Chapter 10

Predicting the effect of aggregate growth on poverty[1]

Gaurav Datt, Krishnan Ramadas, Dominique van der Mensbrugghe, Thomas Walker, and Quentin Wodon

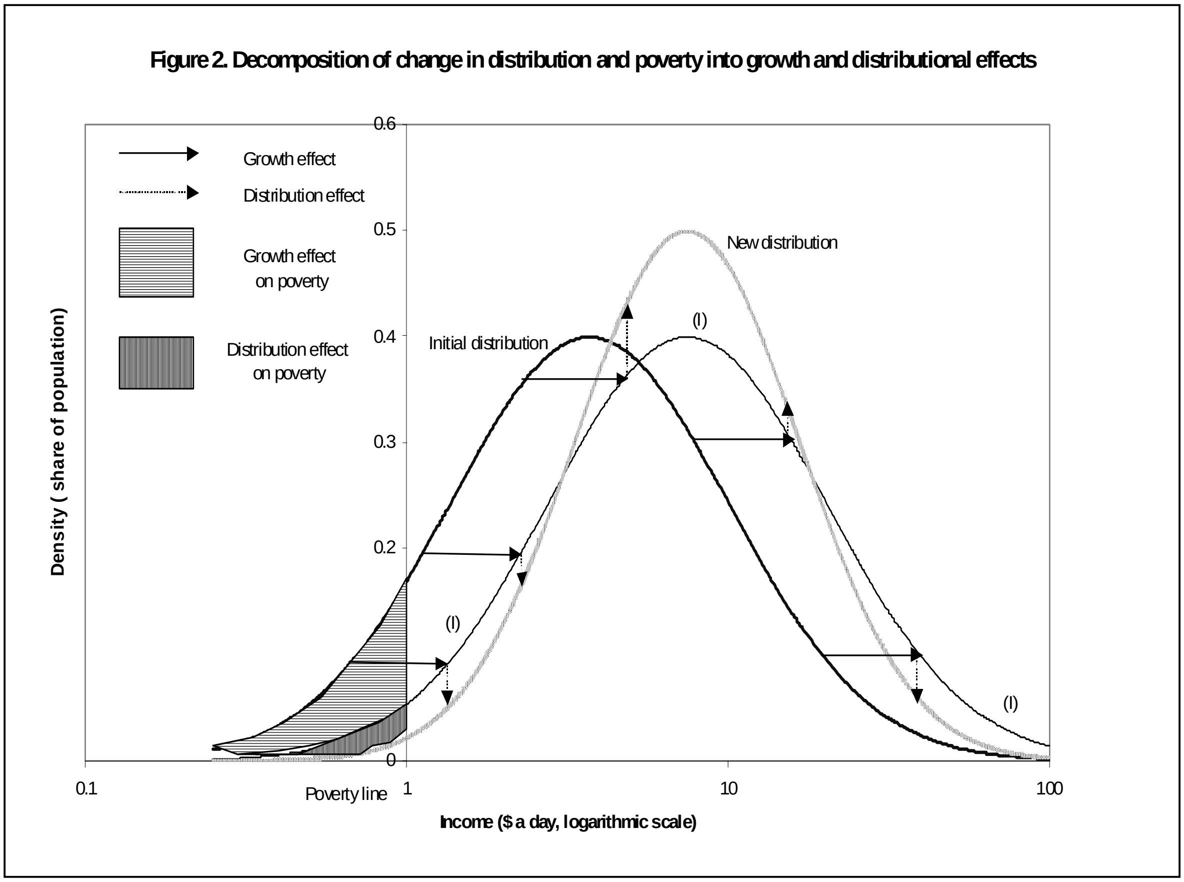
10.1. Introduction

This Chapter explains the functioning of two simple tools that link poverty analysis with the simplest, most aggregated, representation of economic growth. In short, both tools can be considered the "ground floor" for evaluating the poverty and distribution effects of macro-economic policies. The insight upon which both tools are built is that the change in poverty can be decomposed into two parts: a component related to the uniform growth of income and, a component due to changes in relative incomes. The consequences of a policy affecting aggregate output growth on poverty can be predicted using this insight, under the assumption that the policy under scrutiny will be distribution neutral, or conversely assuming a specific quantifiable form for the distributional change.

The basic principle of this decomposition is illustrated in Figure 10.1, taken from Bourguignon [2002]. Income levels measured in dollars per day (logarithmic scale) are ordered along the bottom axis, from lowest to highest. The vertical axis measures the share of population at each income level. The figure decomposes the two aforementioned components of poverty change under a log-normal income distribution. The "growth effect" represents income growth without changes in distribution, and shifts the (log) income distribution to the right while leaving its shape unchanged. The share of the population below the poverty line (normalized at 1) decreases due to the shift. The "distribution effect", meanwhile, represents changes in income distribution. The taller curve defines a new income distribution with less dispersion around the mean, resulting in lower inequality. The "distribution effect" contributes to the poverty reduction by narrowing the dispersion of incomes, while holding overall mean income constant.

