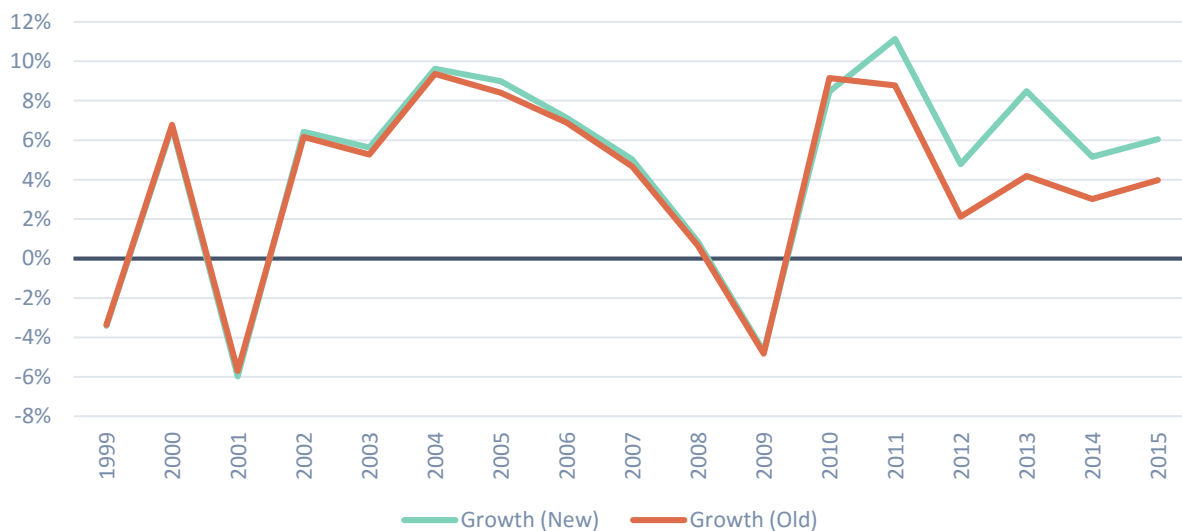


Turkey's GDP Revision: Understanding the Sources of Changes

The Turkish Statistical Institute (TURKSTAT) has gone through a major revision of its national accounts system. TURKSTAT has undertaken a number of changes simultaneously to align its methodology with the European System of Accounts (ESA 2010), improve estimation methods and strengthen information infrastructure. These changes led to substantial revisions in national accounts data, triggering an open debate about the methodology and data. The aim of this focus note is to shed light on this multidimensional revision. The following conclusions emerge:

- ❖ The *level* of nominal GDP in the new series is higher, driven by greater investment *levels*, especially in construction.
- ❖ Higher recorded investment *levels* and investment *growth* are likely due to methodological changes and improved data sources, namely increased coverage of the enterprise sector, which allows a more accurate reflection of the actual economy.
- ❖ Stronger investment *growth* drives stronger GDP *growth*, especially after 2009 (Figure 1).
- ❖ GDP *growth* averaging 6.1 percent between 2012 and 2015 places Turkey among the fastest growing economies in the world, slowing to an estimated 2.1 percent in 2016.
- ❖ As a result of the revision, Turkey's investment-to-GDP-ratio, at about 28 percent in 2015, is on par with Asian Tigers, while Turkey's savings rate amounts to about 25 percent in 2015, which is also high in cross-country comparison.
- ❖ Underlying weaknesses remain, with the current account deficit estimated at 4.1 percent of GDP in 2016.

Figure 1: Growth rates increased substantially with the new series, especially after 2009.



Source: TURKSTAT, WB Staff Calculations

Accounting for higher nominal GDP level

TURKSTAT has undertaken multiple adjustments in its National Accounts System, including adopting ESA 2010, improving estimation methods, and strengthening information infrastructure. Adoption of ESA 2010 implies reclassification of "R&D" and "weapon systems" as an investment and inclusion of "own account software" and "adjusted claims" into the data. Other major sources of revisions, beside the ESA 2010, include re-classification of general government, improved estimation of agriculture, integration of administrative records into the system, use of revised Supply-Use and Input-Output tables (2012), and changes in various calculation and estimation methods.

