activity posted a rapid recovery in the second quarter. Leading indicators of growth suggest that the increase in global production continues albeit at a slower pace. In addition to supply constraints and problems in supply chains, uncertainties regarding the spread of new variants and possible relevant measures are keeping the downside risks to the growth outlook elevated (Chart II.1.2). The growth outlook diverges among countries depending on the country-specific factors, vaccination performance and the disruptions in supply chains (Chart II.1.3).

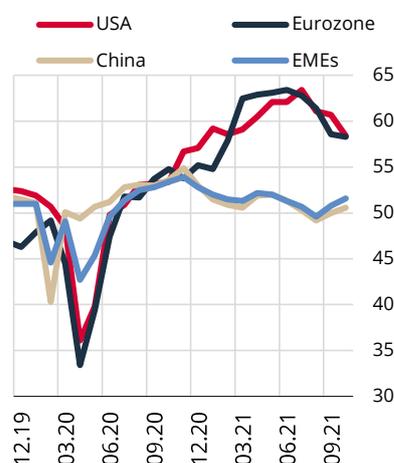
**Chart II.1.1: Annual Growth Rates in Advanced and Emerging Economies (%)**



Source: Bloomberg, CBRT  
Last Observation: 2021Q2

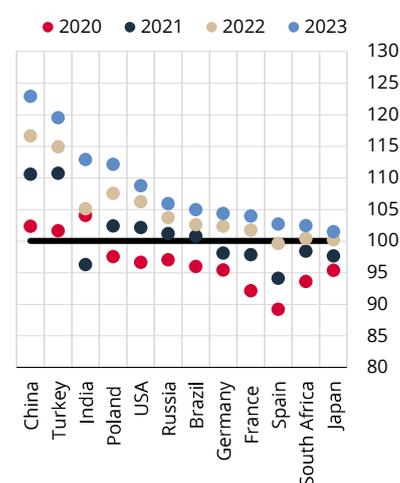
Note: In the first chart, AEs include USA, Eurozone, Japan, UK, Canada, S. Korea, Switzerland, Sweden, Norway, Denmark and Israel. EMEs include China, Brazil, India, Mexico, Russia, Turkey, Poland, Indonesia, S. Africa, Argentina, Thailand, Malaysia, Czechia, Colombia, Hungary, Romania, Philippines, Ukraine, Chile, Peru and Morocco.

**Chart II.1.2: Manufacturing Industry PMI (Index)**



Source: Bloomberg  
Last Observation: 10.21

**Chart II.1.3: Real GDP Projections (Annual, 2019=100)**



Source: Bloomberg, CBRT  
Last Observation: 04.11.21

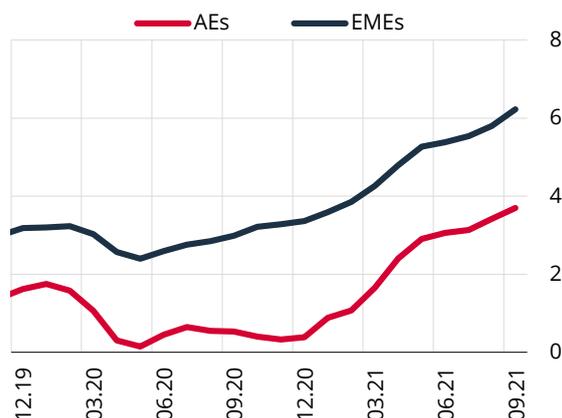
**In addition to the faster vaccine rollout and the deferred demand becoming active after the reopening, supply constraints driven by the problems in supply chains have been pushing inflation rates upward globally.**

Although core inflation, inflation expectations and wage growth in AEs have been relatively mild, the pandemic-specific problems such as the duration of supply constraints and matching problems in labor markets keep the risks related to the persistence of inflationary pressures elevated. Similar to AEs, inflation rates have increased in EMEs as well (Chart II.1.4).

**AEs have been giving signals of a gradual policy shift over time with forward-guidance on asset purchase programs and monetary policy rates.**

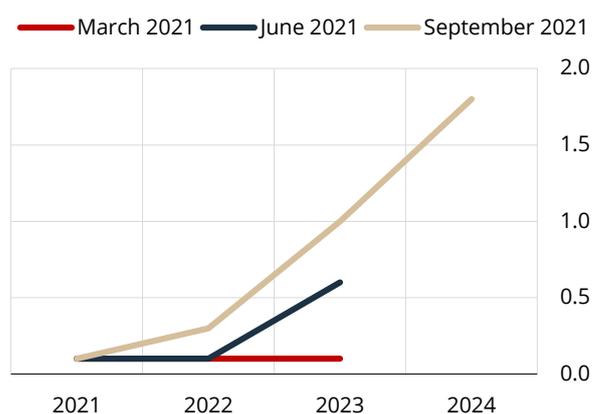
The Federal Reserve (Fed) continues its asset purchase program, which was announced in March 2020 and revised later at the Federal Open Market Committee (FOMC) meetings. However, at its meeting in September, the FOMC stated that a moderation in the pace of asset purchases may be warranted in the case a substantial progress is made towards inflation and employment goals. As a matter of fact, at its November meeting, the FOMC announced that it would reduce the monthly pace of net asset purchases by USD 10 billion for Treasury securities and USD 5 billion for agency mortgage-backed securities. Besides, the FOMC members' federal funds rate projections, which were being kept close to 0% over a two-year horizon

from September 2020 to March 2021, were revised upward (Chart II.1.5). Members, at the September meeting, anticipated seven rate hikes in total as one for 2022, and three for both 2023 and 2024. While the European Central Bank (ECB) announced that the Pandemic Emergency Purchase Programme (PEPP) will end in March 2022 at the earliest, it also stated that the programme could be extended until the pandemic is over. Additionally, the ECB's asset purchase programme of EUR 20 billion continues. Meanwhile, despite maintaining the current monetary stance at its last monetary policy meeting, the Bank of England signaled a rate hike.

**Chart II.1.4: Global Inflation (%)**


Source: Bloomberg, CBRT Last Observation: 09.21

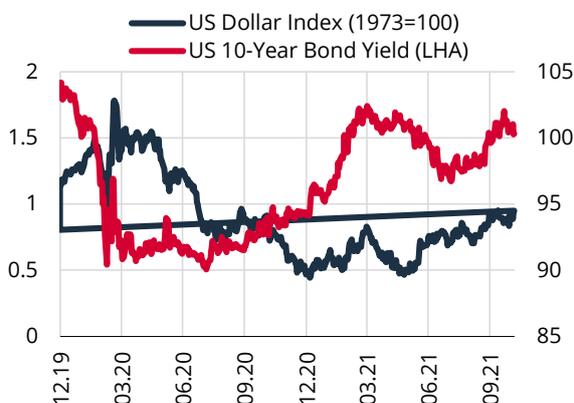
Note: AEs include USA, Eurozone, Japan, UK, Canada, S. Korea, Switzerland, Sweden, Norway, Denmark and Israel. EMEs include Brazil, Mexico, Russia, Poland, Indonesia, S. Africa, Thailand, Czechia, Colombia, Hungary, Romania and Philippines.

**Chart II.1.5: Median Policy Rate Forecasts of FOMC Members (%)**


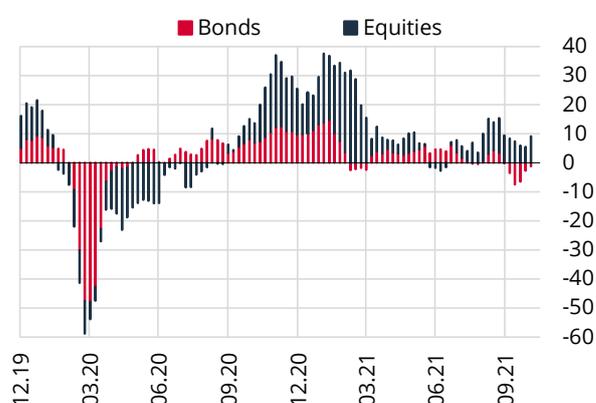
Source: Bloomberg Last Observation: 09.21

### Expectations regarding the Fed's monetary stance cause the US dollar to appreciate against leading advanced economy currencies and have an effect on capital flows towards EMEs.

The US dollar, which had depreciated against the currencies of leading AEs in the March-June 2021 period, appreciated after June depending on the expectations regarding the Fed's monetary policy. On the back of strengthening expectations that inflationary pressures in the US might last longer than past projections, US long-term bond yields have been increasing since early August (Chart II.1.6). Portfolio inflows towards EMEs remained strong from October 2020 to February 2021 due to vaccination developments and the increased risk appetite driven by supportive financial conditions. In the subsequent period, the volatility of capital flows towards EMEs increased due to the persistence of the pandemic with new variants and the signals of a change in AE monetary policies (Chart II.1.7).

**Chart II.1.6: US Dollar Index and US 10-Year Bond Yield (Index, %)**


Source: Bloomberg Last Observation: 04.11.21

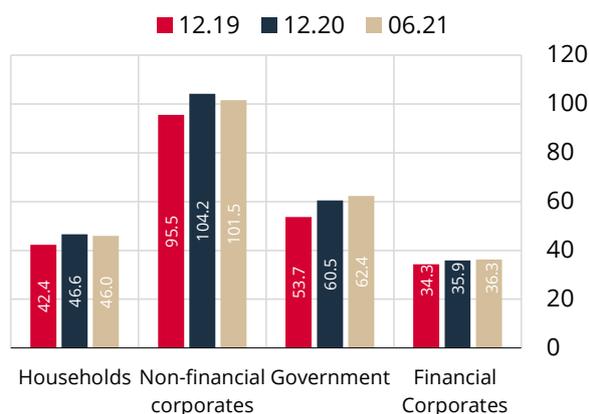
**Chart II.1.7: Weekly Capital Flows to EMEs (4-Week Cumulative, USD Billion)**


Source: EPFR Last Observation: 03.11.21

### The uneven global recovery across sectors and firm sizes, and the ongoing high corporate sector indebtedness stand out as uncertainty factors for global financial stability.

