2008 SNA Recommendations on Central Bank Output-Unresolved Issues for Emerging Markets and Developing Economies

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[*Abstract: Output of central bank is identified as one among the new issues arising from the latest edition of the system of national accounts i.e. 2008 SNA. Recommendations made in 2008 SNA on measurement of central bank output differ from that in its 1993 edition. The latter uses receipt as basis to measure such output. In principle recommendation in 2008 SNA is to distinguish market from non-market output. If such distinction is not possible, the suggestion is to treat whole of the central bank output as non-market and hence cost based valuation is suggested in the 2008 SNA. In this paper, a detailed discussion is made on various issues on measurement of central bank output as per 2008 SNA guidelines. Evolving nature of central bank role has made measurement of its output quite complex. The paper deliberates on a few aspects in connection with measurement of output of central bank in emerging market and developing economies (EMDE) like India and explores alternatives to measure the same.]*

Key words: central bank output

JEL classification: E50, G20.

The latest update on international standards to compile national account is available in the System of National Accounts (SNA) 2008 manual [UN et al. (2008)]. Measurement of central bank output is one among the new issues identified arising from 2008 SNA [UN (2012)]. Central banks play a vital role in the financial system of a country. Roles of all such banks have assumed further complexities post the global financial crisis (GFC). In the aftermath of the GFC, central banks are assigned broader responsibilities and more prominent role in economic policy making. Conventional monetary policy roles of central banks have undergone transformation and other financial stability

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responsibilities, including macro prudential and micro prudential regulation, added to their conventional monetary policy roles [Acevedo (2012)]. Globalisation of financial systems has affected the role of central banks in the design of financial regulation and supervision due to widespread intertwining of the financial systems [Trichet (2007)]. A key lesson from GFC is that there is a broad consensus that a central bank needs to play a crucial role to monitor and regulate [Kawai and Morgan (2012)]. Central banks are now identified as complex institutions and the objective behind all its evolving functions are for the economic interests of the nation, consistent with government economic policy [BIS (2009)]. Price stability has become the central bank objective in many economies needing fine tuning to nurture financial stability with unfolding of the GFC and the euro area debt crises later. All these crises generated stronger school of thought to widen the mandate of central banks [RBI (2012)]. Significant amount of resources are deployed by central banks across the globe for promotion of economic education and literacy [Stark (2006)].

Methodology on measurement of central bank output underwent major revision in 2008 SNA, as some of the central banks may predominantly produce non-market services. However, the uniqueness of some of the activities of central banking renders it difficult to measure some of the outputs, and the complicated and multiple objectives pursued by central banks make application of the standard techniques problematic [Bhuyan (2016)]. In the European system of accounts (ESA) 2010, output of central banks are considered as market but it is measured using the sum of costs by convention [UN (2013)]. In the Australian System of National Accounts (ASNA), a combination of market and non-market approach is followed. While for financial market operations of the Reserve Bank of Australia (RBA), gross operating surplus is used, for monetary policy and other non-market services of RBA however, the method used is as per cost [ABS (2014)]. Endorsements in 2008 SNA/ ESA 2010 on measurement of central bank output might present comparability issue for data on GDP and government final consumption across countries [OECD (2015)]. A detailed discussion is therefore required to get a clear direction to measure the output of a central bank.

Mandate of central banks has gone beyond their traditional responsibility i.e. formulation of monetary policy, because of their increased involvement in the economic growth process in their respective countries, especially in emerging market and developing economies (EMDE). In these countries, central banks are committed to several goals. All these have made the measurement of output of central banks challenging specially in EMDEs since its determinants are difficult to measure or estimate. Three aspects in connection with measurement of central bank output are discussed in this paper. The first one is on classification of output of a central bank. The second aspect discussed in the paper is on representativeness of estimates based on cost to represent the output of a central bank specially in an EMDE like India. The third aspect discussed is on alternative approach to measure the output of a central bank. Rest of the paper is presented as follows. The next section discusses the changes made in 2008 SNA from its 1993 version and presents the recommendations made in 2008 SNA on measurement of central bank output. Proposal from Inter-Secretariat Working Group on National Accounts (ISWGNA) on measurement of central bank output and Advisory Expert Group (AEG)'s recommendation on the same are presented in the third section. Concerns were raised by some countries on the use of cost based method and are presented in the fourth section. A few observations on the recommendations of 2008 SNA on the output of central bank are presented in the fifth section. In the sixth section, alternative approaches are discussed based on 2008 SNA recommendations. As illustration, output of RBI is compiled based on these alternatives. Conclusion of the paper is in section 7.

