4. Supply and Demand Developments

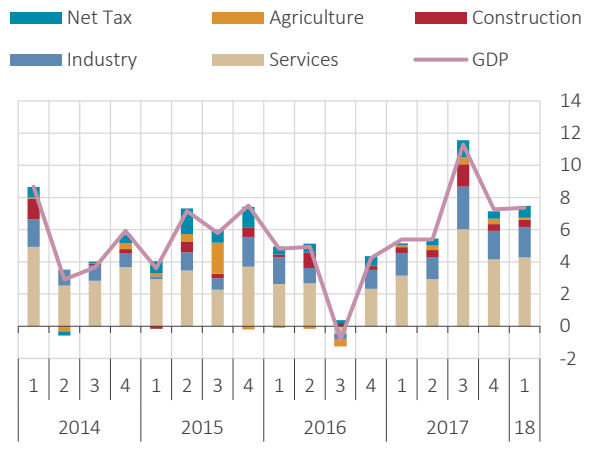
In the first quarter of the year, economic activity remained strong. Domestic demand, particularly private consumption, was the main driver of quarterly growth. Investments had a rather moderate contribution to growth due to weakened machinery-equipment investments. On the foreign demand side, exports and imports of goods and services both declined quarter-on-quarter but net exports nevertheless positively contributed to quarterly growth as the decline in imports was sharper.

Second-quarter indicators suggest that economic activity lost pace, entered a rebalancing process, and started converging to its underlying trend. The depreciation of the Turkish lira, the tightening in financial conditions, and perceptions of uncertainty are projected to rein in domestic demand in the second quarter through private consumption and investment channels whereas the accommodative stance of the public sector is expected to partially limit this slowdown. On the other hand, net exports continue to support growth with the contribution of the robust recovery in tourism. However, the persistently high levels of financial volatility and perceptions of uncertainty keep the downside risks to the magnitude and duration of the slowdown in economic activity alive.

4.1 Supply Developments

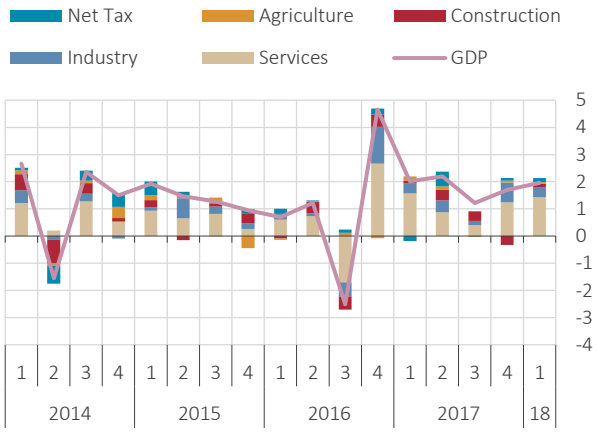
In the first quarter of 2018, Gross Domestic Product (GDP) grew by 7.4 percent year-on-year and by 2.0 percent quarter-on-quarter in seasonally and calendar-adjusted terms. This GDP growth indicates that economic activity remains strong, even a little stronger than projected. On the production side, all subcategories had an upward effect on the year-on-year growth in the first quarter (Chart 4.1.1). In this period, in addition to strong domestic demand, industrial sector and services sector value added posted a large quarter-on-quarter increase, the increase in the latter one driven by the recovery in tourism, whereas the quarterly increase in construction sector and agricultural sector value added remained rather limited (Chart 4.1.2).

Chart 4.1.1: Contributions to Y-o-Y GDP Growth from the Production Side (% Point)



Source: CBRT, TURKSTAT.

Chart 4.1.2: Contributions to Quarterly GDP Growth from the Production Side (Seasonally Adjusted, % Point)



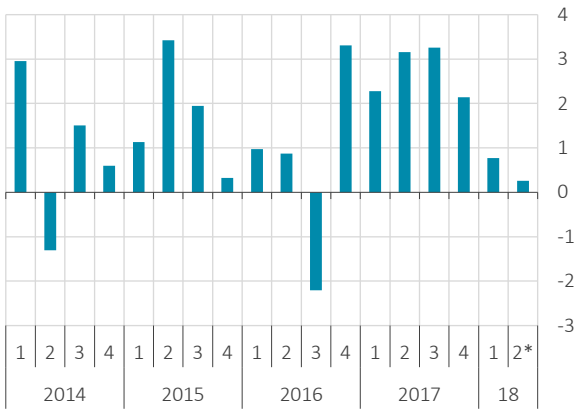
Source: CBRT, TURKSTAT.

Production indices signal a slowdown in economic activity in the second quarter. This slowdown has spread across all major sectors constituting GDP due to the volatility in financial markets and the consequently increasing perception of uncertainty. In the April-May period, industrial production slightly increased compared to the first quarter (Chart 4.1.3). During the same period, production increases in exporting sectors continued whereas domestically-oriented sectors, particularly sectors closely affiliated to construction, experienced a deceleration. Survey indicators suggest a June outlook that is similar to

May outlook (Chart 4.1.4). Accordingly, the deceleration in the second quarter is projected to be probably stronger than implied by April-May data.

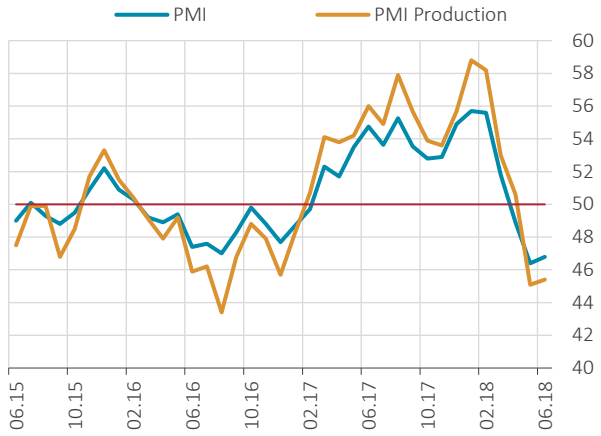
Considering the decrease in the production of construction-affiliated sectors together with the falling employment rates in the construction sector in April, it is envisaged that the construction sector value added will contribute less to growth in the second quarter relative to previous periods (Chart 4.1.5, Chart 4.3.4).

Chart 4.1.3: Industrial Production Index
(Seasonally Adjusted, Quarterly % Change)



Source: TURKSTAT.
* As of the April-May period.

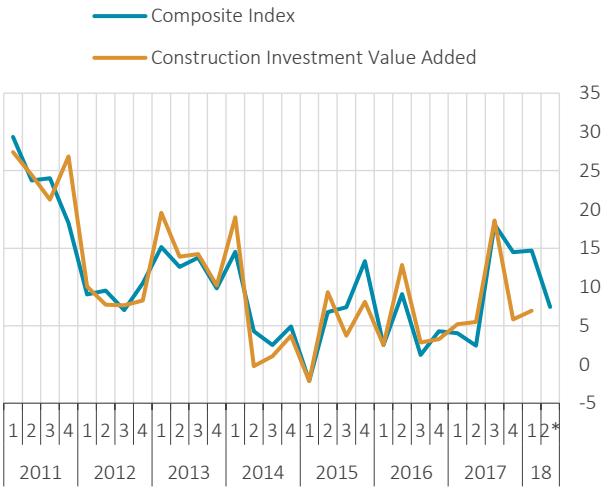
Chart 4.1.4: PMI and PMI Production
(Seasonally Adjusted, Level)



Source: IHS Markit.

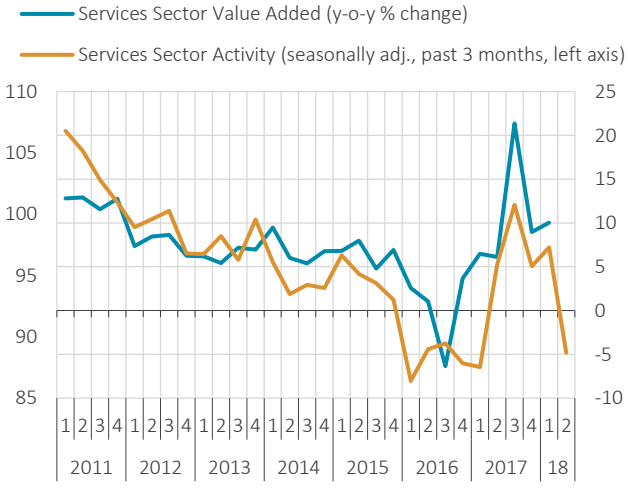
Services sector indicators hint at a slowdown in sectoral value added similar to the case in industrial and construction sectors (Chart 4.1.6). It is judged that in this period there was weakening in financial services due to sluggish loan utilization as well as in industry-related services subcategories. On the other hand, the favorable outlook in tourism-related subcategories is expected to continue on the back of the robust recovery in tourism. The pickup in employment in these sectors also confirms this evaluation (Chart 4.3.6).

Chart 4.1.5: Construction Sector Value Added and Composite Index** (Y-o-Y % Change)



Source: TURKSTAT.
* As of May.
** Construction sector composite index is measured by the annual percentage change in domestic real revenues in fabricated metals and mineral products. Weights are obtained from linear regression.

Chart 4.1.6: Services Sector Activity and Value Added*

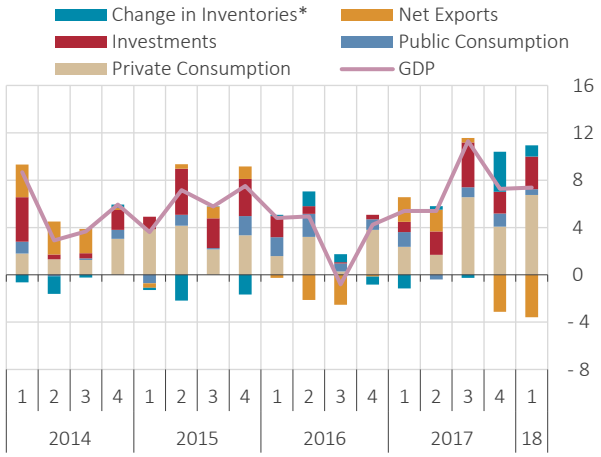


Source: TURKSTAT.
* Services sector activity is measured by the question on services sector activity (in the last 3 months) under sectoral confidence indices.

