

Economic and Labour Market Papers

World and regional trends in labour  
force participation:  
Methodologies and key results

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## Preface

As part of a broader goal in the ILO to better inform policymakers and researchers of the key trends in global labour markets, the Employment Trends Unit produces world and regional estimates of labour market indicators such as labour force, unemployment, employment, employment by sector, labour productivity and working poverty, among a few others, with many estimates available disaggregated by age and sex. The ILO's Economic and Labour Market Analysis Department has a growing literature, to which this current paper contributes, detailing the methodologies used and models developed to generate these estimates.

This paper provides an overview of the data and methodology used to produce the series of harmonized country-level labour force participation rates and economically active population estimates presented in the 4<sup>th</sup> Edition Key Indicators of the Labour Market (KILM) database. It addresses the problem of missing data in cross-country labour force participation databases and documents a model developed to produce estimates of labour force participation rates in countries for which reported data do not currently exist. A key feature of this model is a correction for potential sample selection bias. Because the methodologies utilized in this paper produce a complete cross-sectional panel of data, the resulting figures can also be used to generate global and regional aggregate estimates of labour force participation. As a result, the paper also presents some of the key trends in labour force participation around the world over the last 25 years, placing a particular emphasis on how the trends differ among different age groups, between the sexes, and throughout different regions of the world.

The estimates of economic activity rates and the size of the economically active population described in this paper have also been published in the 5<sup>th</sup> Edition of the ILO's Economically Active Population Estimates and Projections (EAPEP) Database. The estimates are the result of a collaborative project involving the ILO's Bureau of Statistics and the Employment Trends Unit. In this project, the Employment Trends Unit had primary responsibility for developing the econometric model to produce the historical estimates portion of the database (corresponding to the period from 1980 to 2003) and for designing a data selection routine to identify and select cross-country comparable data for use in the model. The Bureau of Statistics had primary responsibility for developing the projection model utilized to project labour force participation rates for the period from 2004 to 2020. The basic model for the projections was developed by James Brown and Fiifi Amoako Johnson of the University of Southampton. This collaborative project utilized new and enhanced methodologies to improve the KILM and EAPEP labour force estimates, while also establishing a system to guarantee more frequent and reliable data updates. The resulting models and methodologies will be the basis for subsequent updates of the KILM and EAPEP Databases.

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## 1. Introduction

This paper provides a methodological overview of the series of harmonized labour force participation rates (LFPR) published in the ILO Key Indicators of the Labour Market (KILM) dataset.<sup>1</sup> The harmonized LFPR series included in the 4<sup>th</sup> Edition KILM, which corresponds to KILM tables 1a and 1b, is a new addition to the database.<sup>2</sup> This new series was created with the goals of providing 1) a more complete cross-sectional picture of the evolution of labour force participation in countries and regions around the world, and 2) a harmonized set of economic activity rates from which country and regional comparisons can be made.<sup>3</sup>

Tables 1a and 1b are “complete” panel datasets, containing labour force participation rates along with counts of the economically active population and total population for 191 countries over the period 1980 to 2005.<sup>4</sup> Due to the presence of missing data in the underlying country-reported labour force participation dataset – that is, the fact that not all countries report data in every year covered in the new series, and indeed some countries do not report data in any year – the new KILM series contains both real (country-reported) data and estimates generated through an econometric model.

Two major methodological issues are taken up in this paper. The first relates to the criteria utilized to select country-reported labour force participation data for inclusion in the series of harmonized participation rates. Because cross-country comparability is a key goal of the series, one essential step involved in the design of the series was the establishment of selection criteria to eliminate data deemed insufficiently comparable. The second methodological issue taken up is how to address the problem of missing data in the KILM harmonized LFPR series. Missing data frequently pose a serious challenge for researchers and policymakers alike and there is a large and growing literature related to this topic.<sup>5</sup>

The remainder of the paper proceeds as follows: Section 2 describes the criteria used to select the baseline national LFPR data that serve as the key input into the KILM harmonized LFPR series. This section includes a discussion of non-comparability issues that exist in the available national LFPR data and concludes with a description of the LFPR data coverage, after taking into account the various selection criteria. Section 3 provides a methodological overview of the econometric model developed for the treatment of missing labour force participation rates, both in countries that report in some of the years in question, as well as for those countries for which no data are currently available. Because the new KILM LFPR series is a complete panel, it can be readily used to compile world and regional aggregations

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<sup>1</sup> The ILO launched the KILM programme in 1999 to improve the dissemination of data on the key elements of the world’s labour markets. The KILM is designed to present a core set of labour market indicators and to improve the availability of the indicators to monitor new employment trends. The KILM contains 20 “key” indicators of the labour market relating to participation in the world of work, employment and variables relating to employment (status, sector, hours, etc.), the lack of work and the characteristics of jobseekers, education, wages and labour costs, labour productivity and poverty. It is a biennial publication and the 4<sup>th</sup> Edition was released in 2005. For more information see <http://www.ilo.org/kilm>.

<sup>2</sup> While there are 2 new tables containing harmonized labour force participation data in the 4<sup>th</sup> Edition KILM, the data underlying the two tables are identical and the only difference between the two tables is the age groupings used in each. For this reason, this paper discusses the creation of a singular series of harmonized estimates instead of two separate series.

<sup>3</sup> The terms “labour force participation” and “economic activity” are used synonymously throughout this paper.

<sup>4</sup> Estimates have been produced for 191 countries. Of these countries, 189 are included in the KILM dataset. However this paper discusses the results for the full sample of 191 countries.

<sup>5</sup> See, for instance, Nicoletti (2002), Schafer (1997) and Little and Rubin (1987).

of labour force participation rates and of the economically active population. Accordingly, Section 4 provides an overview of some of the key trends in labour force participation around the world since 1980, with a particular focus on different trends among women and men and among different age groups. Section 5 concludes.

## 2. Data selection criteria & coverage

### *Overview*

The harmonized LFPR series in the KILM is a collection of country-reported and econometrically estimated labour force participation rates. The database is a complete panel, that is, it is a cross-sectional time series database with no missing values. The series covers 191 countries with historical estimates for 1980 to 2005.<sup>6</sup> The KILM labour force participation rates are reported by sex (male, female and both sexes) and standardized age group.<sup>7</sup>

A key objective in the construction of the database was to generate a set of *comparable* labour force participation rates across countries and over time. With this in mind, the first step in the production of the KILM LFPR series was to carefully scrutinize existing country-reported labour force participation rates and to select only those observations deemed sufficiently comparable. In the second step, a weighted least squares econometric model was developed to produce estimates of labour force participation rates for those countries and years in which no country-reported, cross-country comparable data currently exist. The remainder of this section describes the sources of data non-comparability, the process through which data were either selected or eliminated and the resulting data coverage and database structure.

### *Non-comparability issues*

In order to generate a set of sufficiently comparable labour force participation rates across countries and over time, it was necessary to identify and address the various sources of potential non-comparability. The main sources of non-comparability of labour force participation rates are as follows:<sup>8</sup>

- **Survey type** – country-reported labour force participation rates are derived from several types of survey data including labour force surveys, population censuses, establishment surveys, insurance records and official government estimates. Data taken from different survey types are often not comparable.

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<sup>6</sup> The Economically Active Population Estimates and Projections (EAPEP) dataset includes these data and also provides projections to 2020. Data in years after 2003 were taken from the EAPEP database, which uses the 1980 to 2003 data generated using the model described in this paper as the benchmark for projections. A full description of the projection model is described in “ILO estimates and projections of the economically active population: 1980-2020 (Fifth Edition), Methodological description (March 2006), <http://laborsta.ilo.org/>.

<sup>7</sup> The age groupings used in KILM table 1a include 15+, 15-24, 15-64, 25-54, 25-34, 35-54, 55-64 and 65+. These are calculated from the 11 standardized age groups presented in KILM 1b, which include 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64 and 65+.

<sup>8</sup> This section draws heavily on the labour force participation data comparability discussion in the Key Indicators of the Labour Market (KILM), 4<sup>th</sup> Edition, Geneva, ILO.

- **Age group coverage** – non-comparability also arises from differences in the age groupings used in measuring the labour force. While the standard age groupings used in the present context are 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64 and 65+, some countries report non-standard age groupings, which can adversely affect comparability.
- **Geographic coverage** – some country-reported labour force participation rates correspond to a specific geographic region, area or territory. Geographically-limited data are not comparable across countries.
- **Others** – Non-comparability can also arise from the inclusion or non-inclusion of military conscripts; variations in national definitions of the economically active population, particularly with regard to the statistical treatment of “contributing family workers” and “unemployed, not looking for work”; and differences in survey reference periods.

#### *Data selection criteria*

Taking these issues into account, a set of criteria was established upon which nationally-reported labour force participation rates were selected for or eliminated from the input file for the KILM LFPR dataset.<sup>9</sup> The selection criteria include the following:

**Selection criterion 1. Data must be derived from either a labour force survey or population census and population census data are included only if no labour force survey data exist for a given country.** Labour force surveys are the most comprehensive source of internationally comparable LFPR data. National labour force surveys are typically very similar across countries, and the data derived from these surveys are generally much more comparable than data obtained from other sources. Consequently, a strict preference was given to labour force survey data in the selection process. Yet, many developing countries without adequate resources to carry out a labour force survey do report LFPR estimates based on population censuses. Due to the need to balance the competing goals of data comparability and data coverage, some population census-based labour force participation rates were included. However, a strict preference was given to labour force survey-based data, with population census-derived estimates only included for countries in which no labour force survey-based data exist. Data derived from official government estimates were not included in the dataset, as the methodology for producing official estimates can differ significantly across countries and over time.

**Selection criterion 2. Only data corresponding to the 11 standardized age groups (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64 and 65+) are included.** The inclusion of data corresponding to age groups other than those listed above could result in a less comparable dataset. Therefore only data from 11 standard age groupings were included in the input file.

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<sup>9</sup> All labour force participation data in the input file were selected from the ILO Key Indicators of the Labour Market (KILM) 4th Edition Database (Geneva, 2005), <http://www.ilo.org/kilm>. The main sources of data in the KILM include the ILO Yearbook of Labour Statistics (Laborsta), <http://laborsta.ilo.org>; the Organization for Economic Development and Cooperation (OECD) Labour Force Statistics Database, <http://www.oecd.org>; and the ILO Labour Market Indicators Library (LMIL), <http://www.ilo.org/trends>.

**Selection criterion 3. Only fully national (i.e. not geographically limited) labour force participation rates are included.** Labour force participation rates corresponding to only urban or only rural areas were not included. This criterion was necessary due to the large differences that often exist between rural and urban labour markets.

*Resulting input data file*

Together, these criteria determined the data content of the final input file, which was utilized in the subsequent econometric estimation process. Table 2.1 provides response rates and total observations by age group and year. These rates represent the share of total potential observations for which country-reported, cross-country comparable data exist.

**Table 2.1. Response rates by age group and year, both sexes combined**

Year	Age group											Total	Obs.
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+		
1980	0.32	0.32	0.32	0.28	0.28	0.28	0.31	0.31	0.30	0.29	0.31	0.30	1274
1981	0.20	0.20	0.19	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.20	0.18	770
1982	0.18	0.19	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.16	0.19	0.18	736
1983	0.24	0.26	0.25	0.25	0.24	0.24	0.23	0.23	0.24	0.22	0.25	0.24	1006
1984	0.20	0.21	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.18	0.20	0.19	818
1985	0.23	0.24	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.20	0.23	0.22	908
1986	0.24	0.24	0.23	0.23	0.23	0.23	0.22	0.22	0.23	0.21	0.24	0.23	956
1987	0.22	0.23	0.21	0.21	0.21	0.21	0.21	0.20	0.21	0.20	0.20	0.21	886
1988	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.25	0.25	0.26	1096
1989	0.27	0.28	0.27	0.27	0.26	0.26	0.26	0.26	0.27	0.26	0.26	0.26	1112
1990	0.39	0.40	0.40	0.39	0.38	0.38	0.38	0.38	0.39	0.38	0.38	0.39	1624
1991	0.29	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	1262
1992	0.28	0.28	0.27	0.26	0.25	0.25	0.25	0.26	0.27	0.26	0.27	0.26	1108
1993	0.30	0.31	0.30	0.30	0.29	0.29	0.29	0.29	0.30	0.29	0.30	0.30	1250
1994	0.30	0.31	0.30	0.29	0.29	0.29	0.29	0.29	0.30	0.29	0.30	0.30	1242
1995	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.32	0.32	0.30	0.31	0.32	1326
1996	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.30	0.31	0.29	0.30	0.30	1276
1997	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.28	0.29	0.30	1256
1998	0.31	0.31	0.30	0.30	0.29	0.30	0.30	0.30	0.30	0.28	0.29	0.30	1256
1999	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.29	0.26	0.26	0.28	1194
2000	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.30	0.29	0.31	1290
2001	0.28	0.28	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.27	0.28	0.28	1186
2002	0.29	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.29	0.29	1224
2003	0.28	0.29	0.29	0.28	0.28	0.28	0.28	0.28	0.28	0.27	0.27	0.28	1186
Total	0.28	0.28	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.27	0.27	27242
	2542	2586	2532	2480	2442	2440	2442	2450	2484	2372	2472		

The input file is also broken down by sex, however the number of both male and female observations is the same (13,621), thus only total figures are provided in the table. In total, comparable data are available for 27,242 out of a possible 100,848 observations, or approximately 27 per cent of the total. The total number of potential observations in the panel is determined by multiplying 191 countries \* 11 age groups \* 2 sexes \* 24 years = 100,848. It is important to note that while the percentage of real observations is rather low, 159 out of 191 countries (84 per cent) reported labour force participation rates in at least one year

during the 1980 to 2003 reference period. Thus, some information on LFPR is known about the vast majority of the countries in the sample.

It is clear that there is very little difference among the 11 age groups with respect to data availability. This is primarily due to the fact that countries that report LFPR in a given year tend to report for all age groups. The main exception to this occurs in cases in which some reported age groups do not conform to selection criterion 2. On the other hand, there is significant variation in response by year. In particular, coverage has tended to improve over time, as the worst years in terms of coverage are the early 1980s. While the overall response rate is approximately 27 per cent, as will be shown in the next section, response rates vary substantially among different regions in the world.

### 3. Missing value estimation procedure

#### *Overview*

This section describes the basic missing value estimation model developed to produce the KILM LFPR database. The present methodology contains four steps. First, in order to ensure realistic estimates of labour force participation rates, a logistic transformation is applied to the input data file. Second, a simple interpolation technique is utilized to expand the baseline data in countries that report labour force participation rates in some years. Next, the problem of non-response bias (systematic differences between countries that report data in some years and countries that do not report data in any year) is addressed and a solution is developed to correct for this bias. Finally, the weighted least squares estimation model, which produces the actual country-level LFPR estimates, is explained in detail. Each of these steps is described in the sections below.

#### *Step 1: Logistic transformation*

The first step in the estimation process is to transform all labour force participation rates included in the input file. This step is necessary since using simple linear estimation techniques to estimate labour force participation rates can yield implausible results (for instance labour force participation rates of more than 100 per cent). Therefore, in order to avoid out of range predictions, the final input set of labour force participation rates is transformed logarithmically in the following manner prior to the estimation procedure:

$$Y_{it}^T = \ln\left(\frac{y_{it}}{1 - y_{it}}\right) \quad (1)$$

where  $y_{it}$  is the observed labour force participation rate in country  $i$  and year  $t$ . This transformation ensures within-range predictions, and applying the inverse transformation produces the original labour force participation rates. The specific choice of a logistic function in the present context was chosen following Crespi (2004).

#### *Step 2: Country-level interpolation*

The second step in the estimation model is to fill in, through linear interpolation, the set of available information from countries that report in some but not all of the years in question. In many reporting countries, some gaps in the data do exist. For instance, a country will

report labour force participation rates in 1990 and 1992, but not in 1991. In these cases, a simple linear interpolation routine is applied, in which “smoothed” LFPR estimates are produced using equation 2.

$$y_i^T = \frac{y_{i1}^T - y_{i0}^T}{t_1 - t_0}(t - t_0) + y_{i0}^T \quad (2)$$

In this equation,  $y_i^T$  is the interpolated logistically transformed labour force participation rate in country  $i$ , and  $t$  is the year for which  $y_i^T$  is linearly interpolated.  $y_{i1}^T$  is the logistically transformed labour force participation rate in year  $t_{i1}$ , which corresponds to the closest reporting year in country  $i$  following year  $t$ .  $y_{i0}^T$  is the logistically transformed labour force participation rate in year  $t_{i0}$ , which is the closest reporting year in country  $i$  preceding year  $t$ . Accordingly,  $y_{i1}^T$  is bounded at the most recent overall reporting year for country  $i$ , while  $y_{i0}^T$  is bounded at the earliest reporting year for country  $i$ . This procedure increases the number of observations upon which the econometric estimation of labour force participation rates in reporting and non-reporting countries is based.

**Table 3.1. Response rates by estimation group**

Estimation group	% of potential obs.	% of potential obs., post-interpolation	Obs.	Obs., post-interpolation
Developed Europe	76.8	86.6	8924	10056
Developed Non-Europe	86.1	89.2	4090	4238
CEE and CIS	28.1	78.5	4008	11198
East and South-East Asia	15.5	25.5	1796	2958
South Asia	18.1	51.9	858	2444
Central America and the Caribbean	24.8	52.2	3280	6900
South America	44.7	69.9	2360	3690
Middle East and North Africa	9.7	30.1	922	2886
Sub-Saharan Africa	3.9	6.7	1004	1742
Total	27.0	45.7	27242	46112

The increase in observations resulting from the linear interpolation procedure is provided in Table 3.1. This table also provides a picture of the large variation in data availability among the different geographic/economic estimation groups. In total, the number of observations increased from 27,242 to 46,112 – that is, from 27.0 per cent to 45.7 per cent of the total potential observations. The lowest data coverage is in sub-Saharan Africa, in which the post-interpolation coverage is just 6.7 per cent. East and South-East Asia and the Middle East and North Africa also have relatively low coverage, at 25.5 per cent and 30.1 per cent, respectively. Post-interpolation coverage in all other regions is over 50 per cent, reaching nearly 90 per cent in the developed regions. The resulting database represents the final set of harmonized real and estimated labour force participation rates upon which the multivariate weighted estimation model is carried out as described below.

