



## 26-3 India's 20 Years of GDP Misestimation: New Evidence

Abhishek Anand, Josh Felman, and Arvind Subramanian

March 2026

---

### ABSTRACT

This working paper presents new evidence suggesting that India misestimated its annual growth rate during the past two decades. Growth during the boom years between 2005 and 2011 may have been underestimated by about 1-1½ percentage points on average; and subsequent growth between 2012 and 2023 may have been overestimated by about 1½-2 percentage points. Once these adjustments are made, it appears that the Indian economy did not grow at a stable rate over the past two decades but rather boomed during the early 2000s, then decelerated after the global financial crisis and subsequent domestic shocks. The misestimation problem can be traced to two methodological issues. The first is that the formal sector has been used as a proxy for the vast informal sector, even though unorganized enterprises were disproportionately hit after 2015 by demonetization, the introduction of the goods and services tax, and the COVID-19 pandemic. The second is that deflators for many sectors have been based on commodity prices, which have moved sharply in relative terms. The methodological revisions in February 2026, made following commendable consultations, aim to address the challenges identified.

**JEL Codes:** E01, O47, C82, O11, O53

**Keywords:** GDP mismeasurement; national accounts; informal sector; price deflators; India

**Abhishek Anand** is a Visiting Fellow at the Madras Institute of Development Studies.

**Josh Felman** is a principal at JH Consulting.

**Arvind Subramanian** is a senior fellow at the Peterson Institute for International Economics.

**Authors' note:** Versions of this paper were presented at Cornell University, Harvard University, the Indira Gandhi Institute of Development Research, the Peterson Institute for International Economics, and the International Monetary Fund. We are grateful to participants at these seminars, as well as to Sajjid Chinoy, R. Nagraj, Dev Patel, Justin Sandefur, and Rajeswari Sengupta for their comments. We thank Nell Henderson for excellent editorial suggestions and Greg Auclair for checking every data point, source, table, chart, and regression. Any errors are our own.

*Unless we understand how the numbers are put together, and what they mean, we run the risk of seeing problems where there are none, of missing urgent and addressable needs, of being outraged by fantasies while overlooking real horrors, and of recommending policies that are fundamentally misconceived.*

– Angus Deaton, *The Great Escape*

At the end of February 2026, following an extensive consultative process, the Indian government introduced a revised GDP.<sup>1</sup> One purpose was to update the weights of the various goods and services, a step that was long overdue since India's economy has gone through tremendous changes since the weights were last established in 2011–12. Another purpose—perhaps an even more important one—was to address methodological shortcomings that had been identified by academics and statisticians.

For much of the past decade, experts had raised questions about the methodology used to estimate GDP.<sup>2</sup> These doubts spread to a wider public in 2016, when the demonetization and withdrawal of 86 percent of the country's currency apparently caused real GDP growth to accelerate to an eye-popping annual rate of 8.3 percent. They resurfaced in 2019, when a credit crunch caused by a crisis in India's nonbank financial institutions apparently caused only a minor blip in growth. Then, in June 2025, with private investment and job creation weak but GDP apparently booming, two former officials from the statistical agency expressed concern that “something does not add up” (Sharma, Hussain, and Kumar 2025). Around the same time, the International Monetary Fund gave India's GDP methodology a mere C grade.

This paper revisits these debates, in order to: (a) reassess the trajectory of the world's fifth-largest economy during a critical period in its development and (b) provide a benchmark for evaluating the 2026 changes to GDP methodology. It does not assess the quality of the new numbers, something that can be done only with time. But it does provide re-estimated historical growth rates that could be used as a reference when the new methodology is used to produce a GDP back series.

One might ask why GDP methodology is important. After all, it hardly matters whether growth is, say, 7.2 percent or 7.4 percent. If, however, the misestimation is large enough to convey a false sense of how well the economy is doing, serious problems arise. If the GDP numbers suggest that growth is strong when it is actually weak, businesses are liable to misinvest, households to overspend, and the central bank to maintain an excessively tight monetary policy. Inaccurate numbers also make it difficult for the government to calibrate its fiscal or reform policies, as it cannot respond to problems it cannot see. For all these reasons, getting GDP growth right is critically important.

This paper examines the GDP methodology introduced in January 2015, initially to the post 2011–12 numbers and later to the historical series. It explains why doubts about the GDP numbers arose, identifies the key methodological problems, and quantifies the bias they caused. It builds on previous work by: extensively testing to see whether there really was a problem, emphasizing the role played by the overstatement of informal sector output, and quantifying the extent of the bias.

<sup>1</sup>New GDP growth numbers start in 2023–24. The fiscal year runs from April 1 to March 31. Unless otherwise specified, 2004 denotes fiscal year 2004–05, 2005 denotes 2005–06, and so forth.

<sup>2</sup>See Bhattacharya (2019); Dholakia (2015); Dholakia, Nagraj, and Pandya (2018); Kazmin (2019); Manna (2017); Nagaraj and Srinivasan (2016); Nagaraj, Sapre, and Sengupta (2019); Sengupta (2016, 2025); Subramanian (2019a, 2019b); and Subramanian and Felman (2019).

The paper finds that after the 2015 methodology was introduced, correlations between GDP and key indicators that span sectors—exports, credit, taxes, electricity consumption, sales, and the index of industrial production—broke down or weakened.<sup>3</sup> Economist Robert Solow once famously said that we can see productivity growth everywhere but in the statistics. In India, growth has sometimes been evident nowhere but in the GDP statistics—and occasionally everywhere but in the GDP statistics.

Why did this misestimation occur? The January 2015 methodology had two main problems: inappropriate data sources and inappropriate deflators.<sup>4</sup> A large share of Gross Value Added (GVA) emanating from the informal sector was based on data from the formal sector, and a large share of GVA was deflated by indices that were driven not by the prices of the goods and services involved but rather by commodity prices, particularly oil prices.

To be clear, the main problem with the 2015 series was not the absence of double deflation, as is often alleged. In fact, this was a relatively minor problem. The real problem was the use of inappropriate deflators and inappropriate indicators.

These methodological problems caused growth over the past two decades to be misestimated in both directions (table 1). Broadly, they caused growth for 2005–11 to be underestimated by about 1–1½ percentage points in the backcasting exercise; and caused subsequent growth to be overestimated by about 1½–2 percentage points.<sup>5</sup> We estimate that from 2011 to 2023, the economy actually grew at 4–4½ percent on average instead of the 6 percent reported. Consequently, we find that instead of steady growth over the past two decades, there was a boom followed by slower but still robust growth.

Table 1

**Official GDP growth and direction of misestimation, 2005–25**

Period	Official GDP growth (percent)	Direction of misestimation
2005–11	6.9	Underestimate
2012–19	6.6	Overestimate
2020–22	3.8	Underestimate
2023–September 2025	7.9	Overestimate

Source: Ministry of Statistics and Programme Implementation (MoSPI).

We find that the post-2011 overestimation occurred because the triple shocks of demonetization, introduction of the Goods and Services Tax (GST), and the Covid-19 pandemic caused the performance of the informal sector to diverge sharply from that of the formal sector, while the fall in oil prices inappropriately pulled down the GDP deflator. As a result, the real increases in output were significantly overestimated.

The paper is structured as follows. The next section identifies the misestimation problem by comparing GDP estimates against other macro indicators, within India and across countries. The following section determines the

<sup>3</sup>There were many other weaknesses, some of which are detailed below. Particularly problematic was the introduction of a new database for the corporate sector: MCA-21.

<sup>4</sup>Over all but the shortest periods, GDP and GVA are essentially synonymous, as they show the same numbers for economic growth. For technical reasons, in some places GVA is preferred to GDP as a measure of economic activity, as GDP includes indirect taxes and subsidies, which can swing widely depending on when the subsidies are actually paid.

<sup>5</sup>The backcasting exercise produced new official numbers for 2005–11, based on the 2015 methodology. Note that elsewhere in the paper, especially in the discussions of the correlations, the figures for 2005–11 refer to the “old” GDP series based on the methodology in place at that time.

sources of the misestimation.<sup>6</sup> The next section discusses the backcasting exercise, in which the 2015 methodology was used to re-estimate growth during India's boom years of the mid-2000s. The penultimate section attempts to correct the problems identified, providing rough estimates of how growth actually evolved over the past few decades. The last section summarizes the paper's conclusions.

## WERE OFFICIAL ESTIMATES OF GROWTH PROBLEMATIC?

The main reason the public questioned India's GDP numbers is that they painted a picture at variance with common perception, depicting an economy that boomed throughout the past quarter-century rather than one that boomed in the mid-2000s and slowed thereafter, as India was hit by a succession of shocks, including the slowdown in global growth, the Twin Balance Sheet crisis, demonetization, introduction of GST, and the Covid pandemic.<sup>7</sup>

Of course, public perception can be wrong. It—and the claims of GDP critics—therefore need to be rigorously examined. The standard way of doing so is by comparing GDP data with other indicators of economic performance. Accordingly, this section compares the growth numbers with other Indian indicators before checking them against international indicators.

### *Evidence from India*

Comparing GDP growth to other indicators can be a perilous exercise in India, given the astonishing vastness and variety of its economy, as a result of which activity in individual sectors can diverge sharply from overall trends. Even if the relationship between sectoral indicators and GDP is tight during particular periods, the correlations often break down in later periods, as the economy evolves and transforms. At one time, for example, production of electric fans and air coolers was once a reasonable indicator of growth. But that age is long gone.

To avoid this trap, we sidestep sectoral indicators, focusing on well-measured macro indicators that are more likely to capture aggregate activity. We chose six: exports of goods and services, bank credit (excluding food credit), the index of industrial production (IIP), electricity, tax revenues, and corporate sales. To ensure that they are truly representative, we conducted a series of robustness checks, for example by checking to see whether the results differed if we used total credit, including from nonbank sources. It turned out that different specifications made no difference to the results.<sup>8,9</sup>

<sup>6</sup>The focus here is on the methodology for estimating annual estimates, but the conclusions apply a fortiori to quarterly data, which rely heavily on a benchmark-indicator approach. In the quarterly data, nominal growth is extrapolated largely from the financial performance of listed firms, which are used as proxies not only for informal activity but also for broader formal sector output, potentially biasing estimates upward, for reasons explained below. Real GDP is then obtained using deflators that largely mirror those used for annual estimates, carrying over similar measurement concerns.

<sup>7</sup>For a detailed analysis of how the Twin Balance Sheet crisis affected the Indian economy, see Subramanian and Felman (2019).

<sup>8</sup>To address the concern that bank credit may not capture the expanding role of nonbank financing in recent years, we also examined growth in total credit to the private nonfinancial sector (banks plus nonbanks) using data from the Bank for International Settlements. The results were essentially the same: The average annual growth rate of real total credit—deflated using CPI-IW (the price index for industrial workers) core until 2011 and the CPI core thereafter—was 12.6 percent in 2005–11 and just 3.7 percent in 2012–24.

<sup>9</sup>To assess concerns that the IIP may be outdated and may not accurately track underlying economic activity, we compared the average growth of IIP manufacturing with firm-level data from the Centre for Monitoring Indian Economy (CMIE) on growth in manufacturing sales, deflated by the CPI. The two series move broadly in line with each other. During 2005–11, IIP manufacturing grew at 9.0 percent, while real manufacturing sales grew at 9.2 percent. In 2012–24, the corresponding figures were 3.7 percent and 1.4 percent, respectively. Although the IIP has limitations and is overdue for revision, this comparison suggests that it continues to track the direction of manufacturing activity reasonably well. A similar deceleration is visible in investment. Firm-level data from the CMIE show real investment growth (CPI core being the deflator) falling from 9.9 percent in 2005–11 to 6.7 percent in 2012–24.

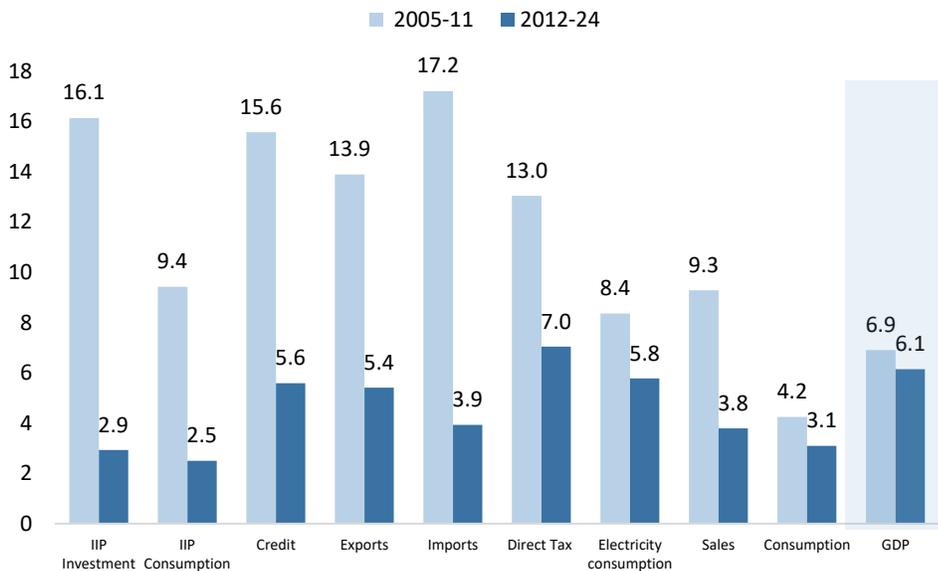
Figure 1 reveals a striking contrast. According to the GDP numbers, the economy has enjoyed steady, rapid ascent over the past two decades, with growth easing only modestly from an annual average of 6.9 percent in 2004–11 to around 6.1 percent in 2012–24 (shaded area in the figure). But the macro indicators tell a very different story. Almost every indicator posted double-digit growth (annual average) in the first period and collapsed in the second:

- Real credit growth fell from 15.6 percent to 5.6 percent a year.
- Real exports fell from 13.9 percent to 5.4 percent a year.
- The IIP plummeted from 16.1 percent to 2.9 percent a year.
- Direct tax revenues slumped from 13.0 percent to 7.0 percent a year.