[1] Using two softwares, the Poverty Module of the Simulations for Social Indicators and Poverty project (SimSIP) and a Poverty Projection Toolkit (PovStat).

Figure 10.1: Decomposition of changes in distribution and poverty into growth and distributional effects



The two tools described below use the key idea of this decomposition to simulate the poverty effect of macro-economic policies . Both develop this idea further to incorporate differential growth rates across major economic sectors.

The first tool is the Poverty Module of SimSIP provided by Wodon, Ramadas, and van der Mensbrugghe [2003]. This module is part of a broader "family" of user-friendly Excel-based simulators that facilitate the analysis of issues related to social indicators in general and poverty in particular (SimSIP stands for Simulations for Social Indicators and Poverty[2].) SimSIP Poverty is a spreadsheet Excel-based software that was recently built and made available to exploit the idea outlined above. The simulator can be useful

[2] Other SimSIP modules deal among others with the evaluation of the impact of programs and policies on poverty and inequality, the cost of reaching development targets (for example in the education sector), debt projections and fiscal sustainability analysis, the impact of tax reforms on poverty and inequality, etc. Originally, the various simulators were designed to help Governments preparing Poverty Reduction Strategies, but they can be used for other purposes as well. Most simulators are "generic", hence they can be used for any country. Two simulators are regional, so that their applicability is restricted to the countries of a given region. Technical explanations on the methodology behind the various simulators are available in each simulator's manual available on the SimSIP web site, at http://www.worldbank.org/simsip.

to analysts who do not have access to the unit level records of household surveys, but do have at their disposal information by level of income as often provided, for example, in published reports from national statistical offices. While the simulator can also be used for poverty estimations, decompositions, and simulations when access to the unit level records from the household survey is feasible, this will typically entail an approximation versus the results that would be obtained with the unit level data.

The second tool, PovStat, relies on a similar procedure (see Datt and Walker [2002]). PovStat generates poverty projections by using household survey data and a set of user-supplied projection parameters for the country under analysis. The program's methodology assumes that the rate and sectoral pattern of growth determine how poverty measures evolve over time. PovStat offers a wide variety of options in specifying projection parameters, along with an output datasheet capability.

As mentioned above, there are similarities between the two techniques and their utilization of the same software (Excel) as a support.

10.2. SimSIP Poverty

SimSIP Poverty uses group data, i.e. currently breaking down the overall population into ten or five groups (these can be deciles or quintiles, for examples). The user must provide information on population shares, and on mean income or consumption in the various groups. The information can be provided nationally and by sector (e.g., urban and rural, or agriculture, manufacturing, and services). Using a parametrization of the Lorenz curve, the simulator then computes poverty and inequality measures nationally and within each of the sectors. Two ways of parameterizing the Lorenz curve are available (GQ Lorenz curve and Beta Lorenz curve.)

The simulator builds on previous work at the World Bank using group data for the estimation of poverty and inequality, namely the POVCAL program – written in DOS-Basic -- created by Datt and Ravallion [1992], who have the paternity of the basic idea. One advantage of SimSIP Poverty over POVCAL is that it is Excel-based, and thus more easy to use. Additionally, the simulator provides interesting functions apart from the basic comparisons of poverty and inequality between sectors and over time. For example, the simulator provides various curves, including poverty dominance and Lorenz curves for robust comparisons of poverty and inequality among sectors or over time. Currently, the simulator reports only the most commonly used measures of poverty and inequality, namely the headcount index (P0), the poverty gap (P1), the squared poverty gap (P2) index for poverty (Foster et al., [1984]), and the Gini index for inequality (nationally and within the defined groups). For poverty, the user may specify two different poverty lines, in order to measure extreme poverty, and overall poverty (the sum of extreme and moderate poverty).

Apart from providing sectoral and national measures of poverty, inequality, and social welfare, the simulator provides decompositions of the change in poverty over time. The decompositions are based on the additive property of the Foster-Greer-Thorbecke (FGT) class of poverty measures. This property ensures that any FGT poverty measure for a group is equal to the sum of the poverty measures for its subgroups when these subgroup poverty measures are weighted by the population shares of the subgroups. Denoting the poverty measures and population shares of the subgroups by P_i and w_i, we have $P = \Sigma_i w_i P_i$. Two poverty decompositions based on this property have been used to describe the dynamics of poverty in a country. The first decomposition is sectoral (Ravallion and Huppi, [1991]). It looks at the contributions of the urban and rural sectors to changes in the national poverty rate P^t between two dates t_1 and t_2. Denote by P_i^t the poverty measure for sector i (i = u, r) in year t, and by w_i^t the population share of sector i in t. We have:

$$P^{t2} - P^{t1} = \Sigma_i^{u,r} w_i^{t1}(P_i^{t2} - P_i^{t1}) + \Sigma_i^{u,r} (w_i^{t2} - w_i^{t1})P_i^{t1} + \Sigma_i^{u,r} (w_i^{t2} - w_i^{t1})(P_i^{t2} - P_i^{t1}).$$