The ESA 2010 revision explains only 0.7 percentage points of the 10.8 percent increase in nominal GDP in 2012. As a result of the changes, recorded nominal GDP was 10.8 percent higher in 2012 – the only year for which TURKSTAT provided details - more than expected based on the experience of other countries with similar methodological revisions. It is important to underscore that most of the difference in recorded GDP level is connected with improved estimation methods and information infrastructure rather than with the implementation of ESA 2010.

The increased coverage of the enterprise sector is the most important factor behind higher nominal GDP. TURKSTAT increased the coverage of firms from 7,000 to 3 million thanks to the integration of administrative records. More importantly, TURKSTAT has started to collect information from all enterprises using Revenue Administration data for some sectors like mining, manufacturing, and construction, boosting the accuracy of data in comparison with former estimations based on samples. In addition, the new data sources enable to track entering and exiting enterprises without a lag, thus leading to more accurate measurement. Overall, these improvements and changes help better capture the economic reality on the ground.

2015 GDP in the new series is 19.7 percent higher mainly owing to higher recorded investment. Table 1 presents the breakdown of the difference in nominal GDP computed with the new and the old methodologies over the period of 2009 and 2015. The differences are particularly noteworthy starting in 2012, with the discrepancy between the new and the old estimate exceeding 10 percent. In 2015, nominal GDP in the new series is about 20 percent higher than in the old series. The decomposition by expenditure component shows that the 19.7 percent difference is mostly explained by investment expenditures and private consumption, with more than two thirds coming from total investment, particularly private investment.

Table 1: The difference in nominal GDP between the new and old series – the breakdown by expenditure component (%)

	GDP	Priv. Cons.	Gov. Cons.	GFCF	Priv. GFCF	Gov. GFCF	Cons.	Mach. & Equip	Oth. Assets	Stocks	Net Exports
2009	4.9	-6.4	1.8	6.6	6.3	0.3	4.4	0.1	2.2	2.6	0.3
2010	5.6	-5.1	1.5	7.3	7.6	-0.3	4.8	0.0	2.6	1.6	0.3
2011	7.5	-3.3	0.8	8.3	8.8	-0.4	6.2	-0.5	2.7	1.7	-0.1
2012	10.8	-1.1	0.9	10.0	10.5	-0.5	7.0	0.1	2.9	1.2	-0.3
2013	15.5	0.7	1.2	12.6	13.2	-0.6	9.5	0.4	2.7	1.1	-0.2
2014	16.9	2.2	1.1	13.7	14.2	-0.5	10.1	1.0	2.6	0.3	-0.3
2015	19.7	3.2	0.9	15.2	15.6	-0.5	10.5	2.0	2.7	0.7	-0.3

Source: TURKSTAT, WB Staff Calculations

Note: A positive number indicates that the new series have higher level compared to the old series.

Construction investment accounts for 10.5 percent of the 19.7 percent increase in nominal GDP in 2015. The share of construction investment in total investment for the period of 2009-2015 increased to around 53 percent from around 45 percent on average in the old series. A similar pattern can be observed on the production side. Although the revision caused an expansion across all sectors, the share of construction in GDP almost doubled, accounting for one third of the increase in GDP in recent years (Table 2).

