IGIDR Conference on GDP Measurement Issues

A summary of discussions

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1 Introduction

There has been considerable discussion lately in policy and academic circles, as well as in the popular media, regarding the best way to measure India's Gross Domestic Product or GDP. As GDP is perhaps the most crucial indicator of how the economy is performing, this issue merits careful and dispassionate attention.

To this end, IGIDR organised a one-day roundtable on GDP measurement on August 5, 2016 in Mumbai. The event included eminent economists, statisticians and analysts who have been working on the issue. The objective of this closed-door workshop was to discuss the various nuances of GDP measurement, examine the drawbacks of particular methodologies, and explore how these drawbacks could be overcome. The event was also attended by Dr. Ramanamurthy from the Central Statistical Office (CSO) and Dr. R.B.Barman, the Chairman of the National Statistical Commission (NSC). Economists from the Reserve Bank of India as well as from top-tier banks such as JP Morgan, Kotak, HSBC etc were also present to share their views.

In this document we have summarised the presentations made by the speakers at the conference on various issues surrounding the measurement of GDP under the new series released by the CSO in January 2015. Apart from presentations, there was also a panel discussion on whether India is truly growing at 7-8% and what is the way forward in GDP measurement. The objective of this document is to provide a comprehensive snapshot of the work being done by various economists in this field and also present their views on the subject.

2 Opening Remarks by Mahendra Dev

This section summarises the opening remarks delivered by IGIDR Director, Prof. Mahendra Dev who gave a brief description of the issues on GDP measurement. According to him, the issues under GDP data and measurement have two components. One is the long term or as some people call it legacy issues and the second one is on the recent revision of GDP numbers. Most of the recent debate has focused on the second one i.e. on the recent revisions. Of course both are inter-linked.

India's National Accounts Statistics (NAS) is one of the most massive statistical exercises undertaken in the world. A rough back calculation shows that it has more than 3000 data sources and is based on more than 300 such surveys. In January 2015, CSO introduced a new series of National Accounts Statistics with 2011-12 as the base year, replacing the old series with 2004-05 as the base year.

The guiding principles for the change were:

1. Revision of base year to a more recent year.

2. Complete review of existing data base and methodology employed in estimation of various macro-economic aggregates and alternative data bases.

3. To the extent possible, implement the international guidelines based on the System of National Accounts (SNA) 2008.

There are four notable changes in the data and methods as a result of this revision:

1. Changes in the private corporate sector data: The earlier series used RBI study of company finances from a sample of around 2500 companies. There has been a discussion in the last several years to change this approach. So in the 2011-12 series, CSO used the MCA21

data set which had about 5.24 lakh non-financial private companies. The new series also adopted the concept of enterprise in place of establishment.

2. Changes in the government account: Earlier information was based on local bodies of four states. Local bodies which were captured on a sample basis are now being captured on a complete basis for about 60-70% of the data. Over time it will go to 100%.

3. Changes in the informal sector: In the earlier series the labour input method was used. Now CSO has adopted the effective labour input method. It gives due weights to different categories of workers such as owners, hired workers and helpers.

4. Changes in the trade sector (whole sale and retail): In the new method, latest survey based estimates of trade for the unorganized sector are used. The old surveys overestimated value added for trade sector. In the new series because of these changes the share of trade has declined.

As a result of these alterations there have been significant differences in the old and new series. These are the main differences:

1. The absolute size of GDP is lower by 3.4% compared to the old series but the growth rates are higher from 2012-13 onwards.

2. The shares of industry increased significantly while that of services declined.

3. Agriculture share has remained more or less same.

4. The shares of manufacturing and financial sector have expanded while that of trade, hotels and community, social and public services have declined.

5. In the institutional categories, the share of private corporate sector increased by 11 percentage points while that of the household or unorganized sector share declined correspondingly.

6. Savings and capital formation estimates are also higher.

The debate around the new GDP series has focused on the following issues:

1. The growth rates of GDP are higher in the new series as compared to the old series. Comparing the ground realities like credit growth, volume growth, private sector investment, exports etc. some say Indian economy does not look like it is growing at 7.6%. The critics say that growth rate could be 5 to 6% if one looks at ground realities and other indices. Chief Statistician of India says that one has to look at the totality rather than bits and pieces.