The first term in this equation capture the intra-sectoral changes in poverty between the two years. The second term captures the effect of intersectoral population shifts. The third term is a covariance measure of the interaction between the intra-sectoral and intersectoral effects. The population shift component is often negative as the migration from rural to urban areas where poverty is lower tends to decrease the national poverty rate (at least in the way migration is captured in the decomposition).

The second decomposition consists in analyzing the contribution of growth and inequality to changes in poverty measures within the two urban and rural sectors along the lines of figure 10.1 above. Following Datt and Ravallion [1992] write poverty measures as a function of the mean consumption and the Lorenz curve, such that $P^t = P(\mu^t, L^t)$, where μ^t denotes the mean consumption of households at time t, and L^t denotes the Lorenz curve of their consumption. Then define the growth component of a change in poverty between two dates as the change due to a change in mean consumption holding the Lorenz curve constant. The distribution component is the change due to a change in the Lorenz curve, holding mean consumption constant. With R as residual, we have:

$$P(\mu^{t2}, L^{t2}) - P(\mu^{t1}, L^{t1}) = [P(\mu^{t2}, L^{t1}) - P(\mu^{t1}, L^{t1})] + [P(\mu^{t1}, L^{t2}) - P(\mu^{t1}, L^{t1})] + R$$

The simulator also performs standard dominance analysis, following Atkinson (1987). The objective is to assess the sensitivity of poverty comparisons to the choice of alternative poverty lines (and alternative poverty measures). For example, poverty incidence curves may plot on the vertical axis the headcount indices of poverty in two sectors or for two periods of time as functions, on the horizontal axis, of the poverty line (these are essentially cumulative density functions). For a given range of poverty lines, one sector (or time period) will be said to first order dominate the other if its poverty incidence curve lies everywhere below that of the other sector (time period). First order dominance implies not only that the headcount index of poverty, but also a number of other poverty measures including those of the Foster-Greer-Thorbecke class, will be lower in the first than in the other sector (time period). If first order dominance does not obtain, one can easily check for higher orders of dominance. Lorenz curves for testing dominance in terms of inequality comparisons are also provided.

The simulator can also be used to assess the impact on poverty and inequality of alternative growth patterns, with these patterns defined using changes in income, distribution, and population in various sub-sectors of the economy (say, urban and rural sectors, or agriculture, industry, and services). The overall impact on poverty of growth can be then be measured, and compared for example with a pattern of growth identical in all sectors.

Finally, a new feature enables the user to test whether past patterns of growth, or simulations for future growth, can be deemed to be pro-poor using alternative potential definitions of what pro-poor growth actually is or should be, following Duclos and Wodon [2003]. Additional features are progressively introduced as the simulator is developed further.

10.3. PovStat

PovStat is an Excel-based program designed to simulate poverty measures under alternative growth scenarios, and to forecast or project poverty measures over a future projection horizon (or, more generally, beyond the current household survey period). The need for such projections naturally arises when assessing the poverty implications of expected growth scenarios. But the need also arises from another source. Poverty estimates are typically based on data on living standards from national household surveys, which are generally available only on an infrequent basis. Even in countries with a well-established household survey tradition, it is not uncommon to find that these surveys are 2 to 5 years apart. For more up-to-date poverty monitoring, therefore, there is often a need to project poverty levels beyond the most recent available national household survey data.

Poverty projections are generated using (i) country-specific (unit record) household survey data and (ii) a set of user-supplied projection parameters for that country.[3] The survey data provide the distribution of household living standards in the country at a point in time, and the projection parameters characterize a

[3] The program can be adapted for grouped data. This is done by first fitting a parametric Lorenz curve to the grouped data and then generating, say, a 100 or 1000 points on the Lorenz curve, which are then used as synthetic household survey data for PovStat.

particular projection scenario. PovStat is designed to process data at the country level, but can also be used at higher and lower levels of aggregation. The program incorporates a wide variety of options, allowing flexibility in data specification. Once the program and data are loaded, the user can change the projection settings and options and generate an immediate update of the calculated statistics. Since PovStat is an Excel-based software, it allows the user to format, print or save results as desired. This makes it a flexible simulation device for evaluating the poverty implications of alternative growth scenarios.