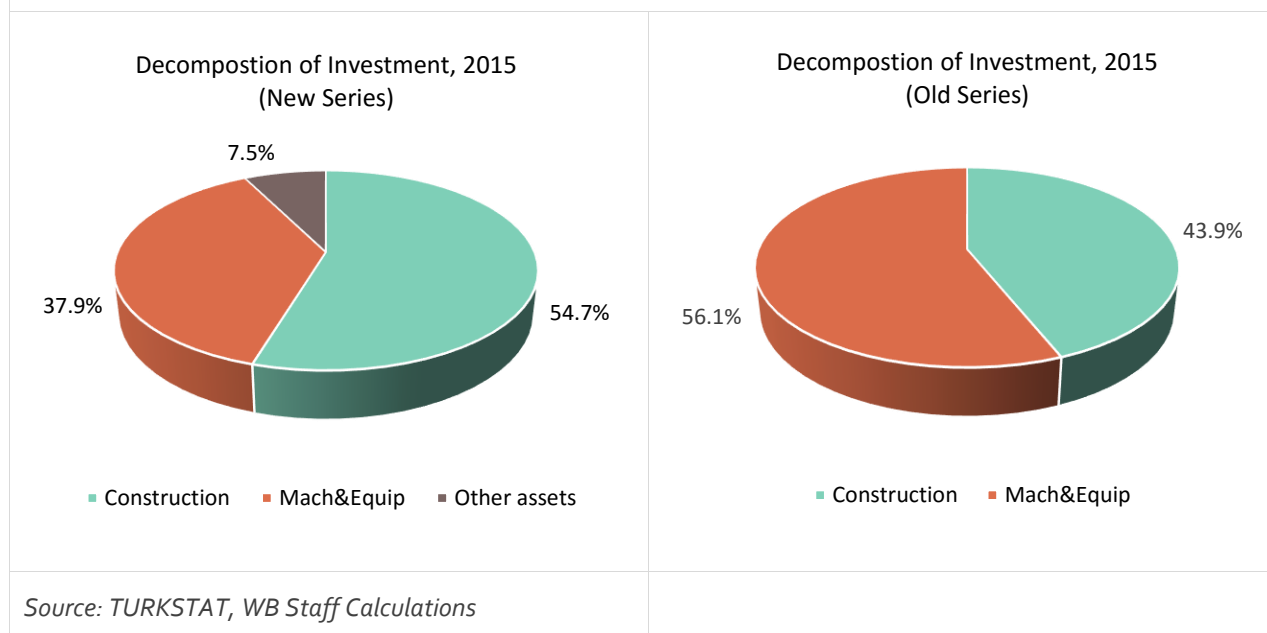
Table 2: The difference in nominal GDP between the new and old series – the breakdown by sector (%)

	GDP	Agriculture	Industry	Construction	Services
2009	4.9	0.3	0.3	2.1	0.2
2010	5.6	1.1	0.1	2.3	0.1
2011	7.5	0.9	1.3	3.3	0.4
2012	10.8	0.7	2.0	3.9	2.0
2013	15.5	0.4	3.5	4.9	3.8
2014	16.9	0.6	3.9	4.9	5.0
2015	19.7	0.7	4.6	5.4	6.4

Source: TURKSTAT, WB Staff Calculations

The change in the composition of investment in favor of construction may raise concerns regarding the quality of investment. For the 2009-2015 period, the share of machinery and equipment investment in total investment is around 38 percent on average in the new series, dropping significantly from 56 percent of the old series (Figure 2). The shift in favor of construction raises concerns regarding the quality of investment, as construction is generally not associated with productivity increases. "Other assets" - an additional investment category in the new classification that includes items such as R&D, intellectual property products, own account software, plant and animal resources yielding repeat products – accounts for an additional 2.7 percent of the 19.7 percent increase in nominal GDP level in 2015.

Figure 2: The composition of investment changed substantially in the new series, with a much higher share of construction investment.



Better information from increased coverage of the enterprise sector explains the increased level of GDP and investment, particularly construction investment. Previous survey-based national accounts data may have underestimated the actual size of investment spending. Extending the coverage of firms to the entire population in key sectors, such as manufacturing and construction, could explain the increase in investment and GDP. Although the decomposition of the revision at sub-sector level is not available, a significant portion of the revision in construction might come from residential investment taking into account the high share of housing in the construction sector. Increased firm coverage is also likely to provide a more accurate reflection of the weight of public-private partnership (PPP) projects in construction investments, particularly considering the significant expansion of PPP projects in the last 5 years.

Revisions in household final consumption expenditures also contribute to the difference in GDP levels. Until 2012, private consumption expenditures recorded in the new series remain below the old figures. Starting in 2013 a significant portion of the upward revision to the level of nominal GDP stems from private consumption expenditures (3.2 percent in 2015, see Table 1). A methodological change affecting the estimation of private consumption expenditures is the re-calculation of commodity flow method rates employing 2012 Supply and Use Tables.²

Revealing the sources of stronger GDP growth post-2009

Growth rates also change between the new and old series. In principle, the reclassifications outlined above should not have a significant impact on growth rates, given that the changes affect GDP levels in all years, leaving growth rates unchanged. However, a significant deviation in growth rates is observed between the new and old series. A possible explanation is the shift from fixed prices to the *chain-linking method*, which sets each previous year as the base year and uses the cumulated annual changes to calculate volume indexes.³ Given that the fixed price methodology does not update the weights of GDP components, the old methodology may have underestimated growth rates as the weights became outdated. A second source of the observed change in growth rates might be the *increase in firm coverage* from 7,000 to 3 million, which is bound to improve the accuracy of GDP estimation, for instance if the sample used in the old series was not fully representative. A third possible cause of the increase in growth rates could be the use of the *double deflation method* in calculation of real value added by industry, which allows deflating the inputs and outputs separately instead of deflating both inputs and outputs by a single deflator. For instance, if input prices fall because of an external commodity price shock, like in 2015, while output prices remain mostly unchanged, the double deflation method would yield a higher value added compared to the single deflation method, where there is no differentiation between input and output prices.⁴