Global indebtedness, which has increased significantly with the liquidity supports provided in the early phases of the pandemic, decreased slightly in the first half of 2021 on the back of the decline in corporate sector indebtedness (Charts II.1.8 and II.1.9). While the low interest rate environment encourages firms to borrow and facilitates debt repayments, it also makes them sensitive to interest rate increases. Additionally, while SMEs with limited access to financing have been more adversely affected by the pandemic, the impact of the pandemic also differs across sectors. As economic policies normalize in the upcoming period, the monitoring of real sector indebtedness will remain important.

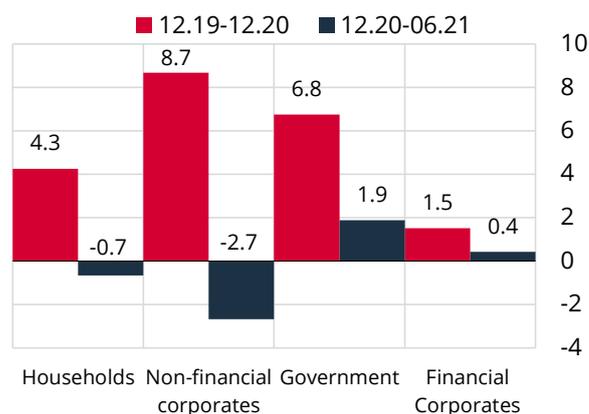
**Chart II.1.8: Indebtedness in EMEs**  
(Debt/GDP, %)



Source: IIF

Last Observation: 2021Q2

**Chart II.1.9: Change in Indebtedness in EMEs (% Point)**



Source: IIF

Last Observation: 2021Q2

Note: The average is calculated based on GDP weights of countries. EMEs: Argentina, Brazil, Chile, China, Colombia, Czechia, Egypt, Ghana, Hong Kong, Hungary, India, Indonesia, Israel, Kenya, Lebanon, Malaysia, Mexico, Nigeria, Pakistan, Philippines, Poland, Russia, Saudi Arabia, Singapore, S. Africa, S. Korea, Thailand, Turkey, Ukraine and United Arab Emirates. Data for the first two quarters of 2021 are estimations.

### Sustainable financing transactions are growing within the scope of managing climate change-driven physical risks and encouraging transition to a low-carbon economy.

The effects of climate change have been observed drastically on a global scale in recent years. The regulatory frameworks built and the measures taken to limit the implications of these effects on financial stability and the economy, as well as providing the necessary financing during the transition to a low-carbon economy are of critical importance. The interest in green finance is growing in both AEs and EMEs, as the pandemic raises awareness of climate change (Chart II.1.10). Accordingly, green bond issuances by public and private sectors recorded a significant increase in 2021 (Chart II.1.11).

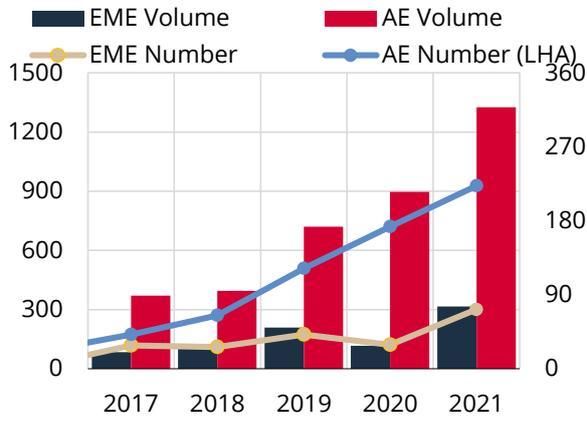
### The outlook for the global financial system is still under the influence of the pandemic and policy measures that have declined compared to previous periods continue to be important on the financial system.

International financial institutions have been working on analyses of the measures taken since the onset of the pandemic and the lessons learned, particularly examining how the current regulatory framework functioned during the pandemic. Currently, recovery of the global economic activity is speeding up thanks to favorable financial conditions. Inflationary pressures in the global economy, which are driven by the easing of lockdown measures and increase in demand due to vaccination progress combined with supply constraints, increase the likelihood of a tightening in financial conditions. Additionally, variants feeding the concerns about the course of the pandemic, differences in access to vaccine and vaccination rates among countries, and fluctuations in the number of cases reduce the predictability of the economic outlook and cause a divergence among countries in terms of the speed of economic recovery.

Climate change, development of financial technology, non-bank financial intermediation activities, cross-border interconnectedness, the LIBOR transition process (Box II.1.1) and cyber resilience (Box II.1.2) are

among the areas that will require further attention in the upcoming period with regard to global financial stability. It is important for financial regulatory authorities to closely monitor the factors that might cause significant vulnerabilities to financial stability and intervene in a timely fashion, while considering country-specific factors and maintaining the gains from post-Global Financial Crisis reforms.

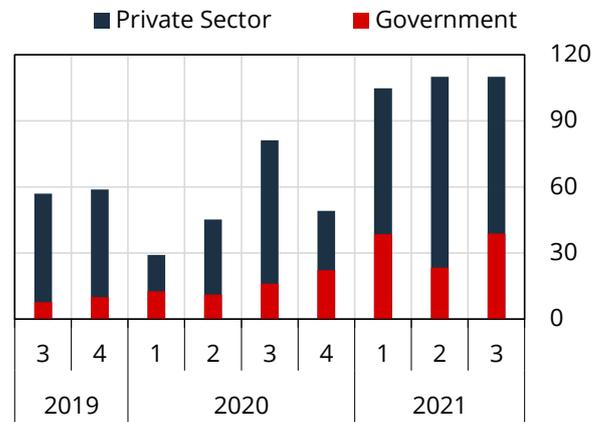
**Chart II.1.10: Total Volume and Number of Issuances of Green Bonds** (USD Billion, Units)



Source: Bloomberg

Last Observation: 09.21

**Chart II.1.11: Breakdown in Issuances of Green Bonds** (USD Billion)



Source: Bloomberg

Last Observation: 09.21

## Box II.1.1

### Benchmark Interest Rates: Transition from Interbank Offered Rates (IBORs) to New Benchmark Interest Rates

Interbank offered rates (IBORs) act as an indicator for various financial products and contracts of high transaction volumes across the global financial system and are used as benchmark interest rates.<sup>1</sup> After the global financial crisis, the rapid decline in transaction volumes on underlying markets of IBORs, coupled with market manipulation and misleading reporting, brought about concerns regarding the reliability of these rates as benchmark interest rates as well as their capability to reflect market conditions.

Upon the G20's call, alternative benchmark interest rates based on actual transactions started to be used as new reference rates (nearly risk free-rates, RFRs) in G20 countries in particular (Table II.1.1.1.1). In Turkey, the TLREF, which is the new benchmark interest rate based on actual transactions, started to be announced by Borsa Istanbul (BIST) on 17 June 2019.

**Table II.1.1.1: Selected IBORs and RFRs**

	Country	Currency	IBOR	RFR	Authority
LIBOR Countries	UK	GBP	LIBOR	SONIA	Bank of England
	USA	USD	LIBOR	SOFR	
	Euro Area	EUR	LIBOR EONIA EURIBOR	ESTER	ECB
	Switzerland	CHF	LIBOR	SARON	SIX Swiss Exchange
	Japan	JPY	LIBOR	TONA TIBOR	Japanese Bankers Association
	Turkey	TRY	TRLIBOR	TLREF	Borsa Istanbul
Other Countries	Australia	AUD	BBSW	AONIA	Reserve Bank of Australia
	Brazil	BRL	DI rate	Selic	Central Bank of Brazil
	South Africa	ZAR	JIBAR	ZARONIA	South African Reserve Bank
	Hong Kong	HKD	HIBOR	HONIA	Treasury Markets Association
	Canada	CAD	CDOR	CORRA	Bank of Canada
	Singapore	SGD	SOR	SORA	Association of Banks in Singapore

Source: FSB

Transition to the new rates may necessitate the amendment of existing contracts or signing of new contracts between parties in financial transactions based on IBORs.

#### Transition Calendar

The UK Financial Conduct Authority (FCA) announced in 2017 that it would cease LIBOR settings as of end-2021.

<sup>1</sup>See Financial Stability Report Volume 27 (November 2018) and Volume 29 (November 2019) to find out more about international developments regarding transition from IBORs.

The transition to new benchmark rates based on actual transactions officially started upon the discontinuation of the publication of IBORs (permanent cessation trigger) by the ICE Benchmark Administration (IBA), which is the authorized administrator of LIBORs, and the announcement of the FCA (the regulatory authority of IBA) on 5 March 2021 that IBORs no longer served as representative benchmarks (pre-cessation trigger).

According to the LIBOR transition calendar, the publication of LIBORs in terms of pound sterling, Swiss franc, euro and Japanese yen will cease as of 31 December 2021. In the case of the US dollar, LIBOR settings will cease for one-week and two-week settings on 31 December 2021 and the remaining US dollar settings on 30 June 2021. After the gradual cessation of the publication of LIBORs on these dates, only the new benchmark rates will apply. A longer transition period is envisaged for the US dollar to enable legally problem-free transition of the existing LIBOR contracts in US dollars.