4.2 Demand Developments

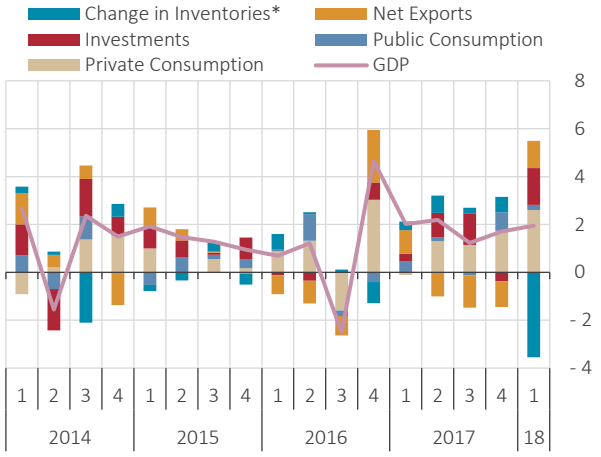
An analysis of 2018Q1 data in terms of expenditures reveals that year-on-year and quarter-on-quarter growth were both driven by domestic demand (Chart 4.2.1 and Chart 4.2.2). In this quarter, private consumption sharply increased year-on-year and quarter-on-quarter due to the improvement in the labor market while public consumption provided a rather moderate contribution to growth. Investments had a construction-driven positive effect on quarterly growth whereas machinery-equipment investments dropped compared to the previous quarter. Exports registered no significant year-on-year change while imports of goods and services substantially increased. Accordingly, net exports weighed on annual growth. In quarterly terms, exports and imports of goods and services both slackened. However, since the fall in imports was more salient than the fall in exports, net exports had an upward effect on quarterly growth. The ongoing strong performance of gold imports contained the contribution of net exports to growth.

Chart 4.2.1: Contributions to Y-o-Y Growth from the Expenditure Side (% Point)



Source: CBRT, TURKSTAT.
* Change in inventories denotes inventories and statistical discrepancy due to the use of chain-linked index.

Chart 4.2.2: Contributions to Quarterly GDP Growth from the Expenditure Side (% Point)

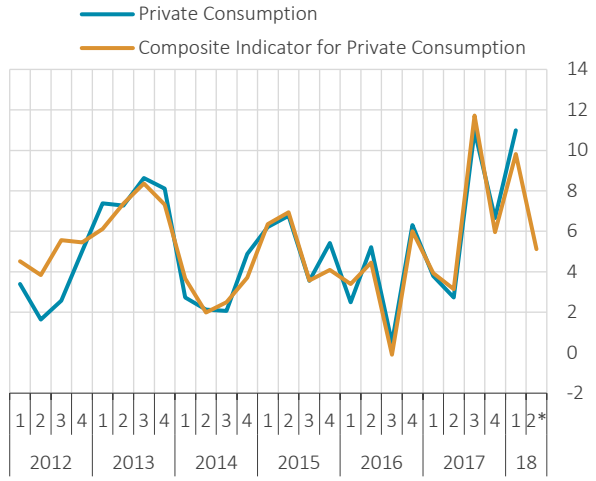


Source: CBRT, TURKSTAT.
* Change in inventories denotes inventories and statistical discrepancy due to the use of chain-linked index.

Indicators for the second quarter suggest a rebalancing in economic activity. The depreciation of the Turkish lira, the increase in financial volatility, the rise in perceptions of uncertainty and financing costs, and the uptrend in inflation are anticipated to put a brake on domestic demand through consumption and investment expenditures channels. Yet, this deceleration in domestic demand is expected to be partially offset by the accommodative stance of the public sector that supports economic activity through expenditures and other fiscal measures. On the other hand, the positive contribution of net exports to growth continues as a result of the ongoing robust recovery in tourism and the downtrend in import demand triggered by the slowdown in domestic demand.

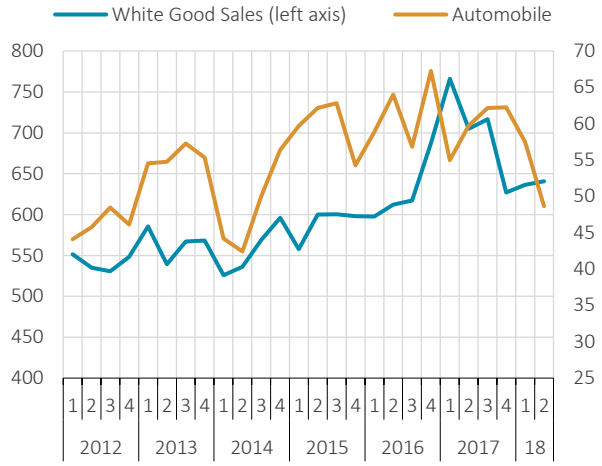
Indicators point to a deceleration in private consumption demand in the second quarter (Chart 4.2.3). This deceleration is attributed to price hikes caused by the depreciation in the Turkish lira, the fall in consumer confidence, and the increase in loan rates. As a matter of fact, the weakening is more pronounced in durable goods consumption which is intensely affected by these factors (Chart 4.2.4). On the other hand, the improvement in the labor market due to employment increases and the robust recovery in tourism have created a more favorable outlook in non-durable goods consumption. Nevertheless, as of the April period, non-durable goods consumption also lost pace quarter-on-quarter due to the interrupted uptrend in non-farm employment in the second quarter.

Chart 4.2.3: Private Consumption and Composite Indicator for Private Consumption** (Y-o-Y % Change)



Source: ODD, CBRT, TURKSTAT, TURKBESD.
* As of May.
** The Composite indicator is the weighted average of the annual percentage changes in real turnover in non-durable goods, durable goods import quantity index, automobile sales, and retail sales volume index. Weights are obtained from linear regression.

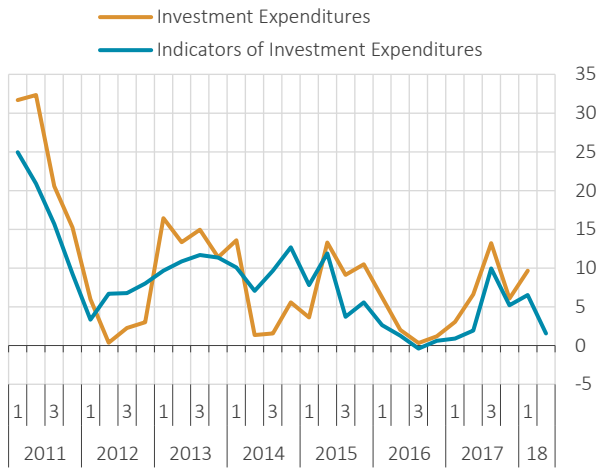
Chart 4.2.4: Automobile and White Goods Sales (Seasonally Adjusted, Average, Thousand)



Source: ODD, CBRT, TURKBESD.

Leading indicators of investment expenditures signal a more visible downturn in the second quarter compared to consumption (Chart 4.2.5). Financial volatility-driven perceptions of uncertainty and tightening financial conditions are believed to be the main factors curbing investments. The fall in investments is projected to become widespread, and machinery-equipment investments are anticipated to be more sluggish than construction investments. On the other hand, investment tendencies of export-oriented sectors remain stronger than those of other sectors despite a slight fall over the previous quarter (Chart 4.2.6).

Chart 4.2.5: Investment Expenditures and Composite Indicator for Investment Expenditures** (Y-o-Y % Change)



Source: CBRT, TURKSTAT.
*As of May
** The composite indicator for investment expenditures is the average of the annual percentage changes in production of capital goods, production and imports of non-metallic mineral products as well as commercial vehicle sales, housing sales, construction sector orders, commercial loan rate and FX-denominated loans, and capacity utilization rate series (manufacturing, services, trade, construction).

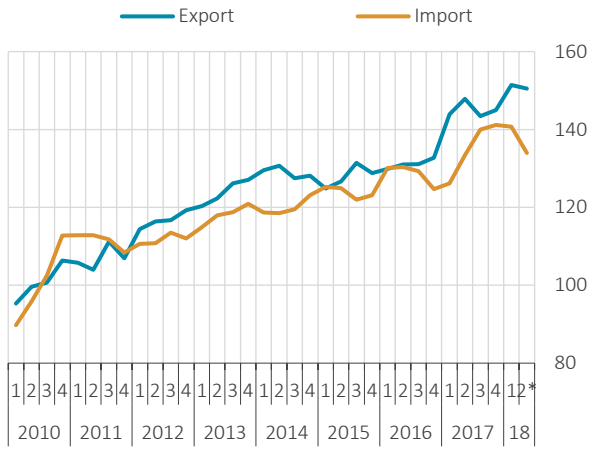
Chart 4.2.6: Fixed Capital Investment Tendency by Sectors Based on BTS (Seasonally Adjusted, Up – Down, %)

Source: CBRT.

* As of July.

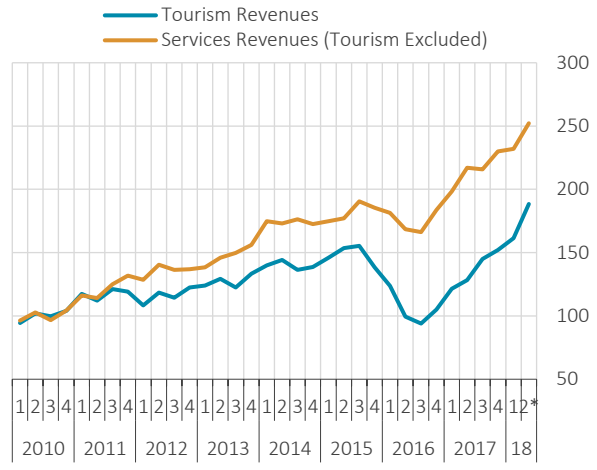
The boosting effect of net exports on quarterly growth is expected to continue in the second quarter. Strong foreign demand, supportive course of the real exchange rate, and foreign market diversification flexibility continue to affect exports of goods positively. Meanwhile, the depreciation of the Turkish lira and the slowdown in domestic demand have pulled import demand down (Chart 4.2.7). On the other hand, the persistence of the robust recovery in tourism reinforces exports via the services revenues channel (Chart 4.2.8). Exports of goods and services are expected to sustain their strong support to growth and favorably affect the current account balance in the upcoming period.

