

Data and Definitions: Underestimating Savings and Investment in an Open Economy

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Abstract

This note clarifies definitions and derives from first principles the relationship between investment, domestic and foreign savings in order to show that there is underestimation of investment and foreign savings given conceptual macroeconomic definitions and Indian practice. Indian national accounts report and use gross domestic savings but the measure of capital inflows used with it is the one appropriate for gross national savings. The degree of underestimation is shown using recent data and implications drawn from the errors.

Key words: gross domestic and national savings, capital formation, national accounts

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The Indian statistical and measurement system set up was advanced for its time and place. Experts nurtured it carefully. But innovation was required to cut through complexities due to underdevelopment and to lack of data for the large unorganized sectors. Approximations are particularly marked in the estimation of savings and investment and where the open economy impinges on the two. This was understandable because estimation difficulties were especially severe in these areas. Moreover, the Indian economy was largely closed justifying the neglect of open economy issues.

But as the economy opens out the three inadequacies interact to create a potentially large underestimation of investment and savings. This can impinge on our assessment of the ongoing growth. Moreover, there is a lack of clarity about key balance of payments categories and their link to macroeconomic variables. This note, therefore has four objectives: First, to clarify definitions and derive from first principles the relationship between investment, domestic and foreign savings; second, show why there is underestimation of investment and foreign savings given theory and Indian practice; third, show the degree of underestimation using recent data; fourth, draw out some implications of the errors².

Basic identities in an open economy

The balance of payments (BOP) defines the current account surplus (CA) as the sum of net exports (or exports minus imports of goods and services, $NX=X-M$), net income from abroad (NY), and net current transfers (NCT). BOP convention gives net receipt from foreigners a positive sign. This is the surplus of the nation on the current account (CAS) (item 6.14) of the National Accounts Statistics (NAS) (CSO, 2006). If net receipts are positive the nation is running a surplus on the current account.

$$CAS = NX + NY + NCT \tag{1}$$

² This note gives the analysis and data underlying the basic argument which was summarized in Goyal (2007).

The current account deficit (CAD) is the negative of the surplus. It records the net payments made to foreigners. If net payments are positive, it implies the nation is running a deficit on the current account. The CAD is taken as the measure of net capital inflow (NCI) by the NAS.

$$\text{NCI} = \text{CAD} = -(\text{NX} + \text{NY} + \text{NCT}) = \text{NM} - \text{NY} - \text{NCT}$$

NM is net imports of goods and services (M-X). The balance of payments prepared by the Reserve Bank of India (RBI) aggregate NY and NCT as part of net invisibles. The latter also includes exports and imports of services, while the merchandise trade balance is the net exports of goods only. There is also some difference between the RBI and NAS data. Since we want to relate the BOP to other macroeconomic identities we stick with NAS data and definitions in this note.

The basic macroeconomic identities follow. First, from gross domestic product (GDP) and expenditure (as in Account 1, Statement 5 of the NAS, on GDP and expenditure (CSO, 2006). Government is ignored, however, as a simplification):

$$\text{GDP} = \text{C} + \text{GDGF} + \text{NX} \tag{2}$$

The expenditure items constituting GDP are consumption (C), gross domestic capital formation (GDGF) and net exports (NX).

Gross domestic product (GDP) is a measure of production. In an open economy, gross domestic product (GDP) can be very different from gross national income (GNI) because Indian nationals hold assets abroad and foreigners hold assets within India. For example, net income paid abroad has to be deducted from GDP produced within India's boundary and net transfers received from abroad have to be added to obtain the nation's GNI. SNA (1993) defines the difference between the two as equal to the difference between total primary incomes receivable by residents from non-residents and total primary incomes payable by residents to non-residents (pp. 163, para 7.16).

As SNA (1993) notes, GNI is the income concept of national output, derived from income earned. This is implicitly defined in the NAS Statement 4 (Relationship of National Income and other Aggregates) (CSO, 2006), and is the second basic macroeconomic identity:

$$\text{GNI} = \text{GDP} + \text{NY} + \text{NCT} \quad (3)$$

It is natural to derive savings from income earned. Both NY and NCT add to household disposable income, and therefore are properly a part of household national savings. Therefore, gross national savings (GNS) is the difference between gross national income (GNI) and consumption (C):

$$\text{GNS} = \text{GNI} - \text{C} \quad (4)$$

Substituting for GDP in Equation (2) from Equation (3) and using the definition of GNS (4) gives the identity (5). This is derived from the basic macroeconomic identities (2) and (3), and equates the gap between savings and GDCF to the current account deficit or measure of NCI:

$$\text{GNS} - \text{GDCF} = \text{NX} + \text{NY} + \text{NCT} \quad (5)$$

The equation shows that GNS plus the CAD finance GDCF, since net positive payments made abroad allow imports that add to domestic resources available to for investment.