Methodology. PovStat uses per capita consumption as the measure of welfare for poverty calculations. The basic methodology underlying PovStat is that the rate and sectoral pattern of growth determine how poverty measures evolve over time. It distinguishes three major sectors, viz., agriculture, industry and services. PovStat starts with the initial assumption that household per capita consumption grows at the same rate as that of per capita output in the sector of employment of the household head.[4] This assumption implies constant relative inequalities within sectors. The assumption can however be relaxed at the user's discretion by specifying a rate of increase/decrease in inequality within any sector over the projection horizon.

PovStat also allows poverty projections to be further conditioned by a number of projection parameters optionally supplied by the user. Besides the rate of output growth by sector, the additional projection parameters relate to: (i) employment shifts across sectors, (ii) changing terms of trade reflecting differential prices faced by consumers and producers, (iii) changes in the relative price of food that is a prominent part of the poor's consumption bundle, (iv) changes in inequality within sectors, (v) changes in the average consumption-income ratio, and (vi) statistical drift in consumption growth between the national accounts (NA) and the surveys. By allowing these adjustments to be built in, PovStat offers a flexible approach to poverty projection that could help avoid the biases typically associated with the simple back-of-the-envelope forecasts relying only on per capita GDP growth and an empirical elasticity of poverty measures with respect to growth. Thus, PovStat can produce forecasts at varying levels of complexity depending upon the availability of reliable data for the post-survey period and the extent to which various factors influencing poverty levels are incorporated. Further details on the specification of these projection parameters and their implementation within PovStat can be found in Datt and Walker (2002).

[4] The current version of PovStat does not capture heterogeneity within households with multiple income earners in different sectors. This is mainly on account of the nature of data available, which for many countries do not provide information on the occupation of all (working age) household members. If such data were available, PovStat can be easily run with individual rather than household level data.

<u>How PovStat works</u> PovStat uses Excel's Visual Basic macro language to compute various poverty and inequality measures over a user-specified projection horizon (of up to 10 years), using two main inputs:

(i) unit record survey data on household consumption from an input data file, and

(ii) user-supplied projection parameters (as discussed above) either provided interactively by the user or taken from a settings file.

Once this information is loaded in, PovStat then calculates the poverty measures and other indices, and displays these on screen. The user can change the projection settings as desired, and re-run the calculations, or save the output and settings to a new Excel file for further manipulation.

10.4. Data requirements

a) For SimSIP Poverty

One of the advantages of SimSIP Poverty is that the data requirement is light. With at least one poverty line, the average income level of various groups in the economy and their weight as a share of the population, SimSIP Poverty can calculate the poverty and inequality indicators. In addition, with two sets of observations, the program can compare over time the changes in poverty and inequality, and run basic sectoral and growth-inequality decompositions to explain changes in poverty over time.

The typical data required for using all the features of the simulator are illustrated in table 10.1 with the case of Paraguay. The table provides population shares by group (in this case, we use ten different groups, which correspond to national deciles, so that within sectors, the share of the population in each group need not be equal to 10 percent) and mean income per capita. The user can then compute poverty for any set of two different poverty lines supposed to capture extreme poverty and total poverty (extreme and moderate), and all the decompositions and graphs will be provided automatically.

For simulations on the impact of future sectoral patterns of growth, the user needs in addition to specify the total rate of growth in each sector, and/or nationally. For example, to simulate the impact of a growth rate of one percent in the per capita income or consumption for households occupied in agriculture over ten years, the user would specify a total growth rate for that sector of 10.46 percent in the simulator, (because $(1.01)^{10} = 1.1046$), and poverty and inequality measures would be computed again assuming that the mean income in each group (say, each decile) in the agriculture sector has been multiplied by 1.1046. Under such a scenario, inequality would remain unchanged within the agricultural sector. But if various growth rates are applied to various sectors, then apart from changes in poverty, we will also implicitly have changes in inequality at the national level. The same is true if the population shares in the various sectors are changing over time. In any case, only one initial set of data (i.e., population shares and mean income or consumption for one year in each group) are needed as baseline in order to simulate future growth patterns. If data at the sectoral level (e.g., urban/rural and agriculture/industry/services) are not available, the simulator will still estimate poverty and inequality where the data are provided (say, nationally).

When testing whether growth has been pro-poor or not, or whether a given expected sectoral growth pattern is likely to be pro-poor or not, additional parameters must be provided by the user to reflect the normative judgments made as to how pro-poor growth should be defined. Following Duclos and Wodon [2003], both relative and absolute pro-poor standards can be defined. Modified stochastic dominance curves then enable the user to provide a robust evaluation (for various classes of poverty measures and a range of poverty lines) as to whether growth can indeed be said to be pro-poor or not.