2. Measurement of output of central bank: 2008 SNA vis-à-vis 1993 SNA

2008 SNA has set out a specific approach to quantify output of a central bank as differentiated from financial services rendered by entities other than central banks and made different recommendations for measurement of central bank output from that in 1993 SNA [UN et al. (1993)]. 2008 SNA endorses non-market view of central bank's output as against non-prescriptive assumption in its 1993 version that presumed all output of the central bank as market production [Bhuyan (2016)]. Main differences

between the 1993 and 2008 SNA may be found in one of the annexes in 2008 SNA. 1993 SNA recommended use of fees, commissions, and financial intermediation services indirectly measured (FISIM) approach for measurement of output of a central bank. It is stated in 2008 SNA that application of such method sometimes resulted in unusually large positive or negative estimates of output.

2008 SNA defines three broad groups of central bank services viz. monetary policy services, financial intermediation and borderline cases. Monetary policy services are classified as non-market as these are collective in nature, serves the community as a whole. Regarding financial intermediation services it is stated that such services are individual in nature and in the absence of policy intervention in the interest rates charged by the central banks, they should be treated as market production. Borderline cases, e.g. supervisory services are classified either as market or non-market depending on whether explicit fees charged. It is also suggested in 2008 SNA that, a distinction should be made in principle between market and non-market output. It is then suggested in 2008 SNA to treat whole of the output as non-market if such distinction is not possible and to value the output at the sum of costs on account of intermediate consumption (IC), compensation of employees (CoE), consumption of fixed capital (CFC) and other taxes on production (less subsidies)].

3. Proposal on central bank output by ISWGNA and recommendation from AEG on the proposals

UN Statistics Division in its site under the module 'ISWGNA' (Inter-Secretariat Working Group on National Accounts) listed several issues that emerged in the course of updating the 1993 SNA[2]. Output of central banks was one of the issues included in the list. It is stated that "*The 1993 SNA recommends that the services of central banks be measured on the basis of receipts from fees, commissions, and financial intermediation services indirectly measured (FISIM). This method sometimes results in unusually large positive or negative estimates of output. In 1995, the ISWGNA therefore decided to allow countries to measure the output of central banks, as a second best, at*

[2] https://unstats.un.org/unsd/nationalaccount/rIssueList.asp

cost. However, the ISWGNA did not provide further guidance on the implications of this method". The Advisory Expert Group (AEG) on national accounts in its February 2004 meeting stated that "*The AEG reviewed the recommendation made by the ISWGNA in 1995 on the measurement of the output of central banks. The Group agreed that, because of the unique functions that may be performed by central banks, the value of their output obtained by the method recommended by the 1993 SNA (the difference between property income receivable less interest payable) may sometimes be exceptionally large or small or even negative. In such cases the output of central banks or at least part of it could be measured at cost. Further work is needed to clarify these cases.*" The AEG in its Jan-Feb 2006 meeting stated that they "*agreed in principle with the proposal to distinguish between market and non-market output. Non-market output should be valued at cost. The group noted that exact implementation might be very resource intensive and that the issue may not be of significant importance. It was therefore agreed that countries should have flexibility in the degree to which they applied the distinction*".

4. Concerns raised by a few countries on the use of cost method

Country wise comments on the issue on central bank output are available under the module 'ISWGNA' mentioned above. Comments from a few central banks are also available in the module. All the comments were in the period from 2004 to 2006. It is observed that the proposal received support from the countries to distinguish between market and non-market output. Concerns however were raised by a few countries on the use of cost based method for measurement of central bank output as discussed below[3].

