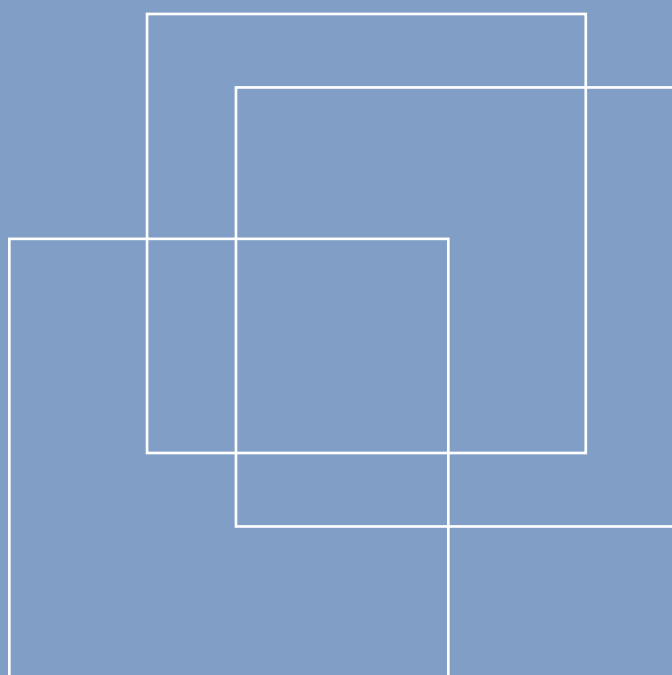




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Employment and economic class in the
developing world

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International Labour Office

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Abstract

This paper introduces a model for generating national estimates and projections of the distribution of the employed across five economic classes for 142 developing countries over the period 1991 to 2017. The national estimates are used to produce aggregate estimates of employment by economic class for eight developing regions and for the developing world as a whole. We estimate that 41.6 per cent of the developing world's workers were middle class and above in 2011, more than double the share in 1991. Yet, regional figures show that widespread poverty and vulnerability to poverty persists in many developing regions. Further growth in the developing world's middle class, which both reflects and supports broader economic development, will require increased productivity levels and an expansion in the number of quality jobs.

Keywords: data estimation and prediction, employment, inequality, middle class, panel data

JEL classification: J00; J300; C13; C33; C53

1 Introduction

One of the sharpest divides between developed and developing economies is that in the former, middle class status is the norm, with a reasonable standard of living enjoyed by the bulk of the population, while in the latter, an estimated 3 billion people, around half of all inhabitants in the developing world, remain poor, living on less than US\$2 per person per day (measured at purchasing power parity).¹ Underpinning this divide is a more than five-fold gap in labour productivity levels: measured at PPP, average output per worker in the developed world stood at nearly US\$73,000 in 2011, compared with an average of US\$13,600 in the developing economies.² As higher levels of productivity facilitate higher average earnings from labour, there is a direct link between labour market outcomes – in terms of both the quantity of available jobs and the productivity of the workforce – and the middle class standard of living enjoyed by the majority of people in the developed world. In this context, at the national level, the aspiration of attaining a near ubiquitous middle class in a developing country is, in many respects, synonymous with the goal of generating a broad and growing base of productive jobs.

At the same time, a wide body of literature argues that growth in the middle class itself is a positive driver of the development process, with widespread benefits to labour markets and the broader economy. Amoranto et al. (2010) find that the middle class hold values associated with higher rates of economic growth, such as greater demand for political accountability. Loayza et al. (2012) find that a growing middle class improves democratic participation, reduces corruption, increases spending on health and education as a percentage of GDP, and leads to reduced tariffs on international trade. Easterly (2001) finds that a “middle class consensus” – defined as having neither strong class differences nor ethnic differences, is a critical driver of differences in the pace of economic development, leading to higher rates of growth, more human capital, infrastructure accumulation, and more democratic societies. Birdsall (2010) argues that economic growth is more likely to be sustained if it is driven by, and to the benefit of, the middle class. A report by the African Development Bank (2011) finds that growth in the middle class is an important medium and long-term development indicator in Africa, as its growth is strongly linked with faster rates of poverty reduction. Banerjee and Dufflo (2008) and Chun (2010) argue that because of the skills, income and values characteristic of the middle class, growth in this group leads to widespread gains in living standards, as middle class workers are able to invest in productive activities with broad benefits to economies. In this vein, Kharas (2010) reflects on the middle class as a source of entrepreneurship and innovation, as well as a driver of domestic consumption, which results in product differentiation, expanded investment in production and marketing of new goods. Meanwhile a small middle class can inhibit growth.

Moving from the societal to individual level, achieving the standard of living enjoyed by the middle class is a core aspiration for millions of households and individuals in the developing world. Yet for many poor individuals in developing countries, whose productivity and resulting incomes facilitate a level of consumption far below the average in the developed world, achieving middle class status as defined by developed world standards is a far-flung aspiration. The immediate concern is escaping poverty and the deprivation associated with it and achieving a “middle class” status represented by a higher, more secure standard of living, allowing them to save and invest in their families’ health,

¹ See World Bank, PovcalNet online poverty analysis tool, <http://iresearch.worldbank.org/PovcalNet/index.htm> and United Nations (2012) where reference to US\$ indicates 2005 international dollars.

