Ministry of Finance
Department of Economic Affairs
Economic Division
(Social Infra Unit)

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Subject: Note on Studies on Poverty Estimates

Introduction

Estimates of extreme poverty in India are based on consumption expenditure of households and use data from Household Consumer Expenditure Surveys (HCESs). The HCESs are conducted by the National Sample Survey Office (NSSO) through a large sample size usually once in five years. Latest available HCES is for the reference period of July 2011 to June 2012. Therefore, the latest official poverty estimates are also a decade old, available only up to 2011-12, estimated by the Tendulkar Committee based on HCES 2011-12. Although NSSO conducted large size HCES in 2017-18, yet, in view of the data quality issues, the government decided not to release it. A new HCES is likely to start during 2022. In the absence of household consumption expenditure survey data for a decade, working out consistent poverty estimates is difficult. Due to this large gap in data, the question, '*what has happened to extreme poverty in India since 2011-12*', has no direct answer. We review studies measuring extreme poverty in India using alternate methods and data sources to show evidence on poverty since 2011-12.

Recently, two papers on poverty estimation for India were published by the International Monetary Fund and World Bank have evoked interest in the policy circles. The IMF working paper "*Pandemic, poverty, and inequality: evidence from India*" authored by Surjit S Bhalla, Karan Bhasin and Arvind Virmani measured the poverty and consumption inequality in India from 2004-05 to 2020-21 using Private Final Consumption Expenditure (PFCE) released by NAS, MoSPI. Similarly, a study by Roy and Weide, 2022, titled, "*Poverty in India has declined over the last decade but not as much as previously thought*", estimated poverty and inequality from 2011 to 2019 using the consumer pyramids household survey (CPHS) of CMIE. There are some other studies which use the 'pass-through' method or 'survey-to-survey imputation' method to estimate poverty in India. A list of the recent studies providing evidence on poverty in India are listed in the Table 1 below. All these studies agree that extreme poverty in India has declined since 2011, however, the level of poverty they suggest is different.

Table 1: Recent Studies on Poverty

Study	Data & method	Duration	Estimates
1. Bhalla, Bhasin and Virmani, 2022	HCES 2011-12 used for projection	2011-12 to 2020	0.8 percent in 2019 and in 2020.
2. Roy and Weide, 2022	Consumer Pyramids Household Survey (CPHS) and other surveys;	2014-2019	12.3 percentage points lower in 2019 than in 2011

3. Newhouse & Vyas, 2020	72 Round NSSO Survey; survey-to-survey imputation exercise	2014-15	12.7 percent in 2014-15
4. Edochie et al, 2022	Health SCS 2017/18; survey-to-survey methodology	2017-18	10.4 percent in 2017
5. Shared Prosperity report, World Bank	Health SCS 2017/18; survey-to-survey methodology	2017-18	9.9 percent in 2017
6. World Development Indicators	Pass-through estimate to per capita HFCE growth;	2017-18	10.4 percent in 2017

Table 2: Comparison of the methods and data used in Studies

	IMF Paper by Bhalla et al, 2022	**WB paper by Roy and Weide, 2022**
Main Data Sources	1. NSO Household Consumption Expenditure Survey (CES) 2011-12 2. National GDP data 3. State GDP data 4. State-level Consumer Price Index (CPI)- rural and urban	Consumer Pyramids Household Survey (CPHS) by CMIE Pvt. Ltd.
Poverty line (PPP 2011, per person, per day)	$1.9, $ 3.2	$1.9, $ 3.2, $5.5
Reference Period	2004-05 to 2020-21	2011-12 to 2019-20
Method	1. Estimate of Private Final Consumption Expenditure (PFCE) growth from NSO GDP data and State level growth estimates to forecast and backcast the CES-2011-12 data to obtain 2004-05 to 2020-21 series. This gives per capita nominal consumption and poverty lines for urban and rural. 2. Incorporate food subsidies by adding cash equivalent of food subsidy (inclusive of leakage) to expenditure of eligible households. (market prices of wheat and rice used)	1. Aligning CPHS with NSO CES, 2011-12 by adjusting sampling weights and estimating relationship b/w CPHS and NSS-consumption. 2. Imputation of NSS consumption expenditure post-2011 into CPHS by using the above relationship. Two approaches to do this i. NSS consumption as a function of HH characteristics (available in both surveys)