### *Step 3: Calculation of response-probabilistic weights*

Out of 191 countries in the series, 32 do not have any reported comparable labour force participation rates over the period from 1980 to 2003.<sup>10</sup> The region with the lowest share of

<sup>10</sup> Appendix 1 provides a list of countries by estimation group and reporting and reporting status. It should be noted that the estimation groups used in this paper differ from the regional groupings provided in the KILM database.

reporting countries is sub-Saharan Africa, at 34 out of 49 countries, or just over 69 per cent. In all other regions, over 75 per cent of the countries report LFPR in at least 1 year. In Developed Europe and Central America and the Caribbean, over 95 per cent of countries report LFPR, while in Developed Non-Europe and South America, all countries in the sample report LFPR.

The existence of non-reporting countries raises the potential problem of non-response bias. That is, if labour force participation rates in countries that do not report data tend to differ significantly from participation rates in countries that do report, basic econometric estimation techniques can result in biased estimates of labour force participation rates for the non-reporting countries, as the sample upon which the estimates are based does not sufficiently represent the underlying heterogeneity of the population.<sup>11</sup>

The identification problem at hand is essentially whether missing data in the input file are missing completely at random (MCAR), missing at random (MAR) or not missing at random (NMAR).<sup>12</sup> If the data are MCAR, non-response is ignorable and multiple imputation techniques such as those inspired by Heckman (1979) should be sufficient for dealing with missing data. This is the special case in which the probability of reporting depends neither on observed nor unobserved variables – in the present context this would mean that reporting and non-reporting countries are essentially “similar” in both their observable and unobservable characteristics as they relate to labour force participation rates. If the data are MAR, the probability of sample selection depends only on observable characteristics. That is, it is known that reporting countries are different from non-reporting countries, but the factors that determine whether countries report data are identifiable. In this case, econometric methods incorporating a weighting scheme, in which weights are set as the inverse probability of selection (or inverse propensity score), is a common solution for correcting for sample selection bias. Finally, if the data are NMAR, there is a selection problem related to unobservable differences in characteristics among reporters and non-reporters, and methodological options are limited. In cases where data are NMAR, it is desirable to render the MAR assumption plausible by identifying covariates that impact on response probability (Little and Hyonggin, 2003). Given the important methodological implications of non-response type, it is instructive to examine characteristics of reporting and non-reporting countries in order to determine the type of non-response present in the KILM LFPR database. Table 3.2 confirms significant differences between reporting and non-reporting countries in the sample.

**Table 3.2. Per-capita GDP and population size of reporting and non-reporting countries**

	Reporters	Non-reporters
Mean per-capita GDP, 2003 (2000 International \$)	9153	2452
Median per-capita GDP, 2003 (2000 International \$)	5829	1501
Mean population, 2005 (millions)	38.3	9.8
Median population, 2005 (millions)	7.7	4.6
Total countries	159	32

Sources: World Bank, WDI Database 2005; UN, World Population Prospects 2004 Revision Database.

The table shows that on average reporting countries have considerably higher per capita GDP and larger populations than non-reporting countries. In the context of the KILM harmonized LFPR dataset, it is important to note that countries with low per-capita GDP development

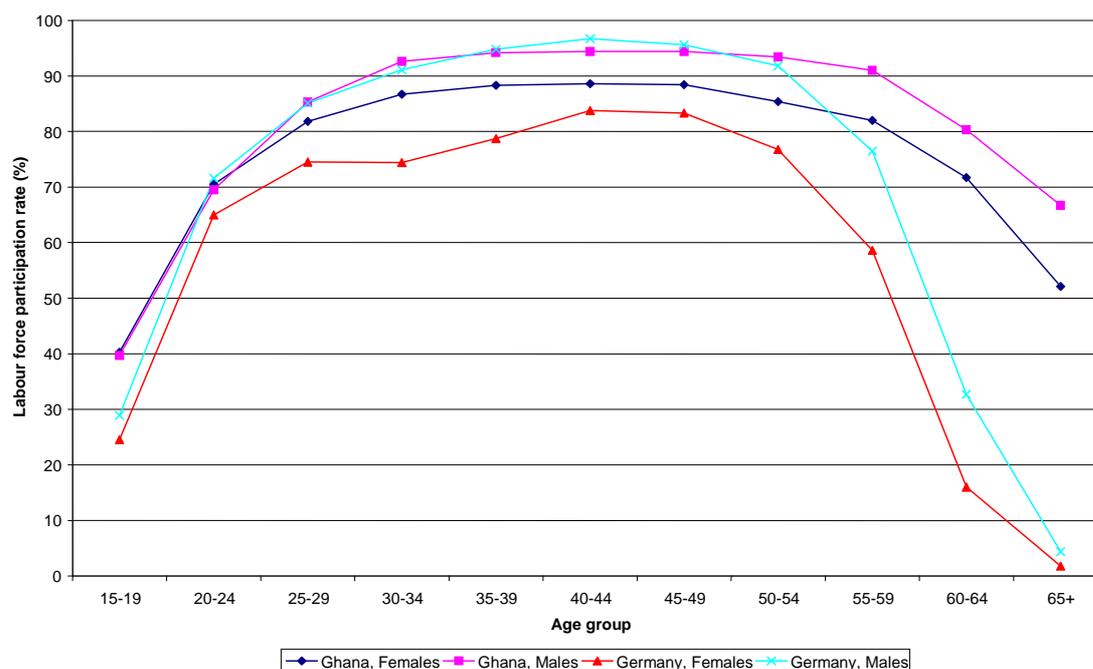
<sup>11</sup> For more information, see Crespi (2004) and Horowitz and Manski (1998).

<sup>12</sup> See Little and Hyonggin (2003) and Nicoletti (2002).

also tend to exhibit higher than average labour force participation rates, particularly among women, youth and older individuals. This outcome is borne mainly due to the fact that the poor often have few assets other than their labour upon which to survive. Thus, basic economic necessity often drives the poor to work in higher proportions than the non-poor. As economies develop, many individuals can afford to work less: youth can attend schooling for longer periods, women can choose to exit the labour market during periods of maternity and older workers can afford to retire. Consequently, overall participation rates in developing economies moving into the middle stages of development tend to decline.<sup>13</sup>

This is demonstrated in Figure 3.1, which depicts actual country-reported labour force participation rates by 5-year age group in Germany and Ghana. Germany's per-capita GDP in 2003 stood at around US \$25,600, while Ghana's was approximately US \$2,100. While there is little difference with regard to male prime working-age labour force participation, female participation is considerably higher in Ghana, including during prime child-rearing years. In addition, the LFPR curves corresponding to women and men in Ghana are considerably flatter than the curves corresponding to their German counterparts. This reflects the considerably higher participation rates of youth and older workers in Ghana.

**Figure 3.1. Labour force participation rates by age group in Ghana and Germany, most recent year**



Source: ILO, Key Indicators of the Labour Market (KILM) Database, 4<sup>th</sup> Edition.

It appears that factors exist that co-determine the likelihood for countries to report labour force participation rates in the KILM LFPR input dataset and the actual labour force participation rates themselves. The missing data do not appear to be MCAR. Due to the existence of data (such as per-capita GDP and population size) that exist for both responding and non-responding countries and that are related to response likelihood, it should be possible to render the MAR assumption plausible and thus to correct for the problem of non-

<sup>13</sup> See ILO, KILM 4<sup>th</sup> Edition, (Geneva, ILO, 2005) and Standing, G. *Labour Force Participation and Development* (Geneva, ILO, 1978).

response bias.<sup>14</sup> This correction can be made while using the fixed-effects panel estimation methods described in the next section, by applying “balancing weights” to the sample of reporting countries. The remainder of the present section describes this weighting routine in greater detail.

The basic methodology utilized to render the data MAR and to correct for sample selection bias contains two steps. The first step is to estimate each country’s probability of reporting labour force participation rates. In the KILM harmonized LFPR input dataset, per-capita GDP, population size, year dummy variables and membership in the Highly Indebted Poor Country (HIPC) Initiative represent the set of independent variables used to estimate response probability.<sup>15</sup> Following Crespi (2004) and Horowitz and Manski (1998), we characterize each country in the input dataset by a vector  $(y_{it}^T, x_{it}, w_{it}, r_{it})$ , where  $y$  is the outcome of interest (the labour force participation rate),  $x$  is a set of covariates that determine the value of the outcome and  $w$  is a set of covariates that determine the probability of the outcome being reported. Finally,  $r$  is a binary variable indicating response or non-response:

$$r_{it} = \begin{cases} 1 & \text{if } i \text{ reports} \\ 0 & \text{if } i \text{ does not report} \end{cases} \quad (3)$$

Equation 4 indicates that there is a linear function whereby the likelihood of reporting labour force participation rates is a function of the set of covariates:

$$r_{it}^* = w_{it}'\gamma + \varepsilon_{it} \quad (4)$$

where a country reports if this index value is positive ( $r_{it}^* > 0$ ),  $\gamma$  is the set of regression coefficients and  $\varepsilon_{it}$  is the error term. Assuming a symmetric cumulative distribution function, the probability of reporting labour force participation rates can be written as in equation 5.

$$P_i = F(w_{it}'\gamma) \quad (5)$$

The functional form of  $F$  depends on the assumption made about the error term  $\varepsilon_{it}$ . As in Crespi (2004), we assume that the cumulative distribution is logistic, as shown in equation 6:

$$F(w_{it}'\gamma) = \frac{\exp(w_{it}'\gamma)}{1 + \exp(w_{it}'\gamma)} \quad (6)$$

It is necessary to estimate equation 6 through logistic regression, which is carried out by placing each country into one of the 9 estimation groups listed in table 2. The regressions are carried out for each of the 11 standardized age groups.<sup>16</sup> The results of this procedure

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<sup>14</sup> Indeed, according to Little and Hyonggin (2003), the most useful variables in this process are those that are predictive of both the missing values (in this case labour force participation rates) and of the missing data indicator. Per-capita GDP is therefore a particularly attractive indicator in the present context.

<sup>15</sup> HIPC membership is utilized as an explanatory variable for response probability due to the fact that member countries are required to report statistics to measure progress toward national goals related to the program. As a result, taking all else equal, HIPC countries may be more likely to report labour force participation rates.

<sup>16</sup> Appendix 2 provides the basic results of these logistic regressions. While the regressions were carried out for each age group, the results for each group do not differ substantially due to the similar breakdown of reporting and non-reporting countries by age group. For this reason, Appendix 2 provides one set of regression results.

provide the predicted response probabilities for each age group within each country in the KILM LFPR dataset. The second step is to calculate country weights based on these regression results and to use the weights to “balance” the sample during the estimation process. The predicted response probabilities calculated in equation 6 are used to compute weights defined as:

$$s_{it}(w) = \frac{P(r_{it} = 1)}{P(r_{it} = 1 | w_{it}, \hat{\gamma})} \quad (7)$$

The weights given by equation 7 are calculated as the ratio of the proportion of non-missing observations in the sample (for each age group and each year) and the reporting probability estimated in equation 6 of each age group in each country in each year. By calculating the weights in this way, reporting countries that are more similar to the non-reporting countries (based on characteristics including per-capita GDP, population size and HIPC membership) are given greater weight and thus have a greater influence in estimating labour force participation rates in the non-reporting countries, while reporting countries that are less similar to non-reporting countries are given less weight in the estimation process. As a result, the weighted sample looks more similar to the theoretical population framework than the simple un-weighted sample of reporting countries.

#### *Step 4: Weighted multivariate estimation*

The final step is the estimation process itself. Countries are again divided into the nine estimation groups listed above, which were chosen on the combined basis of broad economic similarity and geographic proximity.<sup>17</sup> Having generated response-probabilistic weights to correct for sample selection bias, the key issues at hand include 1) the precise model specification and 2) the choice of independent variables for estimating LFPR.

In terms of model specification, taking into account the database structure and existence of unobserved heterogeneity among the various countries in the KILM LFPR input database, we follow Crespi (2004) in using panel data techniques with country fixed effects and the sample of reporting countries weighted using the  $s_{it}(w)$  to correct for non-response bias.<sup>18</sup> By using fixed effects in this way, the “level” of known labour force participation rates in each reporting country is taken into account when estimating missing values in the reporting country, while in non-reporting countries, the weighted average fixed effect among reporting countries in each estimation group is used to estimate these countries’ labour force participation rates. More formally, the following linear model was constructed (and run on the logistically transformed labour force participation rates):

$$Y_{it}^T = \ln\left(\frac{y_{it}}{1 - y_{it}}\right) = \alpha_i + x_{it}'\beta + \mu_{it} \quad (8)$$

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<sup>17</sup> Schaible (2000) discusses the use of geographic proximity and socio-economic status to define estimation domains for data estimation including for ILO labour force participation rates. See also Schaible and Mahadevan-Vijaya (2002).

<sup>18</sup> Crespi (2004) provides a test comparing the bias resulting from different missing value estimation models and finds that the weighted least squares model using fixed-effects provides the smallest relative bias when estimating unemployment rates.

where  $y_{it}$  is the observed labour force participation rate in country  $i$  and year  $t$ ,  $x_{it}$  is a set of explanatory covariates of the labour force participation rate and  $e_{it}$  is the error term. The main set of covariates included is listed in Table 3.3.

**Table 3.3. Independent variables in fixed-effects panel regression**

Variable	Source
Per-capita GDP	World Bank, WDI 2005; IMF, WEO 2005
Per-capita GDP squared	World Bank, WDI 2005; IMF, WEO 2005
Real GDP growth rate	World Bank, WDI 2005; IMF, WEO 2005
Lagged real GDP growth rate	World Bank, WDI 2005; IMF, WEO 2005
Share of population aged 0-14	United Nations, World Population Prospects Database, 2004
Share of population aged 15-24	United Nations, World Population Prospects Database, 2004
Share of population aged 25-64	United Nations, World Population Prospects Database, 2004

In the context of the KILM LFPR database, there are two primary considerations in selecting independent variables for estimation purposes. First, the selected variables must be robust correlates of labour force participation, so that the resulting regressions have sufficient explanatory power. Second, in order to maximize the data coverage of the final KILM database, the selected independent variables must have sufficient data coverage.

In terms of variables related to economic growth and development, as mentioned above, per-capita GDP is often strongly associated with labour force participation.<sup>19</sup> This, together with the substantial coverage of the indicator made it a prime choice for estimation purposes. However, given that the direction of the relationship between economic development and labour force participation can vary depending on a country's stage of development, the square of this term was also utilized to allow for this type of non-linear relationship.<sup>20</sup> Annual GDP growth rates were used to incorporate the relationship between participation and the state of the macro-economy.<sup>21</sup> The lag of this term was also included in order to allow for delays between shifts in economic growth and changes in participation.

Changes in the age structure of populations can also affect labour force participation rates over time. This happens at the country-wide level, since different age cohorts tend to have different labour force participation rates, and thus changes in the aggregate age structure of a population can affect the overall participation rate. More importantly for the present analysis, however, is the potential impact that demographic changes can have on intra age group participation rates within countries. Changes in population age structure can affect the overall burden of caring for dependents at home, thus affecting individuals' decisions to participate in labour markets. As mentioned earlier, this can have a particularly important effect on women's decision to enter into work.<sup>22</sup> In order to incorporate these types of demographic effects, variables of the share of population aged 0-14 (young age-dependent), 15-24 (working-age youth) and 25-64 (prime working age) were incorporated to varying degrees in

<sup>19</sup> See also Nagai and Pissarides (2005), Mammen and Paxon (2000) and Clark et al. (1999).

<sup>20</sup> Whereas economic development in the poorest countries is associated with declining labour force participation (particularly among women and youth), in the middle- and upper- income economies, growth in GDP per capita can be associated with rising overall participation rates – often driven by rising participation among newly empowered women. This phenomenon is the so-called “U-shaped” relationship between economic development and participation. See ILO, KILM 4<sup>th</sup> Edition and Mammen and Paxon (2000).

<sup>21</sup> See Ngai, L. and Pissarides (2005), Fortin and Fortin (1998) and McMahon (1986).

<sup>22</sup> Bloom and Canning (2005), Falcão and Soares (2005), O'Higgins (2003), Clark et al. (1999), Fullerton (1999) and McMahon (1986) provide some examples of the relationships between population structure (and demographic change) and labour force participation rates for different groups of the population.

regions in which an important relationship between participation and demographics was found.<sup>23</sup>

In all estimation groups, a set of country dummy variables was used in each regression in order to capture country fixed effects. A dummy variable to indicate whether the observation was pre- or post-1990 was also included in regressions carried out for the Central and Eastern Europe (CEE) and Commonwealth of Independent States (CIS) estimation group, as was an interaction between this dummy variable and the per-capita GDP and per-capita GDP squared variables. These variables were used to capture the important effects of the dissolution of the Soviet Union on labour markets throughout the region. A preliminary examination of the input data revealed that countries in the South Asia estimation group exhibit a particularly large degree of heterogeneity in labour force participation rates, especially with regard to female participation. In order to estimate robust labour force participation rates in non-reporting countries in this estimation group, it was necessary to introduce a dummy variable to further subdivide economies in the region based on observed national labour market characteristics and prevailing cultural norms with regard to male and female labour market participation. This variable was significant in more than 70 per cent of the regressions carried out for the estimation group. Finally, the constant  $\alpha_i$  given in equation 8, is country-specific and captures all the persistent idiosyncratic factors determining the labour force participation rate in each country.<sup>24</sup>

The end result of this process is a balanced panel dataset containing real and imputed cross-country comparable labour force participation rates for 191 countries over the period 1980-2003. In the final step, these labour force participation rates are multiplied by the total population figures given in the United Nations World Population Prospects 2004 Revision database, the result of which gives the total labour force in each of the 191 countries, broken down by age group and sex. The following section provides some of the key global and regional trends in labour force participation derived from the resulting database.

#### **4. Key world and regional trends in labour force participation**

The 191 countries included in the KILM harmonized LFPR series account for over 99.9 per cent of the world's population. This complete panel database can therefore be used to produce global and regional aggregations of labour market indicators, which are useful for examining broad trends in labour force participation around the world. This section examines some of these trends, with a particular emphasis on differences between men and women, among the different age groups and in the various regions of the world.

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<sup>23</sup> It should be noted that these variables are by definition correlated and thus increase the presence of multicollinearity in the regressions. However a careful examination of the resulting LFPR estimates that resulted from the inclusion of these variables revealed that this did not present a prohibitively significant problem in the context of the present estimation procedure.

<sup>24</sup> Full regression results are given in Appendix 3. In total, 198 regressions were run (9 regions \* 2 sexes \* 11 age groups). Covariate selection was done separately for each estimation group. In general, the regressions have considerable explanatory power, as the lowest R-squared is 0.55, with most in the range of 0.70 to 0.95.