² International Labour Organization (2012).

education and wellbeing. This points to important differences in potential definitions of the middle class in developing countries vis-à-vis the developed world.

While there is an established literature on the benefits of growth in the middle class, and a wide range of estimates of the size of the middle class in developing countries, despite the strong relationship between economic class status and labour market outcomes, the literature on the dynamics of middle class employment in developing countries is sparse. This paper seeks to fill this void, by developing a first set of estimates of employment across different economic classes for developing regions and the developing world as a whole. To this end, the estimates of the distribution of employment across classes developed herein represent a new indicator to help analyse trends in employment quality in developing countries – a desirable outcome given the relative dearth of information on employment quality as compared with indicators on the quantity of employment, such as labour force participation and unemployment. This builds on earlier work by the ILO to estimate poverty among workers in the developing world – the so called “working poor”.³ In moving away from a binary examination of the employed in developing countries (poor versus non-poor) to a more detailed picture of the distribution of employment across economic classes, and by estimating trends in middle class employment versus the working poor and other economic classes, we seek to improve the understanding of the nexus between growth, economic development and labour market outcomes in the developing world. The overarching aim is to develop a comprehensive picture of employment across five economic classes – extreme poverty, moderate poverty, near poverty, developing middle class and developed middle class and above, to better understand on-going dynamics of employment generation in the developing world and the broader relationship between labour market outcomes and economic development outcomes.

Section 2 sets out the definitions of the economic class groups considered in the paper, reviewing the literature on defining the poor, near poor and middle classes. Section 3 describes the data used to produce estimates of employment by economic class for different regions and the developing world as a whole, along with the econometric model developed for this purpose. Section 4 presents estimates of employment by economic class, comparing trends over time and across regions. With a view to understanding future labour market and development prospects, the section also provides projections in employment by class derived from the model. Section 5 provides conclusions and potential areas of future work.

2 Defining economic classes in developing countries

The starting point for producing estimates of employment across different economic classes is to define the specific thresholds for the classes themselves. A critical point of departure is the decision whether to define classes in relative or absolute terms. Defining economic classes in relative terms, for instance by setting the threshold for the middle class at between 75 and 125 per cent of the median national income or consumption measure is useful for measuring social exclusion, particularly in middle- and upper-income economies, where the vast majority of the population is living above the subsistence level.⁴ Used in this context, the measure provides a comparison of an individual’s or household’s income or consumption relative to an average range. There are, however, two clear disadvantages that disqualify the use of relative measures of economic class in the present context: First, the use of relative

³ See Majid (2001), Kapsos (2004) and ILO (2011).

⁴ See, for example, Easterly (2001) and Birdsall et al. (2000).

class measures would result in varying class thresholds across countries. This would inhibit comparison across countries as well as the production of regional and global estimates based on a uniform definition of economic class. Second, relative measures may not be suitable for the least developed economies, in which a majority of individuals may be living below or near poverty levels. In these countries, a relative measure of economic class could result in classifying individuals as middle class, despite the fact that they are poor based on an absolute measure, as their income or consumption may be near the median.⁵

Consequently, the estimates of employment by economic class presented in this paper are based on an absolute measure of household income/consumption. However, there is little consensus in the literature as to which absolute thresholds should be used to define different economic classes in developing countries. Definitions of absolute poverty in the developing world arguably enjoy the greatest degree of consensus. Based on the purchasing power parity (PPP) data from the 2005 International Comparison Program, Chen and Ravallion (2008) define the poor in developing countries as those living below the US\$1.25 poverty line (measured at PPP and based on per-capita household income or consumption). This poverty line is equal to the mean of the poverty lines for the poorest 15 countries for which data are available and provides a measure of extreme poverty, below which basic human needs are unlikely to be met (World Bank, 2008). This definition is used to measure poverty for the Millennium Development Goals (MDGs) (UN, 2012). The definition of the US\$2 poverty line follows from the same analysis, and is equivalent to the median poverty line among a sample of national poverty lines for developing and transition economies. This measure is intended to provide an indication of those households whose members are poor, but not failing to meet basic human needs such as an acceptable daily caloric intake.

Moving to definitions of the middle class, a wide range of thresholds is found in the literature. In developing countries, Ravallion (2009) defines the middle class as those living in households with per-capita consumption between US\$2 and US\$13 per day at PPP. The lower-bound is consistent with the cut-off for poverty discussed above, while the upper-bound corresponds to the poverty line of the United States of America in 2005. Households above the US\$13 line are considered to be in the “Western” or developed economy middle class.

In a study of characteristics of the middle class in developing countries, Banerjee and Duflo (2010) define the middle class as those living between US\$2 and US\$10 per day. To assess differences in characteristics among those at the lower and upper ends of this range, they focus on two middle-class segments – those between US\$2 and US\$4 and those between US\$6 and US\$10. They find a substantial difference between these two groups in terms of the share of casual wage workers versus regular wage workers, with the share of casual wage workers in the US\$2 to US\$4 range nearly as high as among the poor between US\$1 and US\$2. This reflects widespread informality and vulnerability among workers in the US\$2 to US\$4 category.