2. GDP vs. GVA: There has been a lot of debate about whether GDP at market prices should be used or Gross Value Added (GVA) at basic prices. Also differences between GDP in production method and GDP in expenditure method have been fairly large in recent quarters. This was the case earlier as well. The expenditure method is based on some thumb rules. Production method is supposed to be a robust one.

3. The main debate is centered around the manufacturing sector. The quality of MCA21 data for private corporate sector, as collected by the Ministry of Corporate Affairs, is being questioned. MCA data base is based on the responses of self selected companies. This may have unknown magnitude of errors. Efforts must be made to address this problem. The critics say that higher growth in manufacturing could be due to the use of MCA data whose quality is unknown. They also question the blowing up method used to account for unavailable companies.

4. A related problem is the comparison of Index of Industrial Production (IIP) and the value added in manufacturing. IIP growth rate shows 2% growth while manufacturing value added shows 7% growth. It may be noted that IIP base year is 2004-05 and it is also volume based. Some estimates show that shifting the base of IIP to 2011-12 will increase growth rates of the manufacturing sector.

5. The last point is on price deflators. One issue is whether we should have single deflation or move to the double deflation method. Some feel we should have double deflation method so that inputs and output are deflated separately.

6. The nominal growth of GDP has declined but the GDP growth in constant prices has increased. Also the difference between WPI and CPI has been quite large in recent years. Which is the right deflator to use, particularly for services, CPI or WPI? The Chief Statistician of India clarified that there was no change in the use of prices in the old and new series. Only change he says is that earlier they were using CPI for industrial workers. Now they have started using the CSO's new CPI series. Other than this, he says whatever price information has been available is the same that has been available for the last 50 years.

Most of the conference focused on the above issues comprehensively highlighted by the Director.

3 Presentations

3.1 Sources of GDP growth & India's new GDP series, by Rajeswari Sengupta

This presentation focused on the two main sources of GDP growth, namely investment and exports and how India has fared in these.

The revision by CSO improved India's GDP growth rates sharply for 2012-13 and 2013-14. Growth rate for 2012-13 revised to 5.1% from 4.5% under the old series. Growth rate for 2013-14 revised to 6.9%, from 4.7%. Growth rates for 2014-15 and 2015-16v were 7.4% and 7.6% respectively. Looking at these estimates it is clear that India has been growing very rapidly over the last few years. In fact it is the fastest growing large economy in the world at present.

One important source of growth is investment or capital accumulation. If we imagine the country as a large factory, for output per worker to grow, we need a bigger factory, and more machines. This comes from investment in infrastructure, equipment etc. As countries start with low levels of capital, they have tremendous opportunities to invest and increase their capital stock. Countries like China, Korea, Japan and Singapore that have built up their physical capital at rates of 30-45% of GDP every year, have high growth rates of above 6%.

Another important source of growth is Exports. A number of studies have discussed the role for exports in economic growth (for example, Balassa, 1978 [1]; Edwards, 1993 [3]; Fukuda and Toya, 1995 [4]; Krueger, 1980 [5];). Benefits from exports are greater capacity utilisation, resource allocation based on comparative advantage, economies of scale, technological improvements etc.

Table 1 shows India's data on investment (gross fixed capital formation) and exports for 2015-16. As can be seen, investment has been falling consistently throughout 2015-16 and its growth rate became negative in the Jan-March quarter. Overall investment rate has been rather low at 4%. Exports growth on the other hand has been negative for the entire year.

Time period	GFCF	Exports
April -June	7.1%	-5.7%
July - September	9.7%	-4.3%
October - December	1.2%	-8.9%
January - March	-1.9%	-1.9%
Annual	3.9%	-5.2%

Table 1: Investment and Exports growth rates, 2015-16

A look at the rest of the world reveals an interesting pattern. We look at all countries in the World Economic Outlook database and select those countries with growth rates similar to India's i.e growth rate of 7.5% or higher in any year. We exclude oil-exporters owing to their very different growth dynamics. We look at countries of three size thresholds in purchasing power adjusted terms in 2015 prices: $500bn, $250bn and $100bn. We find that over the period from 1950 to 2015, for the $100bn economies with growth rates similar to that of India, the average investment growth rate has been 15.4% and average exports growth rate has been 12.8%. Similar numbers are seen for the median and for the sample 1980-2015 as shown in Table 2

Time period		Investment growth	Exports growth
1950-2015	Mean	15.4%	12.8%
	Median	14%	12.6%
1980-2015	Mean	15.6%	12%
	Median	14%	12.4%

Table 2: $100bn (PPP) economies: Investment and Exports growth rates, 1950-2015

The Table 2 shows that countries growing at 7% rate or more have on average experienced commensurately high growth rates of both investment and exports, contrary to what we find in India in 2015. The numbers are similar when we look at the $250bn and $500bn economies.