The high degree of correlation across macro indicators is vitally important, because individual indicators can move for idiosyncratic reasons, including flaws in the methodology used in their construction. But when all key indicators move in the same way, this suggests they are reflecting the aggregate economy. Put simply: The sharp declines in the macro indicators lend support to the public perception that the economy slowed in the years following the boom of the mid-2000s.

Figure 1  
Growth rates of macro indicators and of GDP

Real annual average growth (percent)



Note: All variables are in real terms. Bank credit excludes food credit. Real bank credit and real direct taxes are obtained by deflating with CPI-IW core from until 2011 and with CPI core thereafter. IIP Investment is proxied by IIP Capital for 2005–11 and by the simple average of IIP Capital and IIP Infrastructure for 2012–24. Real per-capita consumption is constructed from Household Consumption Expenditure Survey (HCES) 2004, 2011, and 2023. We compute the CAGR for 2004–11 and 2011–23 separately. The 2004–11 growth rate is based on the Uniform Recall Period (URP), while the 2011–23 growth rate uses the Modified Mixed Recall Period (MMRP). Consumption for 2004–11 is deflated using CPI-IW, and for 2012–23 using CPI.

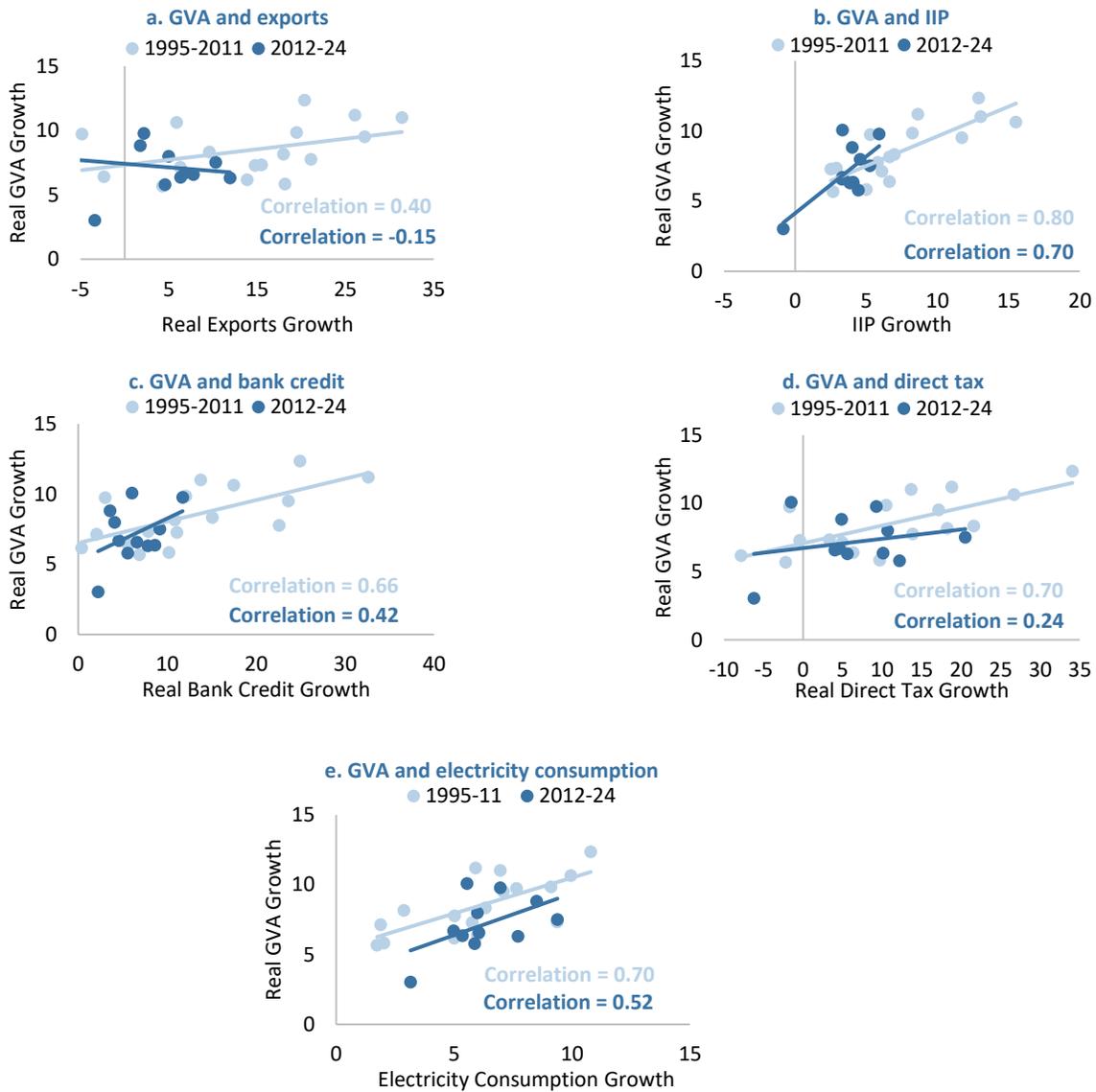
Sources: RBI, CMIE, CEA, MoSPI, HCES.

Is the divergence between the indicators and the GDP numbers somehow related to the change in the GDP methodology? To test this hypothesis, we consider correlations during two time periods: 1995–2011, when the “old” GDP methodology was being used; and 2012–24, after the 2015 methodology was introduced. Figure 2 plots

annual growth in the macro-indicators on the x-axis and GVA growth on the y-axis.<sup>10</sup>

Figure 2

Correlation between Gross Value Added and core macro indicators



Note: Real bank credit and real direct taxes are obtained by deflating with CPI-IW core from 1995 to 2011 and with CPI core thereafter. For the period 1995–2011, real GVA and real exports are measured using the 2004 base year series; from 2011 onward, the 2011 base year series is used. 2020 and 2021 are excluded to avoid pandemic-related distortions arising from supply shocks, lockdowns, and policy interventions that obscure normal cyclical relationships. GVA excludes agriculture and public administration. Bank credit excludes food credit. Sources: RBI, CEA, and CMIE.

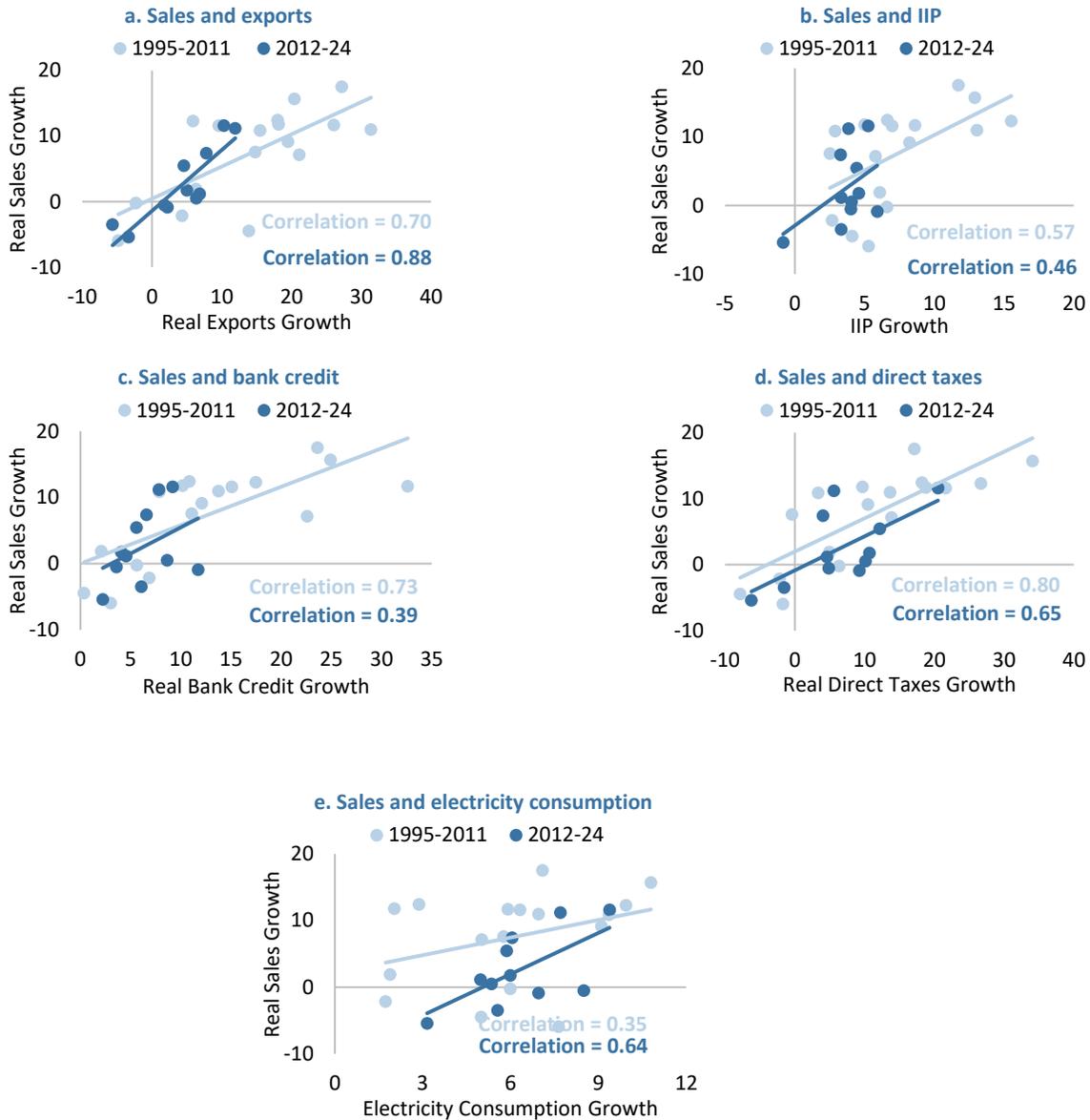
A consistent pattern emerges. The correlation is strong for the 1995–2011 period, when GDP numbers are based on the “old” methodology, and breaks down or weakens when the 2015 methodology is adopted.<sup>11</sup> This breakdown occurs for quarterly data as well (see annex A), a useful confirmation, as that series has a much larger sample size.

So far we have focused on the standard macro-indicators, used by most analysts of the Indian economy. More

<sup>10</sup>As an additional robustness check, we examined the correlation between total credit (bank plus nonbank) and average annual GVA, which fell from 0.58 in 1995–2011 to 0.14 in 2012–24.

<sup>11</sup>To be clear: the 1995–2011 GDP growth figures are taken from the “old” series, with 2004 as the base year.

Figure 3  
Correlation between sales and core macro indicators



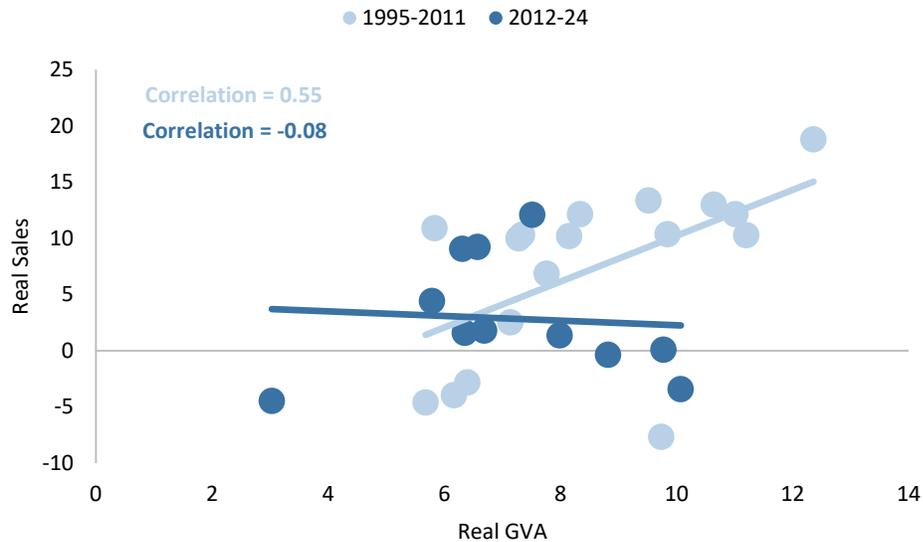
Note: Real sales, real bank credit, and real direct taxes growth are arrived at by deflating with CPI-IW core from 1995 to 2011 and with CPI core thereafter. 2020 and 2021 are excluded to avoid pandemic-related distortions from supply shocks, lockdowns, and policy interventions that obscure normal cyclical relationships. Bank credit excludes food credit.

Sources: RBI, CEA and CMIE.

recently, a few commentators have begun to look at a different measure: sales of the corporate sector (see annex B for a discussion affirming the validity of this measure). The correlation between sales and other indicators is strong in both periods, reinforcing confidence in sales as another plausible macro indicator (figure 3).

As with the other indicators, the correlation with GVA growth—which is strong in the 1995–2011 period under the “old” methodology—breaks down altogether in the post-2011 period after the 2015 methodology is adopted (figure 4).

Figure 4  
Correlation between Gross Value Added and sales



Note: Agriculture and public administration are excluded from Real GVA because corporate sales data do not capture activity in these sectors—agriculture is dominated by unincorporated enterprises and smallholder farms, while public administration consists primarily of government expenditure rather than market-based corporate activity. In addition, 2020 and 2021 are excluded to avoid pandemic-related distortions from supply shocks, lockdowns, and policy interventions that obscure normal cyclical relationships. Real sales growth is arrived at by deflating nominal sales growth with CPI-IW core from 1995 to 2011 and with CPI core thereafter. For the period 1995–2011, real GVA is measured using the 2004 base year series; from 2011 onward, the 2011 base year series is used.

Sources: RBI and CMIE.

Particularly striking are three data points:<sup>12</sup>

- In the demonetization year (2016), real sales growth was 1.4 percent and real GVA growth 8.0 percent.
- In 2019, real sales fell 4.5 percent, and real GVA rose 3.0 percent.
- In 2024, real sales rose 2.2 percent and real GVA 6.4 percent.

Summing up, all the major Indian macro indicators move in the same way, booming in the mid-2000s and slowing subsequently.<sup>13</sup> But this qualitative change in the economy's behavior is not reflected in the GDP data, which shows the economy continuing to boom.