Focusing on developing countries in Asia, the middle class is defined as those between US\$2 and US\$20 (Chun, 2010). He observes that a large share of the middle class in the range US\$2–US\$4 have high degrees of vulnerability to poverty, while those in the range of US\$4 to US\$10 a day are able to live beyond the subsistence level, consuming non-essential goods and having the ability to save. The African Development Bank (2011) uses the same definition as Chun in their report, wherein the middle class is

⁵ Focusing on poverty lines, Ravallion and Chen (2009) propose a hybrid approach, combining both absolute and relative measures into “weakly relative” poverty lines.

classified in the range US\$2–US\$4 “floating class”, with consumption only slightly above the poverty line and high vulnerability to slipping back into poverty; the US\$4–US\$10 “lower-middle class” and the US\$10–US\$20 “upper-middle class”.

In Latin American countries the middle class is defined as those households with per capita income between US\$10 and US\$50, which is based on the concept of economic security and the related probability of households falling into poverty (Ferreira et al., 2013). The lower-bound is based on a 10 per cent probability of falling into poverty over a 5-year period. It is argued that this definition is applicable for middle-income countries, as it is consistent with a survey of self-perceptions of the middle class in five Latin American countries.

In the developed world context, Kharas (2010) defines the middle class as individuals living in households with per-capita daily consumption of between US\$10 and US\$100 at PPP. The lower-bound is set at the average poverty line of Portugal and Italy, while the upper-bound is equal to twice the median income in Luxembourg.⁶ The Kharas definition therefore sets a much higher bar than Ravallion’s for being considered “middle class”, which is consistent with Kharas’ focus on a “consumer class”, akin to consumers in the developed world. Similar to this, Loayza et al. (2012) defines the middle class as those households with per-capita incomes above US\$10 at PPP.

Birdsall (2010) develops a hybrid approach using both absolute and relative measures and defines the middle class in the developing world as people living in households at or above the equivalent of US\$10 a day at PPP in 2005, and at or below the 95th percentile of the income distribution in their country. Again, this definition is more in line with the developed world middle class, with the important exception that it excludes those above the 95th percentile of the income distribution (who are considered rich).

The objective of this paper is to establish class groups with thresholds that are analytically appropriate for estimating the levels and trends in middle class employment versus employment among the poor and near poor in developing countries. For this purpose, we use a modified version of Ravallion’s definition, dividing groups based on per-capita household consumption as shown in Table 1.

Table 1: Definition of economic classes

Class 1	Extreme working poor: below US\$1.25
Class 2	Moderate working poor: between US\$1.25 and US\$2
Class 3	Near poor workers: between US\$2 and US\$4
Class 4	Developing middle class workers: between US\$4 and US\$13
Class 5	Developed middle class and above workers: above US\$13

Class 1 follows the definition utilized to designate extreme poverty for the purpose of the MDGs, while Class 2 is consistent with the widely-used international measurement of moderate poverty. These two classes are identical to prior ILO estimates of extreme and moderate working poverty, which has an

⁶ This is similar to Kharas, Milanovic and Yitzhaki (2002) who define the middle class as those living between the mean incomes of Brazil and Italy.

added advantage of comparability and consistency with existing ILO estimates of working poverty in the developing world. Class 3, which we define as “near poor” workers, is established as a measure of workers that are not poor, but are highly vulnerable to slipping into poverty.

The choice of US\$4 as an upper-bound for this group follows the findings of Banerjee and Duflo (2008), on key demographic, health, education and labour market characteristics for this group. Class 4 is what we call the “developing middle class”, which takes US\$4 and US\$13 as the lower and upper bounds. The upper bound approximates the United States’ poverty line in 2005. The developing middle class is therefore poor based on a developed world absolute standard, but is above the threshold of poverty or near poverty of the lower three classes. Workers in this class are a nascent consumer class, able to afford nonessential goods and services, including some international consumer goods, and are more likely to have higher levels of education and to have access to quality health care than the lower classes. We denote Class 5 as “developed middle class and above”, which encompasses workers in developing countries from the lower-end of the middle class in the United States and above. Many workers in this class would be able to afford a wide range of international consumer goods (see Box 1 for more description of the characteristics of the five economic classes analysed in this paper).

The estimates of employment by economic class are based on a cross-tabulation of employment status and economic class status, whereby employment status is defined at the individual level (whether or not an individual is employed) while economic class status is determined by per-capita household consumption in the household in which the individual lives. The estimate of total employment in a given class is equal to the number of persons of working-age that are employed; and living in a household with per-capita consumption between the upper- and lower-limits of per-capita consumption for the economic class.

Box 1: How do middle class workers and households differ from the poor and near poor in developing countries?

To better understand what it means to be “middle class” in the developing world and to justify the selection of our five economic classes, we present some key characteristics based on the findings from Banerjee and Duflo (2008) and the analysis of 39 household datasets utilized for the paper. These relate to demographic, economic and labour market profiles of the economic class groups.