New GDP growth numbers diverge from the old series after 2009, which is the base year of the new series. Since sound administrative data was not available for the pre-2009 period, TURKSTAT estimated these years by applying a backcasting methodology. As a result, revisions for the period until 2009 are relatively minor, while for 2010-2015 period, average GDP growth increased from 5.2 percent to 7.4 percent. The change is significantly higher when we exclude the high growth years of 2010 and 2011, increasing the average growth from 3.3 percent to 6.1 percent for the 2012-2015 period (Figure 1). However, GDP growth dropped to an estimated 2.1 percent in 2016.

The main drivers of increased growth rates in the new series are stronger investment and consumption. Using basic growth decomposition, we compare contributions to growth by expenditure components in the new and old series. For the post-2009 period, the contribution from investment is substantially higher, accounting for a significant fraction of the increase in growth rates. The contribution from consumption is also notably higher, especially until 2014. The contribution from net exports is also higher, except in 2012 and 2014, while the contribution from stocks is smaller.

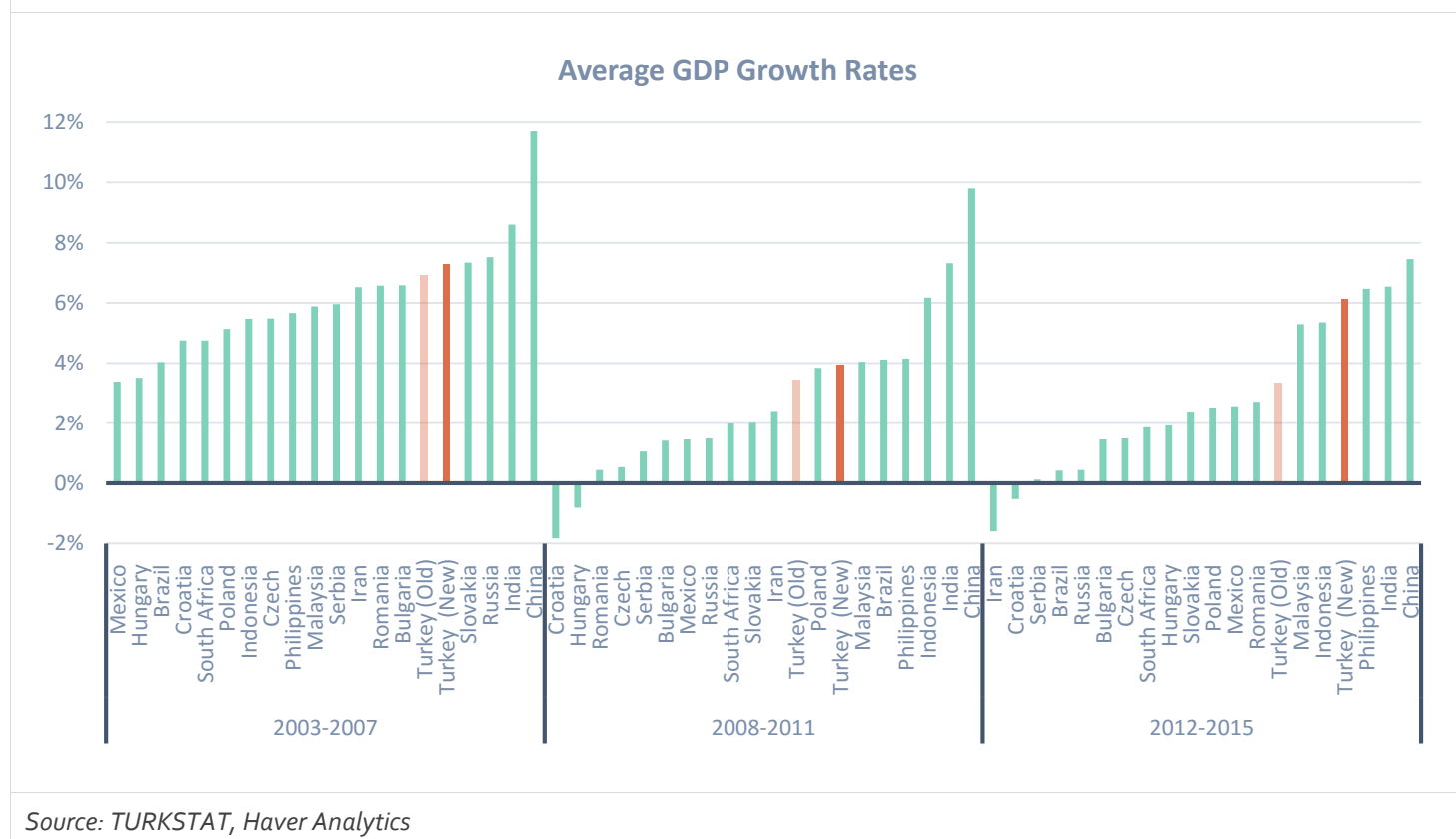
Table 3: The difference between the new GDP growth and old GDP growth and the breakdown of the contribution (%)