#### Cross-country evidence

Is it possible that the breakdown in correlations occurred not because the methodology changed but rather because the structure of the economy changed? One way of answering this question is to look at cross-country evidence. After all, if the relationship between the macro indicators and GDP holds across countries and across time, then it stands to reason that it should hold durably in India, notwithstanding any structural changes.

Subramanian (2019a) found that the indicators could indeed explain a fair amount of the variation in cross-country GDP growth and that India became an outlier after the methodology was changed for the post-2011 estimates. His results still hold up.

<sup>12</sup>The GVA figures exclude agriculture and public administration. If these sectors are included, GVA growth was 8.0 percent in 2016–17 and 3.9 percent in 2019–20.

<sup>13</sup>See annex C for consideration of the one macro indicator that has behaved somewhat differently in the last few years: tax revenue.

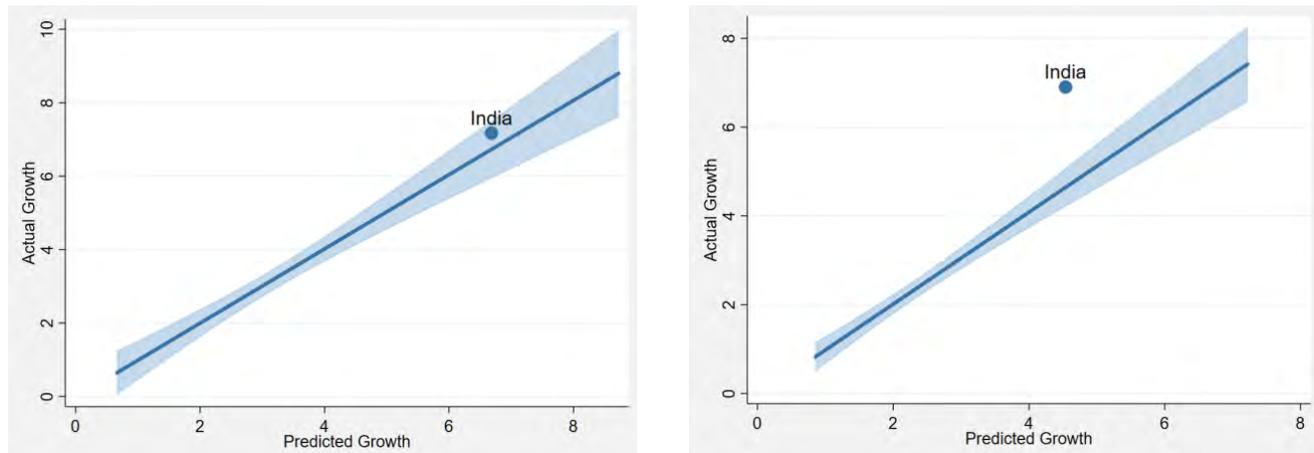
Panel a of figure 5 shows that the macro indicators do a good job of predicting growth in 1995–2011, including in India under the “old” methodology (see annex D for details). Panel b shows that after 2011 the macro indicators continue to perform well in predicting growth for most countries but no longer for India, after its methodology changed. Growth in India was significantly higher than predicted, suggesting that it was being overestimated.

Figure 5

### Is India an outlier in the relationship between GDP and macro-indicators?

a. 1995–2011

b. 2012–24



Note: In panel b, 2020 and 2021 are excluded to avoid pandemic-related distortions.

Sources: WDI, IMF, The Energy Institute, RBI, authors' estimates.

The breakdown of the strong correlation between macro indicators and GDP in India after the “new” GDP series was introduced suggests that something may have gone awry when the Central Statistical Office (CSO) revised the national income account methodology in January 2015. Divergences between corporate sales, investment, and official GDP growth have previously been interpreted as warning signals of possible measurement issues in the Indian national accounts (Chakravarty 2015; Nagaraj 2017; Sengupta 2016). These breakdowns suggest problems in the measurement of nominal output, price deflators, or the proxying of economic activity in official statistics (Bayar and Gogoberishvili 2023; Kumar and Karkun 2026).

Questions can arise about the validity of each of the macro indicators identified as well as about possible omissions. But the key point is that all of them point in the same direction: a strong correlation with GVA under the traditional methodology and weak or no correlation after the 2015 methodology was introduced, and this is true within India and across countries.

### WHAT WAS THE SOURCE OF THE PROBLEM?

The goal of the CSO’s change in national income methodology was to bring the methodology closer to the United Nation’s System of National Accounts 2008 framework. What could have gone awry in trying to do so?

Annex E lays out the full mechanics of how annual GVA was constructed under the 2015 methodology. Several features merit attention. At its core, the series continued to rest on measurement of production in the various sectors, as it has since India’s National Accounts began. The 2015 system differed from the earlier approaches in that it drew on a broader evidence base, combining enterprise balance sheets, administrative data, household

surveys, and updated price indices.

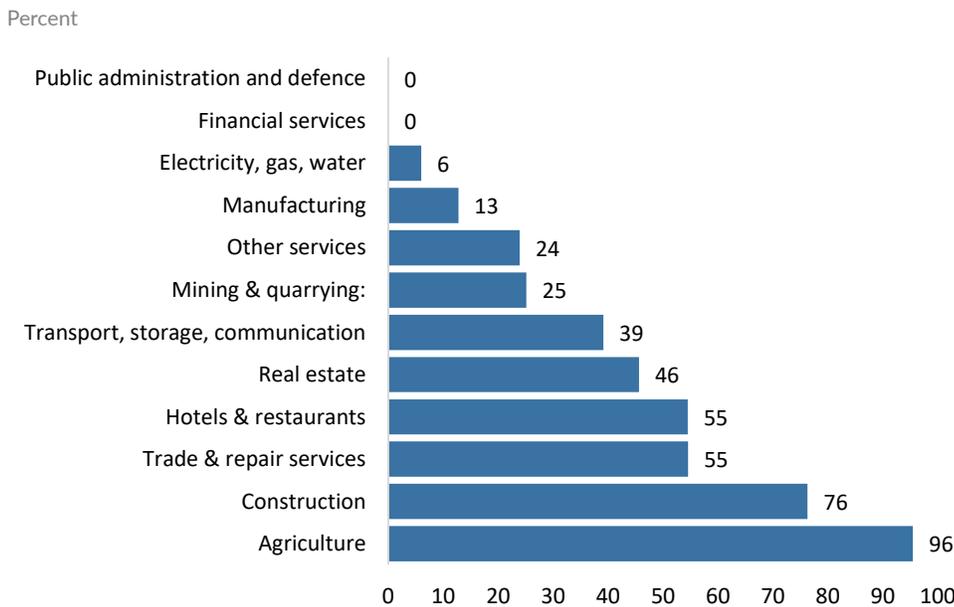
The concept was sound. The problem lay in the use of inadequate data sources and inadequate deflators.

*Inadequate data sources*

For the formal economy, the 2015 national accounts drew on a vast trove of data, including company financial statements, industrial surveys, and regulatory filings from the financial sector. The Annual Survey of Industries (ASI) underpinned the estimates for registered manufacturing; the MCA-21 corporate database provided balance sheet information for a large pool of private firms.<sup>14</sup> Public sector enterprises were captured through budget documents and departmental accounts.

Far fewer data were available for the unorganized sector, however. And this was a serious drawback, since the sector accounts for roughly 44 percent of GVA (figure 6).

**Figure 6**  
**Average share of informal sector in Gross Value Added in 2011–23**



Source: MoSPI.

In the absence of hard data on the informal sector, the CSO needed to employ some heroic assumptions. The 2010 National Statistical Service (NSS) survey of unincorporated enterprises was taken as a starting point, with value added in that year estimated through labor-input (LI), effective labor-input (ELI), and modified ELI methods.<sup>15</sup> These benchmark estimates were then extrapolated using indicators—such as industrial production, transport flows, and tax or sales data—to approximate informal sector GVA for subsequent years.

In principle, proxying informal sector activity by formal sector indicators need not be a serious problem, as the

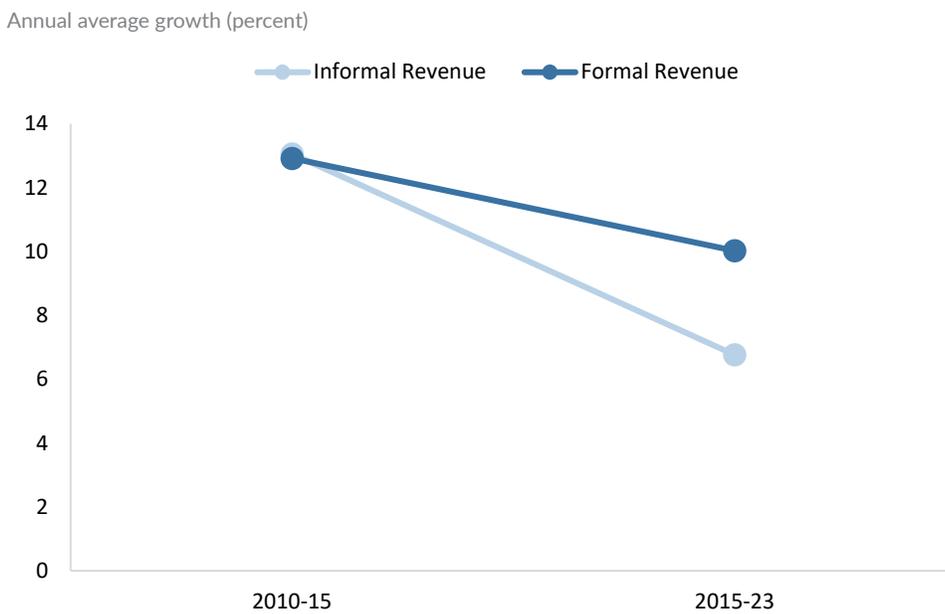
<sup>14</sup>MCA-21 is an administrative database maintained by India’s Ministry of Corporate Affairs that contains financial statements and regulatory filings of registered companies.

<sup>15</sup>In the unincorporated sector, GVA for the benchmark year was estimated using three variants of labor-based methods. The LI method assumes equal productivity across worker categories engaged in an economic activity (i.e., the productivity of an employer, a casual wage worker, and a family worker are equal). The ELI method adjusts labor input using productivity weights for different categories of workers. The modified ELI method applies separate rural and urban productivity measures—using GVA per (effective) worker from rural establishments and urban directory establishments—in order to capture structural differences in enterprise size and composition.

two tend to be correlated. But three shocks after 2015—demonetization, introduction of the GST, and the Covid pandemic—affected the informal sector disproportionately. As a result, use of formal sector indicators significantly overstated activity in the large informal sector. Mohanan’s (2024) analysis of data from the Periodic Labour Force Survey (PLFS), ASI, and Annual Survey of Unincorporated Sector Enterprises (ASUSE) data points to the same post-2015 split between a resilient formal sector and a contracting informal sector.

Figure 7 compares the performance of the formal and informal sectors using data from official surveys of the unorganized sector that were developed in recent years, under the auspices of the NSS. It shows that from 2010 to 2015 (when there were no asymmetric shocks), formal and informal sector sales growth were identical. Using the former as a proxy for the latter would therefore have been valid. In contrast, after the shocks, sales in the two sectors diverged, with annual nominal growth averaging 10.0 percent in the formal sector and just 6.8 percent in the informal sector, a difference of 3.3 percentage points annually.

**Figure 7**  
**Revenue growth in the formal and informal sectors, 2010–15 and 2015–23**



Note: Construction and financial sectors are excluded from formal sector sales as the informal sector surveys do not include these sectors. Growth rates are computed as compound annual growth rates over the relevant period.

Sources: CMIE, Unincorporated Non-Agricultural Enterprises Survey (UNES), ASUSE.

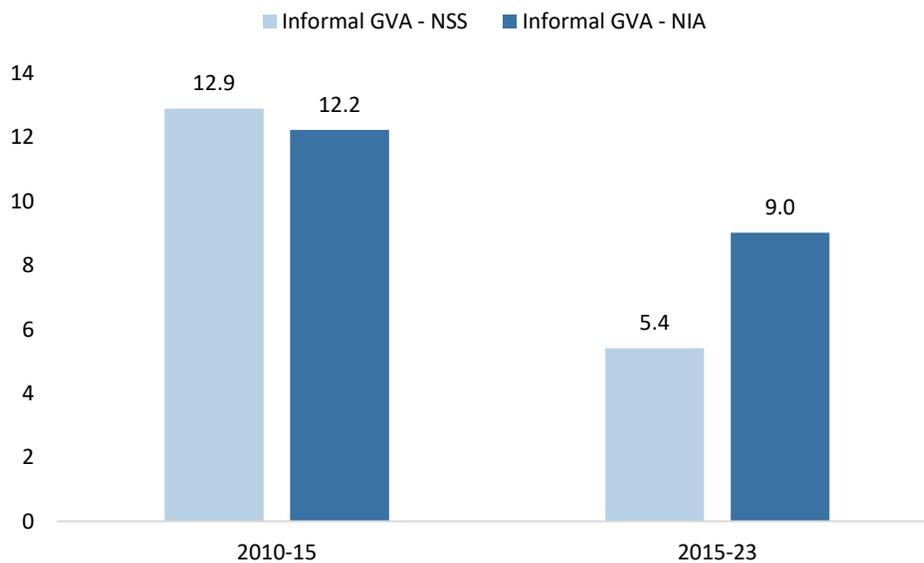
Figure 8 translates this divergence into estimates of informal sector GVA. The NIA and NSS show essentially the same sectoral growth in the 2010–15 period, but very different growth afterwards (9 percent according to the NIA and 5.4 percent according to the NSS).

Before drawing conclusions, we need to consider a possible issue. As the shocks occurred, some of the activities that vanished from the informal sector effectively shifted to the formal sector, a process known as *formalization*. If the official data failed to capture this process, the formal sector might be underestimated, balancing the overestimation of the informal sector and keeping the GDP figures broadly on track.

But there is no reason to think that this happened. If the sales of a formal seller of consumer goods increased because its informal sector competitors went out of business, those additional sales would have been included in its corporate accounts and reported to the MCA-21 database. Formal sector GVA would thus not have been

Figure 8  
Nominal growth of Gross Value Added, 2010–15 and 2015–23

Annual average growth (percent)



Note: Growth rates are compound annual growth rates between the start and end years. To ensure comparability, growth estimates are based on sectors that are covered in the ASUSE. For NIA, informal GVA growth is for 2011–15 as the formal and informal GVA is available 2011 onward.