Banerjee and Duflo (2008) examine key household and individual characteristics of different economic classes, including three of the five classes analysed in this paper: the extreme poor, moderate poor; near poor; and the middle class in the range US\$6 to US\$10 per-capita household consumption. They find that middle class households have far fewer members on average than poor and near poor households. For example, in Mexico, the average middle class household has 4.4 members, versus 6.6 for the extreme poor, 6.2 in the moderate poor and 5.3 in near poor households. They find that members of middle class households live far healthier and more productive lives than the poor, with higher spending on medical care, and greater expenditure per child on education, with children attending schooling longer and having access to better quality schooling. Middle class households are also more likely to have better access to electricity, running water and improved sanitation facilities.

Middle class households have greater access to bank credit, which helps to smooth consumption in periods of income volatility and provides capital for entrepreneurial endeavours, though credit constraints still pose a barrier to widespread entrepreneurship among the middle class. At the same time, middle class households are also far more likely to have health and life insurance than the poor, which further serves to reduce vulnerability to poverty.

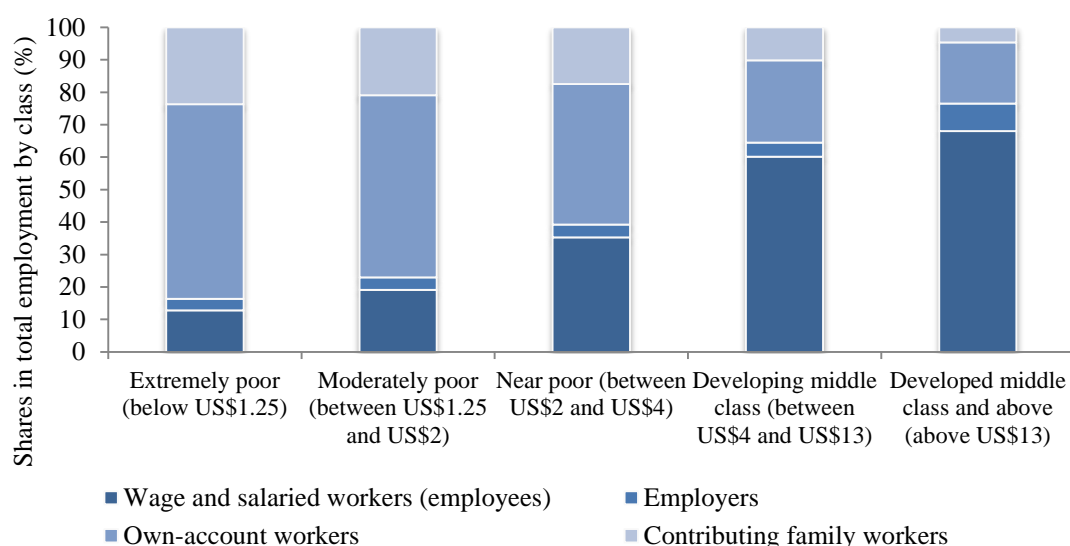
With regard to the types of goods and services consumed by the middle class, across 13 developing countries, they find that households in the range US\$6 to US\$10 spend between 1 and 5 per cent of the household budget on entertainment (simple average of 2 per cent), versus nearly zero for the extreme poor. This is facilitated by a smaller share of household budgets spent on food and basic necessities than the corresponding shares for poor households. In rural areas, they find that nearly 70 per cent of households between US\$6 and US\$10 have televisions, versus around 35 per cent of those in moderate poverty and less than 50 per cent of the near poor between US\$2 and US\$4. In urban areas, around 80 per cent of households between US\$6 and US\$10 have televisions.

In terms of labour market characteristics, the authors find that a higher share of middle class households have at least one non-agricultural business (nearly 60 per cent on average in rural areas, versus 30 per cent for the poor and near poor), with evidence from Cote d’Ivoire that the non-agricultural businesses run by middle class households are more than 4 times as likely to own a vehicle than a business run by a household in the moderate poor category.

The household surveys analysed in this paper allow for a deeper analysis of labour market characteristics of the five economic classes defined. The two figures below indicate that there are considerable differences in the distribution of employment across the classes in terms of economic sector and status in employment. Based on this sample, 83.7 per cent of the extreme working poor are found in either own-account work or unpaid family work versus only 12.7 per cent in wage employment. Among the moderate working poor, 77 per cent are found in these two employment statuses, with a somewhat higher share (19 per cent) in wage employment. A substantially higher share of the near poor class of workers is in wage employment (35.3 per cent) than the two working poor classes, however this group is clearly different than the two middle class segments, each of which have more than 60 per cent of workers in wage employment.

A similar pattern is found across sectors, with a declining share of workers in agricultural employment observed moving up the classes. More than half of the workers in the developing middle class are employed in the services sector, with 3 out of 4 workers in the developed middle class engaged in services. There is only a slight difference in the share of workers in the industrial sector across the economic classes, which reflects low productivity activities among the poor classes, and higher value-added industrial employment among middle class workers.