Chart 4.2.7: Quantity Indices for Imports and Exports
(Excl. Gold, Seasonally Adjusted, 2010=100)



Source: CBRT, TURKSTAT.
* Forecast for June.

Chart 4.2.8: Tourism and Services Revenues
(Real, Seasonally Adjusted, 2010=100)



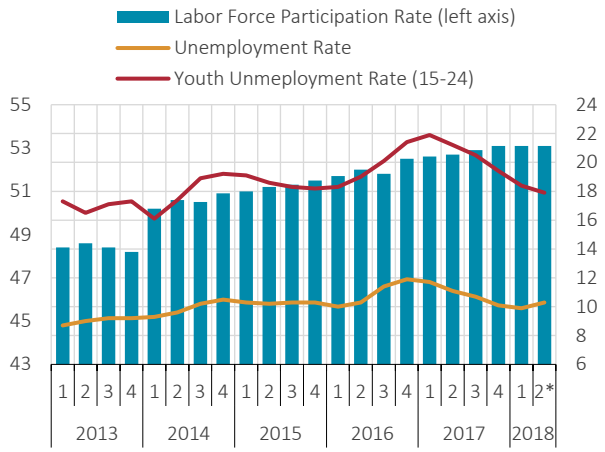
Source: CBRT, TURKSTAT.
* Forecast for June.

To sum up, while growth in the first quarter of 2018 proved a little stronger than projected, second-quarter data suggest that economic activity is slowing down and converging to its underlying trend. Yet, the ongoing robust recovery in tourism and the accommodative stance of the public sector are expected to partially contain this slowdown. However, the persistently high levels of financial volatility and perceptions of uncertainty keep the downside risks to the magnitude and duration of the slowdown in economic activity alive.

4.3 Labor Market

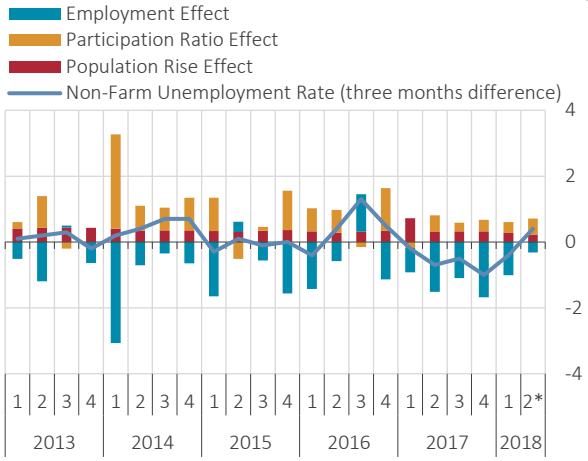
The downtrend in unemployment rates continued from 2017 through the first quarter of 2018. In the first quarter, seasonally adjusted total and non-farm unemployment rates dropped quarter-on-quarter by 0.2 and 0.4 points to 9.9 percent and 11.7 percent, respectively (Chart 4.3.1). Thus, based on raw data, the year-on-year decrease was 2.0 points in total unemployment and 2.4 points in non-farm employment. This was due to the lack of any major change in the labor force participation rate despite the employment increases across all sectors compared to the previous quarter (Chart 4.3.2). In the April period covering March, April and May, the uptrend in employment and the downtrend in unemployment rates halted, and seasonally adjusted total and non-farm unemployment rates rose quarter-on-quarter by 0.4 and 0.5 points to 10.3 percent and 12.2 percent, respectively.

Chart 4.3.1: Unemployment and Labor Force Participation Rates (Seasonally Adjusted, %)



Source: TURKSTAT.
* As of the April period.

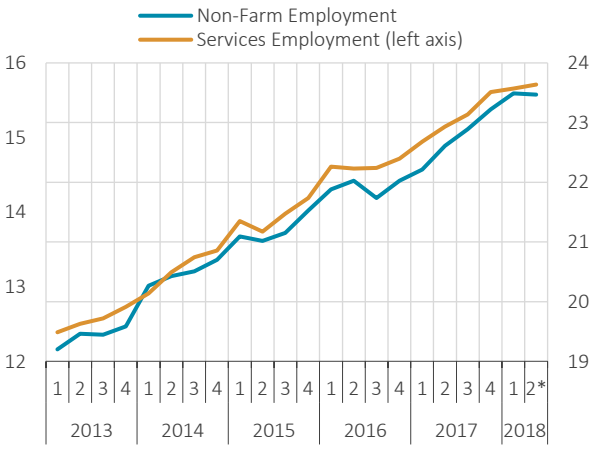
Chart 4.3.2: Contributions to Quarterly Changes in Non-Farm Unemployment (Seasonally Adjusted, % Point)



Source: TURKSTAT.
* As of the April period.

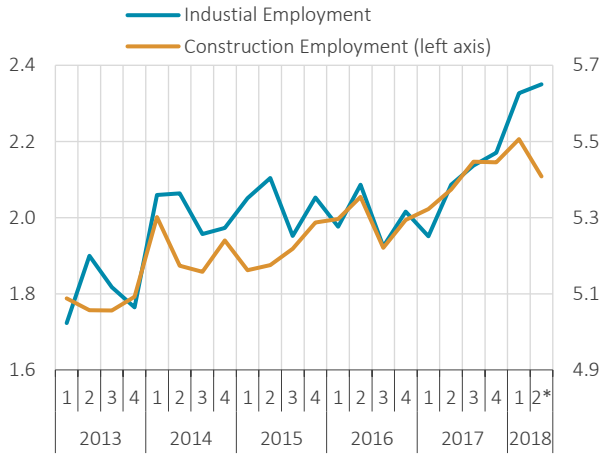
In the first quarter of 2018, approximately 1.2 million new people became employed compared to the same period last year. Non-farm employment received the largest contribution from the industrial sector in this quarter (Chart 4.3.3 and Chart 4.3.4). The sectoral employment outlook is consistent with the strong performance of sectors providing input for the construction sector and the overall manufacturing industry in the first quarter. The robust course of industrial production has also significantly affected employment in the sector, particularly since the second half of 2017. Sectoral diffusion of the manufacturing industry growth accompanied by the pickup in relatively more labor-intensive sectors are believed to be influential in this development (Chart 4.3.5). In the April period, construction sector employment slumped quarter-on-quarter whereas employment in services and industrial sectors moderately increased. This slowdown in employment is consistent with the rebalancing process in economic activity.

Chart 4.3.3: Non-Farm and Services Employment (Seasonally Adjusted, Million People)



Source: TURKSTAT.
* As of the April period.

Chart 4.3.4: Industrial and Construction Employment (Seasonally Adjusted, Million People)

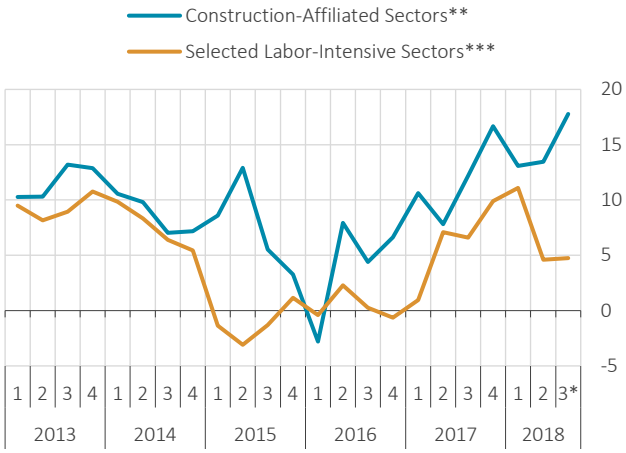


Source: TURKSTAT.
* As of the April period.

The services sector employment, which has been feeble since early 2018, slightly rose from the first quarter to the April period. In its subsectors, different trends are noted. The sound recovery in tourism in 2018 positively affects accommodation and catering services employment. Meanwhile, the impact of the accommodative stance of the public sector has become visible in employment in public administration

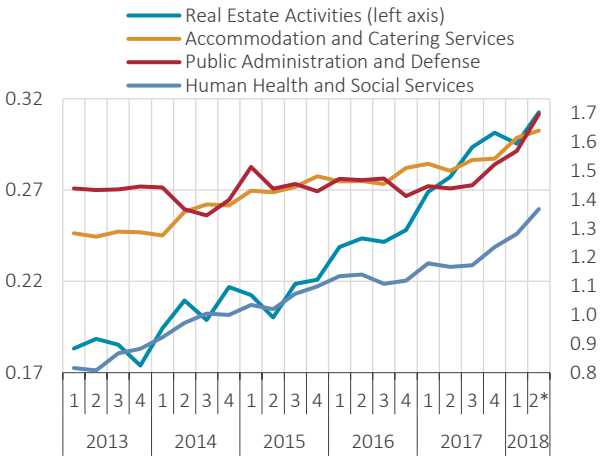
and defense sectors as well as in human health and social services sectors. In addition, employment in the construction-affiliated real estate sector has been steadily increasing (Chart 4.3.6).

Chart 4.3.5: BTS Employment Expectation by Sectors for the Next 3 Months (Up-Down, Seasonally Adjusted, %)



Source: BTS, CBRT.
* As of July.
** Construction-affiliated sectors include rubber and plastics, minerals, basic metal and fabricated metal.
*** Labor-intensive sectors include textile, clothing, leather and furniture.