SimSIP Poverty also provides estimates of the elasticity of poverty to growth and to changes in inequality nationally and in the various sectors. One of the additional features that will soon be integrated in the simulator consists of analyzing the relationships between the levels of poverty, inequality, and growth on the one hand, and the elasticities between any two of these three variables on the other hand (holding the third variable constant.) It is well known that a higher level of initial inequality reduces the elasticity of poverty to growth. But other similar relationships are at work, which may be important for policy judgments. For example, one can show that in poorer countries (such as many of the countries in Africa), everything else being equal, growth is more important than redistribution for reducing poverty.

Table 10.1: Typical data for SimSIP Poverty: Population shares and per capita income by decile, by sector and nationally, Paraguay

	Urban areas		Rural areas		Agriculture		Industry		Services		National	
	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01
	Population shares (%)											
DECILE												
1	4.2	5.3	16.8	15.5	21.2	20.2	3.9	5.0	3.8	4.3	10.0	10.0
2	7.0	8.0	13.5	12.4	16.8	15.0	7.2	6.0	5.6	8.1	10.0	10.0
3	9.8	10.5	10.3	9.4	12.1	12.8	10.9	10.3	7.9	7.5	10.0	10.0
4	10.0	11.4	10.0	8.3	11.2	8.9	9.9	13.3	9.0	9.1	10.0	10.0
5	11.9	10.1	7.8	10.0	8.4	9.2	10.7	13.2	11.1	9.0	10.0	10.0
6	11.2	10.9	8.6	8.9	8.1	8.3	13.4	11.7	9.9	10.5	10.0	10.0
7	11.2	10.8	8.6	9.1	6.6	6.9	12.1	10.7	11.8	12.3	10.0	10.0
8	11.0	11.0	8.9	8.7	6.3	6.5	11.4	10.0	12.4	12.9	10.0	10.0
9	12.1	10.3	7.6	9.8	4.9	5.4	11.9	11.2	13.3	13.3	10.0	10.0
10	11.7	11.7	8.0	7.9	4.4	6.9	8.6	8.8	15.5	13.2	10.0	9.9
	Mean per capita income (Guaranis)											
DECILE												
1	53656	105296	45354	56875	44899	73152	56910	76337	53055	75722	47217	73991
2	112368	199398	110512	113805	110062	150309	112056	150361	113564	152202	111208	150956
3	167764	257891	166065	169360	164667	217732	170586	219701	167381	223853	166960	220132
4	223450	309650	223548	231906	222748	281709	222959	272289	224586	281683	223495	278770
5	286824	376107	286177	308177	286125	342981	286989	342653	286691	338435	286590	341180
6	369796	469111	367553	382076	366904	425985	366830	429341	371712	426085	368901	426946
7	472701	582079	469738	490590	470586	536797	474108	534657	470604	539889	471519	537842
8	612306	744486	611999	638470	610144	698137	619975	689089	609406	693496	612181	693510
9	851704	1048397	842560	865519	848408	958671	832688	926985	855711	971235	848496	957380
10	2001452	2569163	1782926	2308767	1995678	3127525	1832562	2086894	1927719	2321997	1920747	2467151

Source: Robles, Siaens, and Wodon (2003). Estimation using 1997-98 and 2000-01 household surveys from DGEEC. Mean per capita incomes have been normalized to take into account regional poverty lines.

b) For PovStat

Two sets of data are needed to run PovStat.

(i) Household survey data: Survey household data can be set up as a user-specified text data file. This has actual household-level survey data for a particular country and year. For instance, for the Philippines this file may have household-level data on selected variables from the 1997 Family Income and Expenditure Survey.

While PovStat uses unit record data from household surveys, only a limited number of variables from the survey are needed. The data file to be input into the program contains such variables as household identifier, per capita consumption in local currency units, sampling weight, an urban dummy variable, household size, and the sector of employment of household head.

(ii) Projection parameter settings: The following set of projection parameters need to be specified for a PovStat run:

- Forecast horizon (up to 20 years beyond the survey year)
- Poverty line (national or international (PPP-based) poverty lines)
- Survey year and base year for PPP (if relevant)
- Survey year population
- If using an international poverty line, the country's Purchasing Power Parity (PPP) exchange rate, and base and survey year Consumer Price Indices (CPI)
- Output growth rates by sector for each projection year
- Population growth rates and employment growth rates by sector for each projection year
- Survey-year sectoral GDP and employment shares

In addition, the user can optionally incorporate further factors into poverty projections by specifying the following:

- If using the income-consumption terms of trade option, the GDP deflator and CPI for each projection year
- If using the food price option, changes in the relative price of food by year, and the shares of food in the poverty line consumption bundle and CPI
- If using the average propensity to consume option, changes in the ratio of private consumption to GDP
- If relaxing distribution neutrality, the percentage change in Gini within each sector for each projection year

- "Drift" between surveys and national accounts (NA), allowing for correction of any unaccounted discrepancy between survey-based and NA-based growth in private consumption.

