ILO labour force participation rates for 10-14 years old versus UNESCO school enrolment ratios[1]

By Farhad Mehran

1. Introduction

The level of accuracy of the ILO estimates and projections of the economically active population of 10 to 14 years old is not uniform across countries. The estimates and projections are based on national labour force participation rates which are particularly problematic at the tails of the age distribution.

In many national labour force surveys, the minimum age for measuring economic characteristics is set at 15 or above, thus omitting altogether the age group 10 to 14. In others where the minimum age limit for data collection is set between 10 and 14 years, only partial information is available on the 10 to 14 age category as a whole.

The purpose of this article is to evaluate the ILO data in relation to the UNSECO data on school enrolment for 44 countries for the year 1990. An earlier evaluation based on Child Labour Surveys in 6 countries (Cambodia, Nepal, Pakistan, Philippines, and Turkey) showed suprisingly that except for one country (Philippines) the ILO labour force participation rates for the age group 10-14 years tended to be higher than the corresponding rates obtained from specialised national child labour surveys.[2]

2. Labour force participation versus school enrolment

In principle, labour force participation and school enrolment of the young during the school year are incompatible activities. Assuming that young people 10 to 14 years old either go to school or work, it follows that the labour force participation rate for this age group should be related to the net school enrolment ratio as follows :

$$(1) \qquad LFPR_{10\text{-}14} = 100 - NER_{10\text{-}14}$$

In practice, however, the relationship may not be exact in all circumstances : (a) some young people may combine school with economic activity in the off season, and also during the school year ; (b) others may not be in school nor at work due to disability or prolonged sickness ; and (c) still others may be studying at home with their parents

[1] Paper prepared by Farhad Mehran, Bureau of Statistics, International Labour Office, Geneva, presented at the United Nations Administrative Committee on Coordination Subcommittee on Demographic Estimates and Projections, Twenty-first session, Geneva, 27-29 June 2000.

[2] ILO Bureau of Statistics, "Labour force participation rates for children aged 10-14 years old," United Nations Administrative Committee on Coordination Subcommittee on Demographic Estimates and Projections, Twentieth Session, New York, 23-25 June 1998.

thus not registered at school and not accounted for in school enrolment data. Another reason that the relationship may not hold fully in practice is the differential error involved in the measurement of labour force participation rate (LFPR) in relation to the net school enrolment ratio (NER).

These differences, however, should not be considerable. Some estimates of the order of magnitude are available in the case of India from the results of the National Sample Survey of India, *Sarvekshana*, July-September 1992, Table 6 (activity codes 91 to 99). In what follows the assessment of the ILO labour force participation rates will be based on equation (1) stated above.

3. Enrolment ratios for 10-14 years old

The national figures published in the UNESCO *Statistical Yearbook* on net enrolment ratios correspond to the official age groups in primary or secondary education and vary from country to country. Clearly, these age groups need not correspond to the 10-14 years old category of the ILO age distribution. For comparison purposes, it is therefore necessary to adjust the UNESCO data to make them match the ILO 10 to 14 age group.

Two methods of adjustment are examined below :

(a) Uniform ratios. Under the method of uniform ratios, it is assumed that the enrolment ratio is the same for all ages within the official age group in primary education, and similary in secondary education. Thus, if r_1 is the net enrolment ratio in primary education and r_2 in secondary education, the net enrolment ratio for the 10-14 age group, cutting across the official primary and secondary age categories, would be estimated by

(2) $$r_{10\text{-}14} = w_1 \; r_1 + w_2 \, r_2$$

where w_1 is the proportion of the 10-14 population in the official age category of primary education, and w_2 is the corresponding proportion in the official age category of secondary education. In principle, $w_1 + w_2 = 1$.