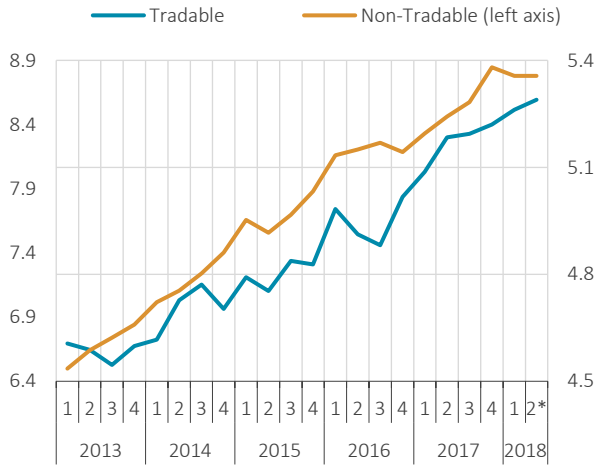
Chart 4.3.6: Employment in Selected Services Subsectors (Seasonally Adjusted, Million People)



Source: CBRT, TURKSTAT.
* As of the April period.

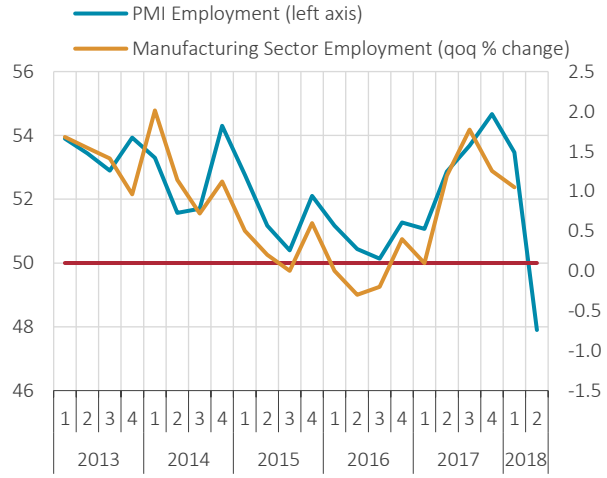
A breakdown of services subsectors by tradable and non-tradable also reveals different trends. Employment in wholesale-retail trade and transport-storage sectors keeps steadily increasing in conformity with the foreign trade outlook. Alternatively, employment in relatively closed services subsectors displays an outlook that is consistent with the deceleration in domestic demand (Chart 4.3.7).[1]

Chart 4.3.7: Employment in Selected Services Subsectors (Seasonally Adjusted, Million People)



Source: TURKSTAT.
* As of the April period.

Chart 4.3.8: PMI and Manufacturing Industry Employment (Seasonally Adjusted)

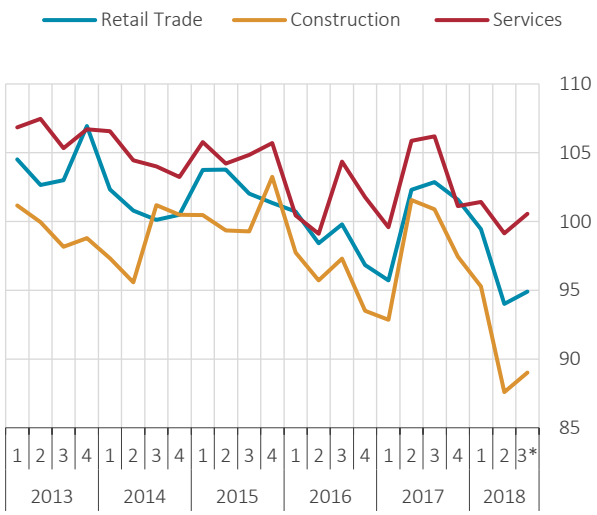


Source: IHS Markit, TURKSTAT.

[1] Tradable sectors include wholesale and retail trade, repair of motor land vehicles and motorcycles, and transport and storage subsectors while non-tradable sectors include public administration and defense, real estate activities, information and communication, financial and insurance activities, professional, scientific and technical activities, administrative and support service activities, educational, cultural, artistic, entertainment, recreational, sport and other services activities, activities of households as employers, goods and manufacturing activities of households that are not earmarked for their own use, and activities of international organizations and agencies.

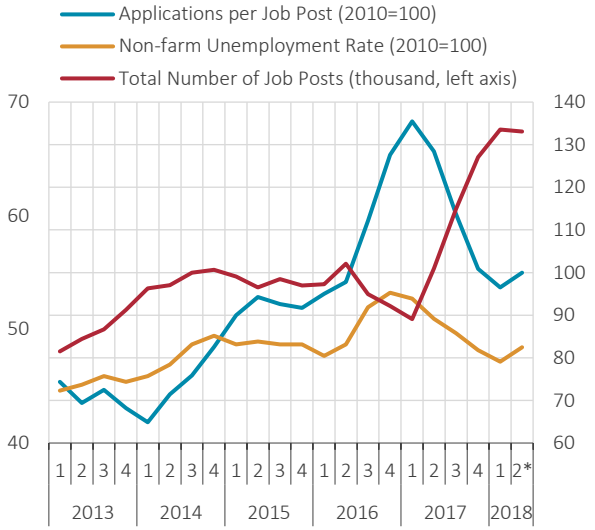
Leading indicators for the labor market signal a sustained deceleration in employment, and it is notable that this outlook prevails across all sectors. In the second quarter of 2018, the PMI employment hit the lowest level since the second quarter of 2009, which indicates that the manufacturing sector employment may significantly weaken in the upcoming period (Chart 4.3.8). Employment expectations for the next 3-month period reveal that employment expectations have also deteriorated in the services subsectors (Chart 4.3.9). Data from Kariyer.net indicate that the total number of job applications increases faster than the total number of job posts. Consequently, the number of applications per job post, a measure that moves close to the unemployment rate, started increasing in the second quarter (Chart 4.3.10). In this context, it is projected that employment opportunities will be subdued in the upcoming period and unemployment rates will keep increasing after the April period.

Chart 4.3.9: Expected Number of Employees by Sectors for the Next 3 Months (Seasonally Adjusted)



Source: CBRT, TURKSTAT.
* As of July.

Chart 4.3.10: Total Number of Job Posts, Applications per Job Post, and Non-Farm Unemployment Rate (Seasonally Adjusted)

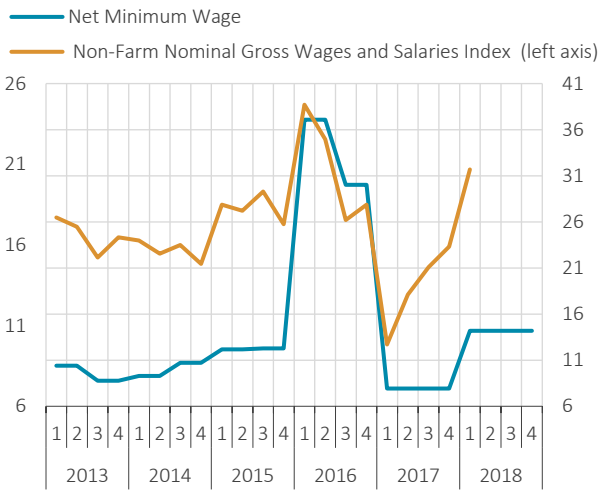


Source: Kariyer.net, CBRT.
* Non-farm unemployment rate is as of the April period.

4.4 Wages and Productivity

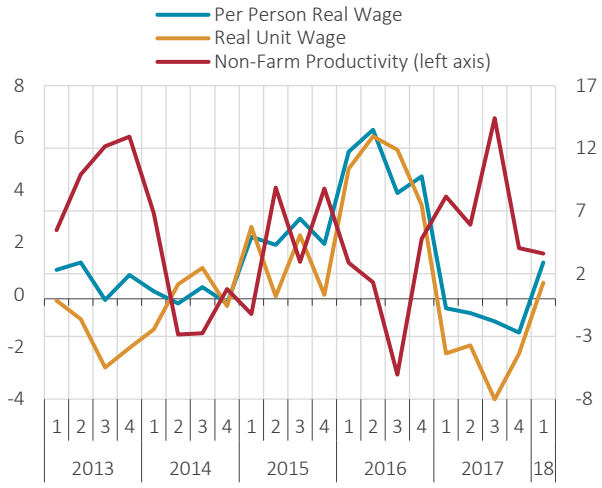
In the first quarter of 2018, the growth rate of wages accelerated (Chart 4.4.1). The 14.2-percent raise in the minimum wage in 2018 has also elevated other wages. In this period, the annual rate of increase in non-farm nominal gross wage and earnings index stood at 20.7 percent while the average annual rate of increase in consumer inflation was 10.3 percent. This led to a substantial rise in real wages in the first quarter of 2018. Meanwhile, the partial labor productivity growth in the non-farm sector limited real unit labor costs. In the first quarter of 2018, the value-added-based partial labor productivity (value added as a ratio of employment) and real wage per person surged year-on-year by 1.6 percent and 2.9 percent, respectively (Chart 4.4.2). Accordingly, real unit wages (real wage per person/productivity) rose.

Chart 4.4.1: Non-Farm Nominal Earnings Index and Net Minimum Wage (Nominal, 2015=100, Y-o-Y % Change)



Source: CBRT, TURKSTAT.