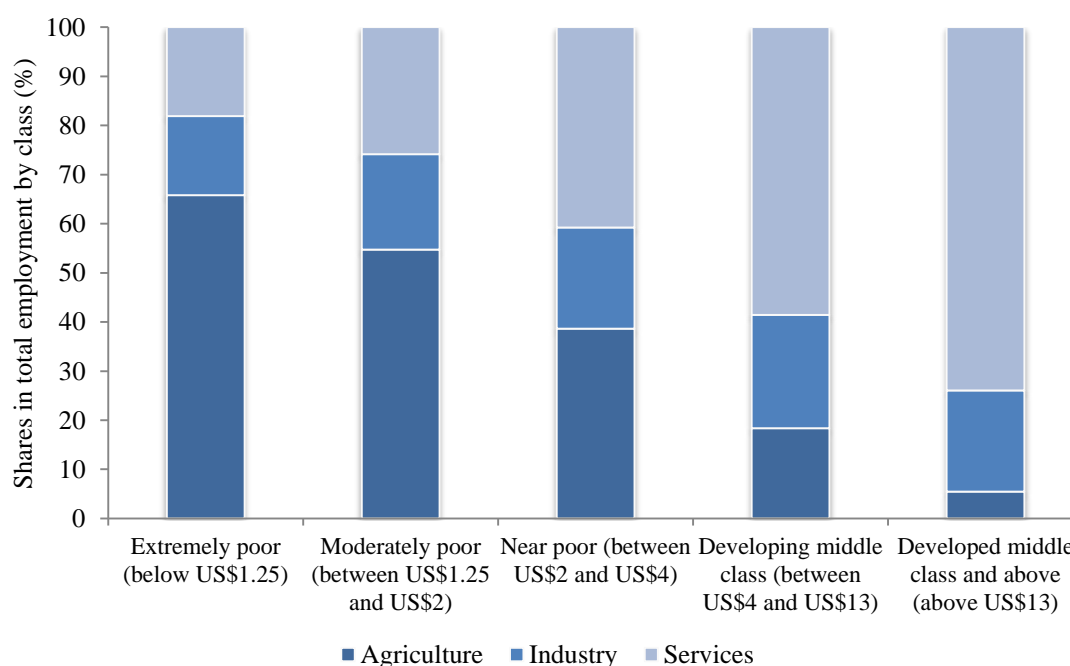
Figure 1: Employment by economic class and status, selected economies (%)



Note: The aggregate refers to 39 countries.

Source: Authors' calculations based on the sources in Table A1 (Appendix 1).

Figure 2: Employment by economic class and broad sector, selected economies (%)



Note: The aggregate refers to 36 countries.

Source: Authors' calculations based on the sources in Table A1 (Appendix 1).

3 Data and Methodology

3.1 Data and definition of economic class

The initial dataset consists of 61 observations of the employed population living with their families below four per-capita household consumption thresholds: less than US\$1.25, less than US\$2.00, less than US\$4.00 and less than US\$13.00 (at PPP) per person per day, as a share in total employment, which comes from national household surveys.⁷ The majority of the surveys are household income and expenditure surveys (HIES) and living standards surveys (LSS), both of which provide details of income and expenditure together with labour market status.⁸

The objective of the model is to produce a full database of internationally comparable and consistent estimates and projections of employment by economic class for the developing world as a whole (142 countries) and for the developing regions from 1991 to 2017.

The foremost consideration for ensuring comparability and consistency in the estimation of employment by expenditure class is a standardised approach to defining employment and expenditure status. The ideal survey to calculate these indicators would therefore be a combination of household income and expenditure surveys (including living standards surveys and similar surveys) and labour force surveys, collecting income and consumption expenditure from the former and obtaining employment status from the latter. Unfortunately surveys of this type are few and far between, the Philippines and India being two exceptions (Kapsos, 2007).

3.1.1 Defining expenditure class status

Expenditure status is defined at the household level: members of households that live on less than US\$1.25, US\$2.00, US\$4.00 or US\$13.00 per person, per day are considered. National rates are taken from the World Bank's PovcalNet database of internationally comparable poverty data. PovcalNet provides poverty and inequality estimates for 109 developing countries since the 1980s, covering 94.5 per cent of the developing world's population. These are based on household surveys that contain suitably detailed consumption and/or income data, combined with information on national prices from the 2005 International Comparison Programme (ICP) to produce internationally-comparable expenditure lines adjusted for purchasing power parity.⁹

⁷ See Table 18b in ILO, *Key Indicators of the Labour Market (KILM)*, Seventh Edition for national estimates of the number of working poor and their share in total employment, with all estimates disaggregated by age group (total, youth and adult) and sex. Also see, ILO: *KILM, Sixth Edition* (Geneva, 2009), Chapter 1, section B, "Analysing poverty-employment linkages with household surveys: Towards an international working poverty database". Appendix Table A1 provides details on the micro-datasets used; see ILO: *KILM, Seventh Edition* (Geneva 2011), Chapter 1, Section A "Working poverty in the world: Introducing new estimates using household survey data".

⁸ In addition, two poverty assessment household surveys were used (East Timor and Guinea) along with national sample surveys for Brazil, India and Kazakhstan. These surveys typically include a wide range of information on demographic and labour market characteristics, education and consumption.