The comment from UK was that they accepted the AEG's recommendations on the measurement of central bank output, although did not consider that the pure cost based measure was a second best solution. It was however stated by the Bank of

[3] all the observations are taken from the page 'country comments' accessible through the link https://unstats.un.org/unsd/sna1993/comments.asp?ID=79&atp=1

England that in many cases a measure based wholly on costs might be an acceptable solution, when judged on cost/benefit considerations. It was commented by Switzerland that both current treatments were unsatisfactory, as central banks could not be considered either as standard financial intermediaries or as pure non-market producers. They further stated that the outcomes nevertheless raised a number of issues e.g. breaking up an institutional unit between market and nonmarket departments was questionable. It was also suggested that an institutional unit should have a dominant activity, which could be market or nonmarket depending on the resource-cost structure. Thus, the proposal could, at best, be seen as a compromise. They further commented that they strongly supported the proposal that countries should have flexibility in the degree to which they applied the distinction. In their comment, Central Bank of Russia agreed with the recommendation to have the opportunity to choose the method to estimate the output of the central bank. They stated that the functions of central banks were wider than functions of financial intermediaries; some of them are dissimilar from market producer such as issuing currency, managing the international reserves etc. They suggested that the estimation of the central bank output should reflect all the aspects of its activity. The comment from China stated that it was reasonable theoretically to distinguish the activities of the central bank as market and non-market output, which were measured differently. They however stated that in practice, it was very difficult to implement the recommendation since market activities and non-market activities were usually integrated closely. Bank of Korea in their comments agreed with the suggestion that the output of central banks be measured at cost if the method recommended by 1993 SNA produces unreasonable results. They however commented that it was possible that this alternative method would weaken comparability. To prevent this, they suggested that it would be useful to set up standards for distinguishing situations when the alternative method should be used. Australia supported the proposition that at least some part of the output of central banks might best be measured at cost. The comments from India highlighted that varying practices adopted by different countries would naturally pose the problems of comparability across countries. Central Bank of Ecuador informed that, negative values in production were not obtained throughout the series in their case after application of the traditional

method unlike other countries. They further informed that a simple exercise was applied based on costs (wages, intermediate consumptions, not included consumption of fixed capital) and the first results obtained showed a significant decline in production in the years analysed. The comment from Vietnam suggested that the output of state management services, the nonmarket output, should be valued by cost method while the rest should be measured from receipts. National Bank of Bahrain in their comment suggested that the national account should not ignore the importance of the central banks output and the use of its services and a clear distinction should be made between market and non-market output. Central Bank of Turkmenistan suggested that they supported the proposal to measure central banks' output by the costs method in situations when the distortion of data occurred. Bank of Botswana commented that while the preferred option was to continue with the net interest approach, it was clear that many countries preferred (and in some cases already used) the cost measure of production, and it might be better to take this route. In their earlier comments they stated that the question of preferred approach raised a lot of questions because a preferred approach in one country might produce adverse results in the other. It was stated that indeed many countries had problems in using the interest approach because of unusual values realised. It happened that there were ambiguities in quantifying the contribution of the central bank. They suggested that the cost approach was convenient but it also could generate unusual values if applied consistently for very long time. It could underestimate or overestimate the contribution of the bank in terms of output, i.e. if costs diminish over time because of technology, output would also take that trend. Unlike non-market producers whose role is specifically known the role of the central bank is quite mixed depending from country to country and policies in place. Bank of Guyana suggested use of fair value to be in consistence with their monetary manual.

5. A few observations on the recommendations of 2008 SNA on the output of a central bank

Recommendations in 2008 SNA on measurement of output of central banks are presented in section 2 above. Arguments given in this regard may be found across several paras in the document. Concerns raised by a few countries on the

recommendations are discussed in the previous section. A few observations emerge from all such information. The observations are presented below.

5.1 Technological up gradation is a routine activity in all organisations including central banks. Main purpose to adopt updated technology is to enhance productivity and also to achieve cost efficiency by reducing cost. There would thus be underestimation of the output compiled based on cost if the same diminishes over time due to technological up gradation. Concern in this regard was already raised by Botswana as discussed above.

5.2 Another important point emerges from the concern raised by Botswana in connection with role of non-market producers presented above. Although central bank may be of non-market by nature of its role and activities across countries, they however would vary from country to country and may not be specific unlike other non-market producer. The cost based method suggested in 2008 SNA however is for non-market producer that are specific in nature.