Meanwhile, introducing a legal change concerning the transition of the existing LIBOR contracts to the RFR, the British Parliament allowed the FCA to carry out the necessary work. With an amendment made in the Financial Services Bill, the LIBOR calculation was replaced by a new method known as “synthetic” basis, to take effect after the cessation of LIBOR settings. The FCA set out the methodology for calculating synthetic LIBOR as well as the products to which it will apply. Accordingly, on 29 September 2021, the FCA announced that the IBA will publish synthetic LIBORs in sterling and Japanese yen in one-month, three-month and six-month tenors in 2022.<sup>2</sup>

### **Preparations by international financial organizations**

International standard-setting organizations contribute significantly to the transition away from IBORs. The Financial Stability Board (FSB) published a global transition roadmap in October 2020 to help countries prepare for transition in a coordinated manner, and updated the roadmap in June 2021 in line with developments.<sup>3</sup> The plan shows what key measures will be the milestones of the transition and the timelines for implementation of these measures. The key measures include a series of steps such as countries establishing national working groups to manage the transition and calculating the risks arising from LIBOR. The FSB also monitors the reform process in member states and IBOR-related risks. Through surveys, information is collected annually from members on the progress they make, and annual progress reports are prepared and published based on the information collected as well as the FSB studies.

The International Swaps and Derivatives Association (ISDA) has contributed significantly to the transition process with its regulations governing derivative contracts. The ISDA regulatory changes were announced on 26 October 2020 and took effect on 25 January 2021. The changes include the Annex to the 2006 ISDA Definitions and the Protocol. The Annex governs the derivative contracts to be drawn up after the regulation date, and the Protocol governs the provisions regarding the alternative benchmark rates (rate options provision) that will replace LIBORs in the contracts signed before the regulation date. These regulations will pave the way for transition of derivative contracts from LIBORs to new alternative rates. While the Annex will be applied automatically to contracts governed by the laws of all ISDA member states, the Protocol takes effect in case all parties to a contract sign it, and compliance with the Protocol is optional.

### **Technical adjustment between IBORs and RFRs**

The new benchmark interest rates have some advantages over IBORs. First, RFRs are based on actual transactions on liquid markets. Second, while IBORs contain credit risk, RFRs do not, helping financial market participants to hedge more effectively against interest rate movements. Moreover, RFRs are overnight rates, whereas LIBORs are available at multiple tenors, requiring calculation to adjust tenors and to identify the RFR corresponding to the relevant tenor during the transition period.

Currently, overnight interest rates are being used for derivative products. For use of overnight rates in cash transactions such as loans, the interest rate charged for the relevant tenor can be calculated

<sup>2</sup> <https://www.fca.org.uk/news/press-releases/further-arrangements-orderly-wind-down-libor-end-2021>

<sup>3</sup> <https://www.fsb.org/2021/06/global-transition-roadmap-for-libor-2/>

either based on the opening interest or closing interest. Since the RFR-based derivatives markets, particularly the overnight interest rate swaps, have yet to reach sufficient depth, the forward RFRs to be derived from these derivatives do not seem fit to be used as a benchmark in cash products yet. Therefore, the FSB recommended its members to follow the method used by the ISDA in the adjustments to be made for spot financial contracts.

The LIBOR authority FCA's announcement on 5 March 2021 is important not only because it officially started the transition process, but also because it allowed the fixation of the adjustment spread reflecting a credit risk. According to the ISDA method, the median of the differences between LIBOR and the RFR is calculated for a five-year lookback period. The FCA's announcement date serves as a deadline for such action. Subsequently, the calculated difference is added to the compounded overnight benchmark rate in the relevant tenor, which results in the fallback rate to be used in the LIBOR-based contracts to be adjusted.

The ISDA regulations adopts a multi-tiered waterfall approach for fallback rates, which offers the use of alternative benchmarks if a benchmark rate cannot be obtained on a certain day. This process is prescribed for three different scenarios: (i) LIBOR publication continues, but a LIBOR value of a specific day cannot be obtained, (ii) LIBOR publication discontinues, so an actual transaction-based "fallback" benchmark rate (SOFR, SONIA, etc.) comes into play, (iii) A fallback benchmark rate pertaining to a specific day cannot be obtained. A brief waterfall process that will govern these three scenarios is given in Table II.1.1.2 by using USD LIBOR and the SOFR as an example.

**Table II.1.1.2: Waterfall Methodology for Fallback Provisions**

Trigger	Replacement Fallback Rate
US dollar LIBOR is not available (LIBOR still in effect, publication continues).	As long as parties do not agree on another rate, the rate recommended by (a) the LIBOR authority or (b) the Fed is used.
US dollar LIBOR is not available (LIBOR no longer in effect).	Secured Overnight Financing Rate (SOFR) is used as the replacement of fallback rate.
The Fed hasn't published SOFR.	The most recently-published SOFR is used.
SOFR publication has been discontinued.	The Fed-recommended rate is used.
The Fed-recommended rate cannot be obtained.	The most recently-published recommended rate is used.
The most recent value of the recommended rate is not available.	The Fed's Overnight Bank Funding Rate (OBFR) is used.
The OBFR is not available.	The most recently-published OBFR is used.
The most recent value of the OBFR is not available.	The Federal Open Market Committee (FOMC) Target Rate is used.
The FOMC Target Rate is not available.	The most recent value of the FOMC Target Rate is used.

Source: ISDA.

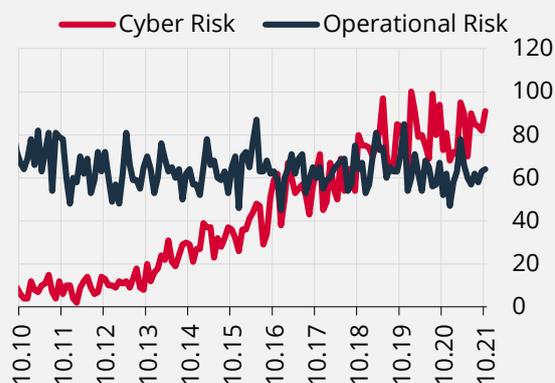
The transition from IBORs to new benchmark interest rates on a global scale remains a priority in G20 studies. In this context, it is important for all organizations to take the necessary measures to minimize their IBOR-related risks.

## Box II.1.II

### Cyber Resilience from the Perspective of Financial Stability

The risks posed by cyber threats and cyber incidents to the global financial system have recently been increasing particularly due to factors such as digital transformation, application of new technologies, increased dependence on third parties, remote working conditions brought about by the pandemic, and the efforts of cyber criminals seeking illegal financial income to find new methods to take over financial institutions. In accordance with the increasing number of cyber incidents, which is defined by the Financial Stability Board (FSB) as cyber events that jeopardize the cyber security of an information system itself or the information that it processes, stores and transmits; or violate security policies, security procedures or acceptable use policies, whether resulting from malicious activity or not, the concept of “cyber resilience”, which denotes the detection, reporting and control of cyber incidents that threaten financial stability has drawn larger attention (Chart II.1.II.1).

**Chart II.1.II.1: Global Online Search Volume Index**



Source: Google Trends

Last Observation: 20.10.21

**Table II.1.II.1: Sectoral Cyber Incident Volume Ranking**

Sector	2020 Ranking	2019 Ranking
Finance and insurance	1	1
Manufacturing	2	8
Energy	3	9
Retail	4	2
Professional Services	5	5
Government	6	6
Healthcare	7	10
Media	8	4
Transportation	9	3
Education	10	7

Source: IBM X-Force Threat Intelligence Index 2021

Note: Values show search interest compared to the highest point on the chart for the given region and time. A value of 100 indicates the point where the term is most popular, a value of 50 indicates that the concept is halfway down the popularity ranking, and a value of 0 indicates that there is not enough data.

Note: The data is generated by identifying the 10 most attacked industries each year and ranking them by percentage of attacks.

The sectoral distribution of cyber incidents suggests that the finance and banking sectors ranked first in the cyber incident volume in 2019 and 2020 (Table II.1.II.1). Cyber-attacks against the financial system can cause a failure in critical functions, thereby affecting market participants along with all related parties, hence financial stability, and have the potential to turn into a systemic crisis by undermining trust in the financial system. Therefore, cyber resilience is a key element in the work plan of international standard-setting organizations such as the FSB, the Basel Committee on Banking Supervision (BCBS), the Committee on Payments and Market Infrastructures (CPMI), the International Organization of Securities Commissions (IOSCO), and the International Association of Insurance Supervisors (IAIS). These organizations support financial stability with their efforts to ensure cyber security. Cyber risks frequently come up on the agenda of G20 meetings, the final declarations of which highlight the importance of collaboration and coordination in this field.

The effective functioning of financial market infrastructures is critical to ensuring and enhancing financial stability and economic growth. Securing the cyber resilience of financial market infrastructures, which can serve as an important transmission channel for transferring financial shocks to national and international financial markets, will contribute to the operational resilience of the financial system and of the entire economy.