The weights w_1 and w_2 may be calculated on the basis of the UN population data in single years. Quick estimates are given by also assuming a unform distribution of the population within each age category. Thus,

$$w_1 = (u_1 - 10 + 1)/5$$

$$w_2 = (14 - l_2 + 1)/5$$

where u_1 is the upper age limit of the official age group in primary education and l_2 is the lower age limit of the official age group in secondary education. Since l_2 is in principle equal to $u_1 + 1$, it is easy to verify that $w_1 + w_2 = 1$.

(b) Logistic ratios. Under the method of logistic ratios, it is assumed that the net enrolment ratio decreases continuously within age groups according to the formula,

(3) $$r_x = \frac{e^{-(a+bx)}}{1+e^{-(a+bx)}}$$

where x is the age at which the enrolment ratio is to be caclculated, and a and b are unknown parameters.

Estimates of a and b may be obtained by solving the system of equations,

$$r_1 = \frac{e^{-(a+bx1)}}{1+e^{-(a+bx1)}}$$

$$r_2 = \frac{e^{-(a+bx2)}}{1+e^{-(a+bx2)}}$$

where r_1 and r_2 are the published net enrolment ratios for primary and secondary education, respectively, and x_1 and x_2 are the mid-point of the corresponding official age groups. This gives the following estimates of a and b,

$$b = -[\log(r_2/1-r_2) - \log(r_1/1-r_1)]/(x_2 - x_1)$$

$$a = \log(r_2/1-r_2) - bx_2$$

The numerical application of the two adjustment methods to the 44 countries studied in this article are given in the Annex, for both sexes, and for males and females separately. In general, the uniform assumption leads to enrolment ratios that are lower, by about 2.5 percentage point, than the values obtained by the logistic assumption.

4. Analysis of the results

The methods described in sections 2 and 3 are applied to 44 countries for which net enrolment ratios were available for 1990 in the UNESCO *Statistical Yearbook 1999*. The results are shown in the Annex.

The analysis of the results show that on average the difference between the ILO estimates of the labour force participation rate for the 10-14 age category and the UNESCO-based estimates is about 15 percentage point. The difference is higher for females (17 percentage point) than males (14 percentage point). The percentage differences correspond to an underestimation of about 80 million economically active young people worldwide in 1990, 37 millions boys and 43 millions girls.

ILO Labour force Participation Rate vs 100-UNESCO Enrolment Ratio
For 10-14 years old (1990)
Comparison of average rates for 44 countries .

	ILO Labour force participation rate	100-UNESCO Enrolment ratio	Diff
Total	7.3 % (2)	22.6 % (1)	15.3 (-1)
Male	7.3 % (2)	21.1 % (1)	13.8 (-1)
Female	6.6 % (2)	23.4 % (1)	16.8 (-1)

Notes : Figures in parentheses are standard deviations of the rates divided by the average rate. Male and female values are based on 40 countries.

The figure below plots the ILO labour force participation rates against the UNESCO-based estimates for the 44 countries examined in this article. Each point corresponds to one country.

- Except for Mexico, the data for all countries are on or above the diagonal line of equality. This indicates that except for Mexico, the UNESCO-based data give higher or equal rates of economic activity than the ILO estimates of labour force participation rates.

- Five countries (Japan, Republic of Korea, New Zealand, Norway and Sweden) exhibit zero-rate of economic activity among the young according to both sets of data.

- For three other countries (Indonesia, Bostwana, and Rwanda), the two sets of data also give similar results, but the rates are non-zero.

- There are 21 countries (the heavy concentration of points on the lower end of the vertical axis) with an ILO labour force participation rate of zero, but less than 100% school enrolment ratio. These are countries for which there is some economic activity among the young, but the national surveys do not provide information as the lower age limit for measuring economic characteristics in the surveys is above 14. The countries are : Australia, Bahrain, Belgium, Bulgaria, Canada, Chile, Croatia, Cuba, Denmark, Greece, Guyana, Hungary, Ireland, Jamaica, Malta, Netherlands, Poland, Qatar, UAE, UK, and USA.