	GDP	Priv. Cons.	Gov. Cons.	GFCF	Stocks	Net Exports
2009	0.1	-0.7	0.3	-1.0	1.4	0.1
2010	-0.7	2.0	0.0	-1.1	-1.8	0.2
2011	2.3	2.4	-0.3	1.7	-1.5	0.0
2012	2.7	2.3	0.3	1.5	-0.4	-1.0
2013	4.3	1.5	0.4	2.7	-1.1	0.8
2014	2.1	0.9	-0.1	1.8	-0.3	-0.1
2015	2.1	0.2	-0.2	1.7	-0.5	0.8

Source: TURKSTAT, WB Staff Calculations

In the new series, Turkey's growth performance accelerates significantly in 2012-2015 period, making it one of the fastest growing economies in the world. We compare Turkey's new growth performance with major peer countries (Figure 2). With the new methodology Turkey's comparative ranking remains unchanged in 2003-2007 period, and it improves slightly in 2008-2011 period, placing it ahead of Poland, with the average growth rate increasing by 0.5 pps to 3.9 percent. The implications are more drastic for 2012-2015 period, when, according to the new methodology, Turkey grew only slightly slower than Philippines and India, outpacing Indonesia and Malaysia.

Figure 2: Between 2012 and 2015, Turkey was one of the fastest growing economies in the world



Source: TURKSTAT, Haver Analytics

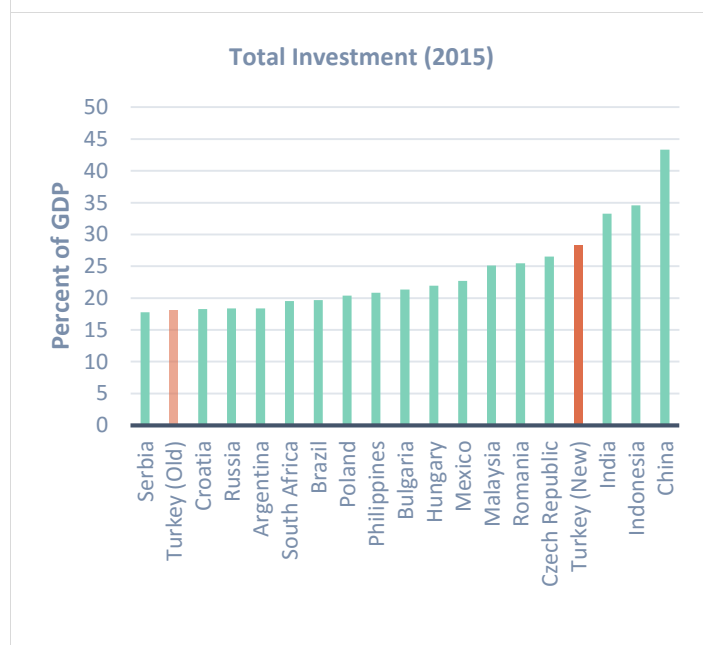
Higher but still insufficient national savings

The new methodology significantly increases the investment and savings ratios. The share of investment in GDP increased significantly with the new methodology for the reasons discussed above, lowering the share of private and public consumption in GDP. In other words, the higher investment ratio translated into a higher savings rate and lower consumption. As shown in Table 1, about three quarters of the increase in nominal GDP is due to the higher investment. The new methodology brings Turkey's investment ratio to 28.3 percent in 2015, from the bottom to near the top of the cross-country pile. With the new methodology, Turkey's investment ratio surpasses major peers, except India, Indonesia, and China. In other words, Turkey's new investment ratio

resembles the Asian tigers. Gross national savings calculated with the new series are about 25 percent of GDP in 2015, compared to 14.1 percent with the old series. Thus, the new methodology increases not only the investment ratio but also the savings ratio.