In this context, the CPMI and the IOSCO jointly published guidance on cyber resilience for financial market infrastructures in 2016.<sup>1</sup> In order to raise awareness of this guidance and to create a resource for financial market regulators, the IOSCO Cyber Task Force (CTF) published a report in 2019.<sup>2</sup> The IAIS, on the other hand, published “Application Paper on Supervision of Insurer Cybersecurity” that provides a standard approach and guidance to supervisors on cyber risk supervising methods to enhance their cyber resilience.<sup>3</sup>

The FSB took stock of the existing regulatory and supervisory practices to improve cross-border cooperation in cyber security. The stocktake report, submitted to the G20 Finance Ministers and Central Bank Governors in 2017, summarized the responses of the G7 Cyber Expert Group to the survey, in addition to 25 FSB member jurisdictions, including Turkey, and nine international body members.<sup>4</sup> The survey was designed to gather information from the respondents only about existing publicly available regulations and supervisory practices with respect to cyber security. The vast majority of the participants reported that they were actively involved in addressing cyber risks related to the financial sector and that they have regulations and guidance in this regard. Participants underlined the importance of a careful addressing of certain elements that are enumerated by operational risk schemes when setting regulatory frameworks by regulated institutions. Some of these elements are risk assessment and risk management; policies, procedures and controls; prevention, detection and reduction of vulnerability and security gaps; protection of information; security tests; backup sites and disaster recovery; business continuity planning; notice to regulators; independent review; and third-party risks. Seventy-two percent of the jurisdictions reported that they are planning to issue new regulations, which will include aforementioned operational risk elements, in the field of cyber security within the next year.

Speeding up its work on cyber resilience, the FSB prepared a Cyber Lexicon in 2018 to address cyber security and cyber resilience in the financial sector. Prepared to support the work of the FSB, other standard-setting bodies, jurisdictions and private sector participants, the Lexicon includes more than 50 terms in the field of cyber security along with their explanations and resources.<sup>5</sup> The Cyber Lexicon is not intended for use in the legal interpretation to provide legal explanations of any international arrangement or agreement. The Lexicon mainly aims to support the work to assess and monitor financial stability risks of cyber risk scenarios, to create a cross-sector common understanding of relevant cyber security and cyber resilience terminology, to allow information sharing, and to provide guidance related to cyber security, including identifying effective practices.

It is essential to have well-established response and recovery tools to reduce the impact of cyber incidents and minimize the risk of contagion to the financial system. Accordingly, after the stocktaking and Lexicon initiatives, the FSB decided to create a toolkit in 2018 to limit the risks to financial stability, taking into account the interconnectedness of the financial system. Responding to cyber incidents effectively and efficiently is critical in limiting risks related to financial stability. These risks could arise from interconnected information technology systems between multiple financial institutions or between financial institutions and third-party service providers, from loss of confidence in financial institutions, or from a failure to compensate for capital losses due to cyber-attacks. While developing its “Cyber Incident Response and Recovery” (CIRR) toolkit, the FSB evaluated responses of 58 external stakeholders to a public consultation. The outcome of the work was a toolkit published on 19 October 2020, describing the steps to be taken upon the detection of a cyber incident.<sup>6</sup> The CIRR toolkit, which includes all the necessary and effective practices for financial institutions to respond to cyber incidents and recover corrupted systems, makes suggestions to counter cyber incidents without intending to act as a standard and aims to summarize the practices that any organization can choose from, based on its size, complexity and risks. Consisting of seven components, the toolkit has been organized as a resource and a reference guide for 49 effective practices, using common cyber-taxonomies in a manner aligned to industry standards.

<sup>1</sup> <https://www.bis.org/cpmi/publ/d146.pdf>

<sup>2</sup> <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD633.pdf>

<sup>3</sup> <https://www.iaisweb.org/page/supervisory-material/application-papers/file/77763/application-paper-on-supervision-of-insurer-cybersecurity>

<sup>4</sup> <https://www.fsb.org/wp-content/uploads/P131017-2.pdf>

<sup>5</sup> <https://www.fsb.org/wp-content/uploads/P121118-1.pdf>

<sup>6</sup> <https://www.fsb.org/wp-content/uploads/P191020-1.pdf>

After the stocktaking of existing supervisory and regulatory practices, the FSB detected fragmentation across sectors and jurisdictions regarding what to report in the context of a cyber incident, what methods are available to measure the severity and impact of a cyber incident, and how the information obtained is used. Accordingly, the FSB published a report titled "Cyber Incident Reporting: Existing Approaches and Next Steps for Broader Convergence" on 19 October 2021 to ensure harmony and establish a standard in cyber incident reporting.<sup>7</sup> The report states that financial stability can be promoted through greater harmonization of regulatory reporting of cyber incidents. This harmonization can be achieved by building a common understanding of cyber events affecting the financial system, monitoring and effective supervision of cyber risks, and facilitating the coordination and sharing of information amongst authorities. In order to achieve greater convergence in cyber incident reporting, it is necessary to develop best practices, identify common types of information to be shared, and create common terminologies for cyber incident reporting. However, there may be challenges in establishing a standard in cyber incident reporting owing to reasons such as excessive operational burden, lack of appropriate and consistent quantitative and qualitative criteria, difficulty in making accurate assessments, inconsistency of definitions and taxonomy, and lack of a secure method of communicating.

Although cyber risks are different from operational risks, that could cause significant operational failures or wide-scale disruptions in financial markets, such as pandemics, technology failures and natural disasters, they can be addressed as a part of operational risks. As a matter of fact, on 31 March 2021, the BCBS republished its two documents (PSMOR and POR) on operational risk and operational resilience with revised content including vulnerabilities to cyber threats in order to better capture operational risks related to information and communication technologies.<sup>8</sup> In today's world, resilience to cyber incidents is a key component of the operational resilience of banks. Achieving cyber resilience requires banks to identify threats and potential failures and safeguard themselves. Cyber risks also cover those that may arise from third-party service providers. Therefore, the operational dependency of banks should also be taken into account while determining security measures against cyber-attacks targeting third-party service providers.

In order to highlight the importance of the subject, the BCBS issued a press release on 20 September 2021, calling on banks to improve their resilience to cyber threats.<sup>9</sup> In its release, the BCBS underlined that cyber threats and incidents have emerged as a growing concern for the banking sector over the past several years, posing risks to the safety and soundness of banks and the stability of the financial system. The increase in the number of third-party service providers such as cloud computing and FinTech, and in the financial services provided via digital channels, that is brought about by the impact of remote working arrangements, has enlarged banks' attack surfaces for malicious access. In this context, as set forth in its work plan, the BCBS has also announced that it will continue to monitor and assess developments in banks' cyber risk management and resilience, and to closely follow this subject and make assessments to help safeguard the confidentiality and integrity of banks' systems and data.

Although standard-setting organizations provide guidance on cyber resilience, they generally do not promote any particular tool, practice or framework, and welcome banks' adoption of tools that conform to sector standards and are used prevalently worldwide. The commonality of content and form among these tools is an indication of the global consensus reached on core cyber security principles, and most of the tools are made available to banks. Supervisory authorities are also expected to encourage banks to use the FSB's CIRR toolkit and Cyber Lexicon. In this way, banks will be able to monitor developments in cyber risk management and cyber resilience, and to safeguard the confidentiality, integrity and availability of systems and data against cyber threats. Thus, necessary steps will be taken to contain potential financial stability effects by promoting banks' safety and resilience. The rapidly evolving nature, scope, frequency, complexity and volume of cyber risks suggest that further steps need to be taken to increase resilience against cyber incidents and security threats.

<sup>7</sup> <https://www.fsb.org/wp-content/uploads/P191021.pdf>

<sup>8</sup> <https://www.bis.org/bcbs/publ/d515.pdf> - <https://www.bis.org/bcbs/publ/d516.pdf>

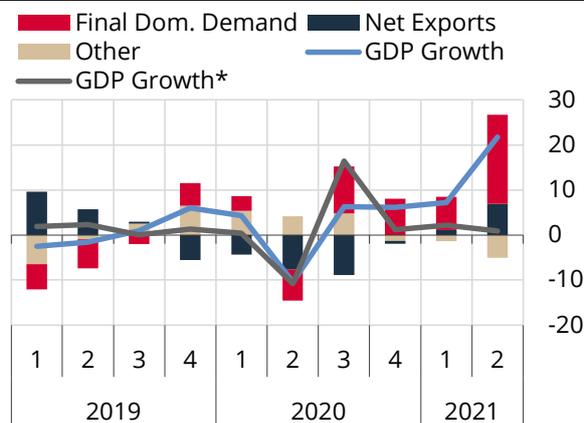
<sup>9</sup> [https://www.bis.org/publ/bcbs\\_nl25.htm](https://www.bis.org/publ/bcbs_nl25.htm)

## II.2 Main Domestic Macroeconomic Developments

**Economic activity lost some momentum in the second quarter due to pandemic related measures and tightening financial conditions, but was brisk in the third quarter on account of the external demand and the recovery in the services sector.**

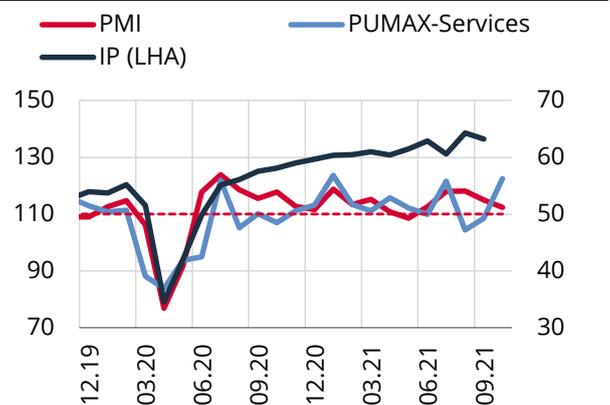
The robust recovery in economic activity observed since the third quarter of 2020 continued at a slower pace in the second quarter of 2021 compared to the previous quarter. In this period, net exports coupled with domestic demand had a significant contribution to annual growth (Chart II.2.1). GDP growth in the second quarter was 21.7% annually amid base effects, and 0.9% quarterly when adjusted for seasonal and calendar effects. According to leading indicators, economic activity displayed a strong course in the third quarter owing to the lifting of pandemic restrictions and external demand (Chart II.2.2). Industrial production rose by 1.6% on a quarterly basis and remained robust in this period, while the PMI index for manufacturing industry production indicates that the favorable outlook is sustained. With the waning pandemic restrictions and a faster vaccine rollout, recovery in the services sectors, with tourism in the lead, gained pace.