10.5. Applications

a) SimSIP Poverty

How good atre the estimates provided in SimSIP Poverty? As mentioned earlier, SimSIP Poverty uses group data, rather than the unit level data available in the household surveys. This implies that poverty and inequality estimates are only approximations of the “true” values. Table 10.2 presents a comparison of the estimates of poverty obtained with the data presented in table 10.1 with the “true” measures estimated with the unit level data. The parametrizations used are the GQ and the beta Lorenz curve (there is a separate simulator for each parametrization). The estimates of the FGT poverty measures using SimSIP Poverty tend to be close to the actual values, but there are some differences. In many instances, i.e. in tests for various countries, we did not have major issues with the estimates. In some cases however, the estimations based on the GQ or the Beta parametrizations of the Lorenz curves may not respect some conditions, or may not converge. In that case, this will be signaled to the user (the estimates of poverty or inequality may then be somewhat off.)

Table 10.3 presents the results of another exercise taking into account different sectoral growth patterns using the 1997-98 data as baseline. For example, holding inequality constant, a two percent growth by year in per capita income in every sector (i.e., nationally) would lead to a headcount of 28.95 percent at the end of a five years period (see column 2 of the table, second scenario), versus 32.1 percent initially. The same result is obtained (with a small approximation error) when the same growth rate is applied to the various sectors and national poverty is obtained by summing poverty across sectors (see the headcount of 28.97 percent in column 4, and 28.92 percent in column 6). By contrast, if the growth rate in industry and services were higher, let’s say at three percent compared to two percent for the agricultural sector, the headcount of poverty computed as the weighted average of the predicted headcounts in each of the three sectors would decrease further to 27.94 percent (see the last column and the fourth simulation.) More generally, the user can easily compare how different growth patterns add up for poverty reduction, and compare this to the poverty reduction obtained with one aggregate equivalent rate of growth for the economy as a whole. Also, because poverty is higher in rural areas and in agriculture, any population shift away from those sectors will also decrease poverty. Although not shown in the table, this type of simulation can easily be conducted on top of the sectoral growth scenarios.

Table 10.2: SimSIP Poverty – Comparing the FGT poverty measures obtained with unit and grouped data, Paraguay

	Urban areas		Rural areas		Agriculture		Industry		Services		National	
	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01	1997-98	2000-01
	Estimates with unit level data (1)											
Headcount of poverty	23.1	27.6	42.5	41.2	52.8	50.8	24.1	28.2	18.7	22.9	32.1	33.8
Poverty gap	8.1	9.2	21.4	18.8	26.9	23.9	8.0	8.5	6.8	8.0	14.3	13.6
Squared poverty gap	4.2	4.7	13.8	11.4	17.4	14.5	4.0	4.3	3.6	4.1	8.6	7.8
	Estimates with data by per capita income decile – using GQ Lorenz Curve (2)											
Headcount	23.8	28.7	42.0	40.6	52.4	51.1	23.5	28.2	20.0	23.8	32.1	34.2
Poverty gap	8.3	9.7	21.4	18.8	26.9	24.1	8.2	9.0	6.9	8.2	14.4	13.9
Sq. poverty gap	3.8	4.3	13.9	11.4	17.4	14.3	3.9	3.9	3.2	3.8	8.5	7.5
	Estimates with data by per capita income decile – using Beta Lorenz Curve (3)											
Headcount	23.21	27.81	42.15	40.87	52.13	51.08	23.31	27.32	19.40	23.30	32.13	33.95
Poverty gap	8.42	9.79	21.76	18.73	27.24	24.03	8.17	9.15	7.04	8.19	14.54	13.92
Sq. poverty gap	4.32	4.90	13.96	11.33	17.59	14.52	4.08	4.50	3.67	4.16	8.75	7.85
	Difference in estimates (1) – (2)											
Headcount	-0.7	-1.1	0.5	0.6	0.4	-0.3	0.6	0.0	-1.3	-0.9	0.0	-0.4
Poverty gap	-0.2	-0.5	0.0	0.0	0.0	-0.2	-0.2	-0.5	-0.1	-0.2	-0.1	-0.3
Sq. poverty gap	0.4	0.4	-0.1	0.0	0.0	0.2	0.1	0.4	0.4	0.3	0.1	0.3
	Difference in estimates (1) – (3)											
Headcount	-0.1	-0.2	0.4	0.3	0.7	-0.3	0.8	0.9	-0.7	-0.4	0.0	-0.2
Poverty gap	-0.3	-0.6	-0.4	0.1	-0.3	-0.1	-0.2	-0.6	-0.2	-0.2	-0.2	-0.3
Sq. poverty gap	-0.1	-0.2	-0.2	0.1	-0.2	0.0	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1

Source: Robles, Siaens, and Wodon (2003). Estimations using 1997-98 and 2000-01 household surveys from DGEEC.