⁹ For a detailed explanation of the PovcalNet methodology, see Chen and Ravallion (2008). There is an extensive literature on the biases associated with household income and expenditure surveys, particularly the length of recall periods for expenditure. For considerations in measuring consumption, see Grosh and Glewwe (1998). The general consensus is that longer recall periods are preferred, however, there can be a downward bias associated with longer recall as, for instance, respondents may forget certain purchases as time elapses and thus

To obtain the level of consumption corresponding to a given expenditure line, we rank households in the 61 micro-datasets based on per-capita consumption and set the line such that the corresponding rate matches the rate in the PovcalNet database. Per capita expenditure (or income) used in determining expenditure status is estimated by dividing total household expenditure (or income) by the number of members in the household. Consumption expenditure-based estimates were given preference over income-based estimates (consistent with the practice used in the PovcalNet database).¹⁰

3.1.2 Defining employment status

The types of surveys for which both consumption expenditure and labour market information are available often have widely varying definitions of employment. The definition of employment as set out by the International Conference of Labour Statisticians (ICLS) was taken as the standard in determining whether a survey could provide a reliable estimate of employment across expenditure groups.¹¹ In all but seven countries (Cape Verde, Ethiopia, Lesotho, Morocco, Nepal, Sri Lanka and Thailand), survey questionnaires included probing questions aimed at capturing temporary absence from work. For surveys in which multiple reference periods were utilized, preference was given to a one-week reference period for employment.¹²

The initial dataset contains a total of 61 observations (from 52 countries), which includes estimates for two years for China.¹³ Figure 3 shows the employment coverage (share of each region's total employment for which at least 1 estimate of employment by economic class is available) for the household survey based estimates and for the estimates included in the PovcalNet database. Overall, an estimate of both expenditure class status and employment status is available for at least one point in time for 77 per cent of the developing world's workforce, including highly populated countries such as Brazil, China, India and Indonesia. The Middle East and North Africa region has only two countries with national estimates in the dataset, and consequently only 10.2 per cent of the region's employment is covered.

understate total expenditure. In contrast, longer recall periods allow for the capture of durable goods and one-off purchases that may be omitted in shorter recall periods.

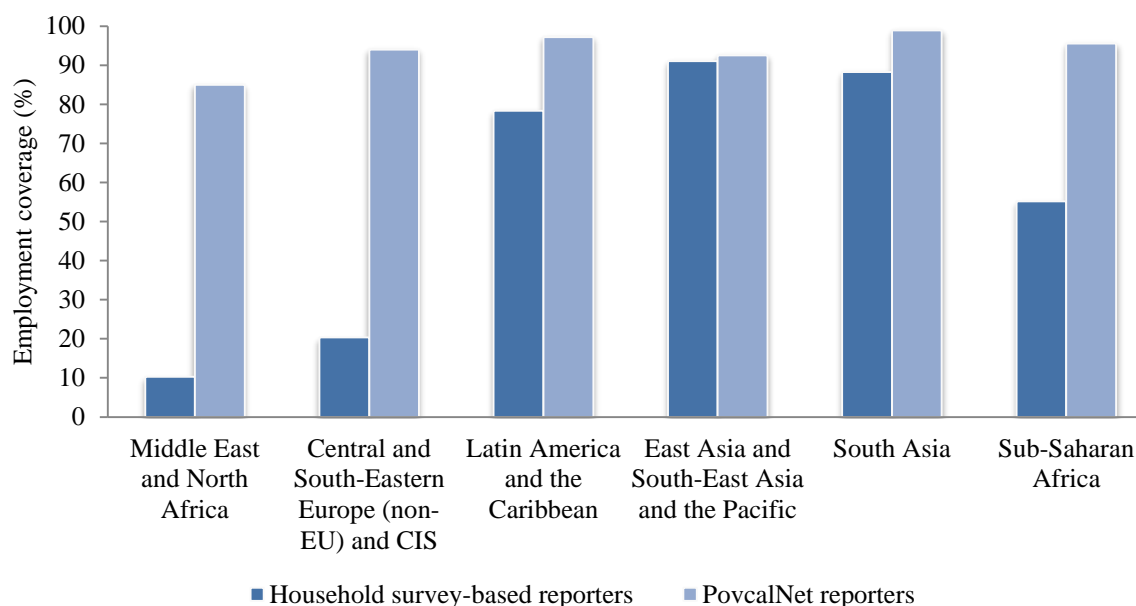
¹⁰ Deaton (1997) states that the difficulties in the collection of reliable income data are significant enough to question the value of attempting to use income estimates altogether. Income was used in the micro-dataset for Brazil (2007). Although Brazil has made a continuous effort with the "Pesquisa Nacional por Amostra de Domicílios", the survey does not contain sufficient information on consumption expenditure to ascertain household expenditure status.

¹¹ Resolution concerning statistics of the economically active population, employment, unemployment and underemployment, adopted by the 13th International Conference of Labour Statisticians, Geneva, October 1982; http://www.ilo.org/global/statistics-and-databases/standards-and-guidelines/resolutions-adopted-by-international-conferences-of-labour-statisticians/WCMS_087481/lang--en/index.htm.