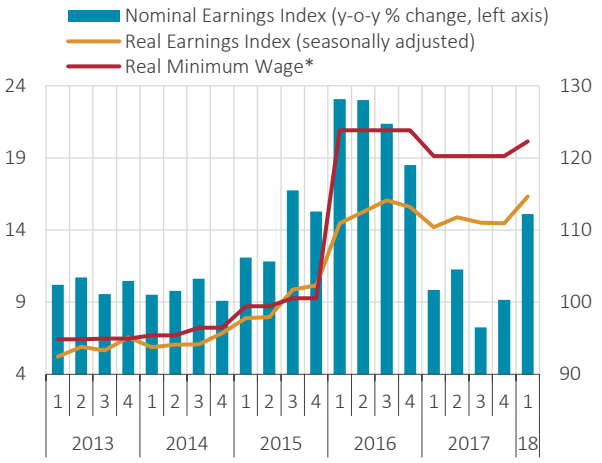
Chart 4.4.2: Non-Farm Partial Labor Productivity*, Per Person Real Wage and Real Unit Wage** (2015=100, Y-o-Y % Change)



Source: CBRT, TURKSTAT.
* Non-farm value added/non-farm employment (HLS).
** Real wage per person * employment/value added.

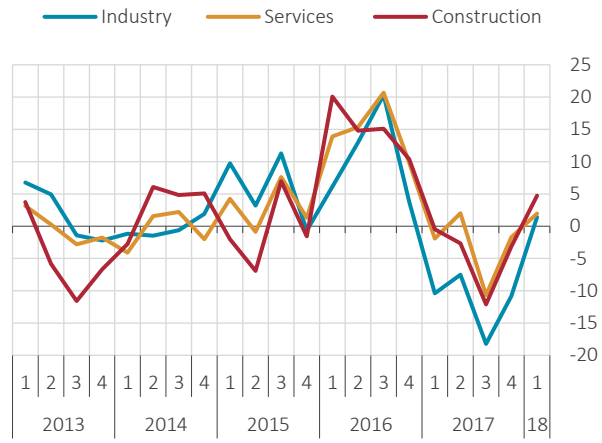
In the first quarter of 2018, the rate of increase in the real earnings index accelerated (Chart 4.4.3). This acceleration was observed in all non-farm sectors. Likewise, the real minimum wage also increased in the same period. The nominal hourly labor cost index registered a high rate of increase of 5.9 percent in seasonally adjusted terms. However, rises in partial labor productivity restrained the increases in real unit labor costs in all sectors (Chart 4.4.4).

Chart 4.4.3: Non-Farm Hourly Earnings Index (Seasonally Adjusted, 2015=100)



Source: CBRT, TURKSTAT.
* Deflated by CPI.

Chart 4.4.4: Real* Unit Labor Cost by Sectors** (2015=100, Y-o-Y % Change)



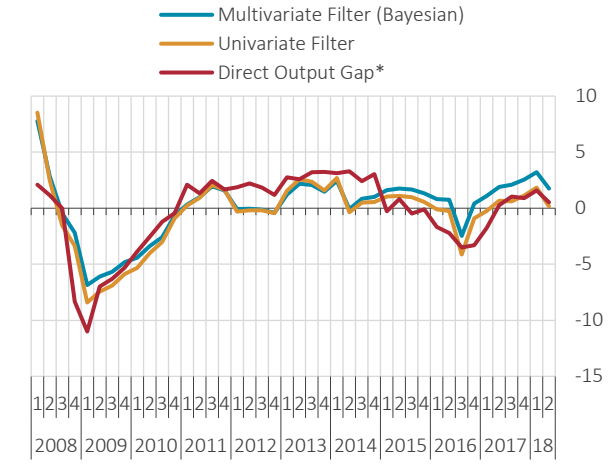
Source: CBRT, TURKSTAT.
* Deflated by CPI.
** Real labor cost/productivity (value added/HLS employment).

In addition to minimum wage developments, the course of economic activity, the unemployment rate, and inflation developments also play a decisive role in wages. Even though the upward pressure of economic activity and unemployment developments on wage inflation will abate from the second quarter onwards, elevated levels of inflation will continue to affect wages through the indexation channel. Under this outlook, nominal wage hikes are projected to hover above the average of previous years throughout 2018. Therefore, sustaining productivity increases in the period ahead is important to contain real unit labor cost pressures.

4.5 Output Gap

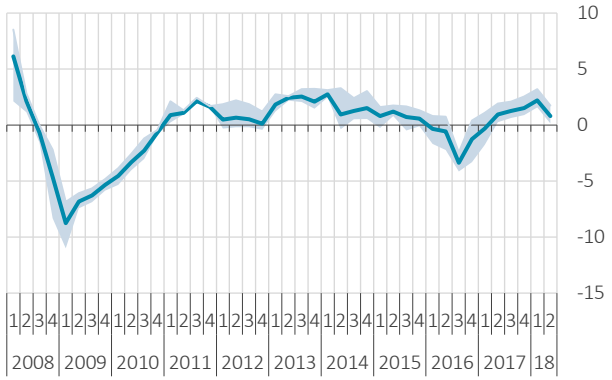
To assess the cyclicality of the economy and the demand-driven pressures on inflation, output gap indicators derived via various methods are monitored at the CBRT.[2] It is noted in the previous sections of the report that economic activity slowed and started converging to its underlying trend in the second quarter. Accordingly, output gap indicators also signal a rebalancing in the economy following the peak in the first quarter (Chart 4.5.1). However, although each one of the indicators of the output gap, which is an unobservable variable, intrinsically includes a forecast uncertainty, there is a consensus that the positive levels were maintained in the second quarter (Chart 4.5.2). A breakdown of the output gap by its components suggests that domestic demand and foreign demand conditions both exert an upward pressure on inflation (Box 4.1). In sum, it is assessed that in the second quarter, economic activity started converging to its potential level but aggregate demand is still at an inflationary level.

Chart 4.5.1: Alternative Output Gap Indicators



Source: CBRT calculations.
* Output gap series obtained by aggregating the series of direct output gap indicators (see Inflation Report 2017-I Box 4.2).

Chart 4.5.2: Output Gap (Average and the Minimum-Maximum Band)



Source: CBRT calculations.

[2] See Inflation Report 2017-1, Box 4.2, "Alternative Indicators for Output Gap", p. 52-56.

Box 4.1

Decomposition of Output Gap into its Demand Components

The output gap reveals the state of economic activity relative to its potential, non-inflationary level. In other words, it serves as an indicator of business cycle phases in the economy (overheating, cooling, etc.). The output gap is also one of the most important variables taken into account when making monetary policy decisions, whereas another one being the deviation of inflation from the target level. Figuring out the source of any output gap, i.e. to what extent it is domestic demand-driven and foreign demand-driven, is key in terms of policy design. For example, rebalancing-oriented policy tools will work through the relative prices (real exchange rate) channel when there is a foreign demand-driven pressure on economic activity while domestic demand-driven pressures will require spending control in addition to relative prices.

In this box, we estimate a New Keynesian general equilibrium model via the Bayesian method. The estimated total output gap is then decomposed into domestic and foreign demand components. In this respect, this box differs from the previous studies by Öğünç and Sarıkaya (2011) and by Alp, Öğünç and Sarıkaya (2012) at certain points. First of all, this study[1] includes a monetary policy reaction function, and accordingly employs a standard Taylor rule. In addition, the inflation target is not taken as exogenous but instead estimated in a time-varying structure consistent with the model. Data set includes eight observable variables from the model, namely, the growth rates of GDP, exports and imports, as well as inflation, real exchange rate, import prices, real interest rates, and global growth. Besides, as distinct from the studies cited above, this study employs the latest 2009-based national income data. The C index that excludes energy, food, alcoholic and non-alcoholic beverages, tobacco, and gold, which is deemed to be more consistent with a Phillips Curve model, is used as the inflation rate. On the other hand, foreign trade series are based on national income definitions.

Table 1: Basic Equations

Domestic Demand Gap
$\hat{d}_t = d_1 * \hat{d}_{t-1} + (1-d_1) * E_t\hat{d}_{t+1} + d_2 * (r_t - E_t\pi_{t+1} - r_t^*) + \epsilon_t$
Export Gap
$\hat{x}_t = x_1 * \hat{x}_{t-1} + x_2 * y_t^{*,C} + x_3 * \hat{q}_{t-2} + \varepsilon_t$
Import Gap
$\hat{m}_t = m_1 * \hat{d}_t + m_2 * \hat{x}_t + m_3 * \hat{q}_t + \xi_t$
Phillips Equation
$\pi_t = \lambda_b * \pi_{t-1} + \lambda_f * E_t\pi_{t+1} + e_2 * \hat{y}_t + e_3 * (pm_t - \pi_t) + \zeta_t \ ;$ $\lambda_b + \lambda_f = 0.99$
Accounting Identity
$\hat{y}_t = y_1 * \hat{d}_t + y_2 * \hat{x}_t - y_3 * \hat{m}_t$
Monetary Policy Reaction Function
$r_t = r_{t-1}^* + \rho_r * (r_{t-1} - r_{t-1}^*) + (1-\rho_r) * \left(\theta_\pi(E_t\pi_{t+1} - \bar{\pi}_t) + \theta_y\hat{y}_t\right) + \eta_t$

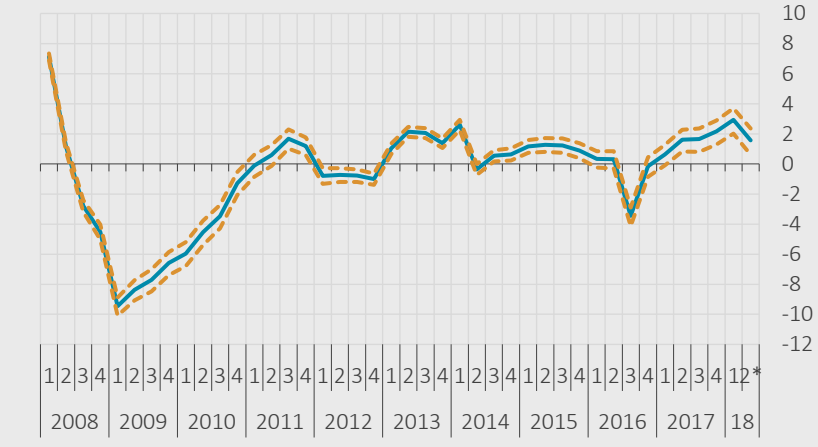
[1] This box involves the initial findings of the study by Koca and Kalafatcılar (2018) in progress.