**Table 4.1. Global labour force and population figures, selected groups**

	1980	1990	2000	2005
Total working-age population ('000s)	2,880,602	3,566,009	4,256,622	4,642,570
Total labour force ('000s)	1,929,563	2,405,653	2,818,456	3,050,420
Total LFPR (%)	67.0	67.5	66.2	65.7
Female labour force (% of total)	38.6	39.8	39.8	40.1
Female LFPR (%)	51.5	53.6	52.6	52.5
Youth labour force (% of total)	27.8	25.6	21.3	20.8
Youth LFPR (%)	63.9	61.4	56.2	54.7
Female LFPR, 25-54, (%)	61.9	65.9	66.3	66.7
Male LFPR, 25-54 (%)	96.3	96.2	95.3	95.1
LFPR 55+	37.1	37.5	36.6	37.1

Table 4.1 provides some of the main global trends in economic activity.<sup>25</sup> The world's working-age population – that is, the population aged 15 and above – has grown from 2.88 billion in 1980 to 4.64 billion in 2005. Growth has slowed in recent years, down from an average annual rate of 2.2 per cent between 1980 and 1990 to 1.8 per cent between 1990 and 2005. For much of the past 25 years, the world's labour force grew more or less in step with the working-age population.

In 2005, there were around 3.05 billion individuals in the global labour force, up more than 1.1 billion since 1980. However, the rate of growth of the global labour force has declined relatively faster than the rate of growth of the working-age population as a whole. The world's labour force grew at an average annual rate of 2.2 per cent between 1980 and 1990, but the growth rate declined to 1.6 per cent between 1990 and 2005. This trend is reflected in the global labour force participation rate. While in 1980 the global labour force participation rate stood at 67 per cent, and in 1990 it was 67.5 per cent, between 1990 and 2005 it declined to 65.7 per cent. A major trend underlying this development was a substantial drop in youth participation rates. This is discussed in greater detail below.

Women comprise a relatively smaller but growing share of the labour force. In 2005, women accounted for 40.1 per cent of the world's workers, up from 38.6 per cent in 1980. The female labour force participation rate grew during the 1980s, reaching 53.6 per cent in 1990. However, between 1990 and 2005, female participation actually declined. This trend can be understood much better when viewed together with age-disaggregated labour force and LFPR data. The share of youth aged 15 to 24 in the labour force declined from 27.8 to 25.6 between 1980 and 1990 and dropped sharply to 20.8 per cent in 2005. This was driven both by underlying demographic changes (the growth rate in the youth population declined from 1.8 per cent between 1980 and 1990 to 1 per cent between 1990 and 2005<sup>26</sup>), and by declining youth participation rates. In terms of the latter effect, the global youth labour force participation rate declined from 63.9 per cent in 1980 to 61.4 per cent in 1990 and then fell sharply to 54.7 per cent in 2005. As will be discussed in the subsequent section, one key development that appears to be driving this trend is growth in the share of youth remaining in

<sup>25</sup> A discussion of standard errors corresponding to the world and regional aggregate estimates of labour force participation is provided in Appendix 4.

<sup>26</sup> United Nations World Population Prospects Database, 2004

school and postponing entrance into the workforce, particularly in certain developing regions of the world, such as East and South-East Asia.

Among the prime working-age cohort (aged 25 to 54), it is clear that there has been a narrowing in the gap between men and women with regard to economic activity rates. The share of prime-age women in the labour force has grown from 61.9 per cent to 66.7 percent over the past 25 years, though the increase has slowed substantially in recent years. Among prime-age men, the share has fallen from 96.3 per cent to 95.1 per cent, and this decline has been more pronounced between 1990 and 2005 than in the decade earlier. Among workers aged 55 and above, there has been little change with regard to economic activity rates over the last 25 years.

**Figure 4.1. Global labour force participation by age group and sex**

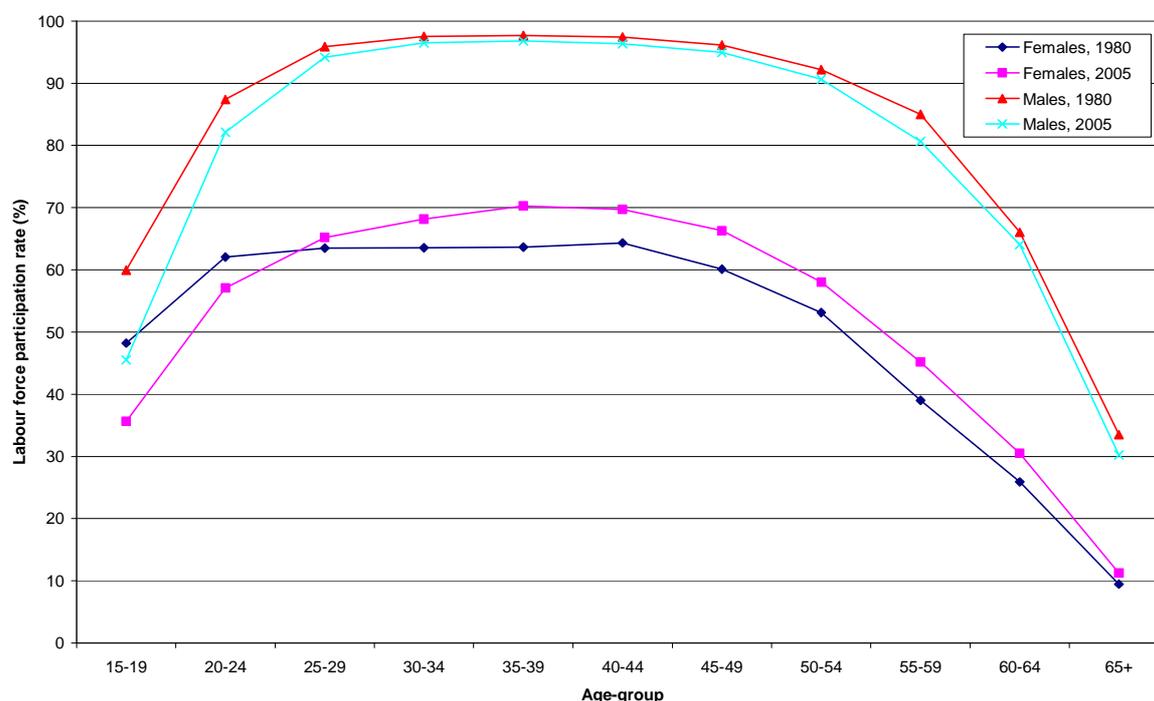


Figure 4.1. provides a graphical view of these ongoing trends. In each of the age groups, women’s participation remains lower than men’s, although between 1980 and 2005 female participation grew in every age group except the two youth cohorts. The largest decline in participation for both women and men has occurred in the 15 to 19 age group. Again, this is likely due to increasing participation in secondary education – a positive reflection of ongoing economic development in some regions of the world. The decline in participation among both women and men aged 20 to 24 could also reflect expanded participation in tertiary education, but this could also be an indication of increased discouragement among young workers who would willingly enter into the labour market if given a better chance to find a decent job.<sup>27</sup> The next section examines participation trends in the different regions in order to provide a clearer picture of how economic activity is evolving around the world.

<sup>27</sup> See ILO, *Global Employment Trends for Youth*, 2006 and Elder and Schmidt (2004).

**Table 4.1. Regional shares of the global labour force and LFPR, 1980 and 2005**

	Total labour force (‘000s)		Share of world labour force (%)		Labour force participation rate (%)	
	1980	2005	1980	2005	1980	2005
Developed Europe	178'947	217'941	9.3	7.1	56.9	56.4
Developed Non-Europe	195'792	261'853	10.1	8.6	63.4	64.3
CEE and CIS	195'263	194'782	10.1	6.4	67.9	58.8
East and South-East Asia	684'603	1'096'269	35.5	35.9	76.5	73.9
South Asia	342'285	590'697	17.7	19.4	63.0	59.7
Central America and the Caribbean	39'198	77'141	2.0	2.5	57.2	60.4
South America	86'158	180'002	4.5	5.9	57.5	67.9
Middle East and North Africa	49'366	121'984	2.6	4.0	48.5	53.7
Sub-Saharan Africa	157'952	309'752	8.2	10.2	74.8	72.9

Table 4.1 provides the total labour force, the share of global labour force and labour force participation rates by region. Together, the two developed regions of Developed Europe (which includes the European Union and non-EU countries in Western Europe) and Developed Non-Europe (which includes North America, Israel, Japan, Australia and New Zealand) have a combined labour force of approximately 480 million, up from 375 million in 1980. These two regions make up 15.7 per cent of the global labour force, down from 19.4 per cent in 1980, a reflection of relatively slow population growth in many developed economies vis-à-vis growth throughout much of the developing world. Developed Europe has witnessed a decline in labour force participation of about 0.5 percentage points over the past two and a half decades, while participation has increased by 0.9 percentage points in the Developed Non-Europe region. Developed Non-Europe also has considerably higher participation rates than the Developed Europe region.

The labour force in Central and Eastern Europe (non-EU) and the Commonwealth of Independent States has actually shrunk slightly over the past 25 years. This region now makes up 6.4 per cent of the global labour force. Labour force participation has declined sharply in this region – down from 67.9 per cent in 1980 to 58.8 per cent in 2005, with the vast majority of this decline occurring after the dissolution of the Soviet Union. This finding is consistent to previous studies that cited falling employment, rising unemployment and rising labour productivity throughout the transition from state-led to market-led economies.<sup>28</sup>

With an economically active population of nearly 1.7 billion, the regions of East and South-East Asia and South Asia make up over 55 per cent of the world's labour force. In East and South-East Asia, labour force participation rates have declined by 2.6 percentage points over the past 25 years, with the bulk of the decline occurring during the past decade, during which time much of the region experienced very rapid economic growth.<sup>29</sup> However, the region maintains the highest labour force participation rates in the world, at 73.9 per cent of the working-age population. In contrast, South Asia witnessed a decline in economic activity rates over the past 25 years. The majority of this decline occurred after 1990. South Asia's

<sup>28</sup> See Kapsos (2005).

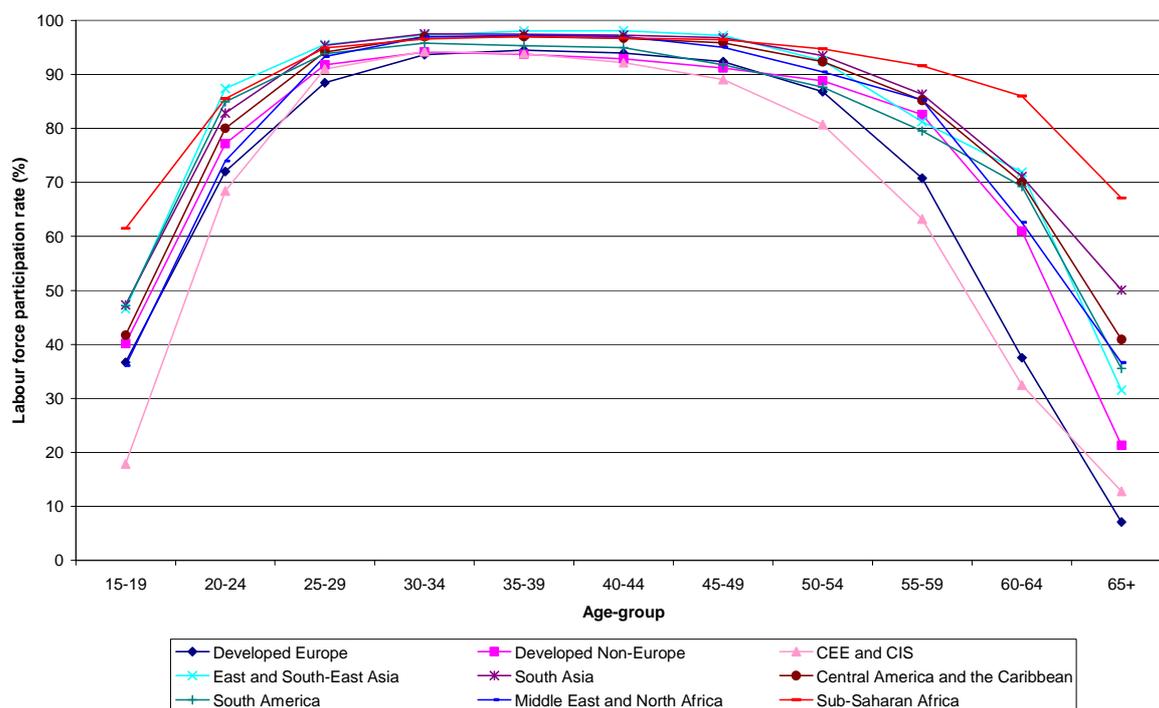
<sup>29</sup> The East and South-East Asian region is the combination of two geographic KILM regions (East Asia and South-East Asia and the Pacific). Due to missing data, it was necessary to combine these regions for estimation purposes and thus they are presented together here.

labour force participation rate, at 59.7 per cent, is quite low in comparison to most other developing regions. This will be discussed in greater detail below.

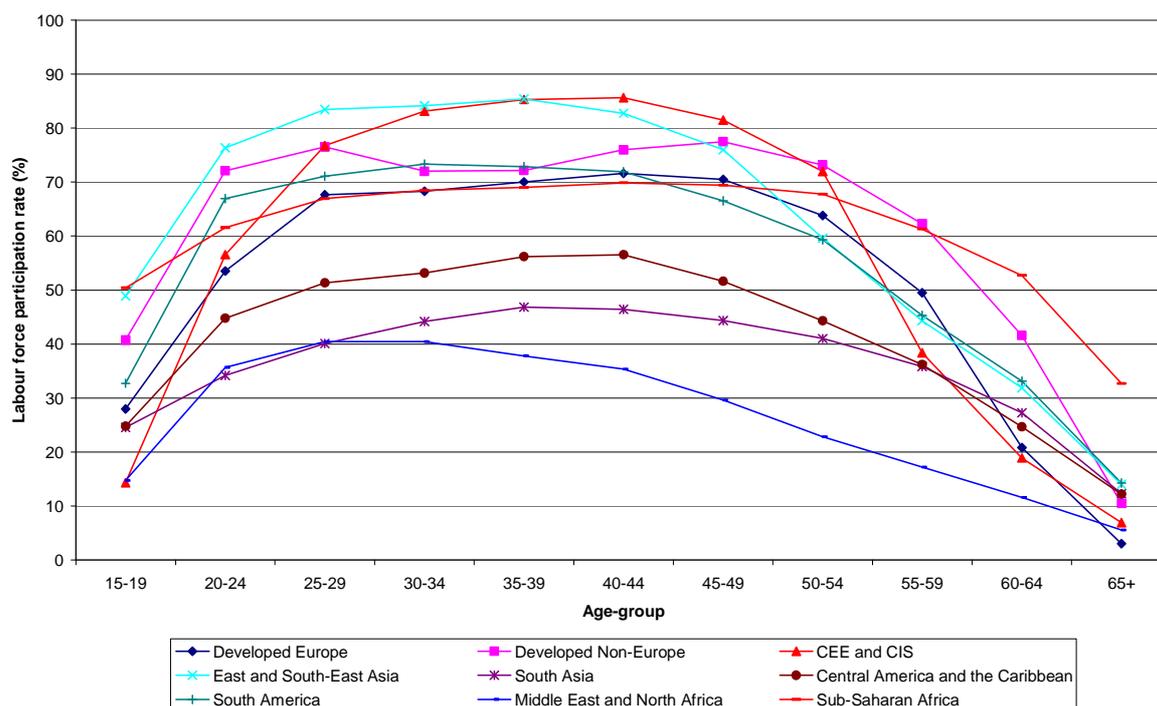
The Latin American regions of Central America and the Caribbean and South America have experienced rapid labour force growth over the past 25 years. Taken together, the labour force in these two regions has more than doubled since 1980, reaching approximately 257 million in 2005. This growth is partly due to the rapid population growth throughout much of Latin America, but also due to sharply rising economic activity rates, particularly in South America, where participation rates rose by more than 10 percentage points between 1980 and 2005.

The labour force in the Middle East and North Africa region grew by an astounding 149 per cent (an average annual growth rate of nearly 3.7 per cent) between 1980 and 2005. This region has the fastest growing labour force in the world, but still makes up only 4 per cent of the total global labour force. Owing to historically low female activity rates, the region also has the lowest overall labour force participation rates in the world, at just 53.7 per cent, but this figure has risen from a very low 48.5 per cent in 1980. Sub-Saharan Africa has also witnessed rapid labour force growth of over 2.7 per cent per year over the past 25 years. The region now contains over 10 per cent of the world's labour force. Labour force participation has decreased slightly, but remains high at 72.9 per cent, reflecting the existence of widespread poverty and the basic need for the poor to remain economically active.

**Figure 4.1. Labour force participation by region and age group, 2005, males**



**Figure 4.2. Labour force participation by region and age group, 2005, females**



Figures 4.1 and 4.2 show some additional characteristics of the regional labour markets as they stood in 2005. First, Figure 4.1 shows male labour force participation rates by age group and region. The figure demonstrates that there is very little difference among the regions with respect to the activity rates of prime working-age men (aged 25-54). There is, however, substantial heterogeneity on the “tails” of the chart – that is, among young men aged 15 to 24 and among older workers aged 55 and above. In particular, the chart shows that in the CEE and CIS region, Developed Europe and Developed Non-Europe, the LFPR among older men is considerably lower than in the remainder of the developing regions. This difference is most likely due to the existence of relatively widespread social safety nets including pension schemes in the developed economies. The large variance in youth participation rates could be indicative of regional differences in educational enrolment, among other socioeconomic factors.

Figure 4.2 provides a picture of female labour force participation by age group and region. In contrast with the previous chart, this chart shows considerable variation among the regions across all age groups. South Asia has the lowest female LFPR in the age groups between 15 and 29. The Middle East and North Africa region has the lowest female LFPR in all age groups between 30 and 64. Among women aged 65 and above, Developed Europe has the lowest female LFPR with just 3 per cent of women in this category economically active. The CEE and CIS and East and South-East Asia regions have some of the highest female labour force participation rates – particularly with regard to women aged 25 to 54. Taken together, figures 4.1 and 4.2 provide a picture of the current levels of economic activity broken down by age group and sex around the different regions of the world. In order to provide a clearer picture of changes and ongoing trends in participation, the subsequent discussion provides a more detailed look at the evolution of labour force participation in each of the aforementioned regions.