		ii. NSS consumption as a function of CPHS consumption
Results	Without food-transfers: In 2020, extreme poverty as 2.5% (Modified Mixed Recall Period or MMRP) and 6.1% (Uniform Recall Period or URP) With food transfers: In 2020, extreme poverty as 0.9% (MMRP) and 2.1% (URP)	Poverty at $1.9: declined to 10.2% in 2019 from 22.5% in 2011, with greater reduction in rural areas. Poverty at $3.2: declined to 44.9% in 2019 from 61.7% in 2011 Poverty at $5.5: declined to 80.9% in 2019 from 87.4% in 2011
Robustness checks	No specific checks conducted + Backcast of URP per-capita consumption for 2004-05 (₹ 682) is almost equal to NSS level (₹ 699).	1. Validation from CES-2011 data: updating 2011-12 CES using PFCE growth rate with pass-through of 67% yields similar results 2. Validation from PLFS data: monthly consumption expenditure. + Back cast of poverty for 2004 close to actual rate.
Recall period	Both, but MMRP is recommended.	URP

Granularity	State level urban and rural level estimation	All-India rural and urban level estimation

IMF working paper: Shortcomings

("*Pandemic, poverty, and inequality: Evidence from India*" by Surjit S Bhalla, Karan Bhasin and Arvind Virmani)

1. Debate on pass-through

The S-NA ratio is close to 50%, which means that PFCE is around 50% of the CES consumption expenditure. Notably, there exist several differences between PFCE and survey-based consumption expenditure:

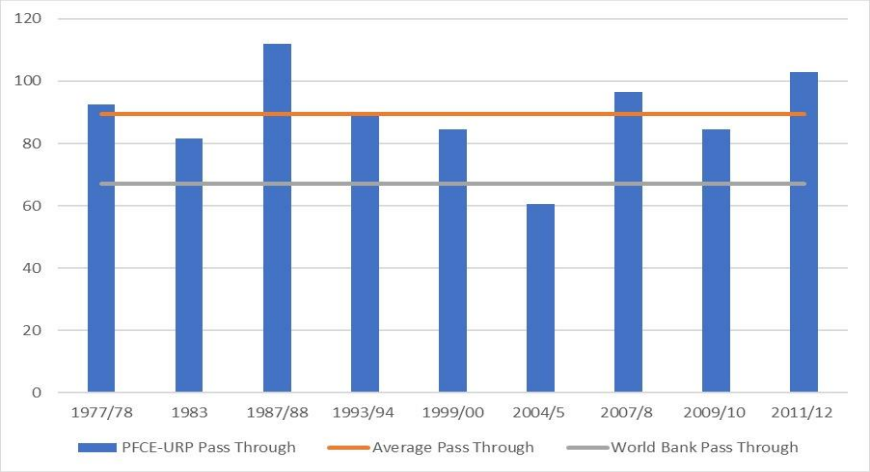
a) Inclusion of the consumption expenditure of NPISHs (Non-Profit Institutions Serving Households such as Gurudwaras, etc.) in PFCE, whereas the same are out of the purview of Consumption Expenditure Survey (CES),
b) Inclusion of imputed rentals of owner-occupied dwellings in the PFCE, whereas the CES includes only the rent on dwellings actually paid.
c) CES may not cover rich households since they are few in number and also suffers from under-reporting by wealthy households.
d) Exclusion of houseless and institutional population like the inhabitants of orphanages, prison and hospitals, in the CES, while the consumption of these persons are included in PFCE.
e) PFCE is mostly through commodity flow approach and the CES is from household surveys. It may overestimate growth in consumption by using outdated "rates and ratios" based on old survey data.

In Bhalla et.al 2022, pass-through of PFCE growth to consumption growth is assumed at 100%, while Roy et.al. take the pass-through to be 67 percent (calculated in Edochie et.al 2022).

Justification by Mr. Karan Bhasin: He says that Edochie's pass-through of 67% is based on an exceptional survey year (2004-05) and hence too low compared to pass-through obtained from previous surveys.

"We present below a chart which captures the issue of the nominal PFCE growth rates pass-through to the nominal consumption growth as obtained from the mean consumption expenditures from the consumption expenditure survey. The average consumption pass-through of PFCE from 1977 onwards has been close to 90 per cent. On an average, the pass through is between 85-94%. The only year in which pass-through was lower in recent past was in 2004-05 when it dropped to 60 per cent. For the last three surveys, 2007/08, 2009/10 and 2011/12, the pass through comes close to 92%. Therefore, there is little justification for using a pass-through factor of 0.67 as used by the World Bank."