Basic equations of the model are presented in Table 1. $\hat{d}_t, \hat{x}_t, \hat{m}_t, \hat{y}_t$, denote domestic demand, export, import, and total output gaps, respectively. These variables, defined as "gaps", are expressed as percent deviations of their current levels from their long-term trends. Accordingly, a positive (negative) output gap value refers to overheating (cooling) of the economy. Domestic demand covers public and private sector consumption and total investments. π_t shows the inflation rate, defined as a deviation from the term average. $\hat{q}_t$ refers to the deviation of producer prices-based real effective exchange rate from the equilibrium value. While r_t is the interest rate adjusted for average inflation, r_t^* stands for the natural real interest rate. pm_t demonstrates the difference of nominal import unit value index in domestic currency from the term average of inflation, whereas $y_t^{*,c}$ shows the cyclical component of the export-weighted global growth index. Finally, $\bar{\pi}_t$ denotes the model-consistent inflation target. $\epsilon_t, \varepsilon_t, \xi_t$ and ζ_t refer to stochastic shocks, and η_t shows the monetary policy shock.

The model, which is composed of 21 equations including main equations and exogenous processes, is estimated for the post-2005 period from a Bayesian perspective. Chart 1 demonstrates the total output gap within the highest and lowest 10-percent posterior density while Chart 2 shows the subcomponents of the output gap.

In the aftermath of the global crisis in 2008, the total output gap remained in the positive area except for short intervals. It moved into the negative area following the sharp decline in economic activity in the third quarter of 2016 triggered by successive shocks. However, it rapidly recovered in the following period and moved back to the positive area where it remained until the second quarter of 2018. Indicator suggests that the economy entered an overheating phase starting from the second quarter of 2017 and the inflationary pressure of aggregate demand conditions consistently increased. It is estimated that economic activity started converging to its potential level as of the second quarter of 2018 in line with the recent rebalancing process in the economy.

Chart 1: Output Gap (%)



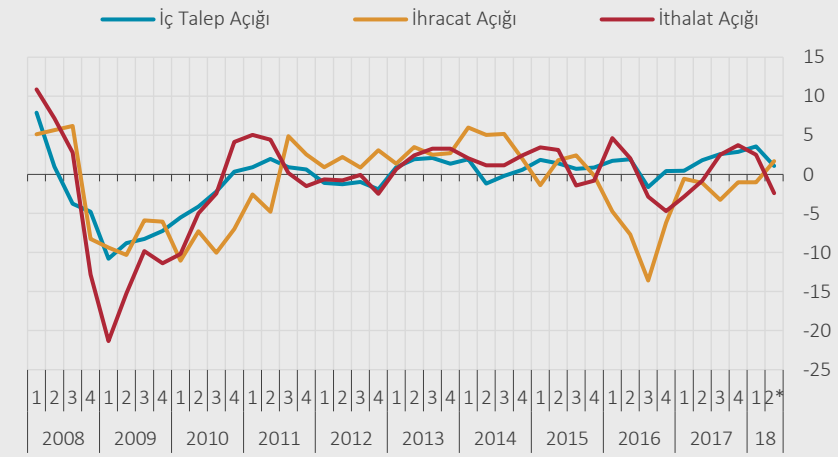
* Forecast.

Chart 2 shows the components affecting the course of the total output gap and the magnitude of their effects. The export gap shifted to the negative area following the global crisis at end-2008 and remained there until the end of 2011 due to the deepening stagnation particularly in the euro area. Recovering and moving to the positive area with the emergence of new markets, the export gap exerted an upward pressure on the total output gap until 2016. With the sharp decline in tourism revenues due to geopolitical developments, the export gap remained below its long-term trend throughout 2016 and curbed aggregate demand pressures.

As a result of the strengthening global demand, the depreciation of the Turkish lira in real terms, and the recovery in the tourism sector in 2017, exports of goods and services rapidly converged to their long-term trend.

The domestic demand gap hovered around the positive area after the global crisis, except for the deceleration periods observed throughout 2012 and in the first half of 2014, and the transitional contraction period in the third quarter of 2016. The import gap largely followed this variable. As of the final quarter of 2016, the economy started to pick up quickly due to policies supporting domestic demand. As a result, domestic demand became the main factor triggering the overheating of the economy in 2017. Accordingly, imports also climbed above their long-term trend.

Chart 2: Subcomponents of Output Gap (%)



* Forecast.

Model estimations indicate that domestic demand is still at an inflationary level despite the slowdown in the second quarter of 2018. During the same period, the import gap shifted to the negative area, which implies a rebalancing in both the rate and composition of growth. Meanwhile, the export gap moved to the positive area following its course just below the neutral level and thus increased the aggregate demand pressures.

To sum up, it is estimated that economy activity started converging to its potential level as of the second quarter of the year. It is projected that this largely domestic demand-driven trend will continue in the second half of the year and aggregate demand-driven inflationary pressures will be subdued. Maintaining the rebalancing process in the economy is crucial to eliminate internal and external imbalances in terms of inflation and current account deficit, and to achieve a stable and sustainable growth path.

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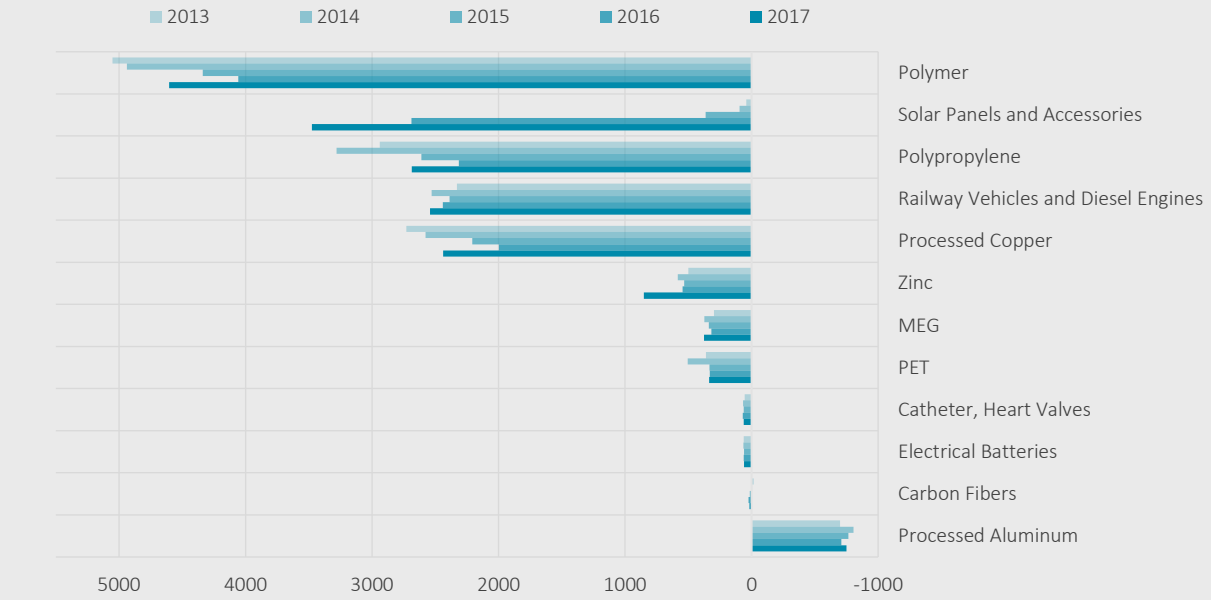
Box 4.2

Products Subject to Project-Based Incentive System and Possible Effects on the Current Account Balance

In the recent period, an incentive system has been introduced for high-to-medium value-added investments in selected products by selected firms that require advanced technology. This system is intended to increase employment and reduce the current account deficit in the medium term through investment incentive certificates to be granted to 23 projects of 19 large-scale firms. The product group to receive incentives covers high-tech imported input products that are important particularly for Turkey's industrial production and exports. This coverage is deemed a significant step towards the elimination of structural factors leading to the current account deficit. This box presents an analysis of the short- and medium-term effects of products covered by the incentive system on Turkey's current account deficit.

Chart 1: Net Imports in Incentivized Sectors by Years (Million USD)



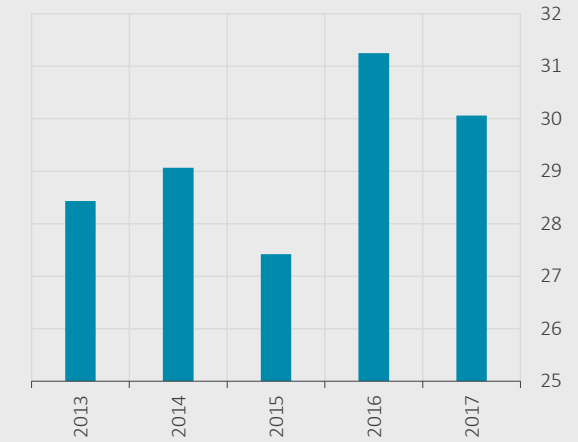
Source: TURKSTAT.

Products covered by the project-based incentive system are mainly composed of imported intermediate goods. Products to be manufactured under the subsidized projects are overall categorized into 12 product groups.[1] Turkey posts a foreign trade deficit in almost all of these products. An analysis of the change in net imports of products covered by the incentive program in the 2013-2017 period reveals that notwithstanding the increases and decreases in imports of most of the products, net imports remained at a certain level. Chart 1 shows net imports in each product group based on 2017 values. Accordingly, products with the highest level of foreign trade deficit are polymer and polypropylene which are the most important input raw materials in industrial production and exports of chemical and plastic products. Net imports of these two products were USD 7.3 billion in 2017. Considering that the current account deficit was USD 47.4 billion in 2017, it is assessed that these two products alone had an unignorably adverse effect on the current account deficit. On the other hand, it is notable that net imports of solar panels and

[1] Processed aluminum, carbon fibers, electrical batteries, heart valves, polyethylene terephthalate (PET), monoethylene glycol (MEG), zinc, railway vehicles and diesel engines, processed copper, polypropylene, solar panels and accessories, polymer.