**Chart II.2.1: Annual GDP Growth and Contribution from the Expenditure Side**  
(% Points)



Source: TURKSTAT Last Observation: 2021Q2  
Note: The data with (\*) shows seasonally and calendar adjusted quarter-on-quarter percentage change.

**Chart II.2.2: Selected Indicators of Economic Activity** (Index)



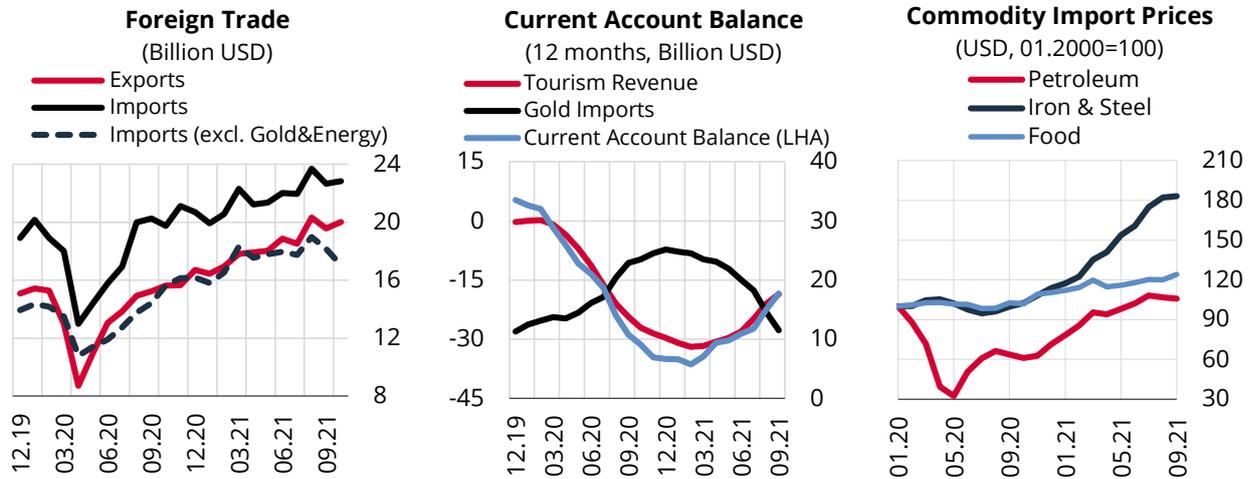
Source: CBRT, ISO, TURKSTAT, MUSIAD Last Observation: 10.21  
Note: Industrial Production Index (IPI, 2015=100) and the Services Sector Purchasing Managers' Index (PUMAX-Services) are seasonally and calendar adjusted. The dotted line shows the stable state in the Manufacturing Industry Purchasing Managers' Index (PMI) and PUMAX indices compared to the previous month.

**Despite the hike in international commodity prices, the current account balance improved significantly on account of favorable external demand conditions, the decline in gold imports and recovering tourism revenues.**

With the contribution of the recovering global economy and higher export prices, the strong uptrend in exports continued in the third quarter of the year, while the increase in imports excluding gold and energy slowed. Gold imports, one of the main determinants of the deterioration in the foreign trade deficit in 2020, have plummeted since the first quarter of 2021. Tourism revenues recovered in the summer of 2021 amid increased activity with the easing of pandemic measures and the spread of vaccination rollout on a global scale. Against this backdrop, the twelve-month current account deficit, which was USD 36.4 billion in February 2021, fell to USD 18.4 billion in September 2021. Meanwhile, the increase in commodity prices in international markets has accelerated as of the second quarter of the year. This has a negative effect on the external balance through the terms of trade channel. FX-based import prices have been on a rise in iron-steel and food products since mid-2020, and in crude oil and products thereof since the last quarter of 2020. The robust course in exports is expected to prop up the improvement in the current account balance

through the last quarter of the year, while the rise in commodity import prices limits the effect of the quantity-based balancing in foreign trade on the current account balance (Chart II.2.3).

### Chart II.2.3: Current Account Developments



Source: CBRT, TURKSTAT, Ministry of Trade

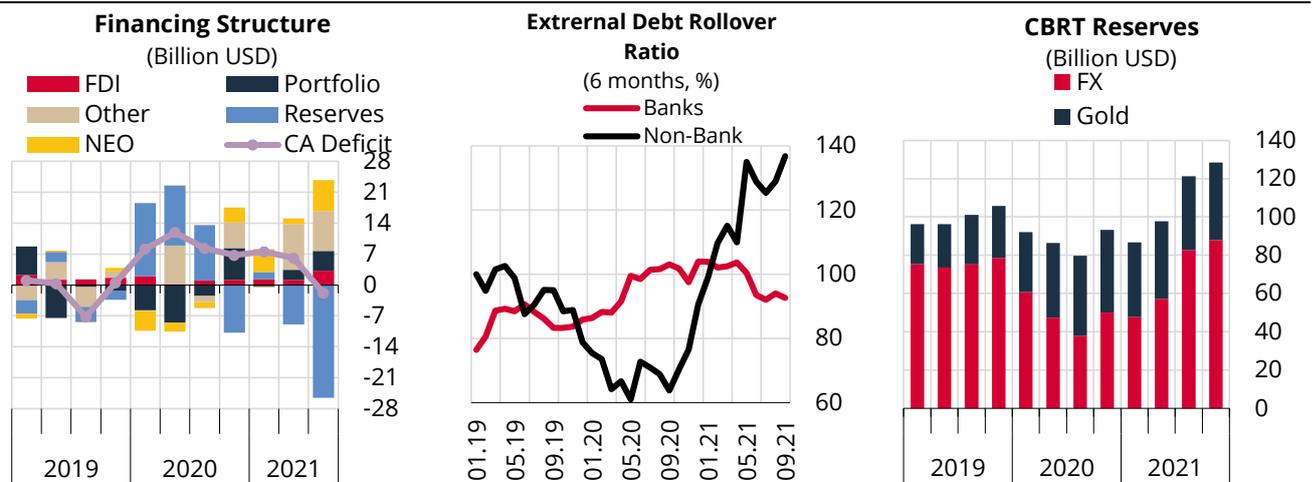
Last Observation: 09.21

Note: For foreign trade, seasonally adjusted and provisional exports (fob) and imports (cif) data as of October 2021 according to the general trade system have been used. Commodity import prices are calculated using unit value indices, where "Petroleum" includes oil and products imports, whereas "Food" includes food and livestock imports.

### Owing to the improvement in the current account balance coupled with the rise in other investments, the CBRT reserves continue to increase.

Since the last Report period, the financing need arising from the current account deficit has declined. In this period, direct investments improved, and portfolio flows, which declined in the first quarter of the year, recovered in the second and third quarters with the contribution of general government Eurobond issuances. Due to the increase in non-residents' deposits at the CBRT owing to the bilateral swap agreements and the use of SDR (Special Drawing Rights) as well as the external borrowing of the non-bank private sector, the current account was financed largely by other investments. Following the decline in financing needs and the rise in other investments, the CBRT reserves have increased by USD 35.1 billion since the beginning of 2021 to USD 128.4 billion as of 19 November 2021. This increase was led by cash and banks' deposits, while the use of SDR supported reserves (Chart II.2.4).

### Chart II.2.4: Financing Developments in the Balance of Payments



Source: CBRT

Last Observation: 09.21

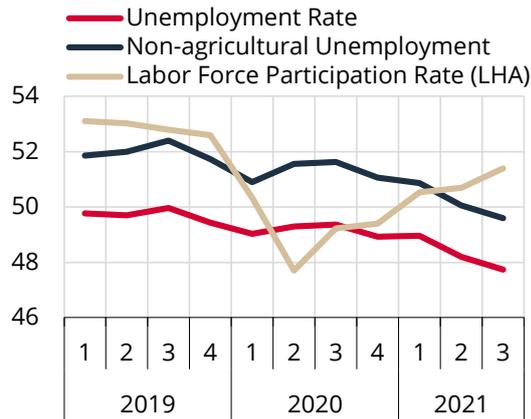
Last Observation: 19.11.2021

Note: "FDI", "Portfolio" and "Other" investments items are in net terms. The (-) sign in "Reserves" implies an increase. External debt rollover ratios are calculated on short and long-term total debt in a 6-month window. NEO: Net errors and omissions.

**The robust course of economic activity driven by the re-opening has a favorable effect on the labor market, while the budget balance is improving.**

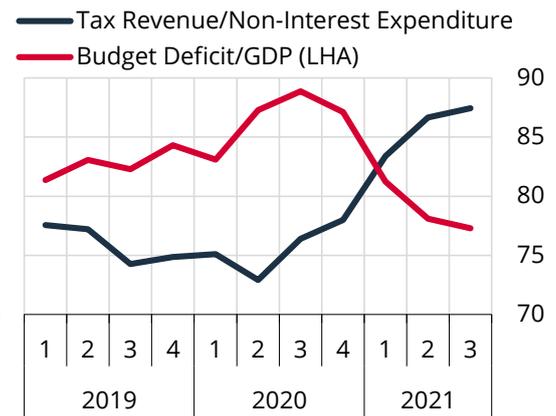
Seasonally-adjusted data suggests that the gradual downtrend in total and non-agricultural unemployment rates that started in the last quarter of 2020, continued as of the third quarter of 2021, and the rise in the labor participation rate limited the decline in the unemployment rate (Chart II.2.5). Public expenditures displayed a limited upward trend, while tax revenues increased on the back of the favorable course of economic activity. This improved the tax revenues' coverage ratio of primary expenditures, and enhanced the budget balance (Chart II.2.6).