But India does not report GNS. Gross domestic savings (GDS), the concept used in the Indian NAS, equals³:

$$\text{GDS} = \text{GNS} - \text{NY} - \text{NCT} \quad (6)$$

Substituting equation (6) in (5) and simplifying gives:

$$\text{GDS} - \text{GDCF} = \text{NX} \quad (7)$$

³ Another way to see this is to note that $\text{GDS} = \text{GDP} - \text{C}$, substituting for $\text{GDP} = \text{GNI} - \text{NY} - \text{NCT}$ from Equation (3) gives Equation (6).

Thus the correct concept of NCI to use with GDS is just the balance of trade, M-X (NM) the excess of imports over exports of goods and services, since GDS plus NM finance GDCF. Rewriting (7):

$$\text{GDCF} = \text{GDS} + \text{NM} \quad (8)$$

One way to understand this is that NY and NCT must not contaminate GDCF. If it is derived from GDS, which is obtained by netting out the two, then the concept of NCI must also net out the two. Since NY and NCT add to GNS and subtract from the CAD they are netted out when GNS and CAD are used to add upto GDCF. Using GDS with the CAD as NCI as is done in the Indian NAS is not correct. If NM-NCT-NY is added to GDS instead of NM, it amounts to subtracting the term (NCT + NY). Since in recent years NCT has been large and positive for India while NY has been small and negative this procedure reduces the estimate of GDCF.

It is useful here to clarify the link between the macroeconomic and BOP categories. Since savings and investment are flow terms, foreign savings or inflows that fill the gap have to be some component of the current account of the BOP. The capital account of the BOP, which records changes in stocks of assets through purchases or sales of financial assets, does not enter the basic macroeconomic flow identity, although it contributes to the BOP equilibrium. For example, a surplus capital account of the BOP makes foreign exchange available to finance a current account deficit. The equilibrating variable for the BOP is the exchange rate or central bank intervention⁴.

Errors in estimates

In India the concept of NCI used is the CA deficit defined in Equation (1). The error is particularly serious because GDS +NCI are used as the controlling total to adjust the GDCF estimates since the financial estimates are regarded as more robust.

⁴ Moreover, because of the principle of double-entry bookkeeping each transaction must generate a debit and a credit entry in the BOP. A payment to foreigners is a debit entry with a negative sign and a receipt from foreigners is a credit entry with a positive sign. Import of a good, which is a current account purchase (debit), will normally generate a credit in the capital account as the foreigner purchases a local asset with the payment received for the imported good. A pure asset transaction will, however, generate both the credit and debit entry in the capital account. See Krugman and Obstfeld (2003) for a basic discussion of the balance of payments.

To correct the error, NY and NCT have to be subtracted from the current account to calculate the value of NCI consistent with the use of GDS, which is NM. That is, the controlling total to calculate adjusted GDCF, if GDS is used, must be GDS+ NM.

	GDS/GDP	GNS/GDP	GDCF (N) /GDP	Percentage increase in GDCF (N) over GDCF	GDCF/GDP
1999-00	24.9	26.8	27.9	7.4	26.0
2000-01	23.5	25.3	25.9	7.1	24.2
2001-02	23.6	25.9	25.3	10.2	23.0
2002-03	26.5	29.0	27.9	10.1	25.3
2003-04	28.9	32.0	30.4	11.5	27.2
2004-05	29.1	31.4	32.5	7.9	30.1

Source: Calculated from CSO, NAS (2006)

In recent years NY is negative while NCT is large and positive for India, so the current practice underestimates investment, savings and capital inflows. Table 1 gives these values as a percentage of GDP at market prices. It shows that since the year 1999-2000 GNS always exceeds GDS. But GNS is not reported by the NAS. Calculated GDCF (GDCF (N)), which equals GDS plus net imports of goods and services, always exceeds the adjusted GDCF (defined by the NAS), which equals GDS plus NCI. Moreover, the percentage of underestimation of the investment ratio is rising and has varied between 7.1 to 11.5 percent since 2000.

The gap between savings and investment measures the contribution of foreign savings to GDCF. The NAS measure of this, which is the CAD, underestimates the contribution of foreign inflows to GDCF, when taken in conjunction with GDS⁵. The correct measure, M-X (column 2 in Table 2), is much larger. The CAD is the correct measure with the GNS. But even if this is used, since GNS exceeds GDS because of large positive NCT, the contribution of foreign inflows to GDCF will still be larger than the currently estimated value. NAS estimates errors and omissions (e&o) as $GDS + NCI - GDCF$ (unadjusted). According to our argument, the correct formula should be $GDS + NM - GDCF$ (unadjusted). This is calculated and presented in the last column of Table 2. It is much larger than the NAS e&o explaining partly why the estimates of GDCF (N) are higher.