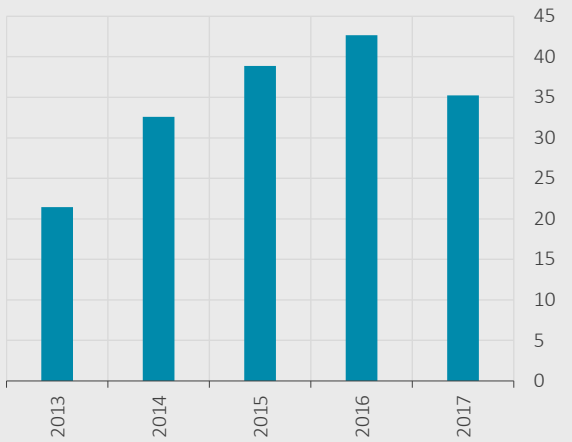
accessories skyrocketed to USD 3.5 billion in 2017 from USD 42 million in 2013. Renewable energy sector investments in the recent years are believed to have been effective in this increase.

Chart 2: Share of Incentivized Products in Net Imports Excl. Gold and Energy (%)



Source: TURKSTAT.

Chart 3: Share of Incentivized Products in Current Account Deficit Excl. Gold and Energy (%)



Source: CBRT, TURKSTAT.

Total net imports of incentivized products increased by approximately USD 3 billion to USD 17 billion in 2017 from USD 13.6 billion in 2013. Likewise, their total share in net imports of intermediate goods excluding gold and energy rose by nearly two points and reached 30 percent in 2017 (Chart 2). In this respect, products under the incentive system have substantially added to net imports. The share of net imports of these products in the current account deficit excluding gold and energy has been hovering around 40 percent for the last four years (Chart 3). On the other hand, a large portion of these products constitutes the main inputs of chemicals and plastics sectors where the industrial production and exports have registered relatively high rates of increase in recent years. This has the potential to further deepen the current account deficit problem in the following years through the imported input channel. Moreover, as renewable energy investments will increase in the upcoming years, imports of solar panels are expected to grow rapidly and push the current account deficit upwards if the domestic production of solar panels remains low. Therefore, it is anticipated that realizing the projects under the incentive system will considerably alleviate the pressure on the current account balance.

To conclude, the project-based incentive system is intended for mostly imported high-tech intermediate products that are required in industrial production and have a considerable share in the current account deficit. Considering that fixed investments in these products will be large scaled, the projects have the potential to increase the current account deficit in the short term particularly via imports of investment goods. Providing selected large firms with these incentives is also believed to be crucial in terms of the success of investments. Accordingly, although the project-based incentive system will unfavorably affect the cyclical component of current account deficit in the short term through high fixed investment costs, it will positively contribute in particular to the structural component of current account deficit in the medium and long term as the products cited above will be largely produced in Turkey.

Box 4.3

Nowcasting Turkish GDP Growth: MIDAS Approach

GDP data are announced by TURKSTAT at a quarterly frequency while many short-term business statistics, particularly on industrial production, are monitored at monthly, credit developments at weekly, and exchange rates at daily frequencies. In the classical approach, to be able to use different-frequency data in forecasts, high-frequency data are converted to low-frequency data (e.g., the quarterly average of monthly industrial production data is calculated and related to quarterly GDP). However, the Mixed Data Sampling (MIDAS) approach, which is popular in modern practice and is among the methods used in economic activity forecasts (particularly in nowcast models), allows data to be used at its own frequency and forecasts to be revised according to the data release calendar for the lowest-frequency data (Anesti et al., 2017). This box presents an analysis of GDP growth forecasts in Turkey from a MIDAS perspective along with a performance evaluation of various models.

The technical display of the MIDAS method is given in Equation 1. y_t can be taken as annual, monthly or weekly data. x_t^m is data at a frequency that is observed m times faster than y_t. For example, if y_t is quarterly data such as GDP and x_t^m is monthly data such as the industrial production, then m=3 as monthly data are announced three times a quarter. The number of independent variables rises when the lagged data of the high-frequency indicator, x_t^m, are also used. This may considerably increase the uncertainty in coefficient estimates. However, in the MIDAS method, coefficients can be calculated using polynomials. In this way, a limited number of parameters required by the relevant polynomial are estimated and a large number of coefficients are obtained as a function of these parameters. The "h" in y_{t+h} denotes the forecast horizon.

$$y_{t+h} = \beta_0 + \lambda y_t + \beta_1 B\left(L^{\frac{1}{m}}, \theta\right) x_{t+w}^m + \varepsilon_{t+h} \quad (1)$$

The fact that the MIDAS method allows for analyses where dependent and independent variables can be used at their own frequencies provides significant flexibility in updating forecasts based on data flow. The range of studies employing the method may give a better idea. Accordingly, some examples include:

i. Revision of quarterly growth forecasts by using daily financial data (Aprigliano et al., 2017),
ii. Revision of global growth forecasts based on monthly data flow for annual growth (Ferrara and Marsilli, 2014),
iii. Daily revision of inflation forecasts (Marsilli, 2017),
iv. Forecast of weekly volatility in stock markets via daily data (Alper et al., 2012).

This box includes two applications regarding the analysis of GDP forecasts. First, we analyze the performance of quarter-on-quarter GDP growth nowcasts obtained by using selected indicators derived from production, survey, credit, tax, and sales data (Table 1). While credit data are announced weekly, all explanatory variables are used in monthly frequency since real credit data are employed in nowcasting.

A total of 2,024 models, obtained from combinations of these 24 indicators taken three at a time, have been included in the analysis. For example, one model employs industrial production, PMI and housing loan data whereas another model uses data on industrial production, PMI and automobile sales. The nowcast performance of each indicator may be evaluated individually or a model may employ more than three variables. Pursuing a balance between the information set

used in the model and the complexity of the model, three-variable models have been included in the analysis.

Table 1: Information Set Used in Quarter-on-Quarter GDP Growth Nowcast*

IPI- Total industry	BTS- Export orders in the last three months	TAX- VAT on imports
IPI- Share of exports <20	BTS- Domestic market orders in the last three months	CREDIT- Total (FX-Adjusted)
IPI- Share of exports >20 ; <40	PMI- Overall	CREDIT- Total corporate (FX-Adjusted)
IPI- Share of exports <40	PMI- Production	CREDIT- Total consumer
BTS- Production in the last three months	PMI- New orders	CREDIT- Housing
BTS- Registered orders	PMI- New export orders	VEHICLE- Automobile sales
BTS- Production in the next three months	TAX- Total real tax revenues	VEHICLE- Light commercial vehicle sales
BTS- CUR	TAX- Real VAT on imports	ELEC- Electricity generation

* Capitalized expressions in front of variables show the data category to which the relevant variable belongs. IPI: Industrial Production Index, BTS: CBRT Business Tendency Survey, CUR: Manufacturing Industry Capacity Utilization Rate, PMI: Manufacturing Industry Purchasing Managers Index.

Three-variable nowcast models have been ranked according to their performance of nowcasting the GDP growth between 2014Q1 and 2018Q1, and the best 10 models have been identified. The information set at the time the nowcast was made has been taken into account when evaluating the nowcast performance. Accordingly, nowcasts have been generated by using data available as of the second and third months of the reference quarter and the middle of the first and second months of the next quarter. For example, in February 2018, survey indicators pertaining to January will be included in the information set while December 2017 data will be available for industrial production. Coefficient estimates have been revised at each stage of the nowcast.

The four-chart panel starting with Chart 1.a demonstrates the average of the nowcasts of the best 10 models obtained for four different periods based on data flow, and the interval between the highest and lowest nowcasts. Results indicate that nowcast errors diminish due to data flow, particularly for the 2014-2016 period. It is notable that nowcast errors increase starting from 2017.

Chart 1.a: GDP Growth and Nowcasts* (Quarter-on-Quarter Change, %)

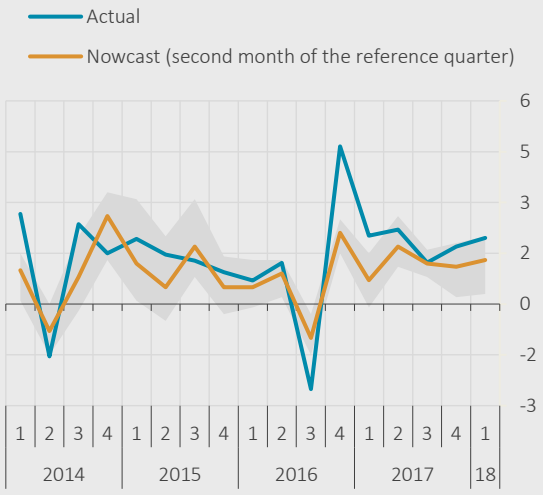


Chart 1.b: GDP Growth and Nowcasts* (Quarter-on-Quarter Change, %)

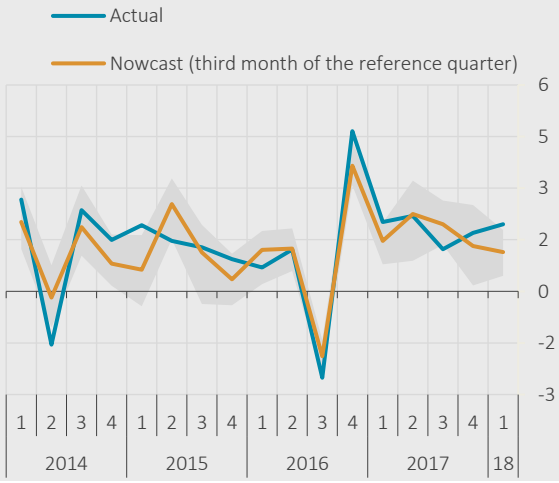


Chart 1.c: GDP Growth and Nowcasts* (Quarter-on-Quarter Change, %)