Sources: UNES, ASUSE, and MoSPI.

underestimated.

In fact, there are reasons to believe that formal sector GVA is being *overestimated*. For a start, the move from the narrow company sample of the Reserve Bank of India to the far broader MCA-21 database added many companies whose accounts had not been properly audited and that may have been inflating their sales and profits. In addition, the MCA-21 database does not take proper account of formal sector firms that shrank, failed, or perhaps never even existed. The 74th NSS Round, conducted between July 2016 and June 2017, estimated that a remarkable 16.4 percent of the companies registered with MCA were nontraceable or closed and that 21.4 percent had been misclassified on the ground.<sup>16</sup> This problem was compounded because the “blowing up” factor that was employed in 2015 to go from the flawed sample to the GVA estimate for the private corporate sector as a whole was itself flawed (Nagaraj 2016).

All things considered, the assumption that the informal sector was doing as well as the formal sector, during a period when it was actually falling far behind, seems to have inflated the estimates of GDP growth.

<sup>16</sup>See Press Information Bureau, Ministry of Statistics & Programme Implementation, “National Accounts Statistics: A Clarification on the Usage of MCA Corporate Database,” May 30, 2019, <https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1572830>. The MCA conducted at least one round of cleansing of its database, but there is a risk that another swarm of new ghost firms subsequently entered the database.

### *Inadequate deflators*

Traditionally, the GDP methodology leaned heavily on volume indicators; as of the 2015 revision, they were still used for about one-quarter of the estimate, notably for the agriculture and transport sectors.<sup>17</sup> As a result of the shift toward the MCA-21 database, roughly three-quarters of the first revised estimate, which is released about 15 months after the end of the fiscal year, were measured by deflating nominal value (see items 2–7 and 9–14 in annex E). Consequently, the choice of appropriate deflators became of paramount importance for producing accurate estimates of real GDP.

International standard practice is to use producer price indices (PPI) for this task. But developing PPIs is a complex task in an economy as varied as India's, and such indices are not yet available.

As a result, the 2015 revision used two types of proxies. In a few cases, subsets of the Consumer Price Index (CPI) were used, but for the most part, Wholesale Price Index (WPI)-based deflators were employed, including for several large service categories, even though WPI does not really measure service prices. In the GVA categories listed in annex E, for example, trade and repair services and hotels and restaurants are deflated using WPI-based indices; construction is deflated using composite input-cost indices derived largely from WPI components such as cement, steel, and bitumen.

Use of the WPI might seem to be more defensible in manufacturing, as this index does purport to measure the price of goods. But even here its use is problematic, because the WPI assigns a heavy weight to inputs rather than outputs.

Put another way, the WPI heavily weights commodities. One could even say that at its heart the WPI follows oil prices. Table 2 presents correlations between oil and several WPI-related deflators for 2004–11 and 2012–24. It reveals that most of the WPI deflators are highly correlated with oil price changes in the second period but not the first.

But why is it a problem if the WPI reflects inputs, such as oil? The answer goes back to the relative price issue discussed above. If input prices fall, inflating profits, this increase needs to be deflated away, as real GDP is meant to be evaluated at constant prices. Using a measure of input prices as a deflator will not solve the problem. In fact, it will make it worse.

To see why this is the case, assume that a firm produces 100 widgets in both period 1 and period 2 using the same quantity of inputs (10) in both periods. There is no increase in production or value added. If, however, relative prices change, so that the selling price increases by 5 percent while the input price increases by only 3 percent, profits (or nominal value added in this simple example) increase by 5.5 percent (table 3).

The task of deflators is to adjust this nominal increase to reveal the fact that production did not change. The standard international methodology is to use double deflation—that is, to deflate revenue by an output price index and costs by an input price index (European Commission et al. 2009). But doing so was not possible in India in 2015.

<sup>17</sup>We focus on the first revised estimate because it is the first estimate for a given financial year that is compiled using the full annual GDP estimation methodology. Earlier estimates—the first advance estimate, second advance estimate, and provisional estimate—are generated using quarterly GDP methodology, relying on high-frequency indicators and benchmark-indicator extrapolation rather than comprehensive annual data.

Table 2

**Correlation between changes in Wholesale Price Index manufacturing deflators and oil prices**

	2004–11	2012–24	Average % share in GVA (2011–23)
Manufacturing	0.3	0.7	15.0
Food products	-0.9	0.3	1.2
Textiles	0.0	0.6	1.2
Rubber and plastic products	0.0	0.5	0.6
Basic metal	0.6	0.9	1.7
Paper products	0.0	0.5	0.2
Motor vehicles, trailers, semi-trailers	0.1	0.2	1.7
Steel	0.4	0.8	n.a.
Cement	-0.2	0.3	n.a.

Note: n.a. denotes Not available.

Sources: MoSPI and Ministry of Petroleum and Natural Gas. The period average for sectoral share in GVA is approximated as the simple mean of the initial (2011) and final (2023) shares. 2020 and 2021 are excluded to avoid pandemic-related distortions.

Table 3

**Illustrative example of use of inappropriate deflators**

Item	Period 1			Period 2		
	Price	Qty	Revenue	Price	Qty	Revenue
Output	100	100	10,000	105	100	10,500
Input	100	20	2,000	103	20	2,060
Nominal value added			8,000			8,440
Nominal value-added growth (percent)						5.5
<i>Real value-added growth (percent)</i>						
Double deflation						0.0
Single deflation using output deflator						0.5
Single deflation using input deflator						2.4
Double deflation using (inappropriate) input deflator						2.4

In those circumstances, several options could have been adopted. Nominal value added could have been deflated using output prices, in which case real growth would have been estimated at 0.5 percent—an overestimation but a modest one. Alternatively, nominal value could have been deflated using input prices, in which case real growth would have been estimated at 2.4 percent—a serious exaggeration.

A third alternative goes to the heart of the matter: the use of double deflation with inappropriate deflators. If output and input are deflated separately but input prices are inappropriately applied to both, the overestimation will remain unchanged, as the last row in table 3 shows. This result shows that the real problem is not the lack of double deflation. It is inappropriate deflators.

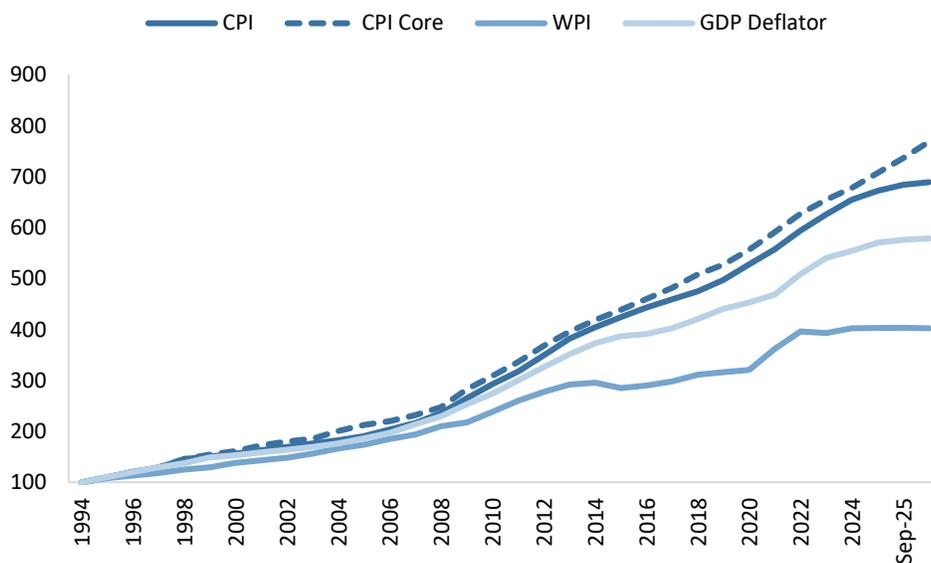
The conclusion is clear: If the relative price of inputs falls, the use of an input-based deflator such as the WPI can cause real growth to be overestimated by a significant margin. If double deflation with proper deflators is not possible, the second-best solution is to use an output-based measure of prices, such as the CPI (Alexander et al. 2017).

This analysis assumes that the price of inputs fell relative to the price of outputs. Did this actually happen? After all, sometimes WPI inflation is less than CPI inflation, and sometimes things are the other way around. Over the long run, these divergences could average out to zero.

That is not what happened in the past decade and a half, however. Between 2011 and September 2025, input prices fell systemically relative to output prices, with annual WPI growth averaging 2.2 percentage points less than CPI growth (figure 9).<sup>18</sup> With such heavy reliance placed on the WPI, the growth in the GDP deflator averaged 1.4 percentage points lower than the CPI. Put simply: The deflator bias over this period was systemic, not cyclical.

Figure 9

Consumer Price Index (CPI), CPI core, Wholesale Price Index, and GDP deflator 1994–2025



Source: RBI.

As a result, there is a risk that the reliance on WPI-based deflators caused growth to be overestimated. To check this inference, we need a measure of this overestimation. Earlier we found that real sales growth is theoretically well correlated with GDP growth and de facto well correlated with the other macro indicators. Accordingly, we used the difference between real sales and official real GVA growth as our proxy for mismeasurement.<sup>19</sup>

Panel a in figure 10 plots the sales–GVA wedge on the *y*-axis and the CPI–WPI differential on the *x*-axis. The correlation is strong (0.81) and in the expected direction: When CPI growth exceeds WPI growth, official GVA growth exceeds sales growth. Correlation is not causation, but it does suggest that when input prices fall relative to output prices, GDP growth may be overstated.

Panel b of figure 10 shows the correlation between the discrepancy between production- and expenditure-side

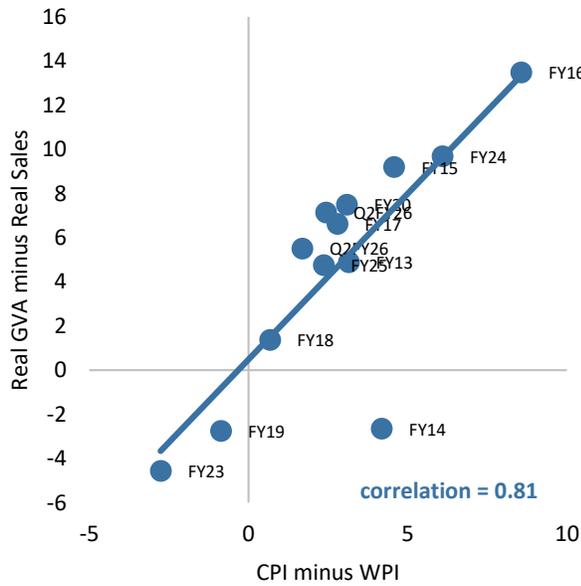
<sup>18</sup>Double deflation per se is not the solution to this problem. As the table shows, if it is undertaken using the wrong deflators, the exaggerated estimate of output growth is the same as with single deflation and inappropriate deflators.

<sup>19</sup>To be conservative, we excluded agriculture and government from GVA, as sharp movements in these sectors (which are quite different from the corporate sector) could cause GVA and corporate sales to diverge.

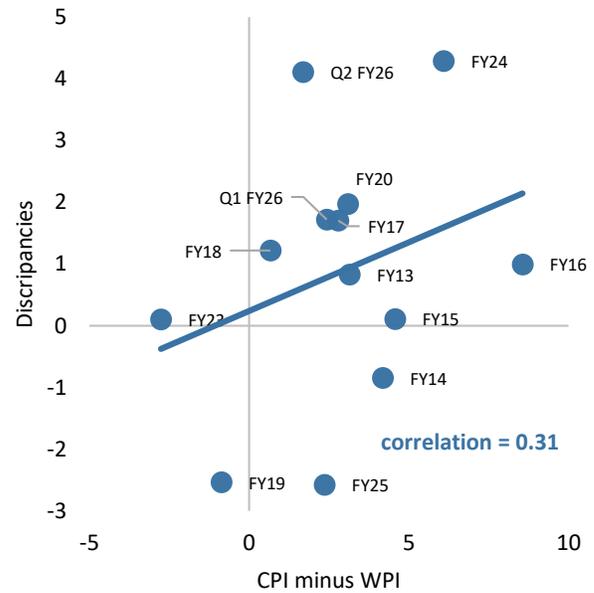
Figure 10

**Wedges between the Consumer Price Index and the Wholesale Price Index and structural discrepancies in India's GDP data**

**a. Correlation between sales–GVA wedge and CPI–WPI wedge**



**b. Correlation between expenditure–production GDP discrepancy and the CPI–WPI wedge**



Note: Real GVA excludes public administration and agriculture. 2020 and 2021 are excluded to avoid pandemic-related distortions.

Sources: RBI and CMIE.

estimates of GDP (*y*-axis) and the divergence between CPI and WPI prices (*x*-axis). The correlation is reasonably strong and of the expected magnitude. When the WPI falls relative to the CPI, production-side estimates exceed expenditure-side estimates, suggesting that the (production-based) GDP estimates may be overstated.

Another piece of evidence comes from breaking down the post-2019 period into 2020–22 and 2023–September 2025 (figure 11). In the latter period, the CPI outpaced the WPI and real GDP again outpaced sales, suggesting that official numbers overstated economic growth. In contrast, during 2020–22, the WPI rose by 1.7 percentage points more than the CPI, leading sales to outpace GDP by 6.4 percentage points, suggesting that the official numbers may have understated economic growth in that period.