⁵ It may be checked that, as expected, given the procedure for adjusting GDCF used by the NAS, the GDS ratio in Table 1 plus the CAD/GDP ratio in Table 2 add up to GDCF/GDP in Table 1. Since GNS exceeds GDCF by the CAS, it is greater than GDCF (N) in the years when the current account of India's balance of payment was positive.

Table 2: Changes in Estimates of Capital Inflow and Errors and Omissions				
	Net Capital Inflow or Foreign Savings as a percentage of GDP		Errors and Omissions (e&o) (Rs. Crores)	e&o(N) (Rs. Crores)
	M-X (goods + services)/GDP	CAD/GDP		
1999-00	3.0	1.1	-2925	34776
2000-01	2.3	0.6	-2564	33514
2001-02	1.7	-0.6	-30731	22564
2002-03	1.4	-1.2	1494	64033
2003-04	1.5	-1.6	26502	113071
2004-05	3.4	1.0	50310	124130

Source: Calculated from CSO, NAS (2006)

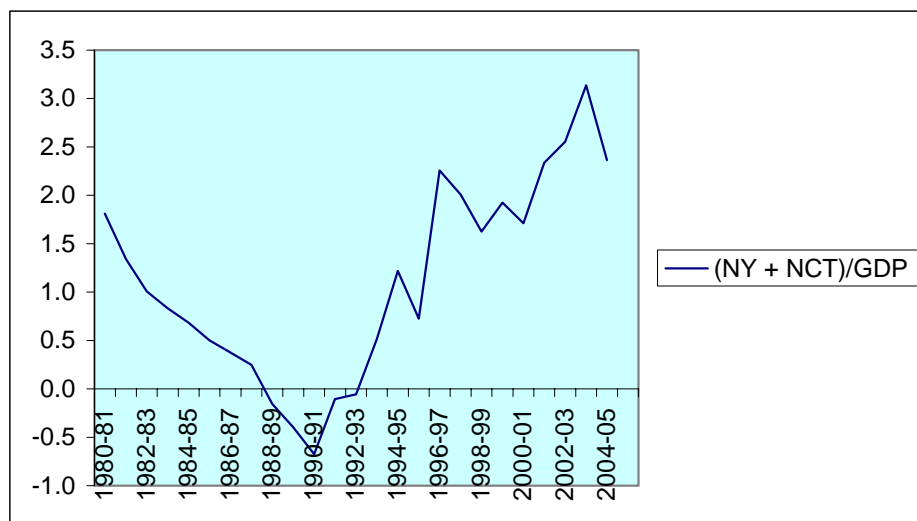


Figure 1: Net current transfers plus income from abroad as a percentage of GDP

The issue is important also because although the error in estimation of GDCF was marginal earlier, the size of the error has been rising since the late nineties. To see this, look at Figures 1 and 2. The size of the error depends on the sum of NY and NCT. The latter is large and positive and has been rising rapidly, dominating the total. Figure 1 graphs the total as a ratio of GDP since 1980, and shows the sharp rise after the reforms. The ratio had become a substantial source of error since the late nineties having reached 2 percent. It rose again steeply after 2001. After the reforms NCT has varied between 24-38 percent of the value of merchandise exports. In the Indian BOP, software is classified under the miscellaneous category of services, and figures for this have been given separately after 2000. It is a rapidly growing category. An indicator of the size of NCT is that net software receipts were 43.9 percent of NCT in 2000-01 and were still below NCT at 91.7 percent in 2005-06. NCT is as large as our earnings from software exports.

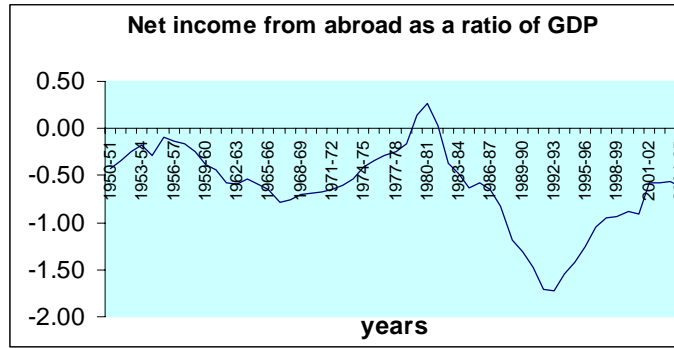


Figure 2: Borrowing more but paying less abroad

Figure 2 shows the ratio of NY to GDP over 1950-2004. NY has normally been negative, since Indians pay more income abroad than they earn from abroad. It steadily became more negative since the eighties, but there was a reversal in trend after liberalization so the ratio had shrunk to about minus half a percentage point in 2001. If a country has been borrowing abroad more than it has been lending the deduction should be high. The upward trend in the ratio in the period of reforms is surprising since this was a period of more openness and borrowing from abroad. The rise in GDP, fall in global interest rates, and fall in net interest and service payments, a component of net income from abroad, were the primary reasons for the reduction in the ratio of the payments we made abroad. We had to pay less for what we borrowed and we had also begun to earn from assets held abroad.