¹² In 75 per cent of the datasets, the reference period is defined as one week, for five datasets the reference period for employment is one month, for six datasets, 12 months, and for one dataset the reference period is one day. For two other datasets the "usual" status of the respondent was measured, i.e. the respondent was "usually employed", and the reference period is not explicitly specified in an additional dataset. The differences in reference periods could result in biases in employment estimates versus those obtained from a one-week reference period; in general, the longer the reference period, the greater the likelihood to be defined as employed. The standard working age used in the analysis in this paper is 15 years and above.

¹³ For an overview of the initial dataset, see Appendix 1 - Table A1. For further details on the China data utilized on see "Special mention: China" which discusses issues pertaining to the China datasets in detail, at ILO: *KILM, Seventh Edition* (Geneva, 2011).

Figure 3: Employment coverage of estimates based on national household surveys and PovcalNet database

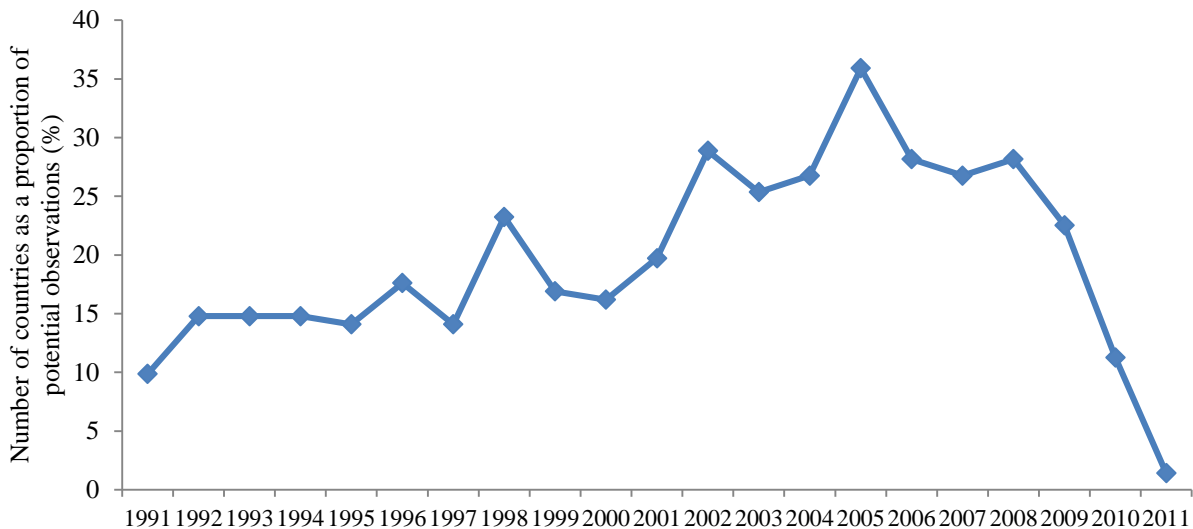


Note: Employment coverage corresponds to the year 2005.

Source: Authors' calculations based on ILO, Trends Econometric Models, October 2012.

The Central and South-Eastern Europe (non-EU) and CIS region has the second lowest employment coverage of the regions, with four countries covered, corresponding to 20.3 per cent of the region's total employment. The 23 countries in sub-Saharan Africa with national estimates in the dataset account for 55.2 per cent of the region's total workforce. The area of greatest coverage is Asia with over 91 per cent of the employed in East and South-East Asia, and 88.2 per cent in South Asia covered by at least 1 observed value. The Latin America and the Caribbean region have the third highest employment coverage of the regions, with 12 countries representing 78.3 per cent of the region's employment.

This initial dataset is combined with the wider set of estimates from the PovcalNet database (discussed in the next section), which substantially boosts coverage. Following this procedure, an estimate is available for at least one point in time for 94.6 per cent of the developing world's workforce. The result of this combination is an increase in the statistical base from 61 to 584 observations, covering between 85 per cent (Middle East and North Africa) and 98.9 per cent (South Asia) of each region's workforce. Figure 4 provides the coverage of countries over time.

Figure 4: Number of countries as a proportion of potential observations

Note: The number of countries corresponds to those for which a PovcalNet-based estimate is available. The potential number of observations is 142 (number of countries in the developing world as a whole).

Source: Authors' calculations.

3.2 Methodology for estimating missing values

The starting point of the estimation procedure is taking what is known about the distribution of employment across economic classes in countries for which survey-based estimates are available and extrapolating this knowledge to produce estimates in countries and years for which no survey-based estimates of this distribution are available, but for which other characteristics are known. The methodology contains two steps: estimating the shares of employment by economic class and then imputing the shares of employment by economic class.

3.2.1 Estimating the shares of employment by economic class

The shares of employment by economic class for countries and years for which no national estimate is available are estimated, using the total population by economic class which are available from PovcalNet. For this purpose, we combine the household survey-based estimates of the employed population living below each of the economic class thresholds together with the corresponding estimates of the total population by economic class from PovcalNet. This helps us in expanding the number of countries in our statistical database. This is done by calculating the ratio of the employed population (aged 15 years and above) in each economic class to the total population in each class.