Chart 1: Pass-through rates over survey years



However, this does not justify use of 100% pass-through rate. The pass-through rate could be taken as 92%, i.e., the average of the past three surveys of 2007/08, 2009/10 and 2011/12.

Real Vs. Nominal PFCE: How does it change the pass-through rate when real PFCE is used rather than nominal PFCE?

According to Mr. Bhasin, *"The pass-through factor becomes more crucial when the real PFCE is used due to the divergence of the PFCE deflator and the CPI Inflation. In periods of high CPI inflation and lower PFCE deflator, application of real PFCE growth rate may overstate the consumption. This is why a pass-through rate is used on the real PFCE growth rates. Since we use nominal aggregates the pass-through issue is not relevant for our method."*

However, in the chart provided by Mr. Bhasin, the pass-through from nominal PFCE to nominal consumption expenditure growth has been less than 100% for all the previous survey years.

Use of same 100% pass-through for national PFCE growth as well as state Domestic Product growth (both being very different variables)

Mr. Bhasin says that *"Our estimates show that even a uniform pass-through of SDP to NSS consumption rates shows a higher poverty level than the use of the PFCE growth rates. Since we used the nominal SDP and then used the CPI to convert to real aggregates, the pass-through effect is less important as different price inflation in various states give us a different real growth factor which is different from the nominal growth factor for each state."*

However, this does not address our query of growth rates in national PFCE and state domestic product passing through equally to NSS consumption. Again, the argument of pass-through rate being unnecessary with nominal variables is not convincing.

2. **PFCE growth rate may not be distribution neutral**, i.e., different deciles may grow at different growth rates. Bhalla *et.al*. justify this by saying that the distribution has become

increasingly equitable (as observed by CMIE and IHDS studies) hence the estimates are rather conservative.

3. Applying a positive growth rate to every person's consumption expenditure is equivalent to increasing the consumption expenditure of every person and assuming everyone is getting better-off or no-one is getting worse-off. While in reality many people also get worse-off over time. The method applied by Bhalla *et.al*. is thus underestimating poverty levels.

4. Calculation on monetary value of PDS transfer: Equating PDS transfers to cash transfers is not straightforward since market prices may not be the same across states, and rural-urban areas. Moreover, the quality of foodgrains for which market prices are taken should also be taken into account.

According to one of the co-authors (Mr. Karan Bhasin), quality adjusted price data are not available. Market prices obtained are an average weighted price of rice and wheat. Wheat and rice prices are available at every state and that makes it possible to impute the monetary value of the subsidy.

Here, it may be noted that it would not be possible for any one price data that is acceptable to all. Which price data to use appears to depend on what conclusions one wishes to reach. In other words, the conclusions that one has already in mind seems to dictate the price data used when one includes the monetary value of in-kind transfers.

That said, the use of prices to impute a monetary value to in-kind transfers is to be applauded since there can be no measurement of poverty or wealth without taking into account transfers and taxes.

5. **Double counting of food expenditure:** Food expenditure by households for PDS goods (at rationed prices) is included in PFCE; therefore applying PFCE growth to consumption expenditure (which also includes market value of the PDS food transfer) can lead to double counting. According to Mr. Karan Bhasin, this problem is taken care of by deducting monetary value of food transfers from PFCE and then calculating the PFCE growth rate, and applying this growth rate to a distribution in which monetary value of food transfer has been added to only the intended beneficiaries (bottom 2/3rd of the population).

"We take the monetary value of the PDS transfers and subtract them from PFCE. Then we calculate the nominal growth rates and there are negligible changes in the PFCE growth rates. We then apply the nominal PFCE growth rates to the 2011 distribution and get a distribution of nominal consumption for the post survey years. We then allocate the food subsidy to the intended beneficiaries in the obtained distribution. This method ensures no double counting. More so because we use the growth rates and not the PFCE levels while adjusting the consumption distribution".

However, there still remains double counting of some sort, due to the base level NSS consumption from 2011-12, which also includes spending on PDS ration. To this expenditure,

the authors apply the growth rate of PFCE (non-food) growth rate and then add the market value of PDS basket too.