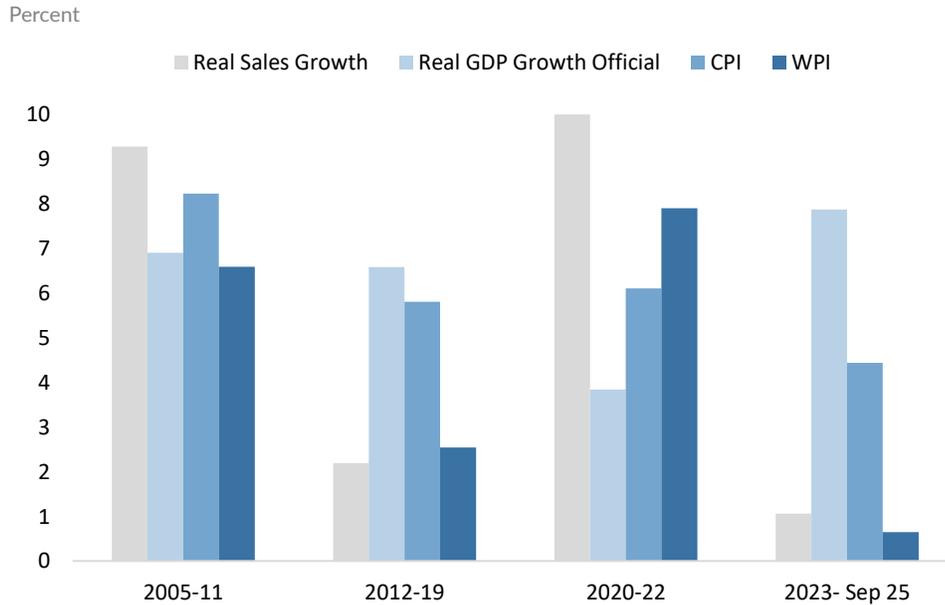
All of these tests suggest that GDP has been overestimated when CPI growth has exceeded WPI growth and underestimated when WPI growth has exceeded CPI growth.

Summing up, the post-2011 deflator problem stemmed from a series of unfortunate events:

- The 2015 revision shifted the “raw material” to the MCA-21 database, so that real GVA for the vast preponderance of sectors was calculated by deflating nominal numbers rather than using estimates of volume indicators.
- The deflators continued to be based on the WPI, which is heavily influenced by commodity (essentially oil) prices.
- The WPI fell sharply in relative terms, causing the deflators to understate actual production inflation.

The net result of the deflator and data problems was that real GDP growth was overestimated for the post-2011 period. Inappropriate deflators affected only real GDP but mismeasuring the informal sector caused both

Figure 11  
Real sales growth, official GDP growth, and inflation across periods



Note: Real sales growth is estimated by deflating nominal sales growth with CPI-IW core from 2004 to 2011 and CPI core thereafter.

Sources: RBI and CMIE.

nominal and real aggregates to be overestimated.

## THE BACKCASTING EXERCISE

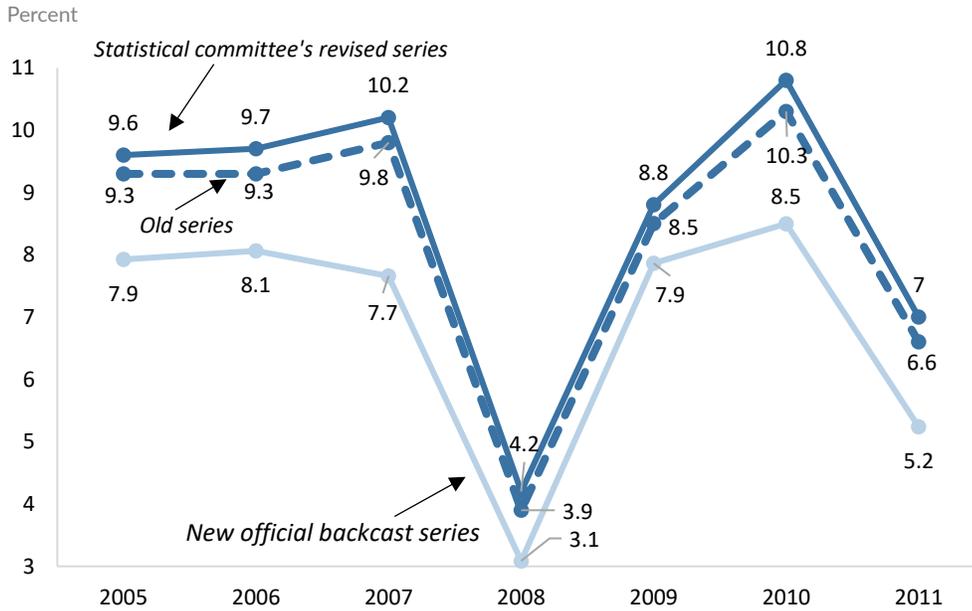
In November 2018, nearly four years after the methodology was changed, historical growth estimates for 2005–11 were revised, using a process known as *backcasting*. Oddly, the figures were announced not by India’s official statistics agency, the Ministry of Statistics and Programme Implementation (MoSPI), but by Niti Aayog (the successor to the Planning Agency).

Also oddly, the official estimates superseded those that had been provided just a few months earlier, in August 2018, by a government-appointed National Statistical Commission (NSC) committee, led by Prof. Sudipto Mundle. As a result, when the official estimates were announced, there were already two sets of estimates for the same period: estimates using the older methodology and base year and estimates using the new methodology by the Mundle Committee. Figure 12 presents all three estimates.

As the figure shows, the NSC Committee (constituted by MoSPI) found that the older estimates had understated GDP. It therefore revised annual GDP growth for 2005–11 upward by 0.4 percentage points on average. The subsequent official estimates took a very different view, revising growth estimates downward. As a result, there was a nearly 1.7 percentage point wedge between the official numbers and those of the NSC Committee.

This wedge is so large that the two estimates—purportedly made using the same methodology—yield two completely different pictures of India’s history. The NSC Committee numbers suggest that the economy boomed in 2005–11, a picture that is consistent with the macro indicators. In contrast, the official backcasting numbers show that growth in 2005–11 was only modestly higher than in the subsequent decade.

**Figure 12**  
**Impact of statistical revisions on measured GDP growth, 2005–11**

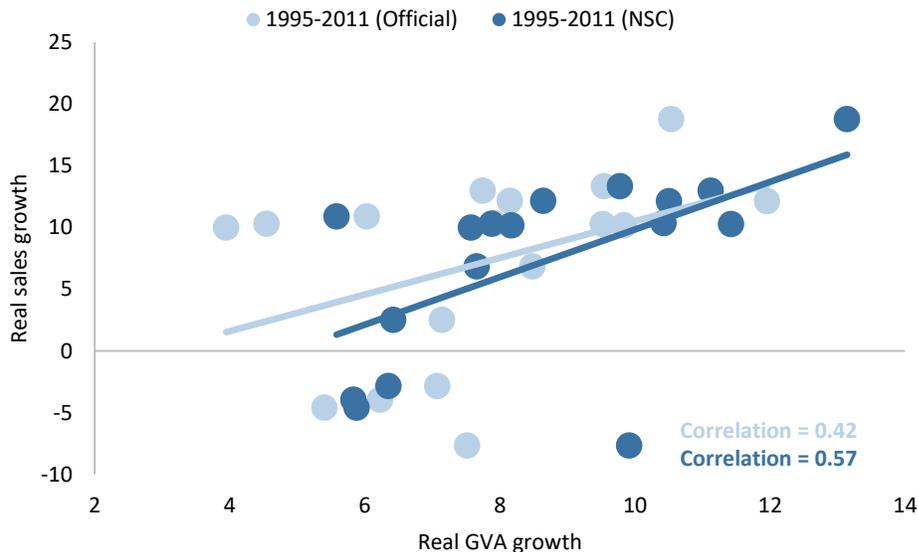


Note: GVA excludes agriculture and public administration.

Source: MoSPI.

Figure 13 sheds some further light on this issue by examining the correlation between real sales growth (our proxy for the macro indicators) and the two sets of “official” estimates. The results show that the correlations are stronger for the NSC Committee estimates.

**Figure 13**  
**Correlation between sales and Gross Value Added, based on National Statistical Committee and official series**



Sources: MoSPI and CMIE.

## ADDRESSING THE PROBLEM

If the Mundle Committee was correct, then the official numbers may have misestimated 2005–11 growth, yielding numbers for this period that are around 1½ percentage points too low. What about the post-2011 period?

Estimating the bias during this period is difficult, because it requires the adoption of a new set of data sources as well as a change in the deflators used for each of the subsectors that go into the GDP estimates. One can, however, get some idea of the magnitude of the GDP overestimation by making a few key changes to the 2015 methodology.

This section presents revised estimates of real GVA for the period 2011–2023. The new estimates incorporate two key changes: (a) the CPI replaces the WPI as a deflator in several sectors and (b) data from recent surveys of the informal sector replaces formal sector proxies. These two changes yield materially lower estimates of real GVA growth compared to the official series.

### Deflators

For manufacturing and key services sectors, we replace input-based deflators with CPI-aligned indices, to ensure that real GVA reflects the price changes experienced by consumers and end-users rather than changes in intermediate input costs. The specific deflators used included the following:

- *Manufacturing*: The CPI-Goods replaces the official WPI-Manufacturing deflator.
- *Trade and repair services*: The CPI-Services Index replaces the WPI for trade and repair services.
- *Hotel and accommodation and construction*: The general CPI replaces the WPI.
- *Financial services*: The CPI-Services replaces a sector-specific WPI-based index.

The indices for CPI-Goods and CPI-Services are derived from the overall CPI by aggregating the goods and services components, respectively. For the period before the establishment of the modern CPI series, in 2012, the CPI-Industrial Workers (CPI-IW) Index is used, in order to ensure that output price inflation is used across the entire estimation period.

### Data sources

For registered manufacturing, we rely exclusively on ASI data rather than the ASI-MCA hybrid used in the official series. Relying only on the ASI provides a cleaner, more representative measure of genuine registered manufacturing activity. For other formal sectors, nominal GVA follows official sources.

For the informal sector, we replace formal sector proxies with data derived directly from NSS' Informal Enterprise Surveys, which we then deflate using the same CPI-based deflators used for their corresponding formal sectors.

Survey data are available only for selected periods, making it impossible to derive annual growth estimates. As the objective is to capture long-run trends, we use the available rounds to compute an average growth rate for the entire period from 2011/12 to 2023/24.

A more problematic limitation is the partial coverage of the survey, which includes only half of the informal sector, excluding some key sectors such as construction. To address this problem, we present two sets of estimates.

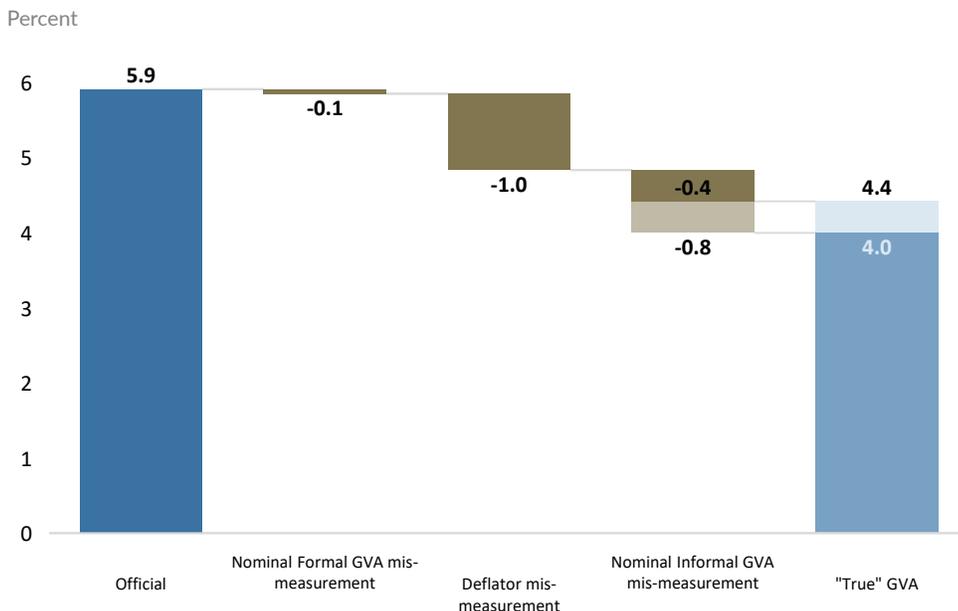
For the upper-bound estimate, we revised nominal growth downward only for the sectors covered by the informal survey, retaining official growth rates for all other sectors, including construction. This estimate is based on the optimistic assumption that the nonsurveyed segments were unaffected by the stresses clearly visible in the surveyed parts of the informal economy.

The lower-bound estimate extends the weak performance observed in the surveyed sectors to the entire informal economy. This approach assumes that similar setbacks were experienced by sectors not directly captured by the survey, notably construction, which was particularly vulnerable to the cash-flow disruptions caused by demonetization. The result is a larger downward adjustment to nominal informal GVA.

*Results*

Applying these corrections produces a significant downward revision of India’s average annual GVA growth over 2011–23. Against an official estimate of 5.9 percent, the revised figures lie between 4.0 and 4.4 percent (figure 14). The deflator correction alone lowers real growth by 1.0 percentage points; adjustments to informal sector nominal GVA account for an additional 0.4–0.8 percentage points, depending on the assumption made. In total, the revision amounts to 1.5–1.9 percentage points, significantly altering the growth narrative, recasting the decade as one of moderate rather than rapid expansion.

**Figure 14**  
**Official and estimated average GVA growth between 2011 and 2023**



*Note:* Faded golden and blue segments denote lower- and upper-bound adjustments to informal-sector GVA and “True” GDP growth respectively. UNES (2010–11) and ASUSE (2023–24) have been used to estimate informal GVA mismeasurement. Growth rates are compound annual growth rates between the start and end years.

*Sources:* MoSPI, Authors’ estimates.

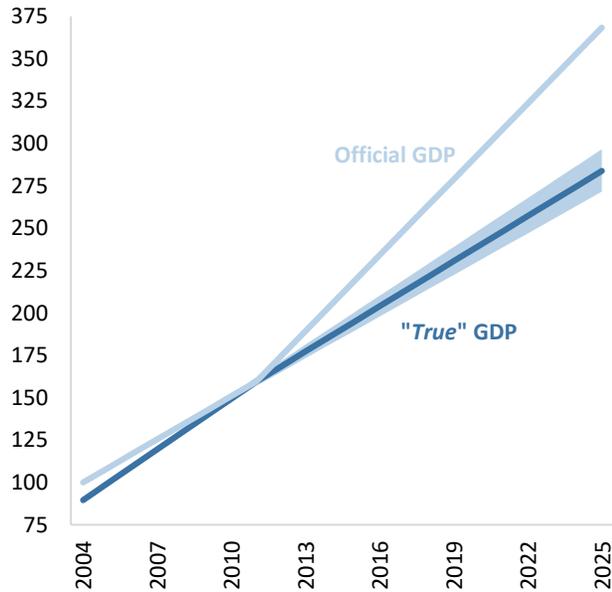
The cross-country evidence yields a similar magnitude of overestimation. The equation underlying panel b of figure 5 suggests an annual average overestimation of 2.3 percentage points. This figure is close to the average of

estimates across the robustness checks shown in annex D as well as to the estimate in Subramanian (2019a).