**Chart II.2.5: Labor Market Indicators**  
(Seasonally Adjusted, %)



Source: TURKSTAT Last Observation: 2021 Q3

**Chart II.2.6: Central Government Budget Indicators**  
(12-Month Cumulative, %)

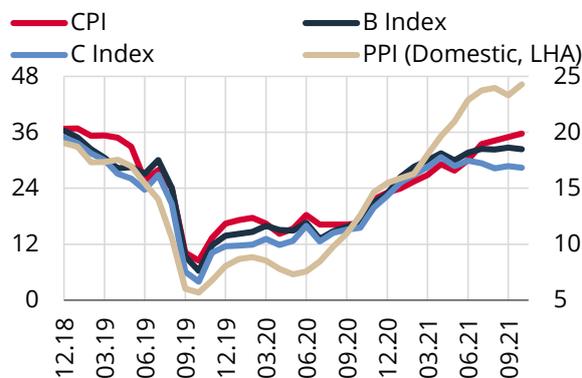


Source: MTF Last Observation: 2021 Q3  
Note: GDP data for 2021 Q3 is CBRT's estimate.

**Recent developments in inflation have largely been shaped by temporary supply-side factors.**

The consumer inflation remained high recently driven by supply side factors such as the rise in food and import prices as well as supply constraints, increases in administered prices, and demand developments due to re-opening (Chart II.2.7). Producer prices that increased further due to international commodity prices coupled with the course of energy prices, ongoing supply constraints and sustained problems in supply chains continues to weigh on consumer prices. Despite a slowdown in recent trends of core inflation indicators, high levels were maintained as of October 2021 (Chart II.2.8). Temporary factors affecting inflation in the short term are expected to persist through the first half of 2022.

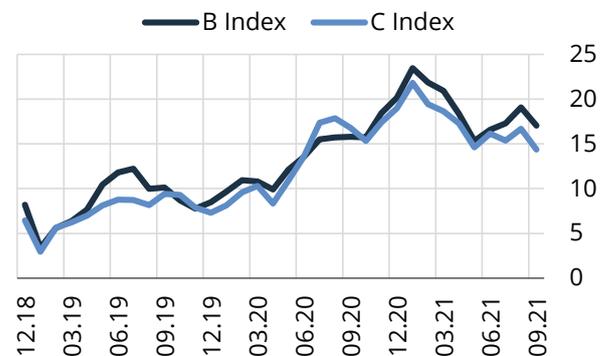
**Chart II.2.7: Inflation Developments**  
(Annual % Change)



Source: TURKSTAT Last Observation: 10.21

Note: The B index is obtained by subtracting unprocessed food products, energy, alcoholic beverages, tobacco and gold items from the CPI, and the C index is obtained by subtracting food and non-alcoholic beverages from the B index. CPI data are in the form of annual rate of change.

**Chart II.2.8: Core Inflation Trends**  
(Seasonally Adjusted, Annualized 3-Month Average % Change)



Source: TURKSTAT, CBRT Last Observation: 10.21

Note: B and C indices are calculated based on tax-adjusted data.

## Box II.2.1

### Steps Taken Towards Effective Functioning of Financial Markets

Supportive monetary and fiscal measures taken to limit the negative effects of the pandemic on the Turkish economy contributed to the recovery in financial stability and economic activity. These measures are being gradually eased as vaccination has recently gained momentum and the recovery in economic activity has grown more evident. On the other hand, in view of the persisting uncertainties about the course of the pandemic, implementation periods of certain supportive measures were extended.

Under main headings, this box summarizes the measures and regulatory steps taken in the current Report period to support financial stability and contribute to the effective functioning of markets (Table II.2.1.1).

**Table II.2.1.1: Major Measures and Regulations for Financial Markets**

#### 1. Policy Rate and Liquidity Management

Effective Date	Measure / Regulation
24.09.2021	One-week repo auction rate was reduced from 19% to 18%.
22.10.2021	One-week repo auction rate was reduced from 18% to 16%.
19.11.2021	One-week repo auction rate was reduced from 16% to 15%.

#### 2. Reserve Requirements (RR)

Effective Date <sup>1</sup>	Measure / Regulation
06.08.2021	The upper limit of the facility for holding FX was decreased from 20% to 10% of Turkish lira reserve requirements and it was announced that the said facility would be terminated on 1 October 2021. Reserve requirement ratios for FX deposits/participation funds were increased by 200 basis points for all maturity brackets. In addition, it was decided to keep FX deposits/participation funds exempt from reserve requirement liabilities that are available as of 25 June 2021 and converted to TL time deposits/participation funds after this date, and to apply an additional remuneration rate to TL-denominated required reserves to increase the share of TL in the total deposit/participation funds in the banking system.
24.09.2021	Within the scope of the remuneration rate to be applied to the TL-denominated RR and the additional remuneration to increase the share of TL in the total deposit/participation funds in the banking system, the remuneration rates set at the policy rate level were reduced by 100 basis points.
01.10.2021	The facility for holding FX for TL reserve requirements was terminated. The RR ratios for FX deposits/participation funds were increased by 200 basis points for all maturity brackets.
22.10.2021	Within the scope of the remuneration rate to be applied to the TL-denominated RR and the additional remuneration to increase the share of TL in the total deposit/participation funds in the banking system, all the remuneration rates were reduced by 200 basis points.
12.11.2021	The upper limit of the facility for holding standard gold for TL reserve requirements was reduced from 15% to 10% and it was announced that it will be gradually decreased and terminated. In addition, the RR ratios for FX deposits/participation funds were increased by 200 basis points for all maturity brackets.
19.11.2021	Within the scope of the remuneration rate to be applied to the TL-denominated RR and the additional remuneration to increase the share of TL in the total deposit/participation funds in the banking system, all the remuneration rates were reduced by 100 basis points.

### 3. Rediscount Credits for Export and Foreign Exchange Earning Services

Effective Date	Measure / Regulation
01.10.2021	<p>The conditions for utilization and repayment of rediscount credits for export and foreign exchange earning services were changed as follows:</p> <ul style="list-style-type: none"> <li>- The total rediscount credit limit was increased from USD 20 billion to USD 30 billion, of which, USD 20 billion was allocated to the credits to be extended via the Export Credit Bank of Turkey (Turk Eximbank), and USD 10 billion allocated to the credits to be extended via other banks. The TL equivalent of USD 5 billion of the aforementioned total limit can also be used for rediscount credits in TL.</li> <li>- Credits will be extended to net exporter firms with an export amount that exceeds the import amount by at least 10% in the last three years or the last year.</li> <li>- Credits can only be used for payments of the specified expenditures in TL.</li> <li>- Credit repayments will be made only with export proceeds.</li> <li>- The maximum maturity of credits was updated to 180 days from 240 days. For credits that are extended to finance exports to new markets, exports of high technology products and foreign exchange earning services, the maximum maturity remained 360 days.</li> <li>- The maximum commission rates that can be charged by intermediary banks was set as 100 basis points.</li> <li>- For firms that make a commitment to sell additional export proceeds to the CBRT, the interest rate applicable to the credit will be discounted.</li> </ul>
15.10.2021	<p>With the amendment to rediscount credits for export and foreign exchange earning services,</p> <ul style="list-style-type: none"> <li>- Firms operating in the defense industry sector were exempted from the condition that a maximum of 60% of the limits allocated to firms for rediscount credits can be utilized in maturities of 121 days and longer.</li> <li>- Two new maturity structures were established in TL rediscount credits as 60 days and 240 days.</li> <li>- For TL loans with an additional export proceeds commitment to sell, the portion corresponding to the minimum loan amount of that to be sold has to be sold within two months as of the drawdown period.</li> </ul>
27.10.2021	<p>With the amendment to rediscount credits for export and foreign exchange earning services,</p> <ul style="list-style-type: none"> <li>- the facility to use whole of the total credit program limit of USD 30 billion in FX or TL rediscount credits was introduced.</li> <li>- Usage options for TL rediscount credits are simplified and three alternatives are offered: additional export proceeds with no commitment to sell with a maturity of 0-180 days, additional single export proceeds with commitment to sell with a maturity of 0-180 days and additional double export proceeds with FX commitment to sell with a maturity of 181-360 days.</li> <li>-In addition to available alternatives in FX rediscount credits, a new utilization option with an extra commitment to sell export proceeds worth of the credit amount with a maturity of 181-360 days is also offered</li> </ul>

### 4. Deposits / Participation Funds, Credit Cards and Payment Systems

Effective Date	Measure / Regulation
01.06.2021	The discount period of the withholding tax rates applied in deposit/participation funds was extended until 31.07.2021.
30.07.2021	The discount period of the withholding tax rates applied in deposit/participation funds was extended until 30.09.2021.
04.08.2021	With a view to protect the smooth functioning and widespread use of the FAST System, the CBRT raised the upper transaction limit to TRY 2,000 from TRY 1,000. On the other hand, all necessary technical preparations and regulations were completed to allow Payment and Electronic Money Institutions along with banks under Law No. 6493 to participate in the FAST System, and requests for participation were received.
15.09.2021	As part of the Central Bank Digital Turkish Lira Research and Development Project, the process that started with the completion of the proof of concept moved to the next stage with the participation of technology stakeholders. Accordingly, the CBRT signed bilateral memorandums of understanding with ASELSAN, HAVELSAN and TÜBİTAK-BİLGEM, and established the "Digital Turkish Lira Collaboration Platform".