World Bank working paper: Shortcomings

("*Poverty in India has declined over the last decade but not as much as previously thought*" by Roy and Weide, 2022)

1. **Uses CPHS of CMIE** - CMIE CPHS is a survey by a private data company, which suffers from several limitations, such as

a) Mean nominal consumption per capita obtained using reported CPHS weights is approximately 33 to 35 percent of private final consumption expenditure (PFCE) per capita from official national accounts (NAS). Hence, CPHS may not be fully representative.
b) In urban areas, NSS- type consumption is on average approximately ten percentage points higher when compared to observed CPHS consumption. This suggests that the CPHS under-estimates consumption in urban India (consistent with observations made in Dhingra and Ghatak, 2021).
c) CPHS suffers from main-street bias, i.e., samples are taken from main street of the locality, which induces systemic bias unlikely to be corrected by reweighting.
d) CPHS under-represents the poorest and the richest households. This may be due to absence of a sampling frame and biased selection of households (Pais and Rawal (2021)).

It should be noted that the detailed reweighting carried out by the study does not still close the gap between CPHS and NSS or other nationally representative surveys fully.

2. The paper uses two approaches to impute NSS-type consumption from CPHS data. However, the approaches assume a stable relationship between NSS-consumption and household characteristics (such as demographics, education and employment) over time, and between NSS-consumption and CPHS-consumption overtime, respectively.

3. The study uses URP which overestimates poverty by 10-12 percent, according to Bhalla *et.al*. In the meeting, World Bank Economists did not clarify why poverty estimates are not calculated for MRP, the data for which is available since 1993.

Conclusion of our analysis

1. The IMF Working Paper by Bhalla, Bhasin and Virmani (BBV) might be using too high a pass-through rate (100%). Further, there are question marks over the use of market prices for rice and wheat distributed through PDS and PMGKAY. Concern with the 100% pass-through rate is a valid one. But, objections to the prices used can be dismissed since it will not be possible for any one price data that is acceptable to all. While they use standard practice of updating HCES with PFCE, they go on to extend it for 10 years.

2. That said, IMF paper's use of prices to impute a monetary value to in-kind transfers is to be applauded since there can be no measurement of poverty or wealth without taking into account transfers and taxes. So, the inclusion of government transfers must be the norm going forward even as one refines the methods such as using a widely acceptable set of prices for grains and other food items transferred by the government.

3. The World Bank working paper suffers from more serious drawbacks than the IMF paper. It uses the URP method when data are available for consumption expenditure gathered using MRP method. The WB authors did not offer a convincing explanation as to why they did not use that. Further, the data from CPHS has considerable downsides to be used as a substitute for HCES. Lastly, there is no convincing explanation for the use of a lower pass-through rate for India than for other countries.

4. In sum, we have more serious concerns with the WB working paper than the IMF Working Paper.

5. The controversy over the right poverty estimate will remain no matter whether a consumption expenditure-based method or a multi-dimensional poverty index is used since the debate is ideological rather than methodological and political rather than practical.

6. As for the poverty estimate for India, it is clear that poverty has declined and that, during the pandemic, the government's in-kind food transfers have significantly helped in preventing the poverty rate from worsening.

Recommendations

1. We recommend using both Consumption Expenditure-based Poverty estimates and multidimensional poverty indices.

2. While consumption expenditure could be a useful proxy for standard of living, they might overstate poverty levels as Government transfers of various kinds are not considered. Here, the approach of multi-dimensional poverty index could be more informative as it automatically takes into consideration public provision of health, education, etc., whereas actual household consumption expenditure may not incorporate them when the state provides them for free.

   NITI Aayog's Multi-dimensional poverty index (MPI) was constructed after the study done by the then Vice-Chairman Dr. Arvind Panagariya. Much investment of effort and care has gone into it. The baseline MPI was prepared in 2015-16 based on NFHS IV and now the work on updating the poverty rate as per MPI based on NFHS V is ongoing and will be available in the next few months. Since NFHS surveys are quinquennial and may

even become once in three years, this can become the reliable poverty indicator to use, for policy purposes.

Further, the MPI[1] may be developed further to be taken as the official poverty index at national, states and lower levels of granularity with focus on multidimensionality.

3. Bhalla *et.al* method can be used to calculate poverty estimates for years between 2 quinquennial CES surveys but with appropriate pass-through rates (could be an average of past three surveys' pass-through rates or the like). For the longer term, we need proper NSS CES surveys as the solid base of poverty estimation, while drawing lessons from various studies. News of a new CES beginning July 2022 and to be over by June 2023 is reassuring.