Next we look at how many other countries in this sample have boomed with investment growing at 4% or less and exports falling. The Figure 1 shows that no country in the 1950-2015 time period in the sample of $500bn (PPP) countries satisfies this condition, except India.

Similar pattern can be seen in Figures 2 and 3 which show growth rates of the $250bn and $100bn economies that satisfy the dual condition of negative exports growth and investment growth less than 4%. Very few economies have a high growth rate of 7% or more and also low investment growth, a few fas growing economies have negative exports growth but no economy satisfies all three conditions of high growth, low investment growth and negative exports growth, except India.

Table 3 summarises the findings in terms of the number of countries in each size threshold that satisfied either the low investment condition or experienced negative exports growth or both during the time period 1950-2015.

The consistent finding that emerges from the figures and tables above is that India is a unique case because what the new GDP series shows for India for 2015-16 has not happened in the post WWII history of the world. This is a pretty startling finding in itself which necessitates further investigations into the measurement of GDP under the new series.

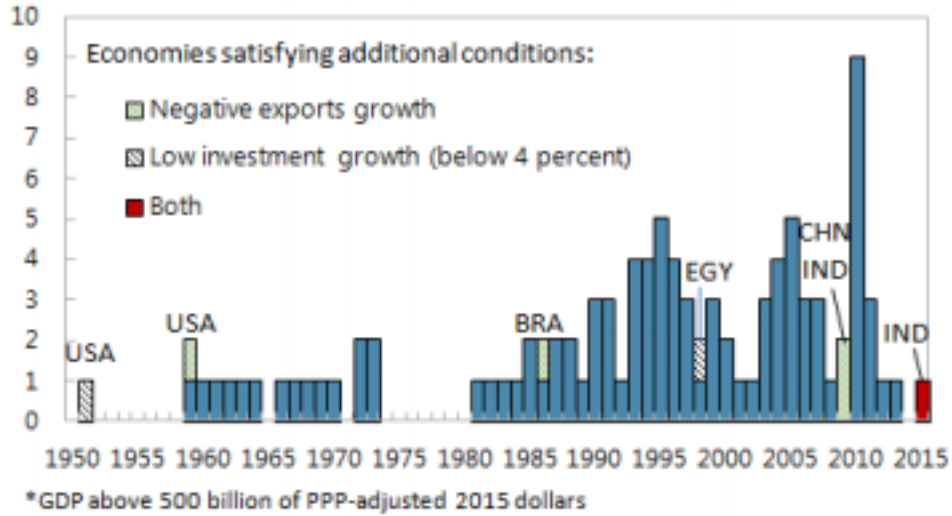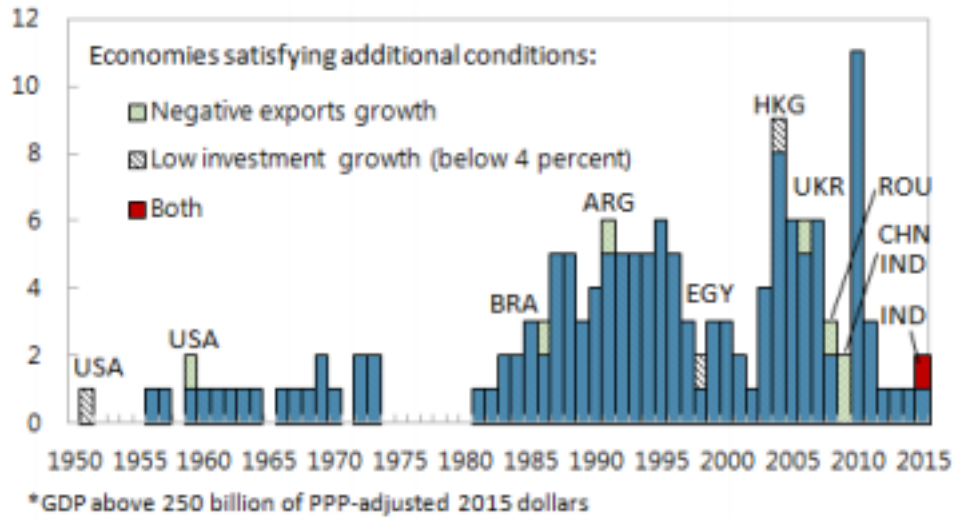Figure 1: Number of large ($500bn), non-oil-exporting and fast growing economies by year