Implications of the error

While the immediate error can be removed by the adjustment shown above, the longer-term solution requires improvement in the estimation of savings and investment in India, and also of the different types of inflows recorded in the BOP.

The error implies that since India's capital formation has exceeded recorded values by 2 to 3 percent since the late nineties, the capacity created has been so much larger. This may be part of the explanation of why India's rate of growth is able to almost hit 10 percent without inflationary pressures. The approach paper to the 11th Plan (Planning Commission, 2006) posits 3 growth scenarios. With an incremental capital output ratio of 3.95, the GDCF/GDP ratio required for the highest targeted 9 percent growth rate in the 11th Plan period is 35.1. The NAS adjusted ratio for 2005-06, the first year of the Plan, was at 33.8. With the error adjustment the investment rate already exceeds the Plan target rate. Thus India's current high

rate of growth seems to have robust foundations. Domestic and national savings rates are both also rising.

Savings forms part of the controlling total for the final estimate of GDCF, since estimates of this are regarded as more robust than those of physical capital. But the estimation of savings is itself ad hoc. Savings can be measured as a difference in flow items (income minus consumption and taxes), or by looking at stocks in the balance sheet, as a change in earned net worth. This is the difference between changes in assets and liabilities adjusted for transfers, capital gains and losses, and revaluation of assets. Our current method is based more on changes in stocks, but with a number of approximations due to incomplete data. Financial savings are estimated by the flow-of-funds method, with the household sector as the residual. The reason is that while government and corporate sectors have their income-expenditure and balance sheets these are not available for the Indian household sector, which is a heterogeneous collection of sole proprietorships and non-profit institutions as well as individuals.

It is certainly time to attempt saving estimates through the income-expenditure method and also to align Indian conceptual definitions more closely to global concepts. Initiating income-expenditure surveys for the household sector will also help to cross check, and plug existing data gaps. Despite past unsuccessful attempts the estimation may now be easier if it is possible to make use of the widespread computerization of government and citizen records for tax etc. purposes. Since India is changing and integrating rapidly with the rest of the world it is essential to prepare for a different future.

There are other reasons also why both investment and savings may be underestimated. The estimates of physical savings in the household sector are identical to those of physical investment. If the latter are underestimated, so are the former. Underestimation is likely because household physical investment, like household financial savings, is also measured as a residual, after deducting the shares of the corporate sector and of government. Since the measurement of the total remains unsatisfactory and the benchmark estimates for corporate investment are constantly improved, household physical and financial savings may be underestimated.

Due to the current dichotomy between household physical and financial savings in the measurement of savings in India, part of financial liabilities finance household physical

savings but they are deducted from household financial savings, thus lowering the share of financial savings. Therefore savings intermediated through the financial system will be higher than the ratio of net financial savings indicates. The latter is lower partly because financial liabilities are high. Until such time as it is feasible to fully measure household income and expenditure, household physical savings in assets should be adjusted by the expenditure undertaken to acquire those assets (financial liabilities). This is more in line with conceptual definitions of savings and will give a better picture of financial deepening and intermediation.

Conclusion

As India becomes more open, the share of its income produced outside its boundaries is rising. The correct concept of savings based on disposable income is GNS, but the NAS only reports gross domestic savings (GDS). The definition of net capital inflow or foreign savings used with it is inconsistent. It leads to an underestimation of GDCF and of foreign savings used to finance it. Since GDS excludes current transfers (NCT) and income flows from abroad (NY), it is incorrect to use with it a concept of capital inflow that includes these categories. It amounts to subtracting the large positive and growing quantity of NCT from the controlling total used to estimate GDCF. Thus NY and NCT can be added to GDS to calculate and present GNS in Indian national income statistics. If GNS plus CAD is used as the controlling total to determine adjusted GDCF there will be no underestimation since NY and NCT will enter GNS and CAD with opposite signs and cancel out. The underestimation is becoming more severe in the recent period during which there has been a sharp rise in current transfers. The data suggest that GDCF has been higher than recorded by 1.7-3.1 percent of GDP since 2000.

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