4. Now, it may be time to focus on further reduction in poverty based on the PPP$3.2 per capita per day through economic growth and employment generation and limit government's cash and in-kind transfers to those whose daily incomes are lower than PPP$3.2.

5. It is also important to differentiate between chronic poverty and sporadic poverty: the former, a result of generations of deprivation and the latter, a consequence of a sudden crisis or short-term shock like the current Corona pandemic. These need to be examined separately.

6. Studies of poverty have generally focused on the state of being poor, rather than on the 'dynamics of poverty' – movement into and out of poverty, and the processes and factors that determine this. Studying poverty dynamics can bring new understanding of poverty and well-being. Crossing a minimum income or consumption threshold does not imply that the lack of education or health will not force households back into poverty, with households just above the poverty line more vulnerable to falling back. Fathoming the depth of poverty is also important, in addition to counting the poor households.

   NITI Aayog's MPI value is a product of poverty headcount and poverty intensity estimates, with the latter capturing number of deprivations faced by households. Hence, MPI decreases with decline in intensity of poverty of the poor households, making it a more complete estimate compared to headcount ratio. These estimates are furnished for States as well as Districts, cognizant of the inter and intra-State diversity of challenges and governance initiatives.

[1] Constructed by customizing Global MPI for India using unit level household data from National Family Health Surveys. The National MPI results for baseline year 2015-16 (at 25 per cent) are close to the UNDP and OPHI MPI (at 27.5 per cent) for that year. The results for National MPI covering NFHS 2019-20 are awaited and preliminary observations show a positive trend.

7. Evidence shows that India is successfully addressing multidimensional poverty through a diverse range of interventions. Alongside the average level of poverty, some of the important socioeconomic indicators such as literacy, education, and health have shown considerable improvement. Global MPI reports indicate what has succeeded and where are the significant gaps for future policy formulation.

8. The progress in poverty reduction and improvement in the socioeconomic indicators in India has been marked by inequalities. Poverty is concentrated both spatially and among social and economic groups, and those most vulnerable to poverty include landless labourers, marginal farmers, socially backward classes and people living in remote areas. Global MPI reports have also highlighted wide disparities across states, districts and social groups. The two-fold strategy of enabling sustained rapid economic growth (with high employment intensity) and attacking poverty while addressing disparities through social welfare programmes remains relevant.

9. As the use of evidence-based policymaking has become widely advocated, it is important to collect and use accurate data and relevant insights, to drive the design of welfare programmes as well as ascertain their impact. A dynamic Social Registry would be highly useful to attainment of India's poverty elimination objectives. Setting up of a Social Registry is a dynamic information system on beneficiaries and benefits - to promote inclusion of intended beneficiaries as well as synergies among welfare programmes. It is being implemented in many countries- Chile, Brazil and Turkey - forerunners in implementing Social Registry. It can be used for effective implementation of multiple programmes by through development of integrated MIS interface with individual social programmes. In India, Social registry like systems are presently being implemented in some states such as Samagra in MP and Bhimashah in Rajasthan.

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Annexure-1

HISTORICAL DEVELOPMENT OF POVERTY IN INDIA

The conventional approach to measuring poverty is to specify a ***minimum expenditure (or income)*** required to purchase a basket of goods and services necessary to satisfy basic human needs. This expenditure is called the poverty line. The basket of goods and services necessary to satisfy basic human needs is the Poverty Line Basket (PLB). Poverty can be measured in terms of the number of people living below this line (with the incidence of poverty expressed as the head count ratio (HCR) or the poverty ratio - number of poor to the total population expressed as percentage). Details of the historical development and background of the poverty estimates in India are given in **Annexure 1.**

About consumption expenditure survey 2011-12 and poverty estimation for 2011-12

Consumption Expenditure Survey 2011-12

The NSSO tabulated expenditure of about 1.20 lakh households. Since these households have different numbers of members, the NSSO for the purpose of comparison divides the household expenditure by the number of members to arrive at per capita consumption expenditure per month. This is called Monthly Per Capita Consumption Expenditure (MPCE) and is computed on the basis of three different concepts: Uniform Reference Period (URP), Mixed Reference Period (MRP), and Modified Mixed Reference Period (MMRP).