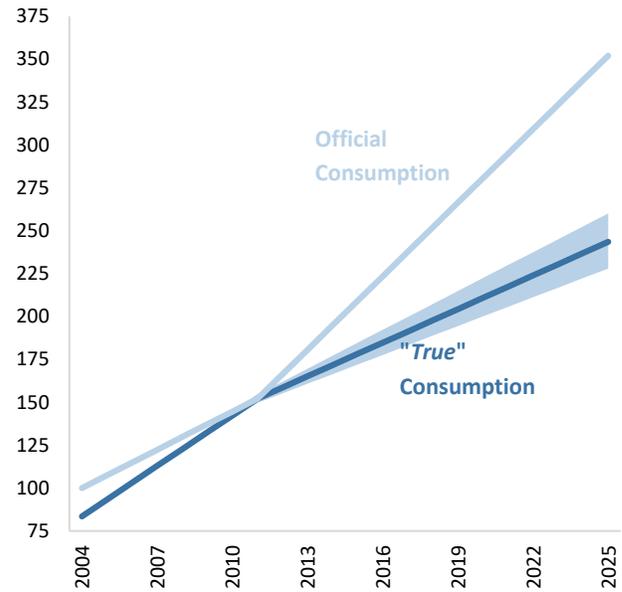
The overestimation of long-run growth suggests that as of 2025, the level of real GDP is overstated by about 22 percent and the level of real consumption by about 31 percent (figure 15).<sup>20</sup> India’s economy is thus smaller and the average standard of living significantly lower than official estimates indicate.

Figure 15  
GDP and consumption, 2004–25

a. GDP



b. Consumption



Note: Series are indexed to 2004 (=100). The “true” values are expressed relative to this base. For 2004 to 2011, “true” series follows NSC-implied averages; post-2011, growth reflects our revised estimates. “True” consumption is inferred by allocating the GDP gap to private consumption. This is based on the assumption that other components are relatively well measured. The 2004–11 NSC–official comparison supports this, as most of the divergence reflects revisions to private consumption.

Sources: Report of the Committee on Real Sector Statistics (2018), MoSPI, Authors’ estimates.

CONCLUSION

The underestimation of GDP growth between 2005 and 2011 and its overestimation thereafter portray a trajectory of growth over the last two decades that is at variance with general perception and most indicators. The macro indicators surged from the 1990s to the early 2000s but then decelerated sharply, falling below pre-2005 levels (figure 16). Yet official GDP growth figures portray a picture of stable growth over the entire period.

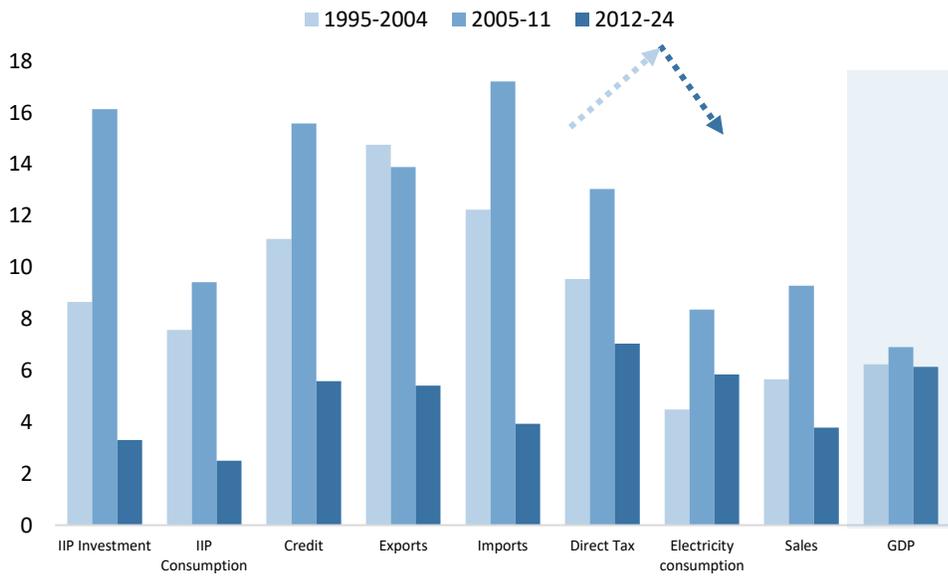
A subtle corollary of the misestimation of GDP growth is its magnification effect on consumption. If GDP is revised, so, too, must its expenditure-side counterparts—and typically most of the revision is concentrated on consumption. For example, the backcasting exercise reduced 2005–11 GDP growth by a sizable 1.7 percentage points but consumption growth by a whopping 2.3 percentage points. As a result, consumption growth during the boom is now estimated to be (marginally) lower than in the subsequent decade—completely different directionally from the findings of the National Statistical Survey of actual consumption patterns (figure 17).

In other words, the impact of the 2015 methodology was not merely to adjust some quantitative estimates: it

<sup>20</sup>Based on the calculations shown in figure 12.

**Figure 16**  
**Growth rates of macro indicators of GDP**

(annual average; real; percent)

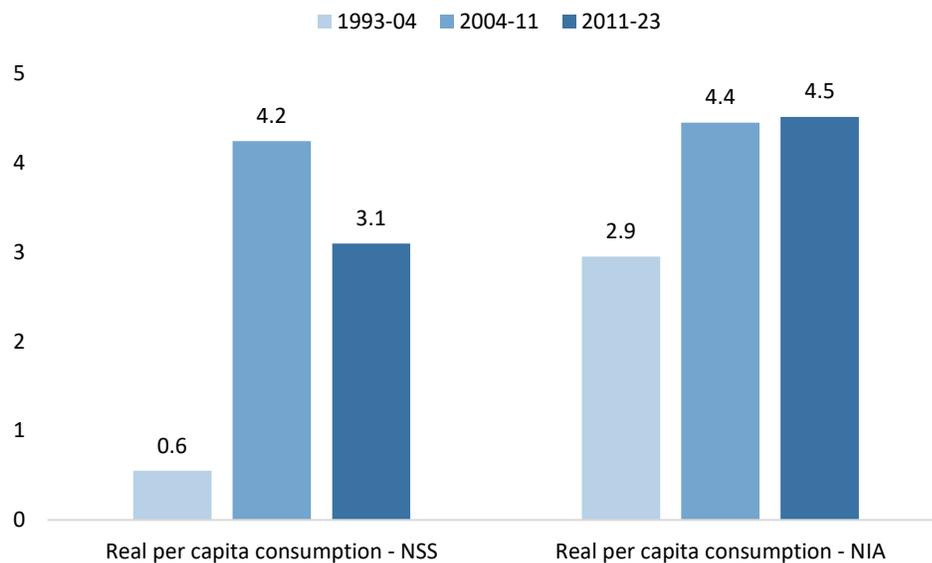


Note: All the variables are in real terms. Real sales and real direct tax growth is arrived at by deflating nominal sales growth with CPI-IW core from 2004 to 2011 and CPI core thereafter. IIP Investment is proxied by IIP Capital for 1995-11 and by the simple average of IIP Capital and IIP Infrastructure for 2012-24.

Sources: RBI, CEA, MoSPI.

**Figure 17**  
**National Statistical Survey and National Income Accounts estimates of growth in real per capita consumption**

Percent



Note: Estimates are not strictly comparable across time due to changes in survey methodology and consumption measurement. The 1993-94 round uses the Uniform Recall Period (URP). The 2004-05 to 2011-12 rounds report both URP and Mixed Recall Period (MRP) measures. From 2022/23 onward, estimates are based on the Modified Mixed Recall Period (MMRP). These rounds further introduced refinements to the item basket, questionnaire design, and treatment of services and free or subsidized items, which may affect measured consumption levels. In the absence of a consistent methodology, comparisons should be interpreted as indicative of the direction of movement rather than quantitatively tight. Growth rates are compound annual growth rates between the start and end years.

Sources: MoSPI, Household Consumption Expenditure Survey (HCES), authors' estimates.

was to portray a completely different trajectory of growth. In effect, the boom of the 2000s and the subsequent slowdown have been erased from history, replaced by a picture of steady, rapid growth.

The official data suggest that the last two decades were an uninterrupted idyll of 6–7 percent growth. India's economy did not soar between 2003 and 2010, when heady, dizzy dynamism was palpable everywhere. And the slowdown in global growth after the Global Financial Crisis, the Twin Balance Sheet problem, and the four major shocks that afflicted the Indian economy (demonetization, adoption of the GST, the Covid pandemic, and the credit freeze triggered by the nonbank crisis) had no impact on growth in India.

This misreading of India's performance has had two important policy consequences. First, it has complicated the task of calibrating macroeconomic policy to the actual condition of the economy. During some periods, the GDP data signaled that the economy was strong when it was in fact weak; in others, they suggested that policy should be eased when growth was in fact strong.

The other problem that misestimation has created is to attenuate the urgency of reforms. After all, why should one change the policy framework when it is already producing world-beating growth?

Two concluding thoughts. First, in the last decade, there have been frequent invocations of “puzzles.” Why was private investment weak, net FDI declining, capacity utilization stagnant, and wage and employment growth tepid if growth was so strong? Each of these puzzles elicits a complex and different explanation. But in the spirit of Occam's Razor, there is one, simple (partial) explanation of all these puzzles: Growth was not as strong as it was reported to have been!

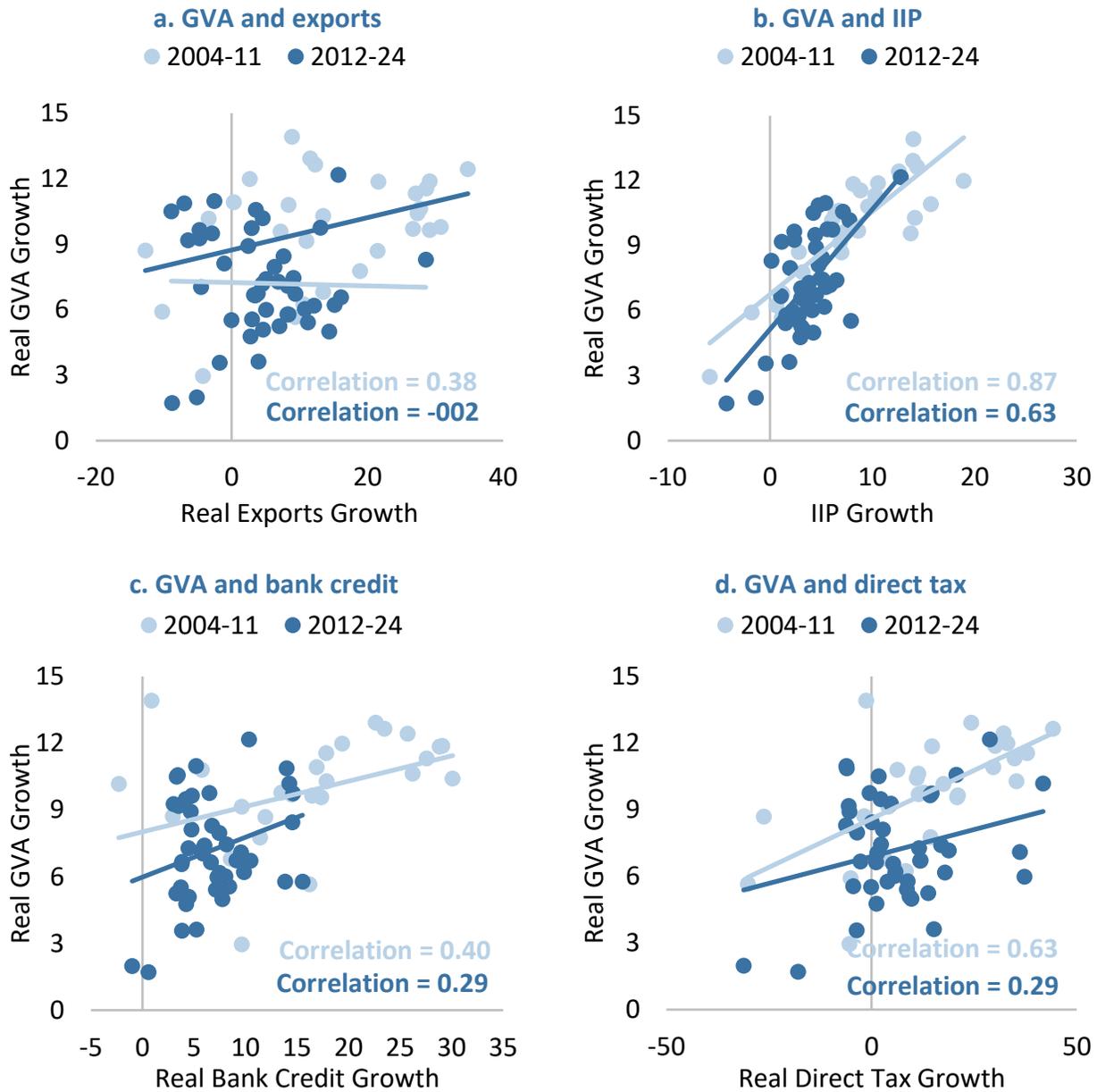
Second, India has taken considerable pride in the fact that it is among the fastest-growing economies in the world. According to official figures, it was the fourth-fastest-growing major economy between 2011 and 2023, behind only Ireland, China, and Bangladesh. Even with our revised estimates, India remains among the top seven or eight fastest-growing economies.

National pride may yet be warranted but it does not require a statistical crutch.

We will have to wait and see if the latest methodological changes are the light that will allow India's national income accounts estimation, undertaken after commendable consultation, to move beyond the fog of the last two decades.