5.3 While endorsing in principle to make a distinction between market and non-market output, it is also suggested in para 6.152 in 2008 SNA to take into account the possible resource intensiveness of the exercise and also relative importance of such exercise to implement conceptual recommendations. It then suggests to treat whole of the output as non-market if such distinction is not possible and to value the output at the sum of costs. A question therefore arises that whether classification of the output into market and non-market is critically important. Further, the suggestion to treat entire output as non-market if market output cannot be separated from non-market may not lead to proper measurement of the output. There may be instance that both market and non-market activities are equally dominant and hence would have significant contribution to total output. But for the reason that the output are non-separable into market and non-market and hence measuring total output as non-market may result into inaccurate estimation. For example, in India, output of the economy including that of Reserve Bank of India (RBI), the central bank of the country, is compiled by the Central Statistics Office (CSO) in the Ministry of Statistics and Programme Implementation

(MoSPI), Government of India (GoI). In the earlier series of GDP, output of RBI compiled by CSO was partly market and partly non-market. Entire output of RBI, however, is now treated by CSO as non-market in the new series of GDP with 2011-12 as base and cost based approach is used to measure output of RBI following 2008 SNA [GoI (2015)]. It was stated by CSO that due to non-availability of disaggregated accounts of RBI in respect of the monetary policy services, financial intermediation services and supervisory services (the three broad groups of central bank services defined in 2008 SNA), entire output of RBI was taken as non-market. There has been a downward revision of around 87 per cent in the gross value added (GVA) of RBI estimates based on this method [Bhuyan (2016)] (Table 1).

Table 1: Output of RBI (at current prices)

(in ₹. Bn)

	2011-12	2012-13
GVA (2011-12 series)**	32.4	61.0
GVA (2004-05 series)***	261.2	467.6

* Source: ** GoI(2017); *** GoI(2014)

5.3.1 The question that emerges now is whether the output of RBI as released by CSO as per cost method represents well the output of RBI. It is the monetary authority of the country, it is responsible for managing the country's currency for proper supply of clean notes along with GoI, it plays the role of banker to governments, banker to banks and thus acts as lender of the last resort, provides support to banks to manage their short term liquidities in the inter-bank market, it is the clearing and settlement house for inter-bank obligations, plays a very important role as the regulator and supervisor of the banking system in the country, initiates several measures to safeguard the interests of depositors to maintain public confidence in the system, plays a central role to regulate and develop the forex market, manages the foreign currency assets and gold reserves of the country, maintains the stability of the exchange rate of the Indian Rupee, regulates and supervises the payment and settlement systems in the country, is responsible to maintain financial stability, initiates many developmental activities especially for the agricultural and rural sectors of the economy. Policy-oriented

economic research, data dissemination and knowledge-sharing are some of the other important activities taken up by RBI for development of the financial system in the country. Thus, a question naturally arises, whether the huge downward revision in the GVA of RBI as per cost method would appear appropriate in view of wide role of activities performed by the central bank.

5.4 In para 6.132 of 2008 SNA it is stated that "*Government units and non-profit institutions serving households* (*NPISHs) may be engaged in both market and non-market production. Whenever possible, separate establishments should be distinguished for these two types of activities, but this may not always be feasible. Thus, a non-market establishment may have some receipts from sales of market output produced by a secondary activity*.... However, *even though a non-market establishment may have sales receipts, its total output covering both its market and its non-market output is still valued by the production costs"*. 2008 SNA thus acknowledges that non-market establishment may have receipt from sales of market output by secondary activity. As per 2008 SNA, non-market output is made up of goods and services which are provided free, or at prices not significant economically. It is hence measured by sum of costs which is equivalent to operating expenses. Central bank services are collective in nature. But they may have operating surplus which may far exceed their operating cost. Such operating surplus may be incidental and may not be out of profit motive. Thus measuring output of a central bank based on operating expenses could be a gross under estimation of its output. Further, no discussion could be found in 2008 SNA that non-market establishment may have operating surplus or profit which is incidental and not out of profit motive.