In the 68th round consumer expenditure survey[2], two types of schedules of enquiry – Schedule 1.0 Type 1 and Schedule 1.0 Type 2 – were used to collect data on household consumption, each in about half of the sample households.

The schedules differed only in reference periods (recall periods for reporting consumption). It is a known fact that using a different reference period alters the estimate of consumption obtained.

Cate-gory	Item groups	Reference period for	
		Schedule Type 1	Schedule Type 2
I	Clothing, bedding, footwear, education, medical (institutional), durable goods	'Last 30 days' and 'Last 365 days'	Last 365 days
II	Edible oil; egg, fish & meat; vegetables, fruits, spices, beverages and processed foods; pan, tobacco & intoxicants	Last 30 days	Last 7 days
III	All other food, fuel and light, miscellaneous goods and services including non-institutional medical; rents and taxes	Last 30 days	Last 30 days

[2] https://pib.gov.in/newsite/erelcontent.aspx?relid=96642

From the data collected through Schedule Type 1, therefore, two alternative estimates of distribution of MPCE can be built up (URP and MRP). Using the data collected through Schedule Type 2, a third estimate of distribution of MPCE and average MPCE can be built up (MMRP).

Since the reference period system used for Schedule Type 2 was only a slight modification of the Mixed Reference Period (differing only in the reference period used for Category II items), this measure of MPCE was called the MPCE MMRP (Modified Mixed Reference Period MPCE).

LIMITATIONS OF THE DIFFERENT APPROACHES

Details comparison of the methodology used in estimation of poverty by the studies are given in Table 2.

1. <u>Traditional line-up approach:</u> applying growth in HFCE to the most recent survey measurement of per capita consumption. Household final consumption expenditure (HFCE) in national accounts grow faster than mean consumption growth in survey, thus overestimates the fall in poverty:

- The overestimation bias is very substantial. For instance, the poverty ratio estimated by applying growth of HFCE for 2009-10 fell from 41.6 % in 2004-05 to 13.4 percent in 2009-10, whereas the actual data from 2009-10 yielded a poverty rate of 32.7% (Newhouse & Vyas, 2022).

- Surveys may exclude very wealthy or include few very wealthy households because they tend to refuse to participate and those included tend to underreport their income or consumption in surveys.
    - National accounts overestimate growth in mean income or consumption, because it uses outdated rates and ratios based on old survey data.
    - Inclusion of the consumption expenditure of NPISHs in the PFCE, whereas the same are out of the purview of CES,
    - Exclusion of houseless and the institutional population like the inhabitants of orphanages, prison and hospitals, in the CES, while the consumption of these persons are included in PFCE,
    - Inclusion of imputed rentals of owner-occupied dwellings in the PFCE, whereas the CES includes only the rent on dwellings actually paid.
    - PFCE is mostly through commodity flow approach and the CES is from household surveys. It may overestimate growth in consumption by using outdated “rates and ratios” based on old survey data.

- Bhalla *et.al* justify 100 percent pass-through by saying that the 67 percent in Edochie *et.al*. pass-through is for real PFCE growth and real CES growth, and it comes out to be less than 100 percent due to use of deflator to derive real PFCE and real CES data, which is not correct. However, authors don’t show how pass through becomes 100

percent when CPI is used or for nominal growth rates. It remains an unjustifiable assumption.

- Survey-based consumption may be more responsive than national account data to weather shocks.

2. Pass-through approach: Edochie *et.al* (2022) calculated pass-through as 67 percent, while Newhouse and Vyas (2018) calculated it for rural areas at 73.3 percent and for urban areas at 55.9 percent.

- Suffers from all the limitations witnessed in 'traditional line-up approach' except the adjustment in the growth rates.

3. Survey-to-survey imputation: The first involves estimating the relationship between economic welfare and explanatory variables in the source data set, in which a welfare measure is available. The parameters are then used to simulate economic welfare into the target data set.

- It assumes that the relationship between welfare and explanatory variable remain unchanged over time.
- Model's power depends on how strongly welfare is associated with explanatory variables.