**Figure 4.3. LFPR by age group and sex, 1980 and 2005, Developed Europe**

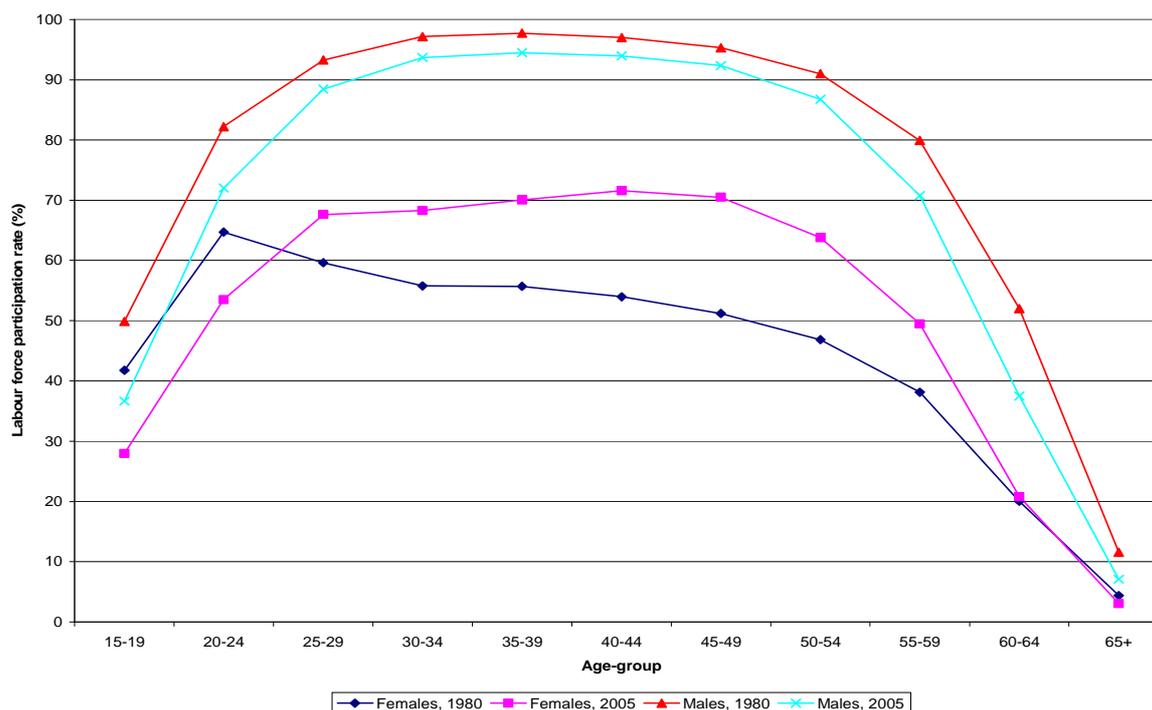


Figure 4.3 shows labour force participation rates in 1980 and 2005 broken down by age group and sex for the Developed Europe region. Two major trends are clear from the figure. First, male labour force participation has declined in each of the 11 age groups. The largest changes have occurred among young men and older male workers. The LFPR among young men aged 15 to 19 declined by 13.3 percentage points and among 20 to 24 year-olds it declined by 10.2 percentage points. With regard to the older age cohorts, the LFPR declined by 9.1 and 14.5 percentage points for 55 to 59 and 60 to 64 year-olds respectively. Second, female labour force participation declined among younger women and rose substantially for the prime-age cohort. Among 15 to 19 year-old females, LFPR declined by 13.8 percentage points between 1980 and 2005, while the decline among 20 to 24 year-olds was 11.2 percentage points. There was also a slight decline in participation among women aged 65 and above, and there was very little change among women aged 60 to 64. On the other hand, the increase in participation among the prime-age female cohorts has been considerable. For example, among women aged 45 to 49, LFPR rose by 19.3 percentage points. It is worth noting that the gender gap in participation declined in every age group except the two youth cohorts. Among the age cohorts between 40 and 59, the LFPR gap declined by over 20 percentage points, with declines of over 12 percentage points in the cohorts aged 25 to 39.

It is interesting to note that the shape of the female LFPR curve changed significantly between 1980 and 2005. More specifically, the curve corresponding to the year 2005 exhibits a gradual rise in LFPR, rather than the spike in LFPR that was evident among 20 to 24 year-olds in 1980. A number of factors could be at play here. The most significant appears to be the tendency for women in Developed Europe to stay in schooling longer – particularly in higher education – and consequently to delay entry into the labour market. Data from the World Bank’s EdStats database confirm this trend for the European Monetary Union (EMU). Between 1980 and 2002 (the latest year for which data are available), gross female enrolment in tertiary education rose dramatically in the EMU, up from 21.7 per cent to 61.5 per cent.

The equivalent rate for males also increased, but at a more moderate pace – from 27.1 per cent to 52.2 per cent. Another possible explanation of the change in the shape of Developed Europe’s female LFPR curve is that more women in the region may be delaying child birth until after the age of 24. It is indeed the case that the fertility rate (measured as the average number of births per woman) has declined in the region over the last two decades – from 1.7 births in 1982 to 1.5 births in 2003, which would be expected to accompany a shift toward pregnancies occurring at older age.

**Figure 4.4. LFPR by age group and sex, 1980 and 2005, Developed non-Europe**

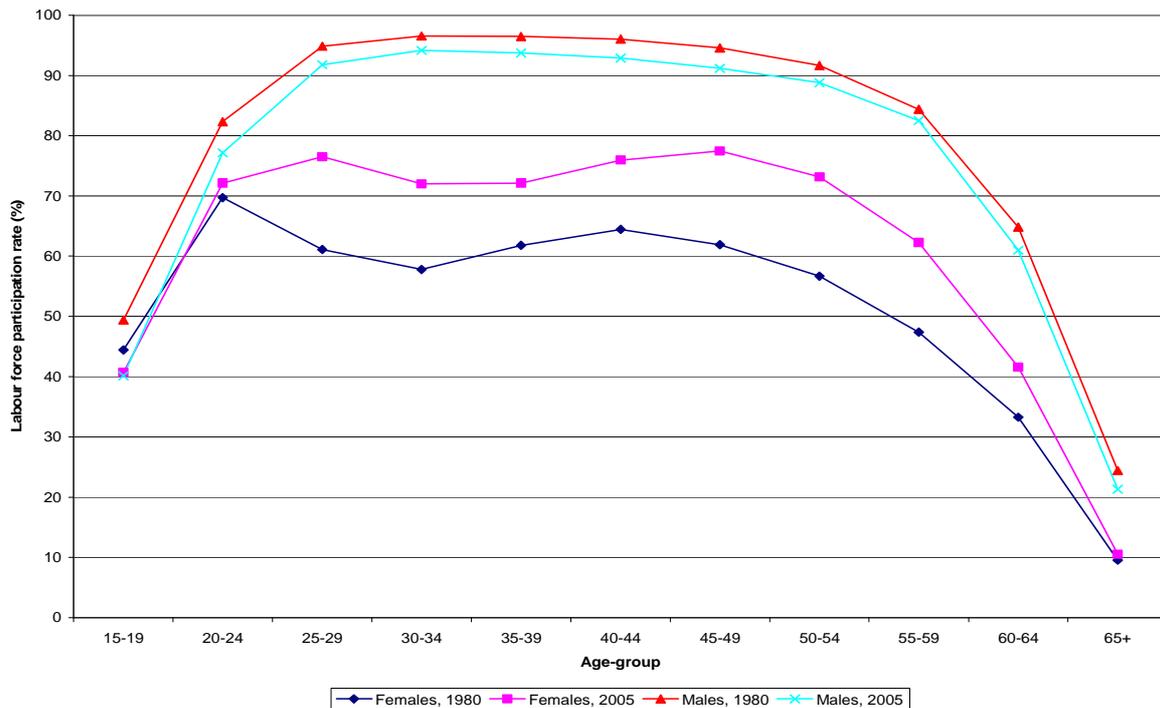


Figure 4.4 provides the equivalent figures for the developed economies outside of Europe. The figures in this region are similar in many respects to those of Developed Europe, with a couple of notable exceptions. One is that the Developed non-Europe region exhibits higher labour force participation rates in every age group for females and nearly every age group for males. Among females aged 35 to 54, the difference in LFPR between the two regions has narrowed over the past 25 years, but among the other age groups the gap has increased. For males, the differences between the regions are much less stark, and indeed in the 35 to 49 year-old age groups, men in Developed Europe have slightly higher labour force participation rates. However among 15 to 29 year-olds and among workers aged 55 and above, the gap between the two regions has grown, with the older and younger men in Developed non-Europe participating in labour markets to a considerably greater extent. Why do the young and old have higher labour force participation rates in the developed economies outside of Europe? To begin to answer this, it is instructive to take a closer look at ongoing trends in LFPR for these groups.

In contrast with Developed Europe, the Developed non-Europe region has not witnessed a large decline in youth LFPR. Among 15 to 19 year-olds, participation has declined by 3.7 percentage points for young women and by around 7.6 percentage points for young men (the respective figures for Developed Europe are declines of 13.8 percentage points for women and 13.3 percentage points for men). There are differences in secondary enrolment

patterns that could explain some of this difference. In the EMU, secondary education enrolment rates have increased over the course of the last two-and-a-half decades, rising to 91.3 per cent in 2002. In the United States, the largest country in the Developed non-Europe region, net enrolment rates in secondary education have fallen slightly, and stood at 85.6 per cent in 2002. In Australia, net enrolment rates stood at 86.8 per cent in 2002. Japan is a notable exception in this group, with secondary enrolment rates approaching 100 per cent. However, in aggregate the enrolment rates in this region are lower than in Developed Europe. Among 20 to 24 year-olds, the results are mixed, with women's participation growing by 2.4 percentage points to 72.1 per cent and men's decreasing by 5.2 percentage points to 77.1 percent. A look at country-level data in the region shows increasing participation in tertiary education for both women and men in Australia, the United States and Japan. However in the US and Japan in 1980, tertiary enrolment rates were considerably higher than in Developed Europe. The increase in tertiary enrolment has been less substantial in the Developed non-Europe region than in Developed Europe, providing one explanation for the differing trends between the two regions in youth economic activity rates.

**Figure 4.5. LFPR by age group and sex, 1980 and 2005, CEE & CIS**

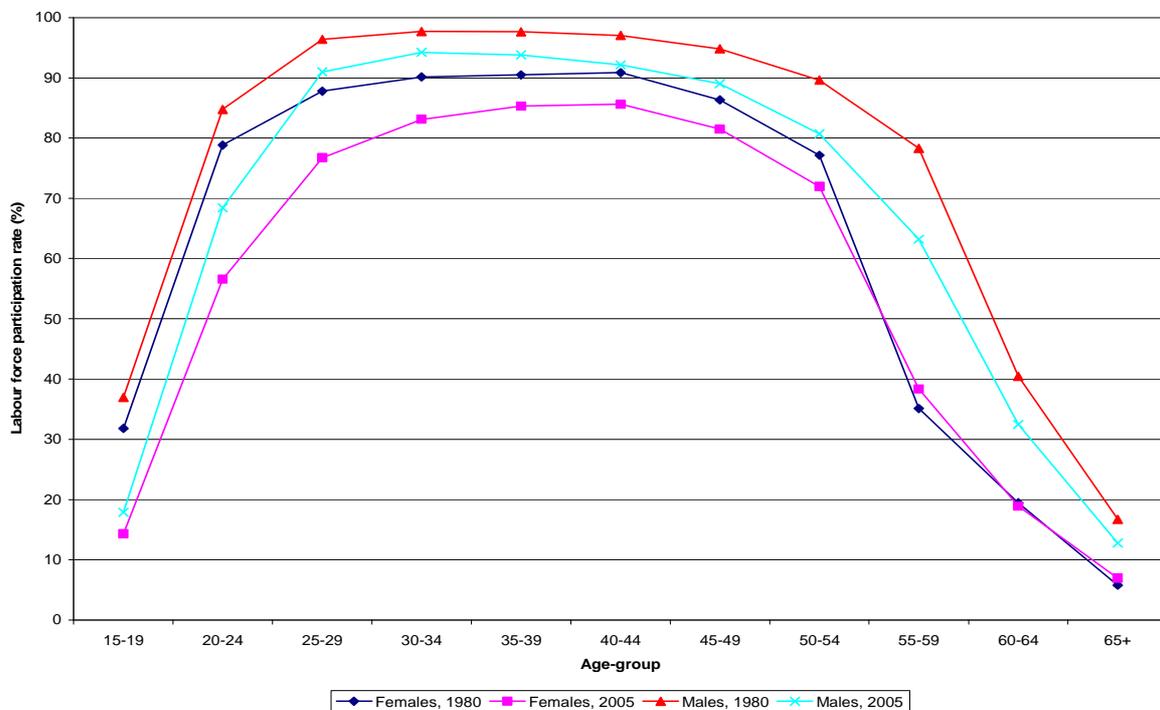
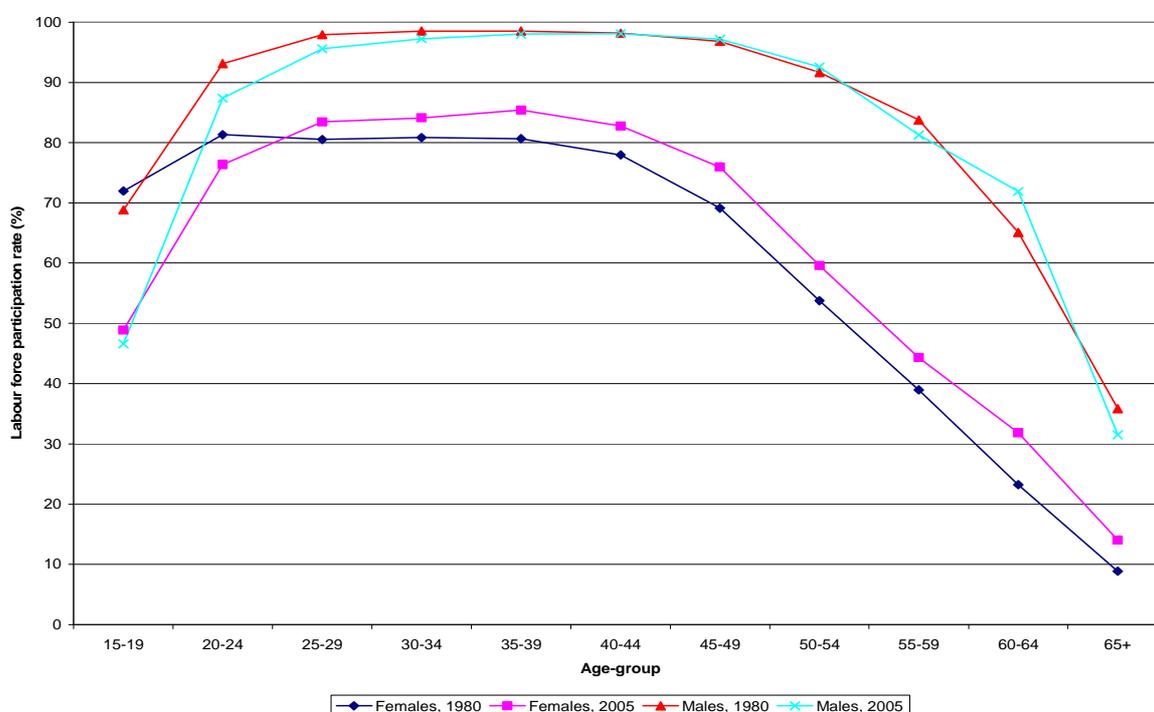


Figure 4.5 examines trends in labour force participation in the CEE and CIS region. Economies and labour markets in this region underwent a dramatic transformation following the dissolution of the Soviet Union and economic activity rates throughout much of the region also changed substantially. One striking characteristic of the CEE and CIS region is the region's comparatively high historical female labour force participation rates. Among all the estimation groups examined in this paper, the CEE and CIS has the smallest gap between male and female prime-age participation. Both male and female participation has been on the decline in this region. Among males, labour force participation declined in every age group between 1980 and 2005, with the clearest example of this occurring in the youth and older-age cohorts. Among females, the largest declines occurred in the two youth cohorts and the 25 to 29 year-old cohort. Female participation in the older-age cohorts of 55 to 59 and 65 and above grew slightly (with no significant change in the 60 to 65 cohort).

Trends in education patterns corroborate the youth labour force trends in the region. While both youth male and youth female participation declined, among youth aged 20 to 24, the decline was greater (from 78.8 per cent to 56.6 per cent among females and from 84.8 per cent to 68.4 per cent among males). In the World Bank’s Europe and Central Asian region, which has substantial overlap with this paper’s CEE and CIS region, gross tertiary education increased from 30.9 per cent in 1980 to 44.1 per cent in 2001. The rate for females rose from 33.1 to 54.1 per cent while for males it rose from 25.8 to 43.3 per cent. The decline in labour force participation that took place among the prime-age cohorts in this region occurred primarily after the dissolution of the former Soviet Union. The 1990s brought about rapid changes in the structure of economies in the region. Aggregate employment has not grown significantly over the past 15 years (the result of an initial decline and subsequent recovery in employment). The recovery in output that began in earnest in the latter half of the 1990s was driven mainly by growth in labour productivity.