**APPENDIX A CORRELATION BETWEEN GROSS VALUE ADDED AND CORE MACRO INDICATORS**

Figure A.1  
Correlation between Gross Value Added and core macro indicators



Note: All growth rates shown on both the *x*- and *y*-axes are quarterly year-on-year growth rates. CPI Core is the deflator for bank credit and direct tax. 2020 and 2021 are excluded to avoid pandemic-related distortions from supply shocks, lockdowns, and policy interventions that obscure normal cyclical relationships. GVA excludes agriculture and public administration. Bank credit excludes food credit. For the period 1995–2011, real GVA and real exports are measured using the 2004 base year series; from 2011 onward, the 2011 base year series is used.

Sources: RBI and CMIE.

## APPENDIX B IS CORPORATE SALES A VALID INDICATOR?

Recently, some analysts have started to use corporate sales as a measure of economic performance. But is it a valid indicator? There are three main concerns.

One obvious problem is that much of the economy lies outside the corporate sector. But that is also true of the national accounts. At the risk of simplification, one can say that the GDP data are based on the MCA-21 database, which is based on corporate results filed with the Ministry of Commerce. Accordingly, the corporate data and the GDP numbers should be very well correlated.

Another potential problem is that corporate sales are conceptually different from GDP. GDP measures value added, which is essentially (by one definition) sales minus the cost of inputs used in production. If the cost of inputs falls relative to the value of output, value added can increase even when sales do not.

In principle, several factors could drive a wedge between sales and value added. If productivity rises, fewer inputs are needed for a given amount of production; value added rises even when production does not. If inventories increase, production could rise even when sales do not. In practice, however, these channels are unlikely to cause long-term correlations to collapse. Productivity tends to rise at a fairly steady rate, and inventory accumulation can fluctuate widely but only over short periods, without affecting correlations among long-term aggregates (Solow 1957).

There is a third possible cause of divergences between sales and value added: changes in relative input prices, which can be large and persistent. Consider a construction firm that is a heavy user of steel. If the price of steel falls sharply, profits can rise considerably even if sales growth is minimal. As another (simple) way to measure value added is profits plus wages, the increase in profits would boost nominal value added. In this case, the correlation between sales and value added would break down.

There is a twist, however. The example above holds for sales and nominal value added. But when it comes to real GDP, evaluation needs to be done at constant prices, because an increase in real GDP is meant to convey an increase in the volume of production, not an increase in profits that occurs simply because input prices fell. For this reason, international standards call for profit increases to be deflated away when they are driven merely by a decline in the cost of inputs. Once profits are deflated, the correlation between real sales and real GDP will once again be strong, as both will increase only when there is growth in the volume of production (abstracting from changes in productivity and inventories). All things considered, then, sales data can indeed provide a valuable proxy for aggregate economic activity (Bayar and Gogoberishvili 2023).

One can go even farther. Compared with other indicators, sales data have several advantages as a proxy for aggregate growth (European Central Bank 2007; Kalemli-Ozcan et al. 2022). The data are drawn from audited company accounts, making them among the more reliable components of the macroeconomic data system. They also offer broad coverage: Sales data are available annually for both listed and unlisted firms and, periodically, for the unincorporated sector as well. Taken together, these sources cover roughly 65 percent of economic activity. The main sectors for which comparable sales data are not available are agriculture and public administration.

## APPENDIX C WHY DID TAX REVENUES RISE?

One macro indicator that has performed well in recent years has been tax revenues. Indeed, some commentators have argued that the sharp growth in tax collections proves that the economy must be booming. For this reason, it is useful to examine these data carefully.

Tax revenues evolved over three distinct periods in the last two decades (table C.1):

- In the boom period (2004–11), average annual nonoil tax revenues grew at a sizzling 18.1 percent on the back of nominal GDP growth of 15.5 percent, yielding a tax buoyancy of close to 1.2.
- In the following period (2011–19), which ended with the Covid shock, average annual nonoil tax revenue growth declined to 10.3 percent, as nominal GDP growth decelerated to 11.0 percent.
- The true boom in taxes occurred after Covid (figure C.1). The tax–GDP ratio (for the center plus states) soared to 18.6 percent in 2024, after fluctuating around 16.5 percent between 2004 and 2022.

Table C.1

### Average growth of tax revenues, GDP, inflation, and Gross Value Added (percent)

Item	2004–11	2011–19	2019–24	2011–24
Oil tax	10.6	12.3	5.8	9.7
Nonoil tax	18.1	10.3	14.9	12.1
Total tax	16.8	10.6	13.7	11.8
Nominal GDP	15.5	11.0	10.5	10.8
Real GDP	6.9	6.6	5.3	6.1
CPI	8.2	5.8	5.7	5.7
CPI core	7.7	5.8	5.2	5.6
Real GVA	6.9	6.3	5.4	6.0

Note: Growth rates are computed as compound annual growth rates over the relevant period.

Sources: RBI, MoSPI, authors' estimate.

The puzzle is why there was a tax boom in this period despite a cut in the goods and services and corporate income taxes. Did it reflect rapid growth or other factors?

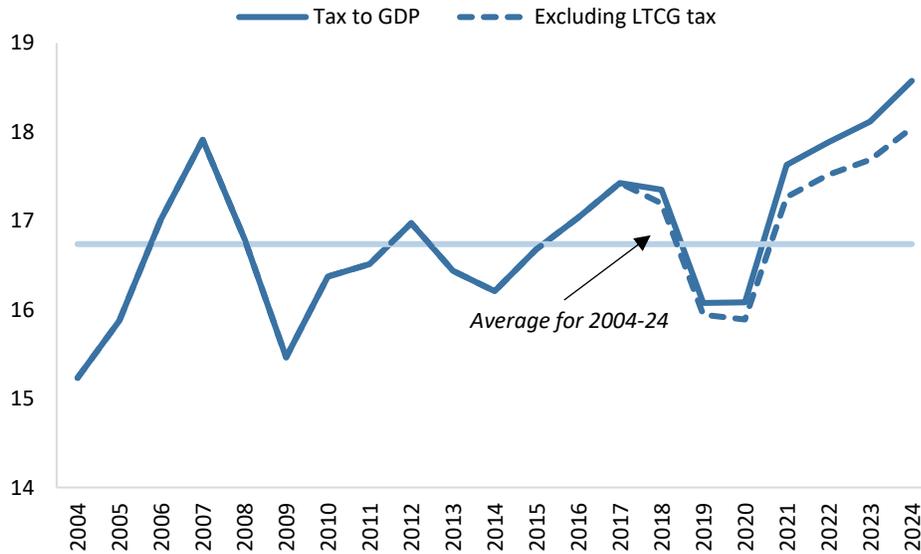
The evidence suggests the latter. Taxes boomed because the pattern of growth and spending was disproportionately tax-intensive. As the economy emerged from Covid lockdowns, activity in Global Capability Centers (GCC), the stock market, and real estate all surged, producing a cascade of income taxes from people who benefited from the expansion of professional jobs and the increase in asset values. Individuals reporting incomes of more than Rs 1 crore (about \$110,000), who typically earned about 8 percent of total reported income, suddenly accounted for nearly 18 percent of the total (figure C.2). The increase in the number of people earning Rs 5 crore or more was even sharper, with their share tripling in just two years.

As a result, personal income taxes increased sharply (figure C.3).

As the newly affluent spent on heavily taxed luxury goods, such as SUVs, GST receipts also soared (figure C.4).

**Figure C.1 Tax to GDP ratio, 2004-24**

Percentage change

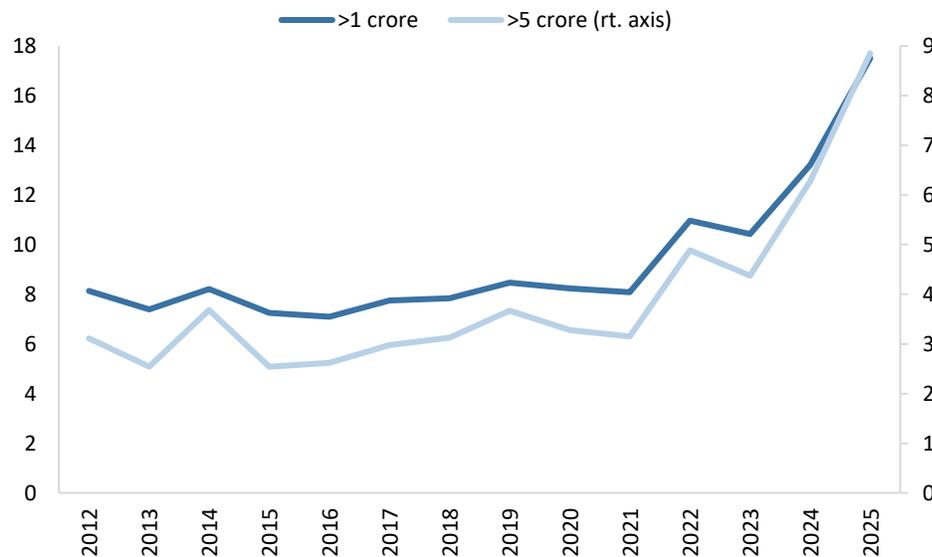


Note: Official data for long-term capital gain tax collections are available until 2022; after 2022, values were estimated based on the collection of securities transactions tax.

Source: RBI.

**Figure C.2 Share of income paid on individual taxpayers' reported income, 2011-24**

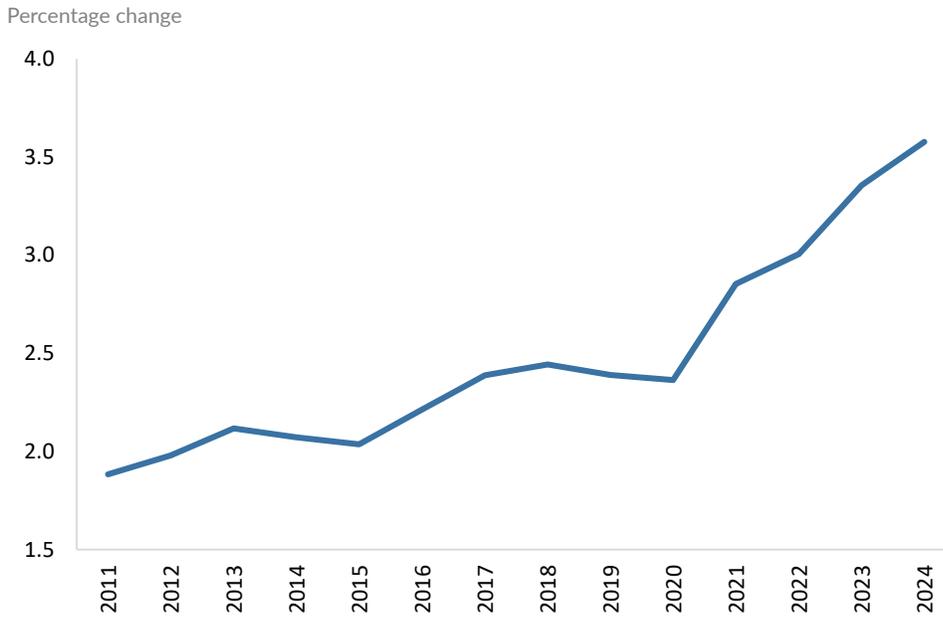
Percent



Note: Central Board for Direct Taxes data are used up to 2023. For 2024 and 2025, filer counts above 1 crore and 5 crore are taken from BusinessLine (2025) and multiplied by 2023 average incomes for the respective categories. Estimates for 2025 are based on data available up to December.

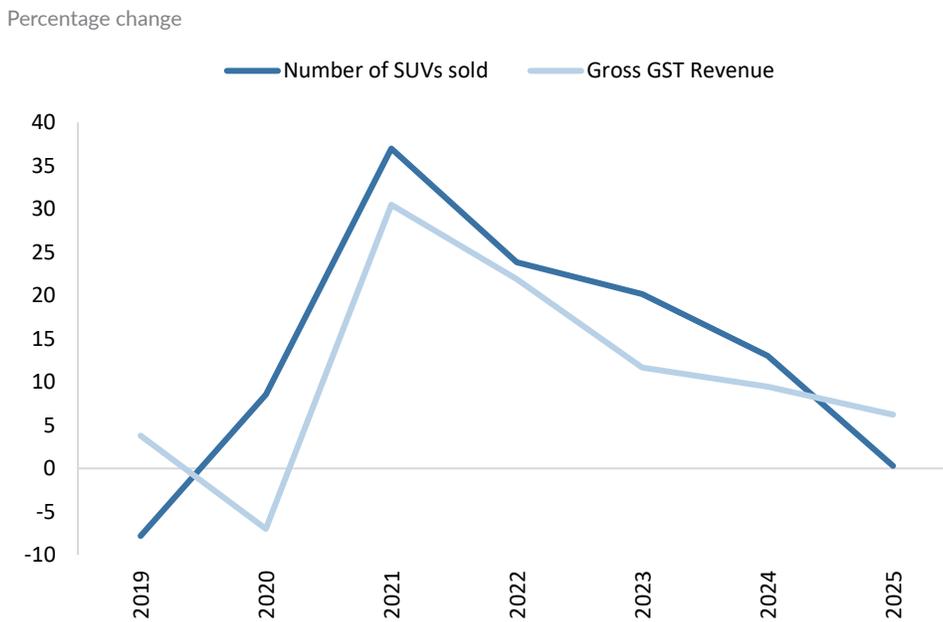
Sources: Central Board for Direct Taxes, The Hindu BusinessLine (2025), Authors' estimates.

**Figure C.3 Personal income tax collected as share of GDP, 2011-24**



Source: Central Board for Direct Taxes.

**Figure C.4 SUV sales and gross revenue from Goods and Services Tax, 2019-25**



Note: FY26 (2025) sales growth and nominal GST revenue are estimated using data available up to January 2026.

Sources: Society of Indian Automobile Manufacturers (SIAM); GST Portal.

Taxes thus boomed because of changes in the composition of consumption, not because growth was exceptionally strong. The *K*-shaped nature of the recovery meant that the increases in GDP that did take place were concentrated in the heavily taxed goods and income brackets.