<sup>1</sup> The effective date in this part indicates the starting date of the RR maintenance period.

30.09.2021 The discount period of the withholding tax rates applied in deposit/participation funds was extended until 31.12.2021.

#### 5. Regulations Regarding Lending, Installments and Payment of Debts

Effective Date	Measure / Regulation
27.05.2021	The deadline for companies with a total risk of TRY 500 million or above, including new loan demand, to obtain a rating from banks was 30.06.2021. In view of the pandemic environment as well the available time and capacity of resources, the BRSA changed this deadline to 31.12.2021 to ensure that the loan allocation processes ran uninterrupted and the rating service costs to be incurred by the related companies were extended over time.
09.06.2021	With the Law on Restructuring of Certain Receivables and Amending Certain Laws, restructuring was allowed in a variety of debts. If the non-performing portion of the debt is paid or restructured by 31.12.2021 out of those which the principal or installment payment date is before 20.05.2021, the records kept at the TBB Risk Center regarding bad checks, protested promissory notes, credit cards and other loan debts of real and legal persons who are in default will not be taken into account by credit institutions and financial institutions in financial transactions with these persons.
01.07.2021	The maturity limits and loan-to-value ratios were redefined in consumer loans and financial leasing transactions extended for vehicle purchases. Accordingly, in these loans and financial leasing transactions, maturity limits have been reduced <ul style="list-style-type: none"> <li>- from 60 months to 48 months if final invoice value is TRY 120,000 and below,</li> <li>- from 48 months to 36 months if final invoice value is between TRY 120,000 and TRY 300,000 (inclusive),</li> <li>- from 36 months to 24 months if final invoice value is between TRY 300,000 and TRY 750,000 (inclusive),</li> <li>- from 24 months to 12 months if final invoice value is between TRY 750,000 and TRY 1,500,000 (inclusive).</li> </ul> The ratio of the loan amount to the value of the vehicle remained as 70% for vehicles with a final invoice value of TRY 120,000 or less. On the other hand, while for vehicles with a higher invoice value, the ratio was applied as 70% up to TRY 120,000 and 50% for the portion exceeding TRY 120,000 previously; it was reduced to <ul style="list-style-type: none"> <li>- 50% between TRY 120,000 and TRY 300,000 (inclusive),</li> <li>- 30% between TRY 300,000 and TRY 750,000 (inclusive),</li> <li>- 20% between TRY 750,000 and TRY 1,500,000 (inclusive),</li> <li>- 0% above TRY 1,500,000.</li> </ul>
01.07.2021	Periods for credit card installments were decided to be reduced <ul style="list-style-type: none"> <li>- from 6 months to 3 months in expenditures related to jewelry that is not in printed or bullion form,</li> <li>- from 12 months to 9 months in purchases of furniture and electrical appliances.</li> </ul> Periods were set at <ul style="list-style-type: none"> <li>- 9 months for TV purchases with prices between TRY 3,500 and TRY 5,000,</li> <li>- 4 months for TV purchases with prices above TRY 5,000 (inclusive).</li> </ul>
02.07.2021	The number of installments applicable in retail trade was rearranged by the Ministry of Commerce to be compatible with the limitations on credits and credit card installments.
16.09.2021	The general maturity limit for consumer loans above TRY 50,000 was reduced from 36 months to 24 months. Credits within this scope that were extended before this change were allowed to be restructured on the borrower's demand with a maximum limit of 36 months, even if the outstanding debt is above TRY 50,000.

#### 6. Classification of Loans and Receivables and Legal Ratio Limitations

Effective Date	Measure / Regulation
08.06.2021	With the amendment introduced to the Regulation on Measurement and Assessment of Capital Adequacy of Banks, the term "mortgage-covered securities" was replaced by "covered securities", and the conditions to be met in order for a risk to be included in the covered securities class and the conditions for issuing covered securities were determined. The risk weight to apply to covered securities was associated with the "credit quality grade" in covered securities rated by a credit rating agency, with "the risk of the issuer" in covered securities that have not been rated although the issuer had been rated; and was set as 100% otherwise.
08.06.2021	The Communiqué on Credit Risk Mitigation Techniques was amended in line with the arrangement in the Regulation on Measurement and Assessment of Capital Adequacy of

	<p>Banks of the same date concerning securities to be used as collateral against repo transactions. Previously, mortgage-covered securities were accepted as collateral in repo transactions if they meet the conditions laid down in the Communiqué. The new arrangement enabled the covered securities issued by the debtor to be accepted as collateral that meet the conditions laid down in the said Communiqué and the Regulation.</p>
30.06.2021	<p>Some of the temporary practices introduced to bank obligations to support the corporate sector, banks and their clients against the negative effects of the pandemic were terminated to monitor the indicators of the financial structure of the banking sector more transparently and to manage possible risks more effectively. Accordingly, the following practices were terminated:</p> <ul style="list-style-type: none"> <li>- If the net valuation differences of the banks' securities within the portfolio of "securities at fair value through other comprehensive income" are negative, these differences may not be taken into account in the equity amount to be used in the CAR calculation.</li> <li>- Provisions for decrease in value of marketable securities within the banks' portfolios may not be taken into account in the FXNGP/Equity calculation as of 23.03.2020.</li> <li>- The obligation to dispose of commodities and real estates within 3 years of the date of acquisition by banks may not be implemented.</li> <li>- The provision stipulating that loans that are restructured and classified as performing loans and whose principal and/or interest payments are past due by more than 30 days within the 1-year monitoring period or that are restructured once more within this monitoring period, are to be classified under loans with limited collection capability may not be implemented.</li> <li>- Loans that are acquired by the bank against a loan debt or paid in kind may be exempt from the provision of not being classified as performing receivables within the scope of the right to repurchase.</li> <li>- The 1-year monitoring period to be provided for restructured non-performing loans to be classified as a restructured receivable under Stage-2 Loans (loans under close monitoring) shall be taken into account as 6 months.</li> </ul>
01.07.2021	<p>The risk weights of personal credit cards and general purpose loans were increased. Accordingly, the risk weight, which was previously 75% in all maturity brackets,</p> <ul style="list-style-type: none"> <li>- was set as 100% for maturities of 1 to 6 months, and 150% for 6 months or longer maturities for personal credit cards,</li> <li>- as 100% for maturities of 1 to 12 months, and 150% for 12 months or longer maturities for general purpose loans.</li> </ul>
30.09.2021	<p>The BRSA abolished some of the temporary practices on some obligations for banks that were brought in in view of the adverse effects of the pandemic. These were,</p> <ul style="list-style-type: none"> <li>- the 90-day overdue period for loans to be classified as non-performing loans (NPL) to be 180 days, and the 30-day overdue period for loans to be classified as loans under close monitoring to be 90 days,</li> <li>- the facility for banks to define grace periods by not demanding their receivables, including the minimum amount, from the card holders during the period for which they postpone their card debts,</li> <li>- card issuers to have the discretion in closing credit cards for which the minimum amount is not paid for cash withdrawal and/or purchase of goods and services.</li> </ul>

## 7. Other Regulations

Effective Date	Measure / Regulation
25.05.2021	Duties and authorities of the Financial Stability and Development Committee were reviewed and it was restructured as the Financial Stability Committee.
12.08.2021	The CBRT and the Bank of Korea signed a Turkish Lira-Korean Won bilateral swap agreement. The swap agreement, the effective period of which is 3 years, allows for the exchange of local currencies between the two central banks of up to TRY 17.5 billion or KRW 2.3 trillion.
22.10.2021	Trading of USD/TL Futures and Options Contracts with Physical Delivery, Platinum and Palladium Futures Contracts, and Government Domestic Debt Securities Futures Contracts was facilitated on the BIST Derivates Market (VIOP).

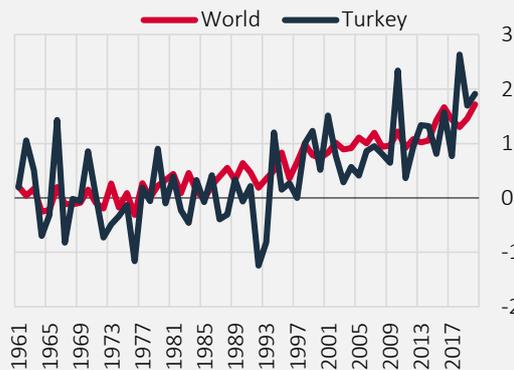
## Box II.2.II

### Opportunities and Risks for the Employment Market During the Transition to Green Economy

Climate change poses a major risk for social and economic life in all countries. Regardless of their development levels, many countries suffer the effects of unfavorable conditions caused by climate change. As temperatures rise, the frequency and destructiveness of extreme weather conditions such as droughts, floods, wildfires, and hurricanes are also increasing. In the recent past, Turkey also suffered from the devastating effects of climate change with the forest fires causing great loss in the Aegean and Mediterranean coasts, and the floods in the provinces of Sinop and Kastamonu. In the last 20 years, the mean temperature has increased by 1.7°C globally and by 1.9°C in Turkey with respect to the 1951-1980 period (Chart II.2.II.1).

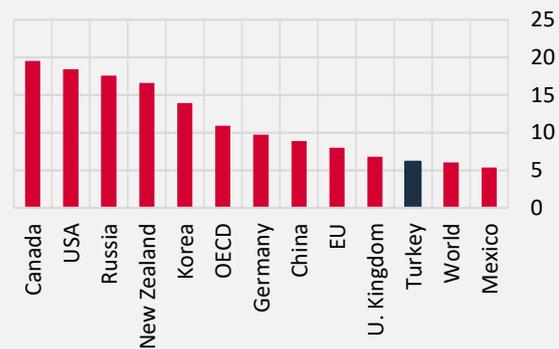
The rapid rise in greenhouse gas emissions produced by human activities is one of the leading drivers of climate change. As of 2018, the per capita greenhouse gas emission in Turkey lags behind many OECD countries and the EU (Chart II.2.II.2).