<Editors, Could you simplify this table. It is probably not necessary to repeat the same figure, 32.13% 15 times! >

Table 10.3: Simulations for the impact of growth patterns on poverty in Paraguay using SimSIP Poverty – some examples

National (using growth)		National (weighted average of urban and rural)		National (weighted average of employment sectors)	
Period 1	Period 2	Period 1	Period 2	Period 1	Period 2
Growth of 3 percent per year in every sector for five years					
32.13%	27.46%	32.13%	27.48%	32.13%	27.42%
Growth of 2 percent per year in every sector for five years					
32.13%	28.95%	32.13%	28.97%	32.13%	28.92%
Growth of 1 percent per year in every sector for five years					
32.13%	30.51%	32.13%	30.53%	32.13%	30.49%
Growth of 2% in agriculture and rural sector and 3% elsewhere per year for five years					
		32.13%	28.15%	32.13%	27.94%
Growth of 1% in agriculture and rural sector and 3% elsewhere per year for five years					
		32.13%	28.82%	32.13%	28.46%
Growth of 3% in agriculture and rural sector and 1% elsewhere per year for five years					
		32.13%	29.06%	32.13%	29.34%

Source: Robles, Siaens, and Wodon (2003).

b) PovStat

Although PovStat was designed primarily as a poverty forecasting tool over the short-to-medium term, it can also be used to project poverty over a historical period, where actual economic variables (as opposed to forecasts) may be available as input. This situation occurs frequently where up-to-date survey data are not available for a country, and a past survey is used. The benefit of hindsight, so to speak, is that the full range of PovStat's options can be used, whereas the inputs for these options – CPI and GDP deflator, food prices, and so on – are hard to forecast for future years and therefore are typically unavailable.

To illustrate the way PovStat works, we look at poverty projections for the Philippines, for which household survey information is available for 1997 and 2000 (Family Income and Expenditure Surveys (FIES), 1997 and 2000). We use the 1997 survey to obtain poverty projections up to 2003, with historical inputs for the period 1997-2001 and forecasts thereafter. The 2000 survey will be used to obtain forecasts to 2003 using forecast economic variables only. We also comment on the comparison of the two sets of forecasts.

As noted in Section 10.3, PovStat requires a number of parameters to be input before projections are made. These input data for each of the two runs can be found in Table 10.4.

Table 10.4: Input Settings for PovStat runs, 1997 and 2000

	1997	2000
PPP Rate (1993 LCU / USD)	10.958	10.958
Survey Year Population (thousands)	73,527	78,231
Base Year CPI (1997=100) Meaning of this? The figure is not 100 for 1997.	73.44	61.40
Food Weight in Poverty Line	0.73	0.73
Food Weight in CPI	0.55	0.55
Survey Year Sectoral Labor Shares		
Agricultural Sector	40.4	38.8
Industry Sector	16.7	16.8
Services Sector	42.9	44.4

	1998	1999	2000	2001	2002	2003
Output Growth (per cent annual)						
Agricultural Sector	-6.6	6.9	3.5	3.9	2.5	2.7
Industry Sector	-1.8	0.6	3.9	1.9	3.8	5.5
Services Sector	3.5	4.0	4.4	4.3	4.8	4.6
GDP Growth	-0.5	3.3	4.0	3.4	4.0	4.5
Employment Growth (per cent annual)						
Agricultural Sector	1.4	1.4	1.4	1.4	1.4	1.4
Industry Sector	3.0	3.0	3.0	3.0	3.0	3.0
Services Sector	4.0	4.0	4.0	4.0	4.0	4.0
Population Growth	2.2	2.1	2.1	2.1	2.0	2.0
CPI (1997=100)	109.7	117.0	122.0	128.2	128.2	128.2
GDP Deflator (1997=100)	111.2	119.6	127.6	136.1	136.1	136.1
Change in Relative Price of Food (per cent)	-2.1	-1.3	-2.3	-1.9	0.0	0.0
Change in C/Y Ratio (per cent)	1.5	-2.4	-2.6	0.0	0.0	0.0
Drift in Growth Rates (percentage points) <The meaning of this could be made more explicit>	0.0	0.0	0.0	0.0	0.0	0.0

The poverty lines used for the forecasts are $1/person/day and $2/person/day in 1993 US PPP Dollars, equivalent to monthly values of $32.74 and $65.48 respectively (in 1993 PPP Dollars). Population figures are required for the survey year to calculate the number of poor in each scenario. The PPP exchange rate, at 10.958 Pesos/$, is taken from the Penn World Tables.