- Two detached countries (Saudi Arabia and Yugoslavia) are similarly located on the vertical axis, but exhibit high UNESCO-based ratios, while the reported ILO labour force participation rates are zero or close to zero.

- The twelve other countries are those for which the minimum age for measuring economic activity is equal or less than 14, but the resulting labour force participation rates fall short of the UNESCO-based ratios. The data exhibits a marked geographic clustering in this respect. Sub-Saharan African countries at the top (Niger, Mali, Togo and Rwanda). Next are Middle Eastern and North African countries (Saudi Arabia, Turkey, Syria and Algeria) as well as Latin American countries (Costa Rica, Brazil, Venezuela, Panama, and Paraguay).

5. Conclusions

The results obtained in this article suggest that the ILO labour force participation rates underestimate the extent of economic activity in the age category 10-14 years old by a wide margin (about 15 percentage point on the average, and up to 50 percentage point for some countries).

Improved estimates of the labour force participation rate for this age category may be obtained by considering data on school enrolment. Assuming that young people if not in school are at work, an alternative estimate of the labour force participation rate would be given by 100 minus the net school enrolment ratio. The two sets of data may be combined by a weighting procedure to derive an improved estimate of the labour force participation rate. The choice of the weighting procedure may be determined by calibrating the data against selected national child labour surveys, for which the estimates for the 10 to 14 age group are considered of sufficient accuracy. To date, data for some 12 countries are available.[3] It is envisaged to report on the resulting improved estimation method in a forthcoming article (ILO *Bulletin of Labour Statistics*).

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[3] International Labour Office, *Statistical Information and Monitoring Programme on Child Labour (SIMPOC) Overview and Strategic Plan 2000-2002*, International Programme on the Elimination of Child Labour (IPEC) and Bureau of Statistics (STAT), Geneva, January 2000 (Annex II).

Annex

CALCULATION OF ENROLMENT RATES FOR COMPARISON WITH ILO PARTICIPATION RATES FOR 44 COUNTRIES BOTH SEXES, 10-14 YEARS OLD (1990)

Annex (Continued)

CALCULATION OF ENROLMENT RATES FOR COMPARISON WITH ILO PARTICIPATION RATES FOR 44 COUNTRIES MALES, 10-14 YEARS OLD (1990)

Annex (Continued)

CALCULATION OF ENROLMENT RATES FOR COMPARISON WITH PARTICIPATION RATES FOR 44 COUNTRIES FEMALES, 10-14 YEARS OLD (1990)

Annex (Continued)

Description of column headings

1.	COUNTRY	Name of country in English in alphabetical order.
2.	CODE	ILO county code.
3.	ILO	ILO labour force participation rate for 10-14 years old *Economically active population, 1950-2010*, Fourth edition, 1996.
4.	L1	Lower official age of primary education.
5.	U1	Upper official age of primary education.
6.	L2	Lower official age of secondary education.
7.	U2	Upper official age of secondary education.
8.	r1	Net enrolment ratio in primary education (UNESCO *Statistical Yearbook 1999*, Table II.9).
9.	r2	Net enrolment ratio in secondary education (UNESCO *Statistical Yearbook 1999*, Table II.9).
10.	w1	(U1-10+1)/5
11.	w2	(14-L2+1)/5
12.	rlinear	w1 r1 + w2 r2
13.	x1	(U1+L1)/2
14.	x2	(U2+L2)/2
15.	f(r1)	Log[r1/(100-r1)]
16.	f(r2)	Log[r2/(100-r2)]
17.	a	f(r2)-bx2
18.	b	[f(r2)-f(r1)]/(x2-x1)
19.	a+bx	a + b(14+10)/2
20.	rlogistic	100*exp(-a-bx)/[1+exp(-a-bx)]
21.	UNESCO	100-rlogistic
22.	Diff	UNESCO-ILO