Figure 2: Number of large ($250bn), non-oil-exporting and fast growing economies by year

Thresholds	Sample	Low Investment growth	Negative Exports growth	Both
USD 500bn	102	3	5	1
USD 250bn	150	4	8	1
USD 100bn	250	15	14	1

Source: Author's own estimates based on data from Haver Analytics.

Table 3: Number of country-year cases, 1950-2015

Figure 3: Number of large ($100bn), non-oil-exporting and fast growing economies by year

*GDP above 100 billion of PPP-adjusted 2015 dollars
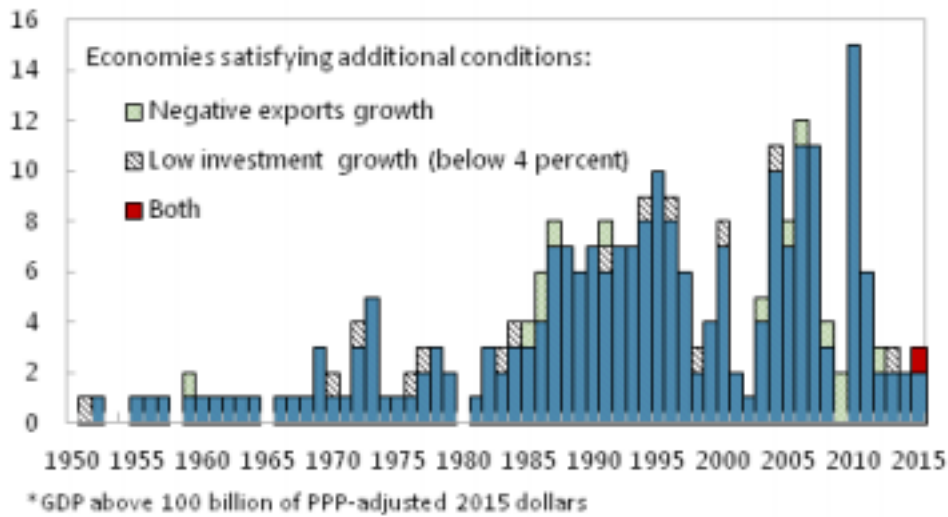
3.2 Some issues in the estimation of GVA in the manufacturing sector by Amey Sapre

This presentation was based on a paper co-authored by Amey Sapre of IIT-Kanpur and Pramod Sinha of NIPFP (Sapre and Sinha, 2016 [6]). Their paper on the manufacturing sector looks into some of the problem areas in computation of the Gross Value Added (GVA) estimate. They use the production side formula given in the Goldar Committee Report [2] to recreate the GVA estimate for firms that file in the eXBRL format in MCA21. They discussed three problems:

1. Choice of indicators in measuring outputs and costs for computing GVA.

2. Possibility of overestimation due to the blow-up of GVA.

3. Potential misclassification of manufacturing companies that can distort the GVA estimates.

In order to answer the questions, first they did a mapping of data fields of an XBRL form and CMIE (Centre for Monitoring Indian Economy) Prowess indicators to identify components of outputs, taxes and intermediate costs. On the output side, the mapping of fields shows inclusion of several disaggregated components of revenue from non-manufacturing activities, such as financial services, operating revenues, non-operating incomes, among others on account of the enterprise approach. Inclusion of such items tends to inflate GVA levels as value addition now includes sources other than conventional manufacturing activities.

On the cost side, data fields show omission of major cost items like power and fuel, marketing and advertising expenses. Such components are significant for manufacturing and diversified firms and their omission can considerably underestimate costs and thus overestimate value addition. They argued that using financial data to identify revenue and costs under the enterprise approach presents considerable challenges and requires a reassessment of data fields to accurately capture value addition.

They also argued that Paid-Up Capital (PUC) based blow-up of GVA can lead to overestimation of value addition. Since for any given year, the GVA contribution of a firm can be negative, the blow-up can lead to overestimation as scaling up always contributes positively, whereas the

actual contribution of the firm may be negative. The size distribution of PUC and GVA for a large number of firms shows no systematic relationship and given the annual variation in filing in MCA21, the blow-up factor can vary significantly.