**Figure 4.6. LFPR by age group and sex, 1980 and 2005, East & South-East Asia**



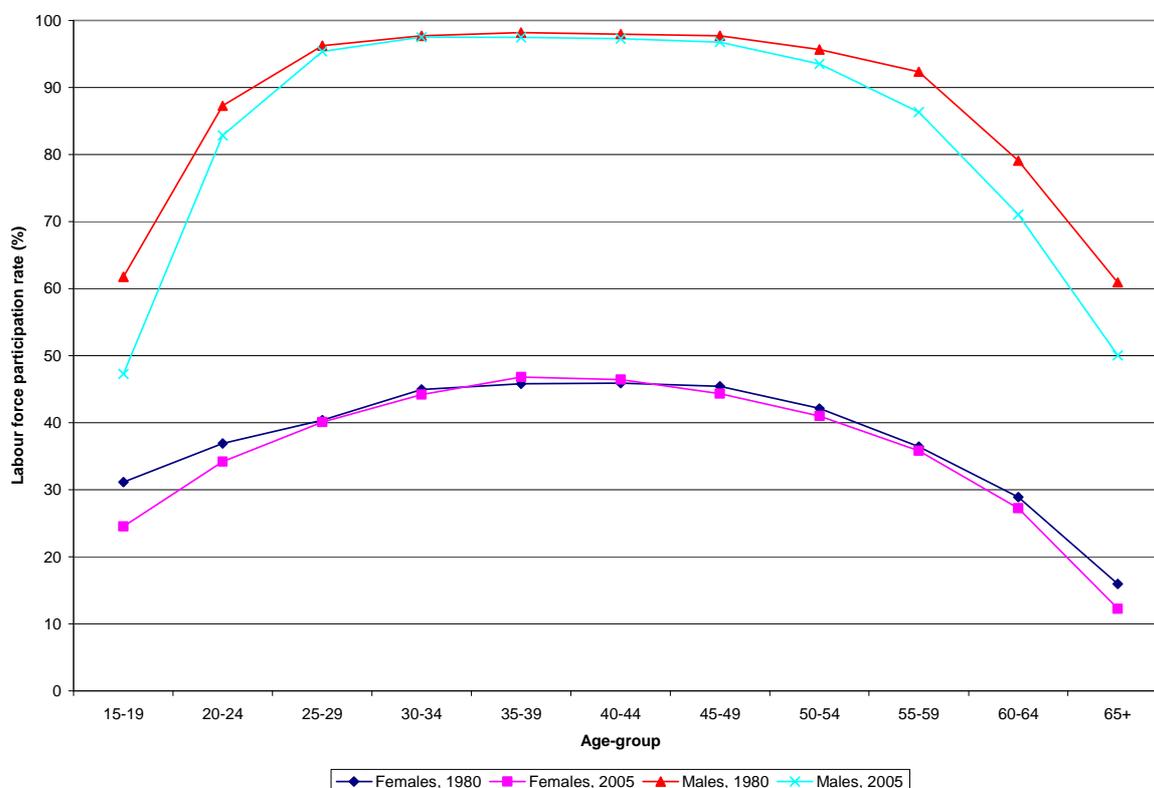
Of all regions examined in this paper, the East and South-East Asia region has undergone the most dramatic changes in terms of economic development since 1980. From China’s rapid growth and the country’s emergence as the global manufacturing hub to the robust growth experienced by other economies such as Singapore, Malaysia, Indonesia and Thailand, and despite the large economic contraction that occurred during the Asian financial crisis of 1997-98, the region’s growth performance has been nothing short of phenomenal. Labour force participation trends in the region reflect this ongoing economic development. First, the East and South-East Asia region has the highest labour force participation rates of all regions covered in this paper. An alternative interpretation of this is that the region has the lowest ratio of inactive, dependent working-age individuals to each economically active individual, which has been found to be growth-enhancing.<sup>30</sup> Broad demographic trends in East and

<sup>30</sup> Bloom and Canning (2005) and Bloom et al (1999) find that faster relative growth in the working-age population (labour input) versus the population at large (which includes dependents) leads to higher rates of economic growth. This is called the “demographic dividend”.

South-East Asia in recent decades have magnified this effect, as the growth rate in the working-age population (i.e. the available labour pool) has exceeded the growth rate of the dependent (youth and old-age) populations.<sup>31</sup> Second, the region's high labour force participation rate has coincided in growth in decent employment opportunities. The share of US\$1 working poor in total employment dropped from around two-thirds in 1980 to around 13 per cent in 2005. The share of US\$2 working poor in total employment declined from over 88 per cent in 1980 to less than half by 2005.<sup>32</sup> Therefore, a growing share of Asia's large economically active population is engaged in employment that provides a large enough income for these workers and their families to successfully escape poverty. Thus, due to the growing availability of higher-productivity employment, East and South-East Asia's high labour force participation has been a key driver of the region's rapid economic growth.

While labour force participation in East and South-East Asia remains the highest in the world, economic activity rates among the region's youth (particularly youth aged 15 to 19) have been on the decline. Female and male rates plunged 23.1 and 22.2 percentage points respectively between 1980 and 2005. Among 20 to 24 year-olds, participation declined by over 5 percentage points. Average years of schooling among individuals aged 15 and above increased from 4.6 in 1980 to 6.2 in 2000. Meanwhile the region's tertiary gross enrolment rate surged from 3.3 per cent in 1980 to 17.2 per cent in 2002.<sup>33</sup> Taken in the context of the region's rapid growth and development and the movement to higher-value production, declining youth participation is a positive development. Increasingly, the future jobs in the region will require workers with higher levels of skills and education.

**Figure 4.7. LFPR by age group and sex, 1980 and 2005, South Asia**



<sup>31</sup> Bloom and Williamson (1997).

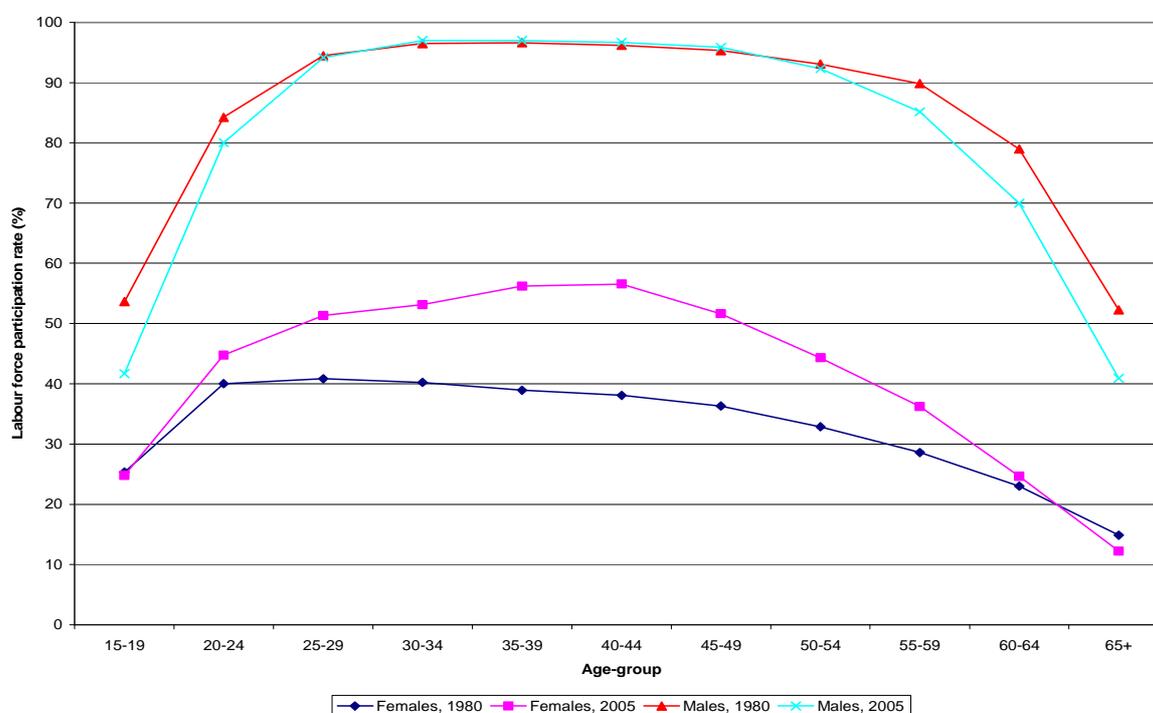
<sup>32</sup> See Kapsos (2004). Figures have been updated and aggregated to correspond with the current grouping.

<sup>33</sup> World Bank, EdStats online database.

The most striking characteristic of economic activity rates in South Asia is the low level of female participation in both 1980 and 2005. Overall, South Asia has the second lowest rate of female labour force participation in the world (after the Middle East and North Africa region). Among women aged 20 to 29, economic activity rates in South Asia are lower than all other regions in the world. This is most likely due in part to the region's very high fertility rate, at 3.0 births per woman versus an average rate of 1.7 in the world's high-income countries.<sup>34</sup> Female participation has been rising nearly everywhere in the world, yet this has not been the case in South Asia, which has seen a decline in female labour force participation of 1.9 percentage points since 1980. The largest declines have occurred among the youth and older-age cohorts, though female participation has also declined moderately in some of the prime age groups. Gender-based discrimination is widespread and persistent in South Asia, both in labour markets and in education. In terms of the former, overall female participation rates remain more than 46 percentage points below the respective male rates and this gap has shrunk by only 2 percentage points over the past 25 years. Meanwhile, the average number of years of schooling for females aged 15 and above has risen from 1.8 in 1980 to 3.4 in 2000. However this remains far below the male average of 5.8.<sup>35</sup> A gap also exists in tertiary education, which is important given the recent rise in importance of high-skilled service-sector jobs in the region. The gross enrolment rate in tertiary education was 8.1 per cent in 2002 for females versus 12.2 per cent for males.

Male participation rates in South Asia follow a roughly similar pattern to the other regions of the world, though participation among males aged 65 and above, at 50 per cent in 2005, is higher than all other regions of the world except Sub-Saharan Africa. Male participation rates among older and younger age cohorts have declined since 1980, a reflection of the region's ongoing economic development.

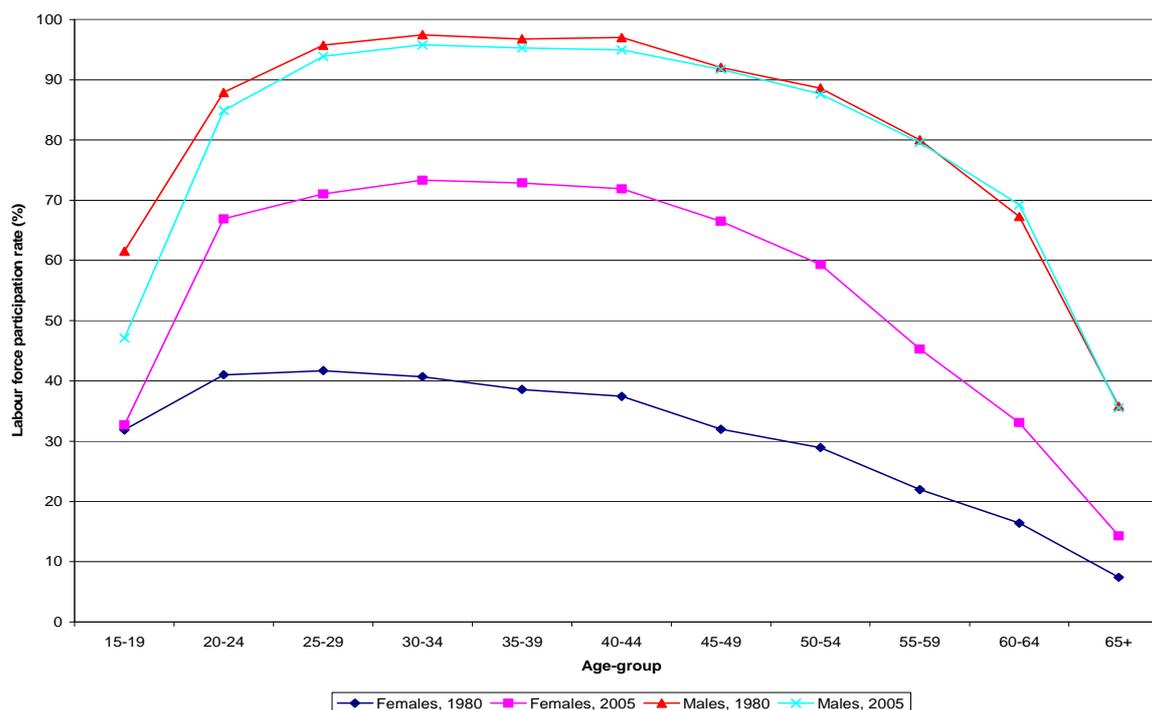
**Figure 4.8. LFPR by age group and sex, 1980 and 2005, Central America & Caribbean**



<sup>34</sup> World Bank, World Development Indicators Database, 2006.

<sup>35</sup> World Bank, EdStats Database.

**Figure 4.9. LFPR by age group and sex, 1980 and 2005, South America**



Figures 4.8 and 4.9 show the labour force participation trends in Central America and the Caribbean and in South America. Historical participation rates in these two regions exhibit similar trends. First, in contrast with South Asia, female participation in the two regions has grown tremendously over the past two and a half decades, with the largest gains occurring among women in the prime-age cohorts. Female participation in South America has grown the most – the overall gap between male and female economic activity rates declined from 49.1 percentage points in 1980 to 23.3 percentage points in 2005. This trend occurred together with a significant decline in fertility rates in Latin America and the Caribbean. The average number of births per woman declined from 3.8 in 1982 to 2.4 in 2003.<sup>36</sup>

There has been a substantial decline in youth male labour force participation in these two regions – particularly among males aged 15 to 19, while participation among females aged 15 to 19 has remained roughly constant. Average years of schooling throughout the Latin America and Caribbean region increased slightly more among males (from 4.6 in 1980 to 6.3 in 2000) than among females (from 4.3 in 1980 to 5.8 in 2000), which is consistent with trends in activity rates.<sup>37</sup> Gross tertiary enrolment rates in the region grew from 13.7 per cent in 1980 to 27 per cent in 2002, however this remains relatively low in comparison with the developed regions of the world. Growth in tertiary enrolment may be responsible for some of the decline in youth male participation, particularly for youth aged 20 to 24. Yet, female participation among 20 to 24 year-olds grew in both the Central America and Caribbean region and in South America, with a very large rise taking place in the latter. Importantly, the female youth unemployment rate in Latin America and the Caribbean, at 21.6 per cent in 2005, was much higher than the respective youth male unemployment rate of 13.2 per cent.<sup>38</sup> Thus, while increasing numbers of young women are entering the labour market in search of work, more than 1 in 5 is unable to find employment. This raises the important point that

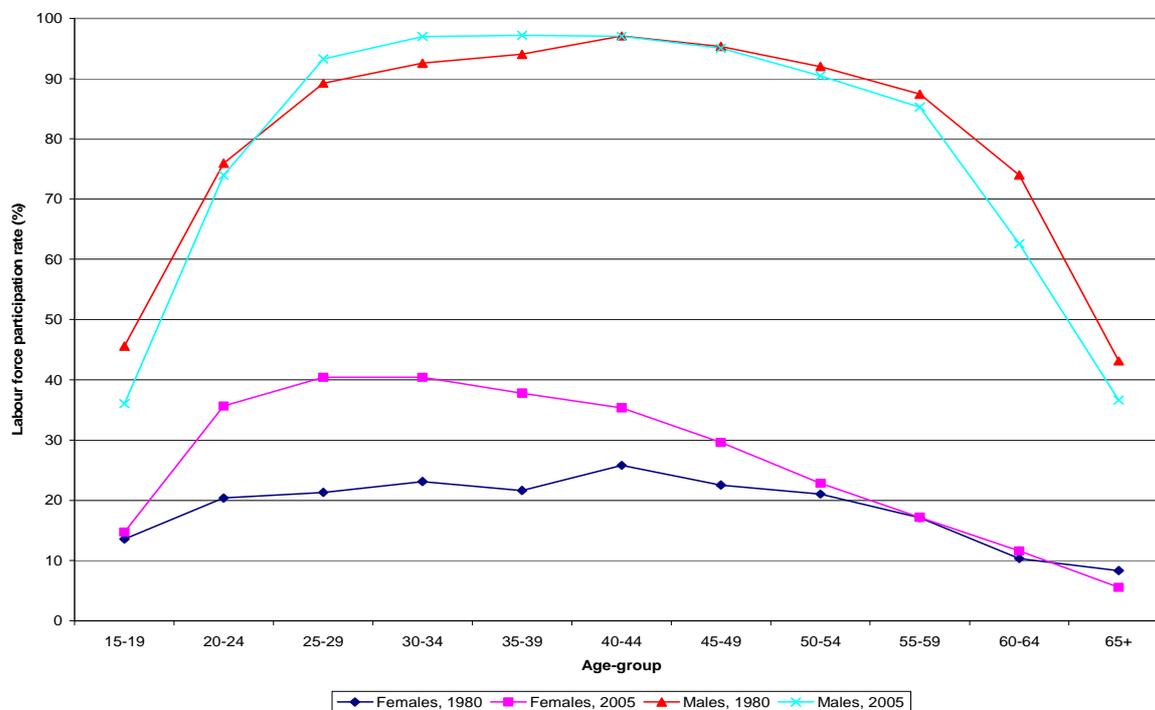
<sup>36</sup> Ibid.

<sup>37</sup> World Bank, EdStats Database.

<sup>38</sup> ILO, Global Employment Trends Model, 2006, Geneva, ILO.

economic activity alone is not enough. For a given increase in labour force participation rates to have a positive impact on an economy, job seekers need access to decent and productive employment opportunities.

**Figure 4.10. LFPR by age group and sex, 1980 and 2005, Middle East & North Africa**



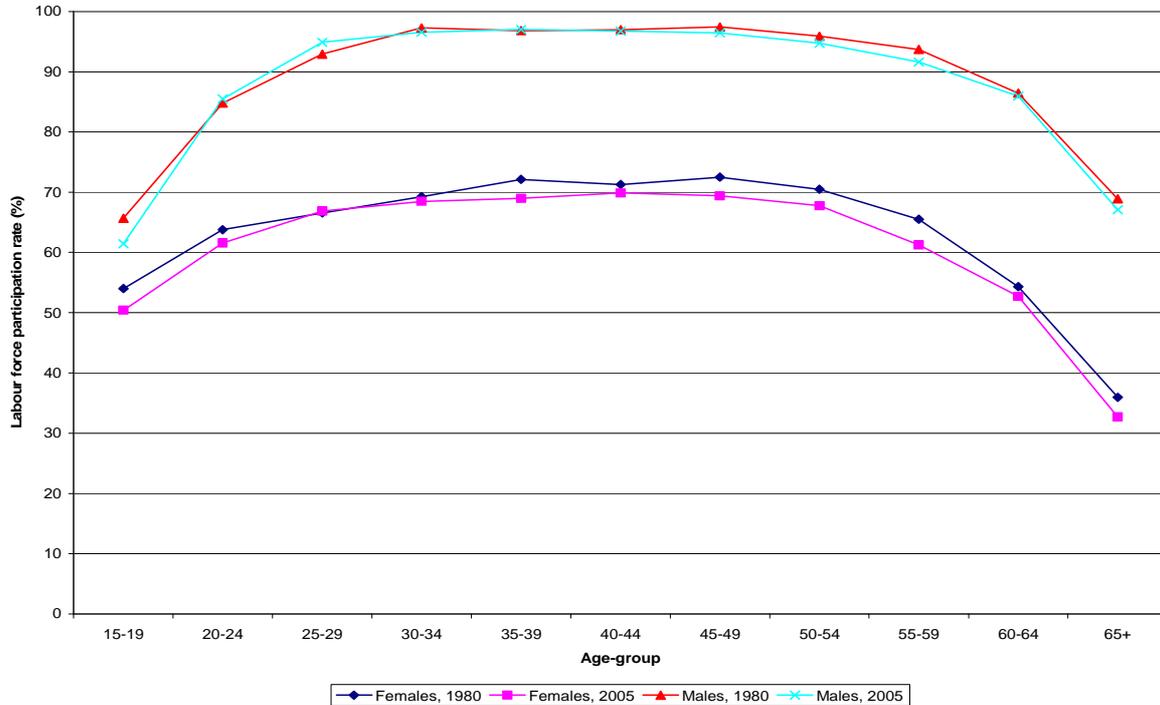
As is clear from Figure 4.10., the most significant trend that has taken place in the Middle East & North Africa (MENA) region vis-à-vis labour force participation rates is the large increase in economic activity among women in the region since 1980. The largest gains have occurred among women aged 20 to 49. Significantly, this trend implies that participation among the older age cohorts is likely to rise in the coming years, as these newly economically active women age. Several recent developments have supported this trend. First, female literacy rates and education levels have been on the rise in the region. In 1990, the latest year for which regional data are available, the literacy rate of adult females in MENA was 38.8 versus 64.7 for males. In the same year the respective rates for young females and males (aged 15-24) were 59.4 and 80.0, respectively.<sup>39</sup> Education trends show similar patterns. Thus a significantly higher share of the region's women aged 30 to 40 are literate and therefore have greater employment opportunities than the previous generation.