## APPENDIX D CROSS-COUNTRY EVIDENCE ON THE MISESTIMATION OF INDIAN GDP

We conducted cross-country regressions in order to validate our findings on the break-down of correlations post-2011. For the sake of tractability and data availability, we restricted the variables to four macro indicators—credit (C), exports (X), imports (M), tax revenues (R), and energy consumption (E)—data on all of which are available for a large sample of middle- and high-income countries. These data are also typically produced independently of the statistical agency. For example, credit data are produced by central banks, trade data by customs authorities, and electricity data by regulators. The trade data can typically be cross-checked with data from partner countries.

We obtained data on real GDP growth, tax revenue, and credit to the private sector from the World Bank's World Development Indicators (WDI) database; on exports and imports of goods and nonfactor services from the International Monetary Fund's World Economic Outlook (WEO) database; and on energy/electricity consumption from the Energy Institute.

We divided the sample into two periods, 2005–11 and 2012–24. For each period, we estimated the following regression:

$$\text{GDP Growth}_i = \beta_0 + \beta_1 \text{Credit Growth}_i + \beta_2 \text{Energy Growth}_i + \beta_3 \text{Export Growth}_i \\ + \beta_4 \text{Import Growth}_i + \beta_5 \text{Tax Revenue Growth}_i + \beta_6 \text{India} + \varepsilon_i,$$

where each country is denoted by the subscript  $i$ . The key variable of interest is the India dummy, which captures whether India is or is not an outlier in the relationship.

To ensure cross-country comparability, we excluded from the core sample atypical countries, which we define as oil exporters, small economies (population of less than 1 million), and fragile countries (countries experiencing conflict or other serious disruptions). These exclusions limited the sample to 46 countries in the first period and 51 in the second (table D.1).

**Table D.1 Countries used in the regression**

Period	Countries
1995–2011 ( $N = 46$ )	Australia, Austria, Bangladesh, Belarus, Belgium, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, India, Ireland, Israel, Italy, Korea Rep., Latvia, Lithuania, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Türkiye, United Kingdom, United States
2012–24 ( $N = 51$ )	Australia, Austria, Bangladesh, Belarus, Belgium, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, India, Ireland, Israel, Italy, Korea Rep., Latvia, Lithuania, Malaysia, Mexico, Morocco, New Zealand, North Macedonia, Peru, Philippines, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Türkiye, United Kingdom, United States, Uzbekistan

The regression captures almost 80 percent of the variation, suggesting that the right-hand side variables are appropriate (table D.2). It reveals that India is a positive outlier in the second period, with a growth rate that is 2.4 percentage points higher than can be explained by the regression. The coefficient is highly significant, with a  $p$ -value of less than 0.01.

Table D.2 Results of regression: Baseline specification

<i>Dependent variable: Real GDP growth</i>		
<b>Item</b>	<b>1995–2011</b>	<b>2012–24</b>
Export volume growth	0.108 (0.080)	–0.028 (0.102)
Import volume growth	0.108 (0.080)	0.275** (0.104)
Real credit growth	0.030 (0.034)	0.033 (0.026)
Energy consumption growth	0.356*** (0.062)	0.372*** (0.072)
Real tax revenue growth	0.160 (0.103)	0.141 (0.097)
India	0.490 (0.580)	2.364*** (0.349)
Constant	0.661* (0.389)	1.025*** (0.282)
Observations	46	51
$R^2$	0.76	0.78

Note: Sample excludes oil producers, small countries, and fragile states. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ ; robust standard errors in parentheses.

We conducted several robustness checks (table D.3). We dropped electricity or government expenditure, and we added real gross fixed capital formation to the right-hand side indicators. In all of these checks, the sign, magnitude, and significance remained broadly unchanged.

This cross-country exercise provides yet another piece of evidence on the direction and magnitude of misestimation of GDP growth in India the last two decades. It also suggests that China's official average annual growth was overstated by as much as 3 percentage points over the last 20 years (results available upon request).

**Table D.3 Results of robustness checks, 1995–2011 and 2012–24****a. 1995–2011***Dependent variable: Real GDP growth*

	(1)	(2)	(3)	(4)	(5)
Export volume growth	0.130 (0.079)	0.197*** (0.055)	0.134 (0.082)	0.173*** (0.049)	0.185** (0.070)
Import volume growth	0.096 (0.079)		0.049 (0.097)		
Real credit growth		0.034 (0.035)	0.026 (0.034)	0.020 (0.033)	0.043 (0.044)
Energy consumption growth	0.337*** (0.070)	0.317*** (0.066)	0.373*** (0.060)	0.301*** (0.071)	
Electricity consumption					0.000 (0.000)
Real tax revenue growth	0.205** (0.090)	0.226*** (0.071)	0.164 (0.109)	0.087 (0.055)	0.116* (0.067)
Government expenditure				0.140 (0.094)	0.369*** (0.086)
GCF growth			0.026 (0.026)	0.036 (0.026)	0.024 (0.023)
India dummy	0.518 (0.477)	0.293 (0.526)	0.382 (0.564)	0.393 (0.415)	0.455 (0.411)
Observations	50	47	43	43	43
$R^2$	0.78	0.75	0.78	0.75	0.60

**b. 2012–24***Dependent variable: Real GDP growth*

	(1)	(2)	(3)	(4)	(5)
Export volume growth	−0.083 (0.098)	0.195* (0.098)	−0.003 (0.069)	0.078 (0.058)	0.078 (0.054)
Import volume growth	0.343*** (0.084)		0.085 (0.073)		
Real credit growth		0.053** (0.023)	0.094** (0.044)	0.034* (0.020)	0.037* (0.019)
Energy consumption growth	0.403*** (0.073)	0.294*** (0.056)	0.173** (0.068)	0.013 (0.072)	
Electricity consumption					−0.000 (0.000)
Real tax revenue growth	0.157* (0.082)	0.236** (0.100)	0.108 (0.089)	0.129* (0.066)	0.130* (0.067)
Government expenditure				0.287*** (0.053)	0.292*** (0.052)
GCF growth			0.207*** (0.043)	0.181*** (0.023)	0.182*** (0.024)
India dummy	2.378*** (0.373)	2.437*** (0.349)	2.386*** (0.360)	2.526*** (0.319)	2.581*** (0.205)
Observations	51	52	47	47	47
$R^2$	0.78	0.74	0.86	0.91	0.91

Note: All samples exclude oil producers, small countries, and fragile states. Countries with fewer than 1 million people in 1995 are classified as small. Oil producers and fragile states are based on IMF country classification. The years 2020 and 2021 are excluded to avoid pandemic-related distortions. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ ; robust standard errors in parentheses.

## APPENDIX E OFFICIAL METHODOLOGY FOR ESTIMATING GROSS VALUE ADDED

Table E.1 Official methodology for estimating Gross Value Added

Sector	Segment	Data source and approach	Deflator
Agriculture and allied	Household/ unincorporated	Crop area and yield from DES of States, MoA, livestock census, fishery/forestry depts.; input use ratios from old CCS/benchmark studies	Farm-harvest prices for crops; WPI for seeds, fertilizer etc.
Mining and quarrying	Public Private corporate Unincorporated	Dept. of Mines, Coal and Petroleum; budget docs and annual accounts of PSU mines ASI + MCA-21 corporate filings ELI method using NSS 68th EUS 2011–12	WPI of respective minerals/ores
Manufacturing	Public Private corporate Unincorporated	Dept./PSU factory accounts ASI + MCA-21 NSS 67th (2010–11) Enterprise Survey + NSS 68th EUS; forward-linked with IIP	WPI manufactured products used to deflate ASI and survey-based nominal GVA
Electricity, gas, water	Public Private corporate Unincorporated	Annual reports of PSUs + MCA-21; output-based GVA Expanded MCA-21 coverage NSS 68th EUS benchmark; extrapolated by growth of Pvt. Corporate	WPI Electricity, WPI Natural Gas/LPG, CPI
Construction	Public (Govt/PSU) Private corporate Unincorporated	Value-of-output = GFCF + intermediate consumption; CBRI Roorkee input structure MCA-21 + ASI NSS 67th Enterprise Survey (2010–11)	Composite WPI of cement, steel, bitumen, bricks
Trade and repair services	Public Private corporate Unincorporated	Annual accounts of public trading units MCA-21 corporate filings NSS 67th (2010–11) Labour-Input method	WPI of traded commodities
Hotels and restaurants	All segments	Same as Trade	WPI—Hotels and Restaurants
Transport and storage	Public Private corporate Unincorporated	Railway, Airline, Port Trust accounts MCA-21 ELI method, NSS 68th EUS; extrapolated by vehicle-stock growth	Fares/tariff indices, WPI freight, CPI T&C
Communication	Public Private corporate Unincorporated	DoT, BSNL, MTNL, AIR, DD accounts TRAI data + MCA-21 Cable operators/couriers benchmarked via service-tax	CPI T&C
Financial services	Public/Private Unincorporated	RBI supervisory returns; reference-rate method for FISIM NSS AIDIS 2013	Sector-specific indices, CPI-IW, WPI
Real estate and dwellings	All segments	Housing boards/MCA-21/Census 2011 housing stock	CPI General, CPI Miscellaneous
Professional and other services	All segments	Govt. budget docs/MCA-21/NSS 67th Enterprise Survey (ELI method)	CPI—Miscellaneous sub-indices
Education and health (private)	All segments	Govt. accounts/MCA-21/NSS 67th–68th surveys	CPI education, CPI health
Other personal/community services	All segments	Govt. budgets/MCA-21/NSS 67th–68th surveys	CPI miscellaneous

Sources: Ministry of Finance, CSO

## REFERENCES

- Alexander, Thomas F., Claudia H. Dziobek, Marco Marini, Eric Metreau, and Michael Stanger. 2017. *Measure Up: A Better Way to Calculate GDP*. Staff Discussion Note 2017/002. Washington: International Monetary Fund.
- Bayar, G., and L. Gogoberishvili. 2023. *A Bottom-Up Approach to Nowcasting GDP: Leveraging Trade and Sales Data*. IMF Working Paper. Washington: International Monetary Fund.
- Bhattacharya, P. 2019. New GDP Series Faces Fresh Questions after NSSO Discovers Holes. *Mint*, May 10.
- Chakravarty, M. 2015. Correlation between falling nominal GDP growth and lower sales. *Mint*, June 2.
- Dholakia, R. 2015. Double Deflation Method and Growth of Manufacturing. *Economic and Political Weekly* 50, no. 41: 10–13.
- Dholakia, R., R. Nagaraj, and M. Pandya. 2018. Manufacturing Output in the New GDP Series. *Economic and Political Weekly* 53, no. 35: 1–6.
- European Central Bank. 2007. The Relationship between Listed Companies' Earnings Growth and Output Growth. *ECB Monthly Bulletin*: 52–54.
- European Commission, IMF, OECD, UN, and World Bank. 2009. *System of National Accounts 2008*. New York, NY: United Nations.
- Kazmin, A. 2019. Economists Condemn Politicization of Modi Government Data. *Financial Times*, March 15.
- Kumar, R., and K. Karkun. 2026. GDP Growth Raises Questions. *Hindu Business Line*, January 2.
- Manna, G.C. 2017. An Investigation into Some Contentious Issues in GDP Estimation. *Journal of Indian School of Political Economy* 29.1: 49–54.
- Mohanani, P.C. 2024. *Are Manufacturing Jobs Growing or Declining? Here's What the Data Shows*. Centre for Economic Data and Analysis. Sonapat, Haryana: Ashoka University.
- Nagaraj, R. 2017. Recent Changes in Measurement of India's GDP. *Economic and Political Weekly* 52, no. 37: 12–15.
- Nagaraj, R. 2016. Unorganised Sector Output in the New GDP Series: Why Has It Shrunk? *Economic and Political Weekly* (2016): 24–27.
- Nagaraj, R., A. Sapre, and R. Sengupta. 2019. Four Years after the Base-Year Revision: Taking Stock of the Debate Surrounding India's National Accounts Estimates. *India Policy Forum* 15: 55–96.
- Nagaraj, R., and T.N. Srinivasan. 2016. Measuring India's GDP Growth: Unpacking the Analytics and Data Issues behind a Controversy That Has Refused to Go Away. *India Policy Forum* 17. Delhi: National Council of Applied Economic Research.
- Sengupta, R. 2016. Real GDP Is Growing at 5%, Not 7.1%. *Mint*, March 14.
- Sengupta, R. 2025. The Unending Saga of India's GDP Data: True Numbers beyond the Story. *Business Standard*, September 15.
- Sharma, N.K., Siraj Hussain, and Sanjay Kumar. 2025. GDP Growth Estimates: Something Does Not Add Up. *The Wire*, September 3. <https://thewire.in/economy/gdp-growth-estimates-something-does-not-add-up>.
- Sinha, S. 2026. Crorepati I-T filers surge 22%, even as India's tax base stagnates. *The Hindu BusinessLine*, January 6.

---

Solow, R. 1957. Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics* 39(3): 312–320.

Subramanian, A. 2019a. *India's GDP Mis-Estimation: Likelihood, Magnitudes, Mechanisms, and Implications*. Faculty Working Paper 354. Cambridge, MA: Center For International Development, Harvard University.

Subramanian, A. 2019b. *Validating India's GDP Growth Estimates*. Faculty Working Paper 357. Cambridge, MA: Center For International Development, Harvard University.

Subramanian, A., and J. Felman. 2019. *India's Great Slowdown: What Happened? What's The Way Out?* Faculty Working Paper 369. Cambridge, MA: Center For International Development, Harvard University.



---

© 2026 Peterson Institute for International Economics. All rights reserved.

This publication has been subjected to a prepublication peer review intended to ensure analytical quality. The views expressed are those of the authors. This publication is part of the overall program of the Peterson Institute for International Economics, as endorsed by its Board of Directors, but it does not necessarily reflect the views of individual members of the Board or of the Institute's staff or management.

The Peterson Institute for International Economics (PIIE) is an independent nonprofit, nonpartisan research organization dedicated to strengthening prosperity and human welfare in the global economy through expert analysis and practical policy solutions. Its work is funded by a highly diverse group of philanthropic foundations, private corporations, and interested individuals, as well as income on its capital fund. About 16 percent of the Institute's resources in 2025 were provided by contributors from outside the United States.

A list of all financial supporters is posted at <https://piie.com/sites/default/files/supporters.pdf>.