5.5 It is stated in 2008 SNA that in practice, there are three possible methods to compile volume estimates of the output of non-market goods and services. The first is based on difference of aggregate input price index over a pseudo output price index. The second approach is defined as output volume method. As the name suggests, volume indicator of output is compiled in this method using adequately weighted measures of output of various categories of non-market goods and services produced. The third approach is defined as the input method. In this method, changes in output is

measured by changes in the weighted sum of volume of all the inputs. None of these three methods is directly applicable to central bank services. The first method requires derivation of the pseudo output price indices. It is however acknowledged in 2008 SNA that related data for derivation of pseudo output price index are rarely available. It is further stated in 2008 SNA that "*price indices for services are more difficult to compile than for goods and this is especially so for non-market services"*. The second approach is recommended for individual services, in particular, health and education. The third approach is recommended for collective services like 'defence service'.

6. Alternative Approaches for Measurement of central bank output

The distinguishing characteristic of non-market output is that there is no market for such output. Since there is no meaningful selling price for non-market output, it is difficult to value those. By convention, it is therefore valued as the sum of the costs of production as labour costs plus intermediate consumption plus depreciation of fixed assets. Summing costs thus may not measure actual output in strict sense, but it provides the best available approximation [Lee and McCrae (2014)].

Output of a central bank is an integral element in the process of production in a country. But the fact is, many of central bank activities are without any market transaction. It should not however lead to under valuation of the contribution of a central bank to the national GDP. Although the importance of central bank output has been well recognised in 2008 SNA, further discussion is still required for valuation of its output. Economic accounting would not extend to all nonmarket activities [Abraham & Mackie (2006)]. There are certain areas like central banking where nonmarket accounts would make significant contributions. There is already wide recognition for the existence of economically valued nonmarket input and output [NAS (2005)]. The issue is how to measure the nonmarket activity in the area a central bank covers. Based on the recommendations across several paras (discussed in detail below) in 2008 SNA it is observed that two approaches may be explored for estimation of output of central bank

viz. input measure and income measure [Bhuyan (2017)]. Both the approaches are discussed below.

6.1 Measurement of output of central bank based on input measure

It is stated in para no. 15.125 in 2008 SNA that "*when it is not possible to avoid using an input measure as a proxy for an output measure, the input measure should be a comprehensive one, it should not be confined to labour inputs but cover all inputs*". As per this guidelines, cost of input incurred by RBI is used to compile the output (GVA) of RBI as per input measure for the period from 2011-12 to 2016-17 and presented in Table 2 (detail is in annex) [Bhuyan (2017)]. Data on GVA of RBI (current prices) released by CSO are also shown in the table for comparison. Data on GVA of RBI presented in the table are as per 2011-12 and 2004-05 series. Data on GVA of RBI in the 2011-12 series pertain to entire RBI. Data on GVA of RBI in the 2004-05 series however belonged to GVA of Banking Department only and data are available up to 2012-13[4]. It may be seen that the estimates of output of RBI derived based on input measure presented in the table show substantial rise over CSO estimates, although the values are significantly lower than the earlier GVA of RBI as per 2004-05 series. It may also be observed from the table that there is significant decrease in the estimated output for the year 2016-17. The main reasons for such decline are huge increase in expenses incurred on printing of new notes in connection with remonetisation of currency and increase in provisions for contingency fund in 2016-17.

Table 2: Estimates of Output of RBI as per Input Measure (at current prices)

[4] As mentioned earlier, part of output of RBI was treated as market and the rest as non-market in the earlier series of GDP [GoI (2015)]. RBI accounts comprise of Issue Department and Banking Department. The first one is in connection with its sole function of currency management and is known as the balance sheet of the Issue Department. The second one, termed as the balance sheet of the Banking Department, reflects the impact of all other functions of RBI. Earlier series of GDP included the output of the Issue Department under the general Government while the Banking Department output was released under the title 'GDP - Banking Department of RBI' under the overall head 'Domestic product from Banking and Insurance'. Entire operations of the Banking Department were considered as market and its output was measured as a sum of actual income net of output of the Issue Department plus imputed income (interest and discount received less interest paid by RBI) minus IC [GoI (2012)]. Output of the Issue Department was measured on cost basis as was done for public administration (based on data provided by RBI), and accounted as the output of 'Public Administration' and disposed of as 'Government Final Consumption Expenditure'. Data on GVA of RBI for 'Issue Department' are not available separately.