Despite the substantial improvement in these social indicators and the recent rise in female economic participation, women in MENA remain the least likely in the world to participate in the labour force. This has important consequences for overall economic development in the region. Demographic trends throughout much of the MENA have been very favourable: the region's age-dependency ratio (the ratio of dependents to members of the working-age population) has declined from .92 in 1980 to .63 in 2004. In theory, a lower ratio of dependents to workers can foster higher economic growth. Yet, one necessary precondition for this demographic dividend is that a sufficient share of the working-age population is economically active. This is clearly not the case in the MENA region. For every 100

<sup>39</sup> World Bank, World Development Indicators Database, 2006.

economically active individuals in MENA, there are 65 economically inactive women of working-age and 87 economically inactive working-age people overall. This is the highest such ratio of inactivity in the world. For comparison, in East Asia, for every 100 economically active individuals, there are 21 inactive women of working age and 35 inactive working-age people overall. While the current trends are favourable, in order for the MENA region to fully realize its economic potential, this ratio must decline.

**Figure 4.11. LFPR by age group and sex, 1980 and 2005, Sub-Saharan Africa**



Sub-Saharan Africa has the lowest average per-capita GDP of all of the regions examined in this paper. Poverty among the region’s workers is widespread: In 2005, an estimated 87 per cent of the workers in Sub-Saharan Africa lived with their families on less than US\$2 per person per day and over 56 per cent of the region’s workers lived in extreme poverty on less than US\$1 per day.<sup>40</sup> These figures have not improved since 1980 – a trend that is closely related to the trends in economic activity rates over the same period. Figure 4.11 shows the very limited changes that have taken place in labour force participation rates in the region since 1980, both between the sexes and among the 11 age groups. It should also be noted that the slopes of the labour force participation curves in the figure are relatively flatter than the other regions, which is also reflective of the region’s poverty. Poverty in Sub-Saharan Africa is widespread among women and men and the young and old. Because of this, most people simply cannot afford to remain economically inactive. The poor depend upon their labour income (or own-production) for their livelihoods and therefore must work to survive.

While economic growth in the region has accelerated in recent years, and hopes have been raised that poverty may decline, in the absence of significant progress in other social areas such as health and education, it is unlikely that economic activity rates or poverty rates will change substantially in the near to medium-term. In 2002, the region’s overall net school enrolment rate at the primary level was 63.7 per cent. This compares with a world average of

<sup>40</sup> See Kapsos (2004).

85 per cent. While data on secondary and tertiary enrolment rates are sparse, it is safe to assume that the very high economic activity rates among young women and men in the region are indicative of low levels of participation in schooling. An estimated 61.5 per cent of young Sub-Saharan African males aged 15 to 19 were economically active in 2005. The rate in the next highest (and indeed next poorest) region, South Asia, is only 47.3 per cent. In order to reach a higher level of development, it is necessary for youth to be enabled to move out of the labour force and into education. This, in turn, could ultimately lead to higher levels of labour productivity at later stages of life, which could help reduce poverty. However, even if progress is made on this front, the region faces other problems that are contributing to the unsatisfactory picture of economic activity. It is clear that a period of sustained economic growth will be needed in order for the region to break out of the current cycle of widespread poverty, high economic activity rates and low productivity work.

## 5. Conclusions

This paper has presented a methodology for producing the labour force participation rates and total labour force figures given in the ILO's Key Indicators of the Labour Market Database. After establishing criteria for selecting cross-country comparable data and detailing the model developed for 1) addressing the problem of non-ignorable missing data, and 2) estimating labour force participation rates in countries and years for which no reported data are currently available, the paper presented findings derived from the resulting dataset. Because the dataset is a complete panel with cross-country comparable data and global coverage, the paper provided the key trends in the size of the labour force and economic activity rates for the world as a whole and for different regions. In order to give a more nuanced picture of trends, the aggregated world and regional estimates have also been presented by sex and 5-year age group. The results provide a number of insights into ongoing labour and social trends around the world. The global trends can be summarised as follows:

- In 2005, there were an estimated 3.05 billion individuals in the global labour force, a figure that represents an increase of more than 1.1 billion – more than 35 per cent – since 1980. This growth was driven not by increased rates of labour force participation, but rather by population growth.
- While the results show an increase in global economic activity rates from 67 per cent in 1980 to 67.5 per cent in 1990, the rate declined to 65.7 per cent in 2005. The initial increase was driven by a substantial rise in female participation that occurred in the 1980s, while the decline has resulted mainly due to a rapid fall in youth participation and a gradual and modest decline among prime-age men.
- Among women aged 25 to 54, activity rates rose a full 4 percentage points in the 1980s to 65.9 per cent in 1990. The trend in prime-age female participation continued in the 15 years from 1990 to 2005 – though at a slower pace – and by 2005 more than two-thirds of women in this age group around the world were in the labour force. Women account for slightly more than 40 per cent of the world's workforce.
- The male prime-age participation rate declined slightly between 1980 and 2005, from 96.3 per cent to 95.1 per cent, with nearly the entire decline occurring after 1990.

- There has been a rapid decline in youth participation rates. The global youth labour force participation rate fell from 63.9 per cent in 1980 to 61.4 per cent in 1990 and then declined sharply to 54.7 per cent in 2005. This paper argues that the most likely cause of this trend is increasing enrolment in secondary and tertiary education.

Key regional trends include the following:

- The East and South-East Asia region has the highest labour force participation rate in the world. The remaining regions, in order from highest to lowest labour force participation rates are Sub-Saharan Africa, South America, Developed non-Europe, Central America and the Caribbean, South Asia, Central and Eastern Europe and CIS, Developed Europe and the Middle East and North Africa.
- Between 1980 and 2005, Central and Eastern Europe and CIS, East and South-East Asia and South Asia each witnessed declining labour force participation. Developed Europe and Developed non-Europe saw little change in participation rates. South America and the Middle East and North Africa registered very large increases in participation, while Central America and the Caribbean saw a more moderate increase.
- Taken together, the labour force in the two Latin American regions and the Caribbean has than doubled since 1980, reaching approximately 257 million in 2005. The labour force in the Middle East and North Africa region grew by nearly 150 per cent between 1980 and 2005.
- There is little difference among the regions with respect to the activity rates of prime working-age men (aged 25-54). This is not the case, however, among young and older workers. Due to the existence of relatively widespread social safety nets including pension schemes, in the CEE and CIS, Developed Europe and Developed non-Europe regions, the LFPR among older men is considerably lower than in the developing regions.
- South Asia has the lowest female LFPR in the age groups between 15 and 29. The Middle East and North Africa region has the lowest female LFPR in all age groups between 30 and 64.
- The relationship between educational enrolment and labour force participation is very evident in regions including Developed Europe (where a decline in participation among women aged 20 to 24 has occurred together with an increase in tertiary education levels), East and South-East Asia (where a large decline in youth labour force participation has occurred hand-in-hand with rapidly increasing secondary and tertiary enrolment) and in Latin America and the Caribbean (where declining youth male labour force participation has accompanied an increase in secondary enrolment).
- In MENA current trends indicate that participation among women in the older age cohorts is likely to rise in the coming years. There has been a significant increase in younger women's participation, which should support this trend over time. Yet, for every 100 economically active individuals in MENA, there are currently 65 economically inactive women of working-age and a total of 87 economically

inactive people of working-age. This is the highest such ratio of inactivity in the world.

- Sub-Saharan Africa's youth labour force participation rates are the highest in the world – a reflection of the region's high rate of poverty and of a lack of participation in schooling. An estimated 61.5 per cent of young Sub-Saharan African males aged 15 to 19 were economically active in 2005.

While this paper highlights these and other broad trends that have shaped the world's labour force over the past 25 years, more work is clearly needed to monitor country-level trends and to formulate policy recommendations. The great differences often observed in labour force participation rates across countries and regions, between the sexes and among different age groups provide a strong indication that there is no "one size fits all" policy to address imbalances in the economically active population. In addition, while it was outside the scope of the paper to examine the distribution of economic activity between employment and unemployment and between the fully employed and underemployed, these are clearly very relevant for understanding labour market conditions and trends. Indeed it is crucial to view many indicators together prior to formulating any suggested policy responses.

The paper addresses the problem of missing data with the specific goal of correcting for sample selection bias occurring due to differences between countries that report labour force participation rates and those that do not. Yet, it must be said that the only true correction for this real and serious problem is to increase the amount of data reported by countries themselves. While this often requires substantial financial commitments as well as institutional and technical capacity building, in the absence of increased data availability, we are faced, quite simply, with unacceptable levels of uncertainty in our estimates.

In a related vein, the examination of trends in labour force participation and educational enrolment rates taken up in this paper reveals the utility of examining cross-tabulations of educational enrolment data with data on labour force participation. Traditional labour force surveys can provide these, yet for various reasons (including a lack of financial resources) this specific tabulation is often not reported by national statistical agencies. Given the strong linkage between participation in schooling and economic activity, and given the important relationship between educational attainment and the expected quality of one's subsequent employment, there is a strong argument to be made for substantially increasing efforts to collect, tabulate and disseminate these types of data.

## Appendix 1. Countries by estimation group and reporting status

<b>Developed Europe (21/22)</b>	<b>CEE and CIS (cont.)</b>	<b>South Asia (cont.)</b>	<b>Middle East and North Africa (15/18)</b>	<b>Sub-Saharan Africa (cont.)</b>
Austria*	Kyrgyzstan*	Nepal*	Algeria*	Mali
Belgium*	Latvia*	Pakistan*	Bahrain*	Mauritania
Channel Islands	Lithuania*	Sri Lanka*	Egypt*	Madagascar*
Cyprus*	Poland*	<b>Central America and the Caribbean (24/25)</b>	Iran, Islamic Rep. of*	Malawi*
Denmark*	Republic of Moldova*	Bahamas*	Iraq*	Mauritius*
Finland*	Romania*	Barbados*	Jordan*	Mozambique*
France*	Russian Federation*	Belize*	Kuwait*	Namibia*
Germany*	Serbia and Montenegro*	Costa Rica*	Lebanon	Niger*
Greece*	Slovakia*	Cuba*	Libyan Arab Jamahiriya	Nigeria*
Iceland*	Slovenia*	Dominican Republic*	Morocco*	Rwanda*
Ireland*	Tajikistan	El Salvador*	Oman*	Réunion*
Italy*	Turkmenistan	French Guiana*	Qatar*	Sao Tome and Principe*
Luxembourg*	Uzbekistan	Guadeloupe*	Saudi Arabia*	Senegal*
Malta*	Macedonia, TFYR of*	Guatemala*	Syrian Arab Republic*	Sierra Leone
Netherlands*	Ukraine*	Guyana*	Tunisia*	Somalia
Norway*	<b>East and South-East Asia (17/22)</b>	Haiti	United Arab Emirates*	South Africa*
Portugal*	Cambodia*	Honduras*	West Bank and Gaza Strip*	Sudan*
Spain*	China*	Jamaica*	Yemen	Swaziland*
Sweden*	East Timor	Martinique*	<b>Sub-Saharan Africa (34/49)</b>	Tanzania*
Switzerland*	Fiji*	Mexico*	Angola	Togo*
Turkey*	French Polynesia*	Netherlands Antilles*	Benin*	Uganda
United Kingdom*	Guam*	Nicaragua*	Botswana*	Western Sahara
<b>Developed Non-Europe (9/9)</b>	Indonesia*	Panama*	Burkina Faso*	Zambia*
Australia*	Korea, DPR	Puerto Rico*	Burundi*	Zimbabwe*
Canada*	Korea, Republic of*	Saint Lucia*	Cameroon	
Hong Kong, China*	Lao PDR	St. Vincent and the Grenadines*	Cape Verde*	
Israel*	Malaysia*	Suriname*	Central African Republic*	
Japan*	Mongolia	Trinidad and Tobago*	Chad*	
Macau, China*	Myanmar*	United States Virgin Islands*	Comoros*	
New Zealand*	New Caledonia*	<b>South America (10/10)</b>	Congo*	
Singapore*	Papua New Guinea*	Argentina*	Congo, DR	
United States*	Philippines*	Bolivia*	Côte d'Ivoire*	
<b>CEE and CIS (22/27)</b>	Samoa*	Brazil*	Djibouti	
Azerbaijan	Solomon Islands	Chile*	Equatorial Guinea*	
Albania*	Thailand*	Colombia*	Eritrea	
Armenia*	Tonga*	Ecuador*	Ethiopia*	
Belarus*	Vanuatu*	Paraguay*	Gabon	
Bosnia and Herzegovina	Viet Nam*	Peru*	Gambia	
Bulgaria*	<b>South Asia (7/9)</b>	Uruguay*	Ghana*	
Croatia*	Afghanistan	Venezuela*	Guinea*	
Czech Republic*	Bangladesh*		Guinea-Bissau	
Estonia*	Bhutan		Kenya*	
Georgia*	Brunei Darussalam*		Liberia*	
Hungary*	India*		Lesotho	
Kazakhstan*	Maldives*			

Note: \* Indicates that the country has at least one reported labour force participation rate. Numbers in brackets indicate number of reporting countries out of total countries in estimation group.

## Appendix 2. Determinants of response probability

**Table A.2.1. Determinants of response probability**

	<i>Developed Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Per-capita GDP	++	++	++	++	--	++	++
Population		+	++	++	++	++	++
HIPC Membership							++
Constant			--	--		--	--
Observations	550	624	528	216	528	432	1176
<b>Pseudo R-squared</b>	.093	.184	0.478	1.000	0.962	0.336	.153
LR Chi2	19.0	101.5	289.4	228.9	138.4	129.0	180.2

Coefficient signs are given. Double signs indicate significance at 5%. Single signs indicate significance at 10%.

### Appendix 3. Weighted least squares regression results

<b>15-19 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-1.12 (0.11)**	-23.37 (3.37)**	7.18 (0.72)**	3.04 (1.14)**		0.10 (0.10)	0.19 (0.22)	7.30 (2.87)*	-0.59 (0.30)
Squared log of per-capita GDP		1.15 (0.17)**	-0.46 (0.04)**	-0.26 (0.07)**				-0.38 (0.14)**	
Real GDP growth rate	0.00 (0.01)	0.01 (0.00)**							
Lagged real GDP growth rate	0.02 (0.01)**	0.02 (0.00)**							
Population share aged 0-14					8.44 (5.74)	-5.09 (4.38)	11.06 (5.86)	1.85 (1.53)	8.54 (1.92)**
Population share aged 15-24					8.83 (7.31)	-3.07 (5.02)	21.38 (8.19)*		
Population share aged 25-64					4.82 (6.55)	-8.11 (5.02)	16.24 (7.15)*		
Pre-1990 indicator			5.81 (5.17)						
Pre-1990*log GDP per-capita			-1.63 (1.25)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.12 (0.07)						
South Asia sub-group dummy					-0.99 (0.13)**				
Constant	9.30 (0.98)**	118.84 (16.42)**	-28.92 (2.86)**	-7.67 (4.80)	-7.54 (5.97)	3.94 (4.29)	-16.88 (7.63)*	-36.95 (14.65)*	1.35 (3.18)
Observations	462	195	486	143	119	291	146	141	95
R-squared	0.88	0.96	0.70	0.94	0.96	0.87	0.94	0.98	0.99

<b>15-19 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-1.28 (0.09)**	-14.89 (3.65)**	6.08 (0.68)**	-1.08 (0.09)**		-0.56 (0.11)**	-0.94 (0.23)**	-0.16 (0.26)	-0.81 (0.34)*
Squared log of per-capita GDP		0.71 (0.19)**	-0.39 (0.04)**						
Real GDP growth rate	0.01 (0.01)	0.01 (0.00)							
Lagged real GDP growth rate	0.02 (0.01)**	0.02 (0.00)**							
Population share aged 0-14					16.91 (9.69)		-7.10 (6.21)		8.41 (2.66)**
Population share aged 15-24					6.44 (10.51)		-21.73 (8.68)*		
Population share aged 25-64					12.14 (11.69)		-16.58 (7.58)*		
Pre-1990 indicator			-2.49 (5.12)						
Pre-1990*log GDP per-capita			0.37 (1.25)						
Pre-1990*log GDP per-capita <sup>2</sup>			-0.00 (0.08)						
South Asia sub-group dummy					-1.06 (0.23)**				
Constant	11.87 (0.79)**	78.02 (17.79)**	-24.13 (2.70)**	7.79 (0.68)**	-12.24 (10.02)	5.03 (1.06)**	21.98 (8.09)**	1.16 (2.21)	3.81 (3.67)
Observations	462	195	486	143	121	320	146	141	95
R-squared	0.90	0.95	0.68	0.95	0.87	0.91	0.93	0.87	0.97

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>20-24 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-0.22 (0.06)**	0.47 (3.35)	3.30 (0.76)**	-2.76 (1.02)**		0.44 (0.10)**	-0.44 (0.20)*	7.92 (2.37)**	-0.42 (0.32)
Squared log of per-capita GDP		-0.03 (0.17)	-0.19 (0.04)**	0.16 (0.06)**				-0.45 (0.12)**	
Real GDP growth rate	0.00 (0.01)	-0.00 (0.00)							
Lagged real GDP growth rate	0.01 (0.01)	0.00 (0.00)							
Population share aged 0-14					14.04 (10.15)	1.89 (3.38)	-15.54 (5.78)**	-4.21 (1.25)**	5.66 (2.03)**
Population share aged 15-24					32.63 (11.36)**	6.01 (3.83)	0.24 (7.81)		
Population share aged 25-64					16.32 (11.59)	4.23 (3.77)	-1.93 (7.04)		
Pre-1990 indicator			9.67 (6.17)						
Pre-1990*log GDP per-capita			-2.42 (1.46)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.16 (0.09)						
South Asia sub-group dummy					-1.00 (0.29)**				
Constant	2.68 (0.60)**	-0.61 (16.34)	-13.39 (3.19)**	13.34 (4.28)**	-17.69 (10.19)	-6.80 (3.75)	9.48 (7.12)	-33.66 (12.10)**	1.67 (3.32)
Observations	465	195	486	147	115	292	172	141	95
R-squared	0.75	0.85	0.74	0.93	0.92	0.93	0.81	0.91	0.99