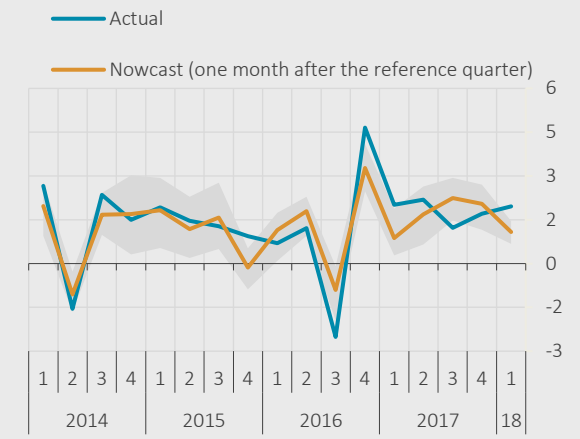
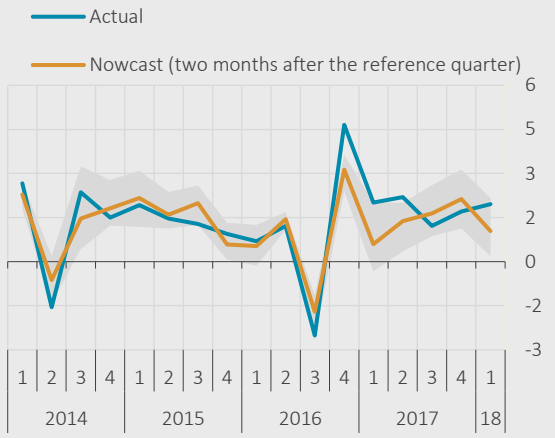


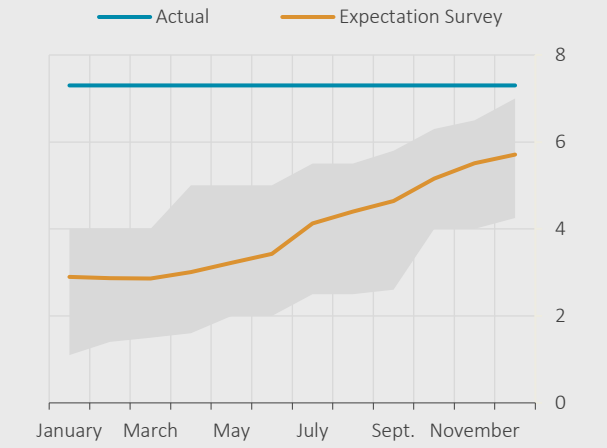
Chart 1.d: GDP Growth and Nowcasts* (Quarter-on-Quarter Change, %)



* Shaded areas in the charts show the interval between the highest and lowest forecasts of the best 10 models.

Since the MIDAS method allows data at different frequencies to be processed together, it enables generation of annual growth nowcasts that can be mechanically revised based on data flow (Günay, 2018). Accordingly, the second section in this box offers findings related to the annual growth nowcast. Considering the changes in growth expectations in 2017, the importance of this issue becomes more visible. For example, although growth forecasts for 2017 compiled by the CBRT Survey of Expectations increased throughout the year, the average expectation remained significantly below the actual growth in December (Chart 2). Forecasts released by international institutions throughout the year may also considerably diverge from one another as well as from the actual figures even at year-end (Chart 3). The high levels of forecast errors despite a substantial amount of data accumulation for forecasts towards the end of the year indicate that a judgmental approach may play a significant role in forecasts.

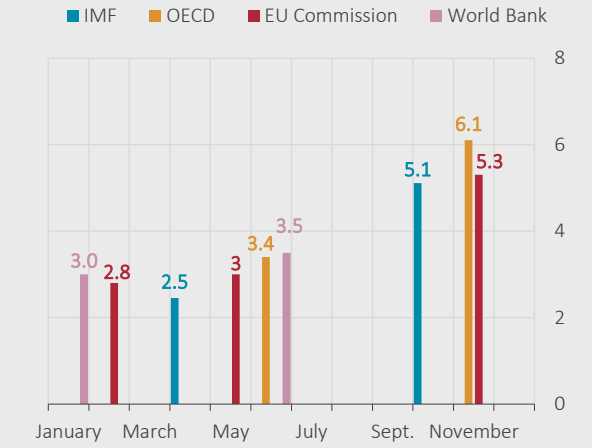
Chart 2: Survey of Expectations-Based Forecasts for GDP Growth in 2017*



Source: CBRT, TURKSTAT.

* Shaded area shows the interval between the highest and lowest forecasts.

Chart 3: GDP Growth Forecasts for 2017 by International Institutions



Source: European Commission, World Bank, IMF, OECD.

To observe the advantage of effectively integrating the data flow into nowcasts, the annual GDP growth has been estimated by using the month-on-month industrial production growth and quarter-on-quarter GDP growth. However limited the number of data may be, nowcast errors are expected to decrease when data announced throughout the year are effectively employed. For instance, data on growth in the first two quarters and on July industrial production are

included in the information set in September. Likewise, in December, the information set will include the GDP growth in the first three quarters and the industrial production in October. Consequently, nowcast errors will possibly decrease when actual figures recorded throughout the year are consistently reflected on nowcasts.

The four-chart panel starting with Chart 4.a shows the annual growth nowcasts and actual figures for the 2010-2017 period, as of April, June, September, and December. The reason for choosing these months is that the quarterly GDP is announced in these months (or in the preceding month). A comparison of nowcasts and actual figures reveals that nowcast errors substantially decrease in the second half of the year. In this framework, it may be useful to generate model-based nowcasts for annual growth in addition to the judgmental approach. Although annual growth nowcasts are not expected to be merely model-based, revising nowcasts so that they are consistent with data flow will enable a sounder assessment of the economic outlook.

Chart 4.a: GDP Growth and Nowcasts (Annual Change, %)

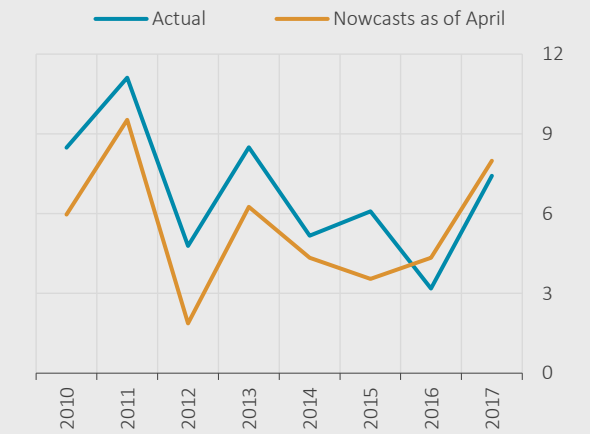


Chart 4.b: GDP Growth and Nowcasts (Annual Change, %)

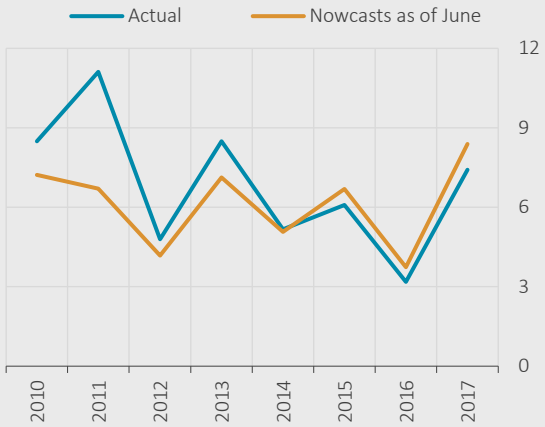


Chart 4.c: GDP Growth and Nowcasts (Annual Change, %)

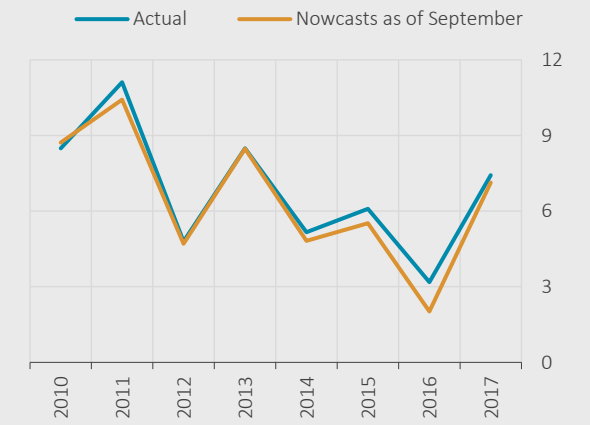
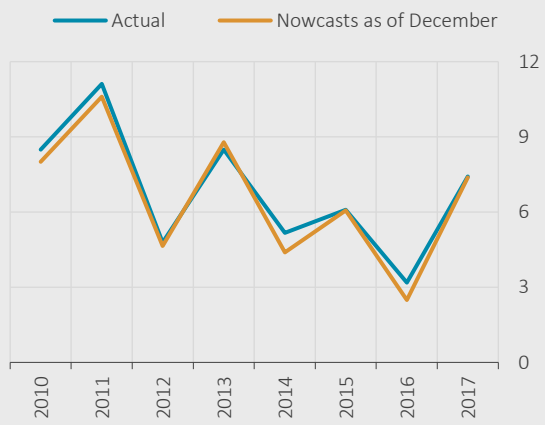


Chart 4.d: GDP Growth and Nowcasts (Annual Change, %)



This box has presented an analysis of the performance of quarter-on-quarter and annual growth nowcasts generated by employing the MIDAS method that allows for nowcasts based on data at different frequencies. The findings suggest that more accurate estimates can be produced for quarter-on-quarter growth nowcasts through data flow but they also point to the role of judgmental evaluations in the success of nowcasts even with full information set availability. As for annual growth nowcasts, the use of the MIDAS method reduces nowcast errors in the second half of the year, proving that more structural models are needed for long nowcast horizons.

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