(in ₹. Bn)

Year	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
(i) Output of RBI (as per input measure)*	95.4	120.9	114.2	125.4	143.5	304.6
(ii) GVA of RBI (2011-12 series)**	32.4	61.0	45.9	43.0	47.0	-
(iii) GVA of RBI (Banking Department) (2004-05 series)***	261.2	467.6				

***** author's estimates based on RBI (2013), RBI (2014), RBI (2015), RBI(2016) and RBI (2017);
** source: GoI(2017); data on GVA as per new series (2011-12 base) are available from 2011-12;
*** source: GoI(2014); data on GVA as per 2004-05 are available up to 2012-13.

6.2 Measurement of RBI output based on Income measure

It is clearly stated in para 16.48 in SNA that the "*production measure of GDP can also be expressed as value added adjusted to ensure all taxes less subsidies on products are included ... value added can be viewed as the elements comprising income: compensation of employees, operating surplus, mixed income and other taxes less subsidies on production. If separate estimates are available of these components, then a third way of compiling GDP is possible, that is, from the income side. Because other taxes less subsidies on production are included in value added and taxes less subsidies on products are to be included also, the two tax items can be replaced by the term that is the sum of them both, taxes less subsidies on production and imports. GDP equals compensation of employees plus gross operating surplus plus gross mixed income plus taxes less subsidies on production and imports".* Thus as per production measure GDP can compiled as,

GDP = CoE + gross operating surplus + gross mixed income + taxes - subsidies on production and imports … (1)

The formula at (1) above is tried for compilation of output of RBI. Gross operating surplus and gross mixed income may be based on income of RBI from domestic sources net of expenses (other than employee cost). Data on CoE, income from

domestic sources and on expenses are directly available in Annual Reports of RBI. RBI does not receive any subsidy. Moreover, as per Section 48 of the RBI Act, 1934, it is not liable to pay income tax or super tax or any other tax on any of its income, profits or gains and is also exempt from payment of wealth tax [RBI (2017)]. Thus, the formula presented at (2) above is modified as shown below to compile the output (GVA) of RBI [Bhuyan (2017)]:

Output (GVA) of RBI = Employee cost + Income from domestic sources net of expenses (other than employee cost) … (2)

The output of RBI at current prices are thus compiled using the above formula for the period from 2011-12 to 2016-17 and the values are presented in Table 3 [Bhuyan (2017)]. It may be observed from the table that there is noticeable decline in the estimated output for the year 2016-17. This was due to decline in income and increase in expenses of RBI in 2016-17. It is however observed that estimates of output of RBI as per income method far exceed that estimated by CSO (2011-12 series) based on cost method shown in Table 2. Further, the estimates for the two years viz. 2011-12 and 2012-13 are comparable to the GVA of RBI (Banking Department) as per 2004-05 series.

Table 3: Estimates of Output of RBI as per Income Measure (at current prices)

(in ₹. Bn)

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Output of RBI	292.16	527.53	415.62	482.72	461.21	213.18

***** author's estimates based on RBI (2013), RBI (2014),RBI (2015),RBI (2016) and RBI (2017);

7. Conclusion

The paper deliberates on methodological issues relating to the measurement of output of central banks. The principle recommendation of 2008 SNA on measurement of central bank output is to distinguish market from non-market output. Entire output of a central bank is to be treated as non-market whenever such distinction is not possible. Under such situation, cost based valuation for measurement of central bank output is recommended in the 2008 SNA. The most important aspect raised in this paper is that

whether sum of costs would well represent the output of central banks in emerging market and developing economies (EMDE) like India. Mandate of central banks have gone beyond its traditional responsibility i.e. formulation of monetary policy, because of their increased involvement in the economic growth process in their respective countries, especially in EMDE. In these countries, central banks are committed to several goals. Specific recommendations in 2008 SNA on output of central banks although have tried to address quite a few issues, the subject on measurement of the output still appears to remain open for the central banks in EMDE. In such countries, these banks play a very critical role and are entrusted with wide gamut of activities. Use of cost based approach could severely under estimate the output of central banks in these countries as has been observed for RBI as discussed in the paper. The paper tries to argue that a more discerning method is required to measure the output of central banks in EMDE. It proposes alternative methods within the framework of 2008 SNA to measure the output of a central bank.