They proposed an alternate method of scaling up of GVA based on representative industry growth rates of GVA. The method has an advantage over the PUC method as it scales up past year's GVA of unavailable firms, instead of blowing-up GVA of available firms. They also highlighted the problem of identification of manufacturing companies. The present method of identification based on CIN codes and top revenue generating products can be misleading as CIN codes do not change with changes in business activity and top revenue generating products do not distinguish between manufacturing and trading activities. The identification of companies has been posed as a year-on-year problem and will require a systematic and automated solution to correctly identify manufacturing companies in the large MCA21 database.

Lastly, the authors argued that changes in both methodology and data have presented several conceptual difficulties and will require a more comprehensive documentation by the statistical agency.

3.3 New National Accounts Series: An exposition and key issues in the debate by Dennis Rajakumar

In this presentation Dennis Rajakumar of EPW Research Foundation highlighted the radical changes introduced in the latest revision of the NAS series and whether these have impact the NAS estimates.

He classified the changes into the following categories:

1. Conceptual changes: This refers to the introduction of GVA at basic prices and GDP at market prices.

2. Classificatory changes at sectoral level: For the first time in Indian NAS, separate estimates of various aggregates for institutional sectors have been introduced. This has been done because of the intrinsic differences in their economic objectives, functions and behaviour. The classifications now are non-financial corporations, financial corporations, general government and households. Quasi-corporations are separated from the households sector and added to the corporate sector.

3. Methodological changes in compilation: This includes shifting to the enterprise approach from the establishment approach, and adoption of effective labour-input method for a majority of unincorporated enterprises.

4. Improvements in coverage of sectors: This refers to the use of MCA21 e-governance data for a comprehensive set of over 5.5 lakh companies instead of the RBI sample study of around 4,500 companies. Also there has been a substantially improved coverage of local bodies and autonomous institutions under the general government.

The estimation methods that have not changed in the new series include the commodity flow approach to estimate capital formation, residual approach to household sector and use of the the blow-up factor.

He further highlighted several issues that need attention such as:

- Reference estimates for arriving at growth rates for later periods.

- Mismatch between declining trend in saving and investment rates and rising growth rates.

- Motivation of companies to file corporate data.

- Reconstruction of the Index of Industrial Production (IIP) with rebasing of NAS.

- Revision of WPI to base year of NAS and creation of a Producer Price Index (PPI).

- Reconciling production-side and consumption-side estimates.

- Using the double-deflation method.

- Inability to compare data over the previous years due to changes in scope.

3.4   The "Double Deflation" issue by Pranjul Bhandari

In this presentation, Pranjul Bhandari of HSBC discussed the problem of CSO not using the "double deflation" method to deflate the nominal GVA to arrive at real estimates at constant prices. Around the time when CSO released the new series, global commodity prices plummeted and the divergence between output and input price inflation in India soared.

The impressive rise in manufacturing estimates published by the CSO was not corroborated by the volume indicators such as IIP, vehicle production, Purchasing Managers' Index (PMI) output etc as shown in Figure 4.

Figure 4: Manufacturing sector growth indicators
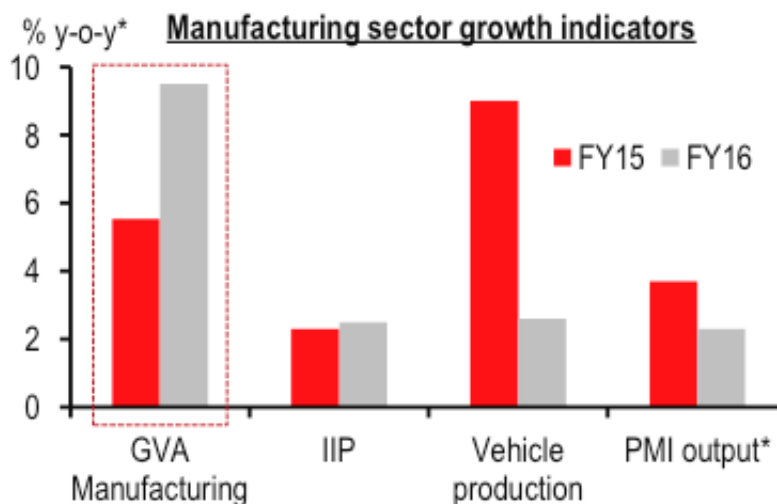
The presentation highlighted the need for "double deflation" and showed that in absence of double deflation, manufacturing growth in FY 2015 could have been overestimated by 120 basis points as shown in Figure 5. Real manufacturing growth may have been overestimated by 450 basis points in FY 2016 due to the divergence between CPI and WPI inflation. Over the next several quarters, as divergence between output and input prices normalises (Figure 6) the GDP growth would auto-correct.