<b>20-24 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-1.07 (0.07)**	-15.25 (3.95)**	5.35 (0.60)**	-0.59 (0.11)**		-0.18 (0.10)	6.82 (3.97)	0.11 (0.20)	-1.42 (0.55)*
Squared log of per-capita GDP		0.72 (0.20)**	-0.33 (0.04)**				-0.42 (0.23)		
Real GDP growth rate	0.00 (0.01)	0.00 (0.01)							
Lagged real GDP growth rate	0.01 (0.01)*	0.00 (0.01)							
Population share aged 0-14					14.49 (4.60)**				-4.01 (4.60)
Population share aged 15-24					8.08 (5.65)				
Population share aged 25-64					10.74 (5.25)*				
Pre-1990 indicator			-14.01 (4.55)**						
Pre-1990*log GDP per-capita			3.25 (1.10)**						
Pre-1990*log GDP per-capita <sup>2</sup>			-0.18 (0.07)**						
South Asia sub-group dummy					0.25 (0.10)*				
Constant	11.26 (0.62)**	82.36 (19.23)**	-20.42 (2.47)**	6.20 (0.81)**	-9.81 (4.78)*	3.98 (0.96)**	-25.10 (17.14)	0.70 (1.70)	14.71 (5.91)*
Observations	465	195	486	147	117	292	172	141	95
R-squared	0.78	0.91	0.69	0.89	0.61	0.79	0.88	0.87	0.85

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>25-29 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	0.89 (1.23)	1.39 (3.46)	1.22 (1.00)	0.26 (0.12)*		0.48 (0.08)**	-0.42 (0.19)*	7.14 (2.68)**	-0.00 (0.23)
Squared log of per-capita GDP	0.02 (0.06)	0.01 (0.18)	-0.06 (0.06)					-0.41 (0.13)**	
Real GDP growth rate	-0.00 (0.00)	-0.01 (0.00)**							
Lagged real GDP growth rate	-0.00 (0.00)	-0.02 (0.00)**							
Population share aged 0-14					18.38 (11.31)	7.90 (2.73)**	-30.09 (5.52)**	-5.11 (1.43)**	-0.37 (1.93)
Population share aged 15-24					38.61 (12.48)**	12.30 (3.15)**	-15.23 (7.46)*		
Population share aged 25-64					23.16 (13.59)	11.94 (3.04)**	-17.30 (6.73)*		
Pre-1990 indicator			20.93 (8.11)*						
Pre-1990*log GDP per-capita			-5.17 (1.92)**						
Pre-1990*log GDP per-capita <sup>2</sup>			0.33 (0.11)**						
South Asia sub-group dummy					-0.74 (0.26)**				
Constant	-9.33 (5.96)	-13.74 (16.86)	-4.91 (4.24)	-0.21 (0.87)	-23.35 (11.65)*	-13.34 (3.12)**	23.07 (6.80)**	-30.09 (13.71)*	1.39 (2.23)
Observations	459	195	486	147	115	282	172	141	82
R-squared	0.88	0.86	0.75	0.94	0.89	0.95	0.81	0.83	1.00

<b>25-29 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	0.17 (1.98)	7.08 (5.58)	3.82 (0.73)**	-0.56 (0.12)**		-0.44 (0.13)**	0.07 (6.44)	0.99 (0.34)**	-1.71 (0.88)
Squared log of per-capita GDP	-0.04 (0.10)	-0.42 (0.29)	-0.23 (0.04)**				-0.03 (0.37)		
Real GDP growth rate	-0.01 (0.01)	-0.02 (0.01)*							
Lagged real GDP growth rate	0.02 (0.01)	-0.00 (0.01)							
Population share aged 0-14					3.44 (7.82)				-18.82 (8.67)*
Population share aged 15-24					-5.72 (9.30)				
Population share aged 25-64					-3.89 (9.54)				
Pre-1990 indicator			6.72 (5.73)						
Pre-1990*log GDP per-capita			-1.69 (1.37)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.11 (0.08)						
South Asia sub-group dummy					1.39 (0.18)**				
Constant	4.94 (9.76)	-26.74 (27.18)	-13.67 (3.06)**	7.15 (0.86)**	3.61 (8.40)	6.36 (1.29)**	4.95 (27.80)	-5.58 (2.93)	24.92 (9.70)*
Observations	459	195	486	147	117	282	172	141	82
R-squared	0.70	0.86	0.79	0.86	0.89	0.73	0.55	0.82	0.91

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>30-34 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-2.73 (1.32)*	1.77 (3.10)	0.30 (1.09)	0.03 (0.08)		0.30 (0.11)**	-0.65 (0.20)**	0.27 (1.27)	0.23 (0.20)
Squared log of per-capita GDP	0.21 (0.07)**	-0.02 (0.16)	0.01 (0.06)					-0.04 (0.06)	
Real GDP growth rate	-0.00 (0.01)	-0.01 (0.00)							
Lagged real GDP growth rate	-0.00 (0.01)	-0.01 (0.00)*							
Population share aged 0-14					24.21 (13.24)	1.51 (2.80)	-36.23 (5.92)**	-7.01 (0.76)**	3.03 (1.06)**
Population share aged 15-24					42.12 (14.80)**	2.71 (3.27)	-20.37 (8.01)*		
Population share aged 25-64					28.55 (15.77)	5.82 (3.04)	-21.50 (7.21)**		
Pre-1990 indicator			11.27 (8.11)						
Pre-1990*log GDP per-capita			-2.81 (1.91)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.18 (0.11)						
South Asia sub-group dummy					-0.52 (0.30)				
Constant	7.61 (6.42)	-14.60 (15.14)	-1.35 (4.60)	1.50 (0.57)**	-28.43 (13.77)*	-4.82 (3.40)	29.68 (7.28)**	2.89 (6.44)	-1.92 (1.79)
Observations	454	191	486	145	110	282	171	129	82
R-squared	0.92	0.87	0.77	0.97	0.87	0.96	0.84	0.91	1.00

<b>30-34 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-4.15 (2.73)	14.60 (8.29)	3.73 (0.97)**	-0.48 (0.11)**		-0.53 (0.11)**	13.25 (5.86)*	0.90 (0.41)*	-1.00 (0.83)
Squared log of per-capita GDP	0.17 (0.14)	-0.79 (0.42)	-0.21 (0.06)**				-0.77 (0.34)*		
Real GDP growth rate	0.01 (0.01)	-0.01 (0.01)							
Lagged real GDP growth rate	0.02 (0.01)	-0.00 (0.01)							
Population share aged 0-14					-22.24 (15.86)				8.05 (6.56)
Population share aged 15-24					-39.23 (18.99)*				
Population share aged 25-64					-34.71 (18.62)				
Pre-1990 indicator			6.93 (6.74)						
Pre-1990*log GDP per-capita			-1.68 (1.62)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.11 (0.10)						
South Asia sub-group dummy					-2.33 (0.36)**				
Constant	28.48 (13.19)*	-64.47 (40.52)	-12.79 (4.08)**	6.86 (0.82)**	33.35 (16.71)*	7.69 (1.05)**	-54.00 (25.29)*	-4.20 (3.47)	7.86 (8.80)
Observations	454	191	486	145	112	277	171	129	82
R-squared	0.61	0.82	0.73	0.83	0.84	0.80	0.63	0.75	0.93

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>35-39 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-2.93 (1.26)*	1.22 (3.01)	0.12 (1.00)	0.04 (0.08)		0.27 (0.12)*	-0.72 (0.23)**	-0.67 (1.27)	0.19 (0.09)*
Squared log of per-capita GDP	0.22 (0.07)**	-0.01 (0.15)	0.02 (0.06)					-0.00 (0.06)	
Real GDP growth rate	-0.01 (0.00)	-0.00 (0.00)							
Lagged real GDP growth rate	-0.00 (0.00)	-0.00 (0.00)							
Population share aged 0-14					10.01 (11.80)	2.39 (3.27)	-36.86 (6.56)**	-7.96 (0.84)**	9.74 (1.19)**
Population share aged 15-24					24.03 (13.55)	4.65 (3.78)	-19.49 (8.88)*		
Population share aged 25-64					14.01 (14.72)	8.63 (3.54)*	-20.85 (7.99)**		
Pre-1990 indicator			5.73 (7.26)						
Pre-1990*log GDP per-capita			-1.38 (1.70)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.09 (0.10)						
South Asia sub-group dummy					-0.56 (0.30)				
Constant	8.72 (6.13)	-9.84 (14.70)	-0.74 (4.22)	1.60 (0.56)**	-13.81 (12.57)	-6.18 (3.97)	30.07 (8.08)**	8.01 (6.47)	-4.72 (1.11)**
Observations	454	191	486	145	110	283	171	129	72
R-squared	0.94	0.88	0.82	0.97	0.88	0.95	0.83	0.91	1.00

<b>35-39 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-1.80 (2.28)	17.60 (5.38)**	3.42 (1.00)**	-0.27 (0.13)*		-0.62 (0.10)**	25.18 (6.02)**	0.41 (0.28)	-2.38 (1.25)
Squared log of per-capita GDP	0.04 (0.12)	-0.95 (0.27)**	-0.20 (0.06)**				-1.45 (0.35)**		
Real GDP growth rate	0.01 (0.01)	-0.00 (0.01)							
Lagged real GDP growth rate	0.03 (0.01)**	-0.01 (0.01)							
Population share aged 0-14					-11.94 (9.58)				-8.30 (15.86)
Population share aged 15-24					-23.85 (11.65)*				
Population share aged 25-64					-21.76 (11.50)				
Pre-1990 indicator			0.75 (6.72)						
Pre-1990*log GDP per-capita			-0.12 (1.58)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.01 (0.09)						
South Asia sub-group dummy					-2.03 (0.22)**				
Constant	17.77 (10.98)	-77.81 (26.26)**	-11.73 (4.17)**	6.57 (0.96)**	21.40 (10.22)*	8.69 (0.94)**	-106.09 (25.98)**	0.00 (2.42)	25.82 (15.87)
Observations	454	191	486	145	112	283	171	129	72
R-squared	0.69	0.91	0.73	0.85	0.89	0.82	0.72	0.85	0.91

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>40-44 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-6.61 (1.23)**	0.674 (3.715)	-0.55 (0.86)	-0.07 (0.08)		0.56 (0.09)**	-0.65 (0.24)**	0.45 (1.15)	0.09 (0.20)
Squared log of per-capita GDP	0.41 (0.06)**	0.021 (0.190)	0.06 (0.05)					-0.05 (0.06)	
Real GDP growth rate	-0.01 (0.00)	0.001 (0.005)							
Lagged real GDP growth rate	-0.01 (0.00)	-0.001 (0.005)							
Population share aged 0-14					9.49 (12.91)	5.56 (2.85)	-38.30 (6.91)**	-7.03 (0.81)**	3.51 (1.97)
Population share aged 15-24					24.18 (13.89)	3.96 (3.24)	-22.85 (9.35)*		
Population share aged 25-64					12.46 (15.73)	10.83 (3.19)**	-22.13 (8.41)**		
Pre-1990 indicator			5.64 (6.50)						
Pre-1990*log GDP per-capita			-1.21 (1.53)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.07 (0.09)						
South Asia sub-group dummy					-0.72 (0.30)*				
Constant	26.52 (5.97)**	-7.630 (18.152)	1.97 (3.63)	2.56 (0.58)**	-13.07 (13.48)	-11.44 (3.17)**	30.98 (8.50)**	2.02 (5.82)	-0.77 (2.12)
Observations	454	191	486	147	110	283	171	123	72
R-squared	0.95	0.88	0.86	0.97	0.87	0.96	0.83	0.89	1.00

<b>40-44 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	0.63 (2.14)	14.95 (6.48)*	4.04 (0.80)**	-0.01 (0.11)		-0.43 (0.10)**	0.344 (0.219)	0.37 (0.38)	-1.94 (1.10)
Squared log of per-capita GDP	-0.09 (0.11)	-0.81 (0.33)*	-0.24 (0.05)**						
Real GDP growth rate	0.01 (0.01)	-0.01 (0.01)							
Lagged real GDP growth rate	0.02 (0.01)*	-0.01 (0.01)							
Population share aged 0-14					-6.43 (14.34)				-3.95 (13.28)
Population share aged 15-24					-16.11 (17.26)				
Population share aged 25-64					-13.24 (15.78)				
Pre-1990 indicator			13.96 (5.96)*						
Pre-1990*log GDP per-capita			-3.17 (1.41)*						
Pre-1990*log GDP per-capita <sup>2</sup>			0.19 (0.08)*						
South Asia sub-group dummy					-1.93 (0.31)**				
Constant	5.60 (10.08)	-65.53 (31.68)*	-14.28 (3.35)**	3.84 (0.83)**	14.44 (14.72)	6.86 (0.95)**	-0.298 (2.002)	0.16 (3.23)	20.22 (13.39)
Observations	454	191	486	147	112	283	171	123	72
R-squared	0.57	0.85	0.77	0.87	0.83	0.79	0.62	0.81	0.94

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>45-49 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-8.68 (1.19)**	-5.92 (3.59)	0.36 (0.69)	-0.09 (0.07)		0.71 (0.09)**	-0.51 (0.22)*	1.83 (0.95)	0.11 (0.28)
Squared log of per-capita GDP	0.51 (0.06)**	0.37 (0.18)*	0.00 (0.04)					-0.13 (0.05)*	
Real GDP growth rate	-0.01 (0.00)	0.00 (0.00)							
Lagged real GDP growth rate	-0.01 (0.00)	-0.00 (0.00)							
Population share aged 0-14					14.86 (12.44)	10.30 (2.61)**	-42.08 (6.45)**	-5.52 (0.60)**	7.31 (2.24)**
Population share aged 15-24					30.81 (12.98)*	8.44 (3.03)**	-29.89 (8.72)**		
Population share aged 25-64					18.13 (15.10)	14.75 (2.93)**	-28.32 (7.86)**		
Pre-1990 indicator			10.03 (4.92)*						
Pre-1990*log GDP per-capita			-2.25 (1.16)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.13 (0.07)						
South Asia sub-group dummy					-0.34 (0.22)				
Constant	36.72 (5.78)**	22.77 (17.49)	-1.32 (2.87)	2.75 (0.53)**	-18.84 (12.84)	-17.30 (2.89)**	34.64 (7.94)**	-5.29 (4.71)	-2.70 (2.46)
Observations	455	195	486	141	112	283	172	127	72
R-squared	0.95	0.89	0.89	0.94	0.88	0.96	0.83	0.92	1.00

<b>45-49 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-3.97 (1.29)**	13.90 (4.73)**	4.09 (0.81)**	0.10 (0.10)		-0.42 (0.10)**	0.72 (0.12)**	-0.49 (0.29)	-1.34 (1.16)
Squared log of per-capita GDP	0.16 (0.07)*	-0.74 (0.24)**	-0.24 (0.05)**						
Real GDP growth rate	0.01 (0.01)	-0.01 (0.01)*							
Lagged real GDP growth rate	0.01 (0.01)	-0.01 (0.01)							
Population share aged 0-14					-27.68 (15.87)				9.26 (13.38)
Population share aged 15-24					-37.92 (19.16)				
Population share aged 25-64					-41.81 (19.39)*				
Pre-1990 indicator			19.17 (5.46)**						
Pre-1990*log GDP per-capita			-4.44 (1.29)**						
Pre-1990*log GDP per-capita <sup>2</sup>			0.26 (0.08)**						
South Asia sub-group dummy					-1.39 (0.14)**				
Constant	26.30 (6.24)**	-62.39 (23.03)**	-14.54 (3.40)**	2.60 (0.73)**	36.82 (17.14)*	6.53 (1.01)**	-4.03 (1.08)**	7.13 (2.44)**	8.77 (13.70)
Observations	455	195	486	141	114	283	172	127	72
R-squared	0.78	0.84	0.78	0.89	0.86	0.82	0.88	0.84	0.92

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>50-54 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-11.20 (1.01)**	-9.24 (3.93)*	-0.03 (0.51)	-0.13 (0.07)		0.86 (0.11)**	-0.65 (0.19)**	1.37 (0.82)	0.23 (0.48)
Squared log of per-capita GDP	0.63 (0.05)**	0.55 (0.20)**	0.02 (0.03)					-0.10 (0.04)*	
Real GDP growth rate	-0.01 (0.00)**	0.00 (0.01)							
Lagged real GDP growth rate	-0.01 (0.00)*	0.00 (0.01)							
Population share aged 0-14					4.67 (11.06)	3.49 (2.95)	-46.25 (5.48)**	-3.07 (0.39)**	4.74 (3.01)
Population share aged 15-24					22.05 (13.00)	0.94 (3.29)	-42.52 (7.41)**		
Population share aged 25-64					7.08 (13.92)	4.51 (3.26)	-36.27 (6.68)**		
Pre-1990 indicator			14.07 (4.51)**						
Pre-1990*log GDP per-capita			-3.34 (1.07)**						
Pre-1990*log GDP per-capita <sup>2</sup>			0.20 (0.06)**						
South Asia sub-group dummy					0.18 (0.23)				
Constant	49.61 (4.92)**	38.23 (19.15)*	0.23 (2.06)	2.56 (0.52)**	-9.54 (11.85)	-11.15 (3.37)**	42.55 (6.75)**	-4.51 (4.08)	-2.65 (4.02)
Observations	456	195	486	141	112	282	172	127	72
R-squared	0.96	0.89	0.93	0.93	0.89	0.95	0.86	0.95	1.00