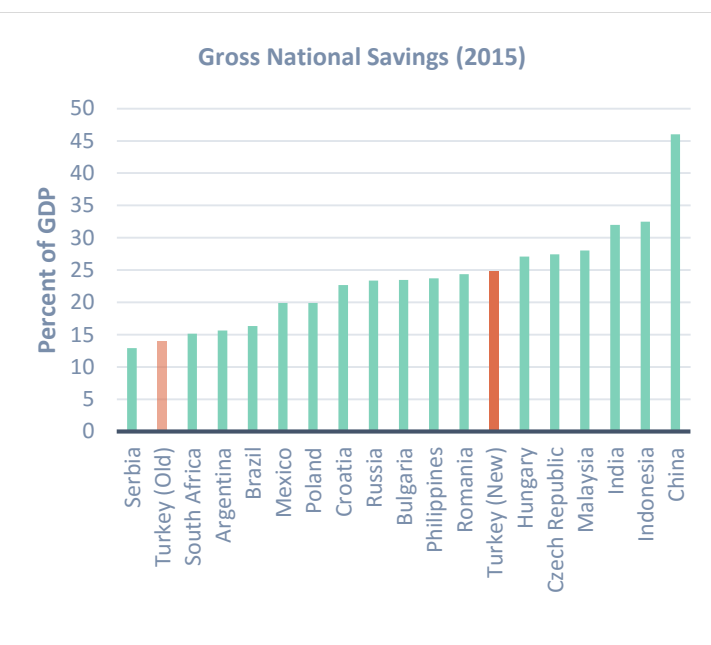
Underlying weaknesses remain with the current account deficit at 3.8 percent of GDP in 2015 and 4.1 percent in 2016. The higher savings rate after the revisions falls short of covering the new higher investment ratio, leaving the current account deficit at a high level. Despite a limited improvement from 4.5 percent to 3.8 percent of GDP in 2015, the current account deficit remains high in cross-country perspective and, despite a declining growth rate, is set to widen to 4.1 percent in 2016.

Figure 3: Turkey's investment ratio is comparable with Asian Tigers



Source: TURKSTAT, IMF WEO, WB Staff Calculations

Figure 4: Turkey's savings ratio is also high in international comparison



Source: TURKSTAT, IMF WEO, WB Staff Calculations

Conclusion

The revisions have improved the quality of national accounts data, and publication of the detailed breakdown of the data would help strengthen policy analysis. The revisions have brought Turkey's national accounts methodology closer to international standards, while improving the quality of information by incorporating administrative data. One important limitation is the lack of detailed breakdowns, for instance for public and private investment, residential and non-residential construction or investment at disaggregated sector detail. The pattern of investment expenditures will play a crucial role for Turkey in the forthcoming period to overcome the challenges on the way of boosting productivity and achieving a high and stable growth performance. Moreover, sound capital stock estimations at detailed breakdowns would also contribute to more robust productivity estimations. Thus, availability of more detailed data would enhance the understanding of underlying dynamics, and lead to the strengthening the robustness of policy solutions.

¹ We would like to thank to TURKSTAT officials Enver Taştı, Tülay Korkmaz, A. Kürşat Dosdoğru, Mehmet Ilgar, and Cevdet Ögüt for their valuable contributions to this note.

² Household final consumption is calculated by using Classification of Individual Consumption by Purpose (COICOP) and commodity flow method.

³ TURKSTAT updated the reference year as 2009 which was previously 1998.

⁴ The GDP growth rate, which was 4 percent at 1998 prices in 2015, increased to 6.1 percent along with the revision. One of the main reasons behind this significant revision was switching to double deflation method. In 2015 oil prices were at very low levels and input costs declined remarkably, and the upward revision in real value added was substantial.

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