Output and employment growth rates up to 2001 are taken from national data sources, and from the World Bank Unified Survey thereafter. PovStat uses sectorally disaggregated data, if available, to incorporate differential growth rates and population shifts across sectors. For the Philippines, we use growth rates for the three sectors: agriculture, industry and services.

Five options are available in PovStat: adjustment for changes in income-consumption terms of trade; changes in the relative price of food; changes in the average propensity to consume; relaxation of distribution neutrality within sectors; and drift between national accounts and survey growth rates. Given the available data, the first three are used here for the historical period.

For the terms of trade adjustment, it is the ratio of the CPI to GDP deflator which is important for projection purposes in PovStat. The data on GDP deflator and CPI are taken from national statistical sources for the historical period, and the relative terms of trade are held constant beyond 2001. The relative price of food option requires the percentage change in the relative food price index (that is, the ratio the food price index to the overall CPI) to be specified, along with the share of food in the CPI and the poverty line consumption bundle. The average propensity to consume option adjusts for the specification of income growth rates rather than consumption growth rates, and requires the user to provide the percentage change in the ratio of nominal GDP to nominal consumption in each year.

PovStat runs as an Excel-based program, and requires the user to specify the input data file (which contains the household-level survey data) and the settings file (containing the projection settings discussed above). The user sets the projection horizon (which was six years for the 1997 case, and three years for the 2000 case), and verifies the settings. PovStat calculates the poverty and inequality indices, which are presented on the program's main worksheet. The user can choose to save these settings and results to a new file for further manipulation.

The results of both runs, at both poverty lines of $1/day and $2/day, are presented in Table 10.5 below. Starting with the projections based on the 1997 survey first, note that these show an increase in headcount index for both poverty lines in 1998, reflecting the negative growth rates associated with the Asian financial crisis (see Table 10.4). Economic recovery since 1998 is then reflected in declining poverty levels.

However, a comparison of the results shows that the link-up between the 1997 and 2000 survey-based projections is not perfect. Thus, for instance, based on the 1997 survey, the predicted headcount for $1/day ($2/day) is 11.0 (43.6) percent against the actual 2000 estimate of 13.2 (46.8) percent. This seems to be mainly on account of an overestimation of the mean consumption for 2000 when NA-based growth rates are applied to the 1997 survey mean consumption. Once we control for this drift between NA and survey growth rates, the predicted headcount indices for 2000 are 13.0 and 46.4 percent respectively at $1/day and $2/day poverty lines. The difference between predicted and actual poverty levels is almost fully accounted for.

Beyond 2000, the projections (both those based on the 1997 survey as well as those based on the 2000 survey) suggest continued reductions in poverty levels towards 2003.

Table 10.5: Results from PovStat runs, Philippines

1997 Survey	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Headcount ($1/day)	12.5	13.3	12.2	11.0	9.3	8.7	7.9
Headcount ($2/day)	45.9	46.0	45.0	43.6	41.2	40.2	38.9
Mean Per Capita Consumption							
(1993 US PPP $/month)	108.6	110.2	111.0	113.9	118.6	121.1	124.0
Gini coefficient	0.460	0.467	0.462	0.460	0.458	0.458	0.458
Number of poor, millions ($1/day)	9.2	10.0	9.3	8.7	7.5	7.1	6.6
Number of poor, millions ($2/day)	33.8	34.5	34.6	34.1	33.0	32.8	32.3

2000 Survey	**2000**	**2001**	**2002**	**2003**
Headcount ($1/day)	13.2	11.5	10.8	10.0
Headcount ($2/day)	46.8	44.7	43.6	42.3
Mean Per Capita Consumption				
(1993 US PPP $/month)	107.7	112.1	114.5	117.2
Gini coefficient	0.462	0.460	0.460	0.459
Number of poor, millions ($1/day)	10.3	9.2	8.8	8.3
Number of poor, millions ($2/day)	36.6	35.7	35.5	35.2

10.6. Conclusions

PovStat and SimSIP are two simple tools that are derived from the same "technique", where the change in poverty can be decomposed into two parts: a component related to the uniform growth of income and, a component due to changes in relative incomes. These tools are capable of linking poverty analysis with the simplest, most aggregated, representation of economic growth. In that sense, these tools can be considered the "starting point" for evaluating the poverty and distribution effects of the simplest effect of macro-economic policies (e.g., changes in mean income). The consequences of a policy affecting aggregate output growth on poverty can be predicted using this sort of technique, under the assumption that the policy under scrutiny will be distribution neutral, or conversely assuming a specific quantifiable form for the distributional change. These are strong assumptions that can not be always present. Therefore, the analysis has to proceed further exploring techniques that will relax these assumptions.

10.7. References

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