<b>50-54 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-5.81 (1.32)**	8.89 (3.91)*	2.77 (0.67)**	-0.09 (0.08)		-0.26 (0.08)**		-0.57 (0.14)**	-1.16 (0.87)
Squared log of per-capita GDP	0.27 (0.07)**	-0.47 (0.20)*	-0.17 (0.04)**						
Real GDP growth rate	-0.00 (0.01)	-0.01 (0.01)*							
Lagged real GDP growth rate	0.01 (0.01)	-0.01 (0.01)							
Population share aged 0-14					3.73 (10.70)		-5.80 (5.43)		7.23 (10.39)
Population share aged 15-24					-1.13 (12.61)		-27.73 (6.23)**		
Population share aged 25-64					-5.20 (12.37)		-12.93 (6.57)		
Pre-1990 indicator			9.58 (4.24)*						
Pre-1990*log GDP per-capita			-2.26 (1.01)*						
Pre-1990*log GDP per-capita <sup>2</sup>			0.14 (0.06)*						
South Asia sub-group dummy					-1.08 (0.10)**				
Constant	33.61 (6.31)**	-39.94 (19.04)*	-9.04 (2.77)**	3.93 (0.58)**	3.11 (11.21)	4.80 (0.85)**	14.05 (5.54)*	7.28 (1.20)**	8.36 (10.57)
Observations	456	195	486	141	114	277	172	127	72
R-squared	0.82	0.86	0.83	0.89	0.84	0.75	0.85	0.97	0.95

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>55-59 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-9.05 (0.90)**	-14.95 (3.64)**	1.31 (0.78)	-0.15 (0.07)*		0.72 (0.08)**	-0.09 (0.19)	0.94 (0.91)	0.54 (0.52)
Squared log of per-capita GDP	0.50 (0.05)**	0.81 (0.19)**	-0.09 (0.05)					-0.08 (0.05)	
Real GDP growth rate	-0.01 (0.00)**	0.00 (0.00)							
Lagged real GDP growth rate	-0.01 (0.00)	0.00 (0.00)							
Population share aged 0-14					-9.70 (9.89)	1.46 (2.30)	-38.85 (5.54)**	-2.02 (0.48)**	9.95 (3.13)**
Population share aged 15-24					7.52 (11.50)	1.02 (2.64)	-33.37 (7.49)**		
Population share aged 25-64					-10.62 (12.00)	2.48 (2.56)	-32.05 (6.75)**		
Pre-1990 indicator			-7.88 (6.29)						
Pre-1990*log GDP per-capita			1.74 (1.49)						
Pre-1990*log GDP per-capita <sup>2</sup>			-0.10 (0.09)						
South Asia sub-group dummy					0.38 (0.23)				
Constant	40.85 (4.35)**	68.12 (17.76)**	-4.37 (3.20)	2.03 (0.51)**	5.23 (10.39)	-8.53 (2.69)**	31.31 (6.83)**	-3.08 (4.52)	-7.67 (4.27)
Observations	456	188	486	140	112	289	172	127	72
R-squared	0.97	0.90	0.83	0.93	0.91	0.95	0.83	0.96	1.00

<b>55-59 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-8.49 (0.87)**	6.57 (3.49)	1.18 (0.67)	-0.20 (0.06)**		-0.33 (0.11)**		-0.33 (0.11)**	-0.60 (0.51)
Squared log of per-capita GDP	0.41 (0.04)**	-0.34 (0.18)	-0.09 (0.04)*						
Real GDP growth rate	0.00 (0.00)	-0.01 (0.00)							
Lagged real GDP growth rate	0.01 (0.00)	0.00 (0.00)							
Population share aged 0-14					-12.42 (9.94)		-18.06 (4.94)**		10.04 (5.74)
Population share aged 15-24					-18.84 (10.85)		-42.61 (5.67)**		
Population share aged 25-64					-23.89 (11.06)*		-30.27 (5.98)**		
Pre-1990 indicator			14.00 (4.76)**						
Pre-1990*log GDP per-capita			-3.52 (1.15)**						
Pre-1990*log GDP per-capita <sup>2</sup>			0.22 (0.07)**						
South Asia sub-group dummy					-1.13 (0.09)**				
Constant	45.89 (4.29)**	-30.05 (17.01)	-1.19 (2.76)	3.82 (0.45)**	19.56 (10.08)	4.79 (1.04)**	27.28 (5.04)**	4.44 (0.93)**	2.07 (5.89)
Observations	456	188	486	140	114	285	172	127	72
R-squared	0.93	0.89	0.88	0.95	0.91	0.80	0.90	0.98	0.99

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>60-64 Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-10.69 (1.13)**	-15.20 (5.26)**	2.69 (0.76)**	-0.02 (0.14)		0.54 (0.10)**	-0.09 (0.23)	-1.46 (1.89)	-0.16 (0.35)
Squared log of per-capita GDP	0.54 (0.06)**	0.79 (0.27)**	-0.19 (0.05)**					0.05 (0.09)	
Real GDP growth rate	-0.01 (0.00)	0.02 (0.01)*							
Lagged real GDP growth rate	0.00 (0.00)	0.01 (0.01)							
Population share aged 0-14					-3.48 (10.94)	-9.74 (4.34)*	-31.16 (5.86)**	-2.58 (0.97)**	1.23 (3.15)
Population share aged 15-24					8.66 (12.91)	-6.01 (4.42)	-24.77 (8.15)**		
Population share aged 25-64					-7.42 (12.89)	-11.15 (4.80)*	-25.82 (7.15)**		
Pre-1990 indicator			3.21 (7.75)						
Pre-1990*log GDP per-capita			-1.24 (1.87)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.10 (0.11)						
South Asia sub-group dummy					-0.34 (0.17)*				
Constant	51.31 (5.50)**	72.04 (25.62)**	-9.92 (3.16)**	0.38 (1.02)	1.69 (11.31)	3.90 (4.68)	24.14 (7.43)**	8.50 (9.71)	1.29 (3.37)
Observations	457	188	486	93	98	281	155	133	72
R-squared	0.95	0.80	0.77	0.93	0.88	0.94	0.92	0.95	1.00

<b>60-64 Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-10.25 (0.94)**	-1.02 (4.11)	2.23 (0.93)*	0.30 (0.20)		-0.41 (0.13)**	0.48 (0.16)**	-0.85 (0.18)**	-1.13 (0.63)
Squared log of per-capita GDP	0.47 (0.05)**	0.03 (0.21)	-0.17 (0.06)**						
Real GDP growth rate	0.00 (0.00)	0.01 (0.01)							
Lagged real GDP growth rate	0.01 (0.00)*	0.01 (0.01)*							
Population share aged 0-14					18.61 (8.48)*				-2.23 (8.16)
Population share aged 15-24					13.00 (9.55)				
Population share aged 25-64					7.72 (8.68)				
Pre-1990 indicator			10.01 (7.77)						
Pre-1990*log GDP per-capita			-2.77 (1.86)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.19 (0.11)						
South Asia sub-group dummy					0.54 (0.15)**				
Constant	55.13 (4.52)**	6.96 (20.05)	-6.47 (3.86)	-0.81 (1.48)	-11.88 (8.38)	5.53 (1.30)**	-4.09 (1.44)**	7.86 (1.53)**	11.38 (8.19)
Observations	457	188	486	93	100	281	155	122	72
R-squared	0.96	0.76	0.73	0.90	0.86	0.90	0.83	0.85	0.99

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

<b>65+ Females</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-2.35 (1.60)	-15.79 (4.92)**	5.18 (1.11)**	0.15 (0.11)		0.92 (0.09)**	-1.21 (0.23)**	-13.65 (4.01)**	0.04 (0.41)
Squared log of per-capita GDP	0.08 (0.08)	0.76 (0.25)**	-0.36 (0.07)**					0.72 (0.20)**	
Real GDP growth rate	-0.02 (0.01)**	0.02 (0.01)*							
Lagged real GDP growth rate	-0.00 (0.01)	0.02 (0.01)**							
Population share aged 0-14					3.07 (8.63)	-11.59 (2.98)**	-58.07 (6.61)**	-1.37 (2.51)	9.67 (3.03)**
Population share aged 15-24					14.49 (10.29)	-13.41 (3.51)**	-68.63 (9.04)**		
Population share aged 25-64					-4.10 (9.23)	-17.18 (3.37)**	-60.94 (8.09)**		
Pre-1990 indicator			0.51 (10.01)						
Pre-1990*log GDP per-capita			-0.69 (2.41)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.07 (0.14)						
South Asia sub-group dummy					-0.52 (0.18)**				
Constant	12.70 (7.76)	78.04 (23.97)**	-20.15 (4.60)**	-2.33 (0.82)**	-3.88 (8.62)	3.32 (3.36)	64.24 (8.17)**	62.12 (20.37)**	-5.32 (3.74)
Observations	456	195	486	90	98	288	171	136	85
R-squared	0.91	0.85	0.74	0.90	0.89	0.97	0.93	0.83	0.99

<b>65+ Males</b>	<i>Developed Europe</i>	<i>Developed Non-Europe</i>	<i>CEE and CIS</i>	<i>East &amp; South-East Asia</i>	<i>South Asia</i>	<i>Central America &amp; Caribbean</i>	<i>South America</i>	<i>Middle East &amp; North Africa</i>	<i>Sub-Saharan Africa</i>
Log of per-capita GDP	-0.74 (1.13)	-11.81 (3.43)**	4.03 (1.11)**	-0.23 (0.06)**		-0.65 (0.12)**	0.44 (0.21)*	0.37 (0.30)	-0.95 (0.52)
Squared log of per-capita GDP	-0.01 (0.06)	0.56 (0.18)**	-0.29 (0.07)**						
Real GDP growth rate	-0.01 (0.00)	0.01 (0.00)*							
Lagged real GDP growth rate	-0.00 (0.00)	0.01 (0.00)**							
Population share aged 0-14					-1.37 (4.31)				-0.38 (3.37)
Population share aged 15-24					-2.91 (4.59)				
Population share aged 25-64					-10.48 (4.55)*				
Pre-1990 indicator			3.47 (10.26)						
Pre-1990*log GDP per-capita			-1.30 (2.47)						
Pre-1990*log GDP per-capita <sup>2</sup>			0.11 (0.15)						
South Asia sub-group dummy					-0.02 (0.14)				
Constant	6.64 (5.36)	59.95 (16.71)**	-14.66 (4.66)**	1.46 (0.41)**	5.05 (4.26)	5.50 (1.11)**	-5.26 (1.90)**	-4.16 (2.57)	8.48 (5.59)
Observations	456	195	486	90	100	288	171	125	85
R-squared	0.93	0.91	0.65	0.92	0.82	0.94	0.82	0.73	0.99

Robust standard errors in parentheses; \* significant at 5%; \*\* significant at 1%

#### Appendix 4. Estimated standard errors for world and regional aggregates

While standard errors for the weighted least squares regressions are provided in each of the regression outputs in Appendix 3, the standard errors associated with the world and regional estimates presented in this paper have not been presented together with the aggregates. The main reason for this is our *a priori* knowledge that any such standard errors will be underestimated. There are several sources of uncertainty in the force participation rate estimates including: 1) uncertainty in the ability of the models described herein to accurately capture the relationship between labour force participation and the selected covariates; 2) uncertainty regarding the correctness of the estimated labour force participation rates in non-reporting countries; and 3) uncertainty stemming from possible errors involved in within-country interpolations. We are only able to calculate standard errors based on the first of these uncertainties and hence any reported standard errors would be considered inferior limits of uncertainty.

Notwithstanding these clear limitations, the tables provided in this Appendix provide the “type 1” standard errors corresponding to the world and regional aggregates presented in the paper. In order to keep the tables to a reasonable length, the figures for one year, 2000, are presented. This is an acceptable approach since there is little difference in the standard errors for the different years for which labour force participation rate estimates have been calculated. Taken together, the standard errors presented in Table A4.1 and A4.2 provide an indication of the confidence intervals surrounding the point estimates of the world and regional labour force participation estimates presented in this paper. It should be noted that since there is an upper bound of 100 per cent, the confidence intervals corresponding to some standard errors will contain values that are not plausible. Yet, especially in the case of prime-age males, this upper bound provides enhanced confidence in the estimates, as their participation rates tend to be very high, but cannot exceed 100 per cent.

**Table A.4.1. Labour force, LFPR and standard errors for world and regional aggregates, 2000**

	Male labour force		Female labour force		Male LFPR		Female LFPR	
	('000s)	Std. Dev.	('000s)	Std. Dev.	(%)	Std. Dev.	(%)	Std. Dev.
Developed Europe	122,576	1,002	85,976	438	67.7	0.6	44.8	0.2
Developed Non-Europe	140,582	1,953	111,635	945	74.6	1.0	56.1	0.5
CEE and CIS	101,285	1,017	90,186	748	67.1	0.7	52.3	0.4
East and South-East Asia	577,889	12,424	450,470	9,111	83.5	1.8	66.7	1.3
South Asia	376,586	3,994	153,732	1,509	83.3	0.9	35.9	0.4
Central America and the Caribbean	45,734	365	24,270	140	82.0	0.7	41.0	0.2
South America	95,267	918	65,106	683	81.0	0.8	53.0	0.6
Middle East and North Africa	77,219	1,134	24,964	383	77.0	1.1	26.0	0.4
Sub-Saharan Africa	158,235	4,340	116,747	742	86.1	2.4	61.5	0.4
World	1,695,371	14,045	1,123,085	9,387	79.9	0.7	52.6	0.4

**Table A.4.2. LFPR and standard errors by age group and estimation group, 2000**

	15-19				20-24			
	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.
Developed Europe	37.1	0.2	28.1	0.1	70.4	0.3	54.3	0.2
Developed Non-Europe	43.4	0.4	42.2	0.4	79.2	0.4	73.0	0.4
CEE and CIS	20.5	0.1	15.6	0.1	73.1	0.3	59.9	0.3
East and South-East Asia	49.7	0.7	52.0	1.7	88.2	0.6	77.3	1.1
South Asia	50.7	0.3	25.4	0.2	83.5	0.2	34.1	0.3
Central America and the Caribbean	52.7	0.3	27.7	0.1	84.0	0.2	44.6	0.2
South America	52.1	0.5	34.0	0.3	86.0	0.2	62.2	0.5
Middle East and North Africa	38.3	0.4	15.5	0.1	74.6	0.4	33.0	0.5
Sub-Saharan Africa	63.7	0.5	51.8	0.4	86.0	0.4	62.6	0.6
World	48.4	0.2	37.0	0.5	83.1	0.2	58.0	0.3

	25-29				30-34			
	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.
Developed Europe	89.5	3.0	67.2	1.1	94.8	3.0	67.6	1.2
Developed Non-Europe	93.2	4.6	74.8	2.3	94.9	6.5	70.6	1.9
CEE and CIS	90.8	3.6	75.7	2.3	92.6	3.0	80.2	2.3
East and South-East Asia	95.9	7.3	84.0	7.3	97.6	7.2	84.1	4.8
South Asia	95.7	2.1	39.3	1.2	97.7	5.1	43.6	1.8
Central America and the Caribbean	94.6	2.8	49.5	1.0	97.0	3.0	51.1	1.0
South America	94.6	3.3	65.9	2.2	96.2	3.1	68.1	2.5
Middle East and North Africa	92.1	4.1	35.3	2.5	96.8	6.3	35.8	1.4
Sub-Saharan Africa	94.9	9.5	66.8	1.6	96.5	8.5	68.2	1.4
World	94.5	2.8	65.7	2.6	96.7	3.0	67.9	1.8

	35-39				40-44			
	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.
Developed Europe	95.4	2.7	68.3	1.2	94.6	2.2	68.9	1.2
Developed Non-Europe	94.2	4.3	72.1	1.9	93.4	5.1	76.0	2.5
CEE and CIS	93.7	3.2	85.3	2.2	91.2	3.1	85.4	2.5
East and South-East Asia	98.1	8.0	84.6	4.7	98.1	7.2	81.8	5.3
South Asia	97.7	2.8	45.9	1.3	97.3	5.2	46.3	2.1
Central America and the Caribbean	97.1	3.0	52.4	1.2	96.4	3.1	52.6	1.0
South America	95.8	3.2	67.6	2.7	96.1	4.5	67.2	2.9
Middle East and North Africa	97.1	4.9	33.2	1.4	97.1	5.3	31.3	1.1
Sub-Saharan Africa	97.0	15.3	69.4	1.0	96.9	13.0	70.0	1.4
World	96.9	3.1	69.1	1.7	96.3	2.9	68.7	1.8

**Table A.4.2 (Continued)**

	45-49				50-54			
	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.
Developed Europe	92.0	0.1	66.7	0.2	86.0	1.3	59.4	0.9
Developed Non-Europe	92.2	0.3	76.5	0.4	90.0	3.0	71.1	2.4
CEE and CIS	88.3	0.2	82.6	0.2	81.9	2.6	71.5	1.6
East and South-East Asia	97.3	0.1	76.4	1.1	92.8	5.6	59.8	3.7
South Asia	96.8	0.1	44.5	0.5	94.0	3.3	40.4	1.1
Central America and the Caribbean	95.1	0.1	47.9	0.2	91.8	1.6	40.6	0.8
South America	92.2	0.2	61.4	0.5	88.3	2.9	53.6	1.8
Middle East and North Africa	95.0	0.1	26.1	0.2	91.2	2.4	20.9	0.6
Sub-Saharan Africa	96.6	0.3	69.9	0.4	95.0	9.6	68.3	3.3
World	95.0	0.1	66.4	0.4	90.9	2.1	57.1	1.2

	55-59				60-64			
	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.
Developed Europe	69.6	1.0	44.2	0.6	35.5	0.4	16.8	0.3
Developed Non-Europe	82.5	2.4	58.9	1.9	60.4	2.1	37.9	1.8
CEE and CIS	66.5	1.6	35.7	0.8	34.0	0.8	19.0	0.6
East and South-East Asia	82.0	4.0	45.5	2.7	71.2	10.4	32.1	2.8
South Asia	88.5	3.3	35.6	1.1	71.9	3.4	27.5	1.4
Central America and the Caribbean	85.8	2.1	33.2	0.7	71.1	2.2	23.4	0.5
South America	79.8	2.3	41.3	1.4	71.2	2.8	32.3	1.4
Middle East and North Africa	86.0	2.1	15.5	0.5	63.7	2.5	11.1	0.7
Sub-Saharan Africa	92.4	5.2	61.6	3.1	86.9	6.9	53.3	1.9
World	81.6	1.5	43.9	0.9	62.7	3.4	28.9	0.9

	65+			
	Male LFPR	Male LFPR Std. Dev.	Female LFPR	Female LFPR Std. Dev.
Developed Europe	7.4	0.1	2.7	0.1
Developed Non-Europe	22.2	0.7	10.3	0.5
CEE and CIS	13.6	0.8	7.0	0.4
East and South-East Asia	33.4	0.9	13.3	0.6
South Asia	52.3	1.2	12.7	0.5
Central America and the Caribbean	44.2	1.2	12.8	0.2
South America	35.9	1.6	12.8	0.5
Middle East and North Africa	38.7	1.5	5.5	0.7
Sub-Saharan Africa	68.6	3.7	34.1	1.3
World	31.3	0.4	10.9	0.2

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