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Annex

It may be observed from the list of items covered under 'expenditure' in 'Income statement' in the Annual Report of RBI that, cost incurred by RBI are on account of 15 items [RBI (2017)]. These items are (i) employee cost (ii) printing of notes (iii) agency charges (iv) rent, taxes, insurance, lighting etc. (v) repairs and maintenance (vi) expense on remittance of currency (vii) postage and telecommunication charges (viii) printing and stationery (ix) directors and local board members' fees and expenses (x) auditors' fees and expenses (xi) law charges (xii) depreciation (xiii) interest (xiv) miscellaneous expenses and (xv) provisions. The first item relates to CoE. Items from (ii) to (xi) would relate to CIC. Item at (xii) viz. 'depreciation' has a link to CFC (but may not be same as CFC). The expenditure item at (xiii) i.e. 'interest' is on account of credit to a fund ('Dr B.R. Ambedkar fund') set up for giving scholarship to wards of staff. The item at (xiv) i.e. 'miscellaneous' is not specified in detail. The last expenditure item viz. 'provisions' is a new head added from 2014-15 for expenditure in connection with transfers to the 'contingency fund' and the 'asset development fund'. The 'contingency fund' (known as 'contingency reserve' earlier) is the amount set aside on a year-to-year basis to meet unexpected and unforeseen contingencies, that includes depreciation in the value of securities, risks arising from monetary/exchange rate policy operations, systemic risks and any risk arising on account of the special responsibilities assigned to RBI [RBI (2015)]. The 'asset development fund' (formerly known as 'asset development reserve') are the amounts provided out of income every year for meeting internal capital expenditure and to make investments in subsidiaries and associated institutions [RBI (2015)]. It may be observed from the description given above that all the expenditure items mentioned above except for the two items viz. 'interest' and 'miscellaneous expenses' are of input in nature. Total expenses on account of these two items viz. 'interest' and 'miscellaneous expenses' ranged between ₹ 5.0 bn to ₹ 8.0 bn in the last few years (from 2011-12 to 2016-17). Total cost of input incurred by RBI after excluding the cost incurred for these two components as shown in Table A1 below for the period from 2011-12 to 2016-17 are used to estimate output of RBI (current prices) as presented in Table 2 above in the paper.

Table A1: Input Cost Incurred by RBI

(in ₹. Bn)

Expenses	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Employee cost	29.9	58.6	43.2	40.6	44.8	46.2
Printing of notes	27.0	28.7	32.1	37.6	34.2	79.7
Agency charges	33.5	28.1	33.3	30.5	47.6	40.5
Rent, taxes, insurance, lighting, etc.	1.0	1.5	1.2	1.1	1.4	1.2
Repairs and maintenance			1.0	1.0	1.0	1.0
Expense on remittance of currency	0.5	0.6	0.7	1.0	1.1	1.5
Postage & telecommunication charges	0.8	0.8	0.8	0.9	0.8	1.0
Printing and stationery	0.3	0.2	0.2	0.3	0.3	0.4
Directors' and local board members' fees and expenses	0.0	0.0	0.0	0.0	0.0	0.0
Auditors' fees and expenses	0.0	0.0	0.0	0.0	0.0	0.0
Law charges	0.0	0.0	0.1	0.0	0.1	0.1
Depreciation and repairs to Bank's property	2.4	2.4				
Depreciation			1.6	2.4	2.2	1.1
Provisions				10	10	131.9
Total	95.4	120.9	114.2	125.4	143.5	304.6

Source: author's calculations based on RBI(2013),RBI(2014),RBI(2015),RBI(2016) and RBI(2017);
Notes: data on 'Repairs and Maintenance' and 'Depreciation' were combined under 'Depreciation and Repairs to Bank's Property' prior to 2013-14.

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