4. Growth Elasticity approach: use elasticity of poverty ratio with respect to growth.

- An in-house study conducted in Social Infra Unit, Department of Economic Affairs to estimate elasticity of poverty with respect to growth.
- The study uses an approach different from these studies to project level of poverty in India. Using a panel data of 21 states and 4 years, 1993-94, 2004-05, 2009-10 and 2011-12, the study attempts to estimate the elasticity of headcount ratio with respect to real per capita NSDP. The estimated elasticity, - 0.478, is used to project poverty ratio and the number of poor lifted out of poverty between 2011-12 and 2019-20. It is projected that between 2011-12 and 2019-20 growth alone has cut poverty level down to 16.5 % in 2019-20 from its 21.9 % in 2011-12.
- Projection based on elasticities estimated by Datt et. al., 2019 suggests that growth has reduced poverty levels in India to 5.5 to 5.8 % in 2019-20. Projections based on these levels suggests that between 2011-12 and 2019-20, about 155 - 195 million poor have been lifted out of extreme poverty.
- This approach assumes that the association between poverty and growth will not change over time.

Annexure-2

Pass-through in Edochie et.al (2022) and Newhouse and Vyas (2018)

In Edochie *et.al* (2022), pass-through is calculated as 67 percent (by machine-learning algorithm to account for systematic variation in pass-through rates between sub-samples of the data). While in Newhouse and Vyas (2018), pass-through for rural areas has been calculated to be 73.3 percent and 55.9 percent for urban areas.

According to Edochie et.al (2022), *"…the gap between the two sources of data was small during the 1950s and 1960s, but the divergence between the series has grown since. For instance, Kulsehrestha and Kar (2005) note that the gap between the two sources of consumption data was 5 percent (with mean consumption from surveys being lower than that from national accounts) for fiscal year 1957/58, however, this gap had grown to 38 percent by 1993/94. The authors also note that the source of the increase in the discrepancy between consumption in national accounts and consumption in surveys are non-food items."*

Newhouse and Vyas (2018) calculate the pass through for 2011-12 to 2014-15 by following method of

1. Estimate poverty for 2014-15 by survey-to-survey imputation method.
2. Calculate the growth rate which, when applied uniformly to 2011 CES data, gives the predicted 2014-15 level of poverty for urban and rural India. These are calculated by trial and error.
3. Divide these growth rates by PFCE growth from NAS. This yields pass-through of 55.9% for urban areas and 77.3% for rural areas.

World Bank's use of pass-through for India

The world bank uses extrapolation and interpolation technique to calculate poverty rate for a year for which official poverty data is not available.

- ✓ Extrapolation technique: For countries that do not have welfare aggregates at or since a specific reference year, but which do have earlier welfare aggregates available, their most recent aggregate is extrapolated forward using growth rates from national accounts.
- ✓ Interpolation technique: In cases where the reference year falls between two surveys, poverty is interpolated for the reference year using the nearest survey on each side of the reference year.

For India, they use extrapolation but with a pass-through of 0.67 from national accounts consumption growth to update the consumption expenditure data. *India is the only case where the pass-through methodology is applied the justification for which is not available.* In the meeting with authors of the World Bank paper, they could not answer why this is so, only

indicating that since India is a major country it matters more for poverty estimation and hence a pass through is derived and applied.

Moreover, in the 'Poverty and Shared Prosperity 2020' report, the World Bank uses a pass-through of 0.85 for world (using Lakner et.al 2022 methodology), while using 0.67 pass through for India for 2012 to 2018 and 0.85 for 2019-2020. This approach is justified in the same report by

"Given the relevance of India for global poverty measurement and the lack of more recent data, this box summarizes several methodologies that have been used to approximate a poverty estimate for India to be used in the 2017 global poverty count.

The first method is a pass-through exercise similar to the method adopted by the World Bank in its nowcasts and forecasts of global poverty. Using all comparable consumption surveys available in PovcalNet, a pass-through rate of 0.67 (with a 95 percent confidence interval of [0.59, 0.75]) is estimated that is to be applied to per capita household final consumption expenditure (HFCE) growth in national accounts. This estimate is in line with many of the pass-through rates available in the literature on this issue (Sen 2000; Datt, Kozel, and Ravallion 2003; Deaton and Kozel 2005; Lakner et al. 2020). This results in a national poverty rate estimate of 10.4 percent in 2017 for the US$1.90 poverty line, which translates into 139 million people living in extreme poverty.

The second approach uses survey-to-survey imputation techniques, similar to the approach used in the 2018 Poverty and Shared Prosperity report, to impute consumption into the 2017/18 Social Consumption Survey for Health (National Sample Survey, 75th round). This approach results in a lower national poverty estimate of 9.9 percent in 2017, with a 95 percent confidence interval of between 8.1 and 11.3.".

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