In other words, India's new GDP series seems to exaggerate the economy's true growth rate and this overestimation is likely to narrow over the next few quarters. This exaggeration was largely

Figure 5: Double deflation method

Manufacturing sector	Output	Input	GVA (output - input)	Output	Input	GVA
	INR bn, constant prices			% y-o-y		
	single deflation			single deflation		
FY15 (official)	75204	58533	16671	3.1	2.5	**5.5**
	double deflation			double deflation		
FY15 (HSBC est)	75,204	56,425	18,778	3.1	2.8	**4.3**

Figure 6: Output-Input inflation
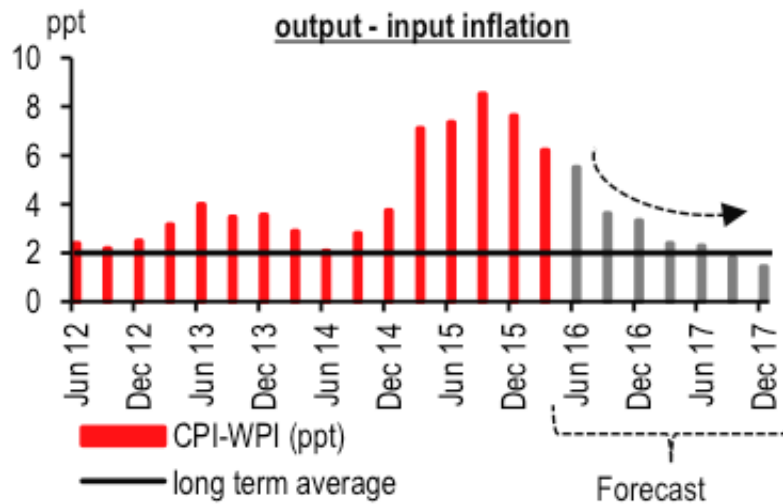
due to the practice of using "single deflation". This implies that as the difference between CPI and WPI inflation narrows down in the next several quarters, real GDP growth rate is likely to come down but users of the GDP data should not read weaker manufacturing growth estimates as renewed weakness on the ground.

3.5   The deflator issue by Josh Felman

The presentation by Josh Felman focused on the multiple problems with the GDP deflators used by the CSO. On the production side, the numbers are bedeviled by deflator problems which will not entirely go away but the methodology needs to be revisited and refined.

He finds that on the production side, the GDP deflator is distorted by heavy reliance on WPI which of course is heavily influenced by fuel prices (Figure 7). Over the last few quarters, WPI and CPI have diverged substantially owing to the sharp fall in oil prices (Figure 8). The

conventional wisdom has been that when fuel inflation normalises, price indices will converge and the deflation problem will disappear. But that does not solve the underlying problem to begin with.