**Chart II.2.II.1: Mean Temperature Change** (°C, with respect to the 1951-1980 period)



Source: Food and Agriculture Organization Annual Mean Global Surface Temperature. Last Observation: 2020

**Chart II.2.II.2: Greenhouse Gas Emission Per Capita by Countries\*** (Million Tons of CO<sub>2</sub> equivalent, 2018)



Source: World Bank. Last Observation: 2019  
Note: (\*) Excludes land use, change in land use, and forestry.

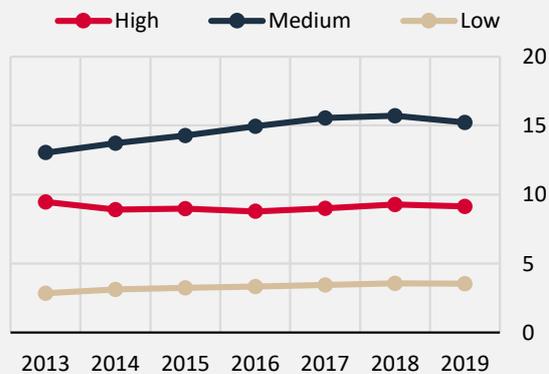
Achieving economic development by reversing the devastating effects of climate change can be possible by transitioning to green technology and energy resources that reduce greenhouse gas emissions. How this transition might affect the economies will differ depending on the economic structure of each country. Turkey is a net importer in greenhouse gas-intensive sectors, particularly in the energy and chemical products sectors. Therefore, the green transformation can be expected to affect the foreign trade balance positively in the long run. On the other hand, as the green transformation will lead to increases in the prices of inputs with high greenhouse gas emissions in their production and to incoming investments in new technologies compatible with the green economy, there will be cost pressures in sectors that use such inputs intensively. These cost pressures may have implications for the labor market and productivity. Another technology trend that accompanies the green transformation is the spread of labor-saving technologies. The green transformation may lead to employment loss in greenhouse gas-intensive sectors and closely related sectors. Although jobs to be created in sectors that enable the transition to green energy may potentially offset the employment loss, different knowledge and skill requirements may hinder the shift of those who lose their jobs to these sectors.<sup>1</sup> In particular, the low-skilled and informal workforce is at greater risk from such a transformation (OECD 2017, 2018; ILO 2018).

<sup>1</sup> In the transition to a circular economy, some of the recycling activities may also increase the demand for low-skilled workers. In this case, facilitating sectoral shifts rather than skill mismatch will be quite an important issue.

As observed in the automotive sector, if the complementarity between green transformation and labor-saving technologies is high, this transformation may cause greater cost and productivity problems in sectors where low-skilled and informal employment is predominant. On the other hand, companies that want to compensate for the costs of green technology transformation may weaken the demand for skilled labor by opting more for informal labor. This can increase the natural rate of unemployment in a labor market where the share of high-skilled workforce in the working population has increased.

To discuss the possible effects of green transformation on labor markets, this box examines the labor and productivity structure of sectors that use greenhouse gas-intensive inputs in their production processes. Greenhouse gas-intensive inputs are produced by the energy, agriculture, chemical products, cement and mining sectors, which account for most of the greenhouse gas emissions. The measure for greenhouse gas input intensity of these sectors has been obtained by calculating the share of greenhouse gas-intensive inputs in the total input cost from the administrative records consisting of firm-to-firm trade transactions. Sectors have been categorized into three groups based on their greenhouse gas intensity: sectors with high intensity (those in the top 25%), sectors with medium intensity (those between the top and bottom 25%), and sectors with low intensity (those in the bottom 25%). Charts II.2.II.3 and II.2.II.4 show the total and informal employment calculated from the Household Labor Force Survey data, in a breakdown of sector groups by greenhouse gas input intensity. Accordingly, sectors with medium greenhouse gas intensity account for the largest share of employment at 54%, followed by sectors with high greenhouse gas intensity with a share of 33%. However, the majority of informal employment is covered by sectors that largely depend on greenhouse gas-intensive inputs. The informality rate is 54%, 30%, and 23% in sectors with high, low, and medium greenhouse gas intensity, respectively.<sup>2</sup> This may cause green transformation-driven cost pressures to lead to fragilities in the employment of low-skilled workers or increases in informal labor demand.

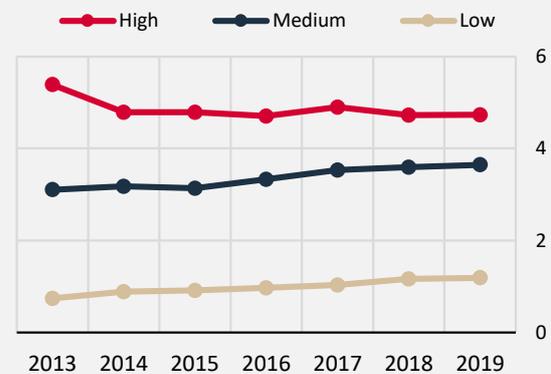
**Chart II.2.II.3: Total Employment by Greenhouse Gas Intensity of Sectors**  
(Million-persons)



Source: TURKSTAT, CBRT calculations

Last Observation: 2019

**Chart II.2.II.4: Informal Employment by Greenhouse Gas Intensity of Sectors**  
(Million-persons)



Source: TURKSTAT, CBRT calculations

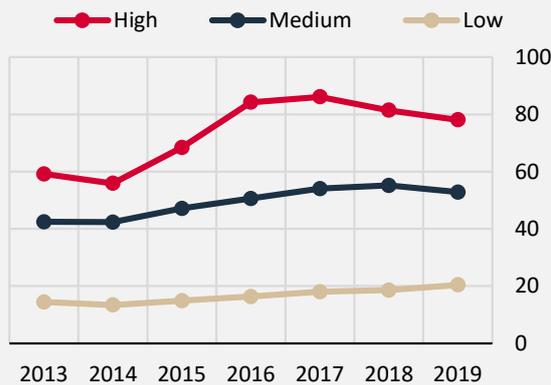
Last Observation: 2019

<sup>2</sup> The agricultural sector is the driver of informal employment in the high-intensity group. Therefore, cost increase trends that are expected to strengthen in the agricultural sector during the green transformation have the potential to affect household welfare through the consumer prices channel in addition to the labor markets channel.

These cost pressures may also affect productivity trends. When labor productivity is defined as the value added per worker, it is observed that the sectors with high greenhouse gas input intensity, which account for the majority of informal employment, are at the same time the most productive ones (Chart II.2.II.5).<sup>3</sup> On the other hand, these sectors may make significant contributions to total productivity increases, as was the case in the 2014-2017 period (Chart II.2.II.6). Thus, cost pressures in sectors with high greenhouse gas intensive inputs and employment risks have the potential to affect productivity developments as well.

Turkey's recent strong economic growth performance relies on conventional energy resources and technologies. While the green transformation offers opportunities to strengthen the production structure through the structural reduction of foreign trade deficits in the energy and petrochemical sectors on the one hand, it also has the possibility to affect labor markets and productivity trends due to the necessary technological transformation and cost pressures in the transition process. The sectors whose input composition includes more products with high greenhouse gas emission account for a major portion of informal employment, and they make the largest contribution to the productivity increase. The ratification of the Paris Agreement represents determination on the issue of transformation. For the transition process to support price stability, labor markets and productivity, it is essential to develop mechanisms to reflect possible increases in main input costs to producers at a slower pace and lower rate, to encourage technology investments that will increase the skilled labor demand, and to introduce policies that will enhance the shift of low-skilled labor between jobs and sectors.

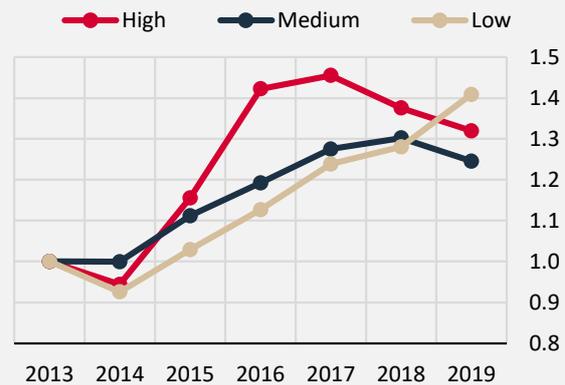
**Chart II.2.II.5. Real Value Added Per Worker** (at 2013 prices, TRY 1,000)



Source: TURKSTAT, CBRT calculations

Last Observation: 2019

**Chart II.2.II.6. Real Value Added Per Worker** (2013=1)



Source: TURKSTAT, CBRT Calculations

Last Observation: 2019

## References

ILO. (2018). World employment and social outlook 2018: Greening with jobs

OECD. (2017). Employment Implications of Green Growth: Linking jobs, growth, and green policies. OECD Report for the G7 Environment Ministers

OECD. (2018). Energy Transition: Implications for jobs and social inclusion. Discussion Note, The Third Annual Meeting of the GREEN Action Task Force 22-23 October 2018, Bratislava

<sup>3</sup> Value added is value added at factor cost published under the Annual Industry and Services statistics. Employment figures by sectors have been obtained from the Household Labor Force Survey and include all formal and informal workers. Prices have been deflated by the producer price index. The productivity average in each greenhouse gas intensity group has been calculated by weighting it with the employment of the sectors.