Figure 7: Co-movement of WPI and Fuel Prices
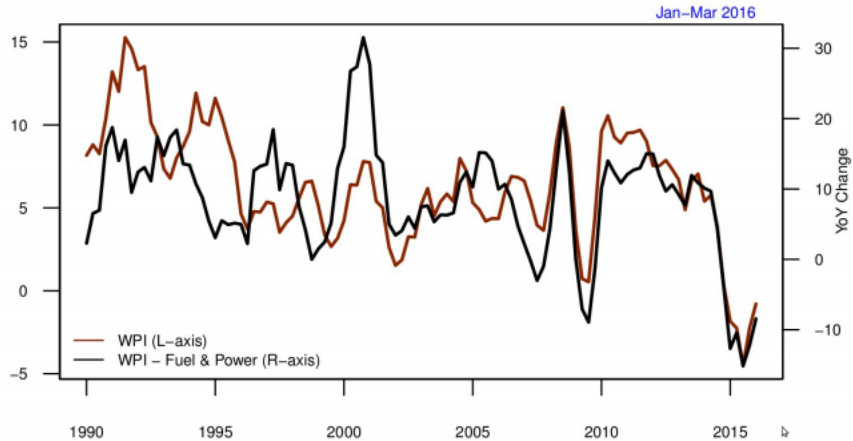
The aggregate GVA deflator is a function of sectoral deflators. So he looks at the specific sectors and the deflators used therein. For example, in case of Trade, the deflator used by CSO is WPI. The biggest component of GVA in the Trade sector is wages and the best proxy for wage costs is the cost of services. But the weight of services in the WPI is 0. On the other hand CPI covers services. So when CPI-services is used to deflate the nominal GVA in the Trade sector, the resultant estimates obtained are much lower than what the CSO has released, as shown in Figure 9. The same applies to GVA in the Finance sector as well as overall Service sector GVA. (Figures 10 and 11). These point to an imminent need to refine the manner in which GVA is deflated.
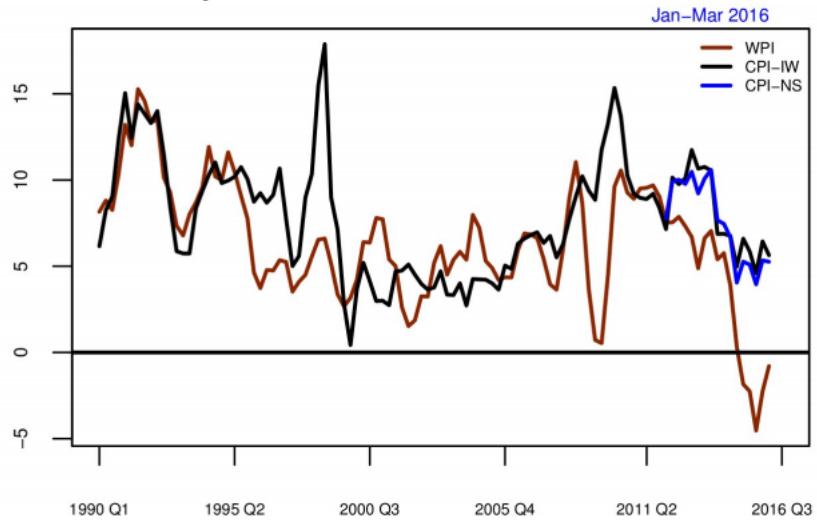
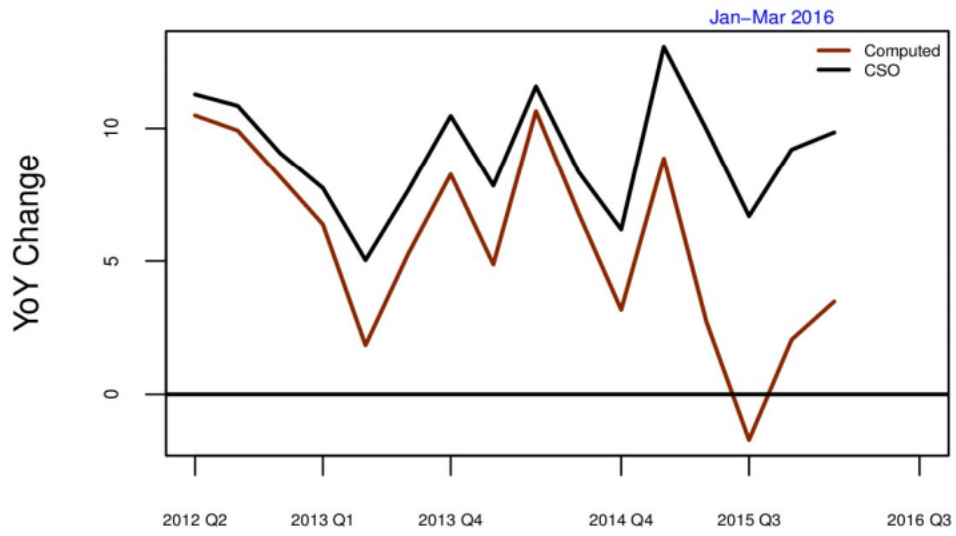Figure 8: Co-movement of WPI and CPI
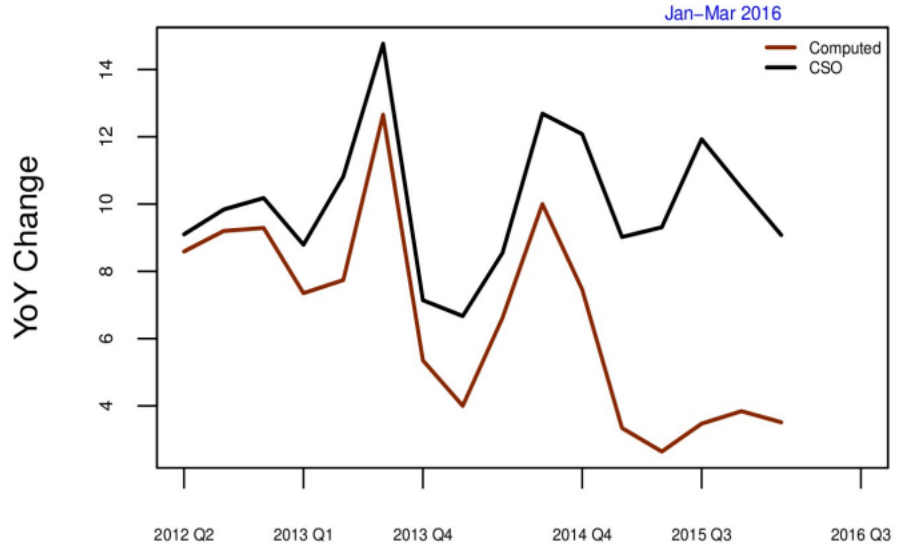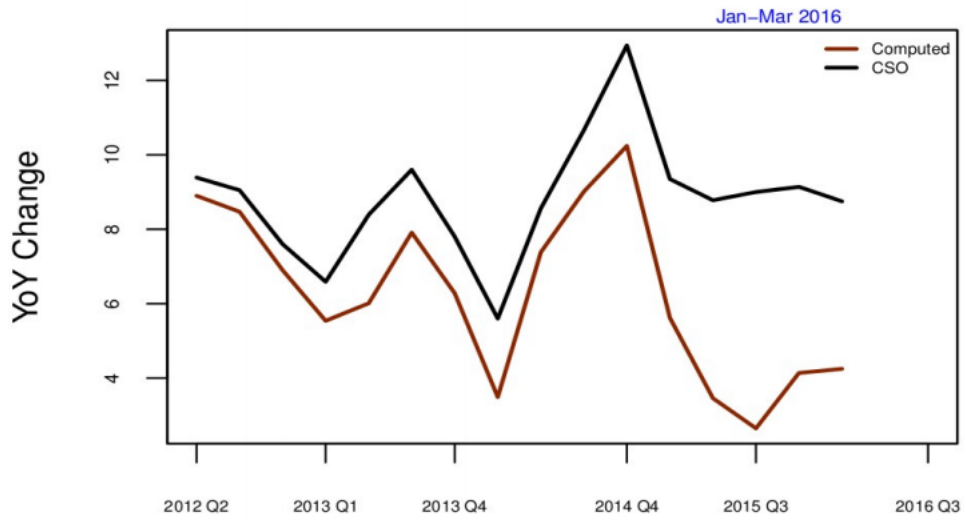

Figure 9: GVA in Trade

Figure 10: GVA in Finance

Figure 11: GVA in Service sector

4 Panel Discussion: Is India really growing at 7-8% and way forward in GDP measurement

The panelists were economists from top tier banks and firms of Mumbai. Most panelists expressed concerns over the GDP data and its reliability. In general, the disconnect of GDP data with other macroeconomic indicators was discussed. In particular, the divergence of flow in non-food bank credit and GDP growth was emphasised. The issues with WPI based deflators were also discussed. Some of the problem areas identified were:

1. Continuation of old base year for WPI is inconsistent with the change of base year for the new GDP series.

2. Product basket for CPI had not been updated to reflect changes in the economy over time.

3. Use of a combination of WPI and CPI based deflators for services sector may not be the most appropriate alternative.

4. The feasibility of using the double deflation method was also discussed. However, it was also mentioned that the implications of using the method have not been clearly understood and will require a much deeper analysis.

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[5] Krueger, Anne O. 1980. *Trade Policy as an Input to Development.* NBER Working Paper No. 466.

[6] Sapre, Amey, and Pramod Sinha. 2016. *Some areas of concern about Indian Manufacturing Sector GDP estimation* NIPFP Working Paper 172, August 2016.