We then attempt to identify key correlates/determinants of this ratio using a multivariate regression equation and then utilize this information to estimate the ratios for the observations for which only estimates for the total population by economic class are available.

$$ratio_{i,year} = a + region_i + \beta X' + \varepsilon_i \quad (1)$$

where $i=1, \dots, 53$ is the number of countries available in the initial dataset, $year=1994, \dots, 2010$ is the year to which the initial dataset's observation refers, a is the constant term, $region$ indicates regional

dummy variables corresponding to the geographic region of each country, X is a vector of the explanatory variables and ε is the error term.¹⁴ We focus on seven demographic and labour market indicators as independent variables in the regression: the employment-to-population ratio (EPR), the share of agriculture in total employment (AGR), the share of wage and salaried employment in total employment (WSW), the ratio of the working-age population (15 years and over) to the total population (WAP), the share of population aged 0 to 14 and population aged 65 years and above in the total population (DEP1), the share of population aged 0 to 14 years and economically inactive population aged 15 years and above in the total population (DEP2) and the log of labour productivity (LP), measured as output per worker.

The rationale behind using these variables is as follows: as the EPR increases, i.e. as a greater share of the working-age population is employed, we expect a higher ratio of the employed population (aged 15 years and above) in a specific threshold to the total population (see Appendix 1). The higher the share of agriculture in total employment, the higher the expected ratio, as widespread agriculture is often reflective of surplus labour and low-productivity employment. The higher the share of employees in total employment, the lower the expected ratio, as a larger share of the workforce is engaged in formal, higher-productivity employment.

A higher ratio of the working-age population to the total population is expected to be associated with a higher ratio of the employed population in each economic class to the total population in each class. As the above ratio includes in the numerator only persons aged 15 years and above, while the denominator corresponds to the total population, if the population aged 15 years and over makes up a larger share of the total population in one country versus another, all else equal, we would expect a higher ratio of the employed population within an expenditure group to the total population within the same expenditure group.

The two other demographic variables used are intended to capture the relative size of dependent (economically inactive) segments of the population. These include: (i) the share of the population aged 0 to 14 plus 65+ in the total population; and (ii) the share of the population aged 0 to 14 plus the economically inactive population aged 15+ in the total population. Both these variables are expected to have a negative relationship with the ratio of the employed population to total population in each economic class, as higher dependent segments of the population should be associated with a larger gap between the employed and the total population below a given economic class threshold.

With regard to the labour productivity variable, if employment is more productive in one economy than in another, we would expect a larger gap between the size of the employed and total population in a given economic class in the more productive economy. That is, poverty should be less associated with employment in a higher-productivity economy and would be expected to be more prevalent among dependent groups of the population such as children and economically inactive persons, including the elderly. Finally, regional dummy variables are included for five regional groups to control for other differences across regions not captured by the above variables.

In order to investigate which combination of the above variables produces the best predictions for each threshold and each region examined, we test 24 different specifications of the variables. The EPR

¹⁴ The regions are: Central and South-Eastern Europe (non-EU) and Commonwealth of Independent States (CIS); Middle East and North Africa; East and South-East Asia and the Pacific; South Asia; Latin America and the Caribbean; Sub-Saharan Africa.

appears in all specifications. The regressions utilize the full sample of 53 countries (61 observations). We rank the resulting estimates based on the lowest root mean squared error (RMSE), and lowest Akaike information and Bayesian information criteria (AIC and BIC). The first criterion for ranking specifications is the RMSE, with the AIC and BIC values used as additional selection criteria in the event of specifications having equal RMSEs. The five top-ranked specifications along with the average prediction of the five top specifications are then tested to assess which best replicates the observed values. The final prediction for each region is based on the specification that produces the lowest RMSE for the region.

A principle utilized throughout the estimation is preservation of real country-reported data. That is, the 61 estimates from the national household surveys are fully utilized in the final set of estimates. For countries with at least one observed ratio of a given class threshold, we calculate the difference between the actual ratio and the ratio predicted by the regression equation and adjust the predicted series such that it is in line with the real observation.¹⁵ For countries with PovcalNet estimates but no household survey based estimates, the ratio that is predicted from the model described above is applied to the total population estimate to produce an estimated share of the employed population living with their families below the specific class threshold in total employment. For each threshold, the final estimate is:

$$\widehat{share}_{i,year} = (\widehat{ratio}_{i,year} * TPOP_{below}) / TEMP \quad (2)$$

where *share* is the estimated share of employed people living in each expenditure class and $TPOP_{below}$ is the total population living in each expenditure class. As shown in Figure 3, this step of the model increases the statistical base from 61 to 584 observations.¹⁶

3.2.2 Imputing the shares of employment by economic class

The share of employment by economic class is imputed in the second step for the countries and years for which neither a household survey-based estimate nor an estimate of the total population by class is available. To impute the shares we use a regression model, wherein the dependent variable is the logistically transformed share of employment by economic class in total employment¹⁷:

$$Share\ of\ class_{c,i,year}^T = \ln \left(\frac{Share\ of\ class_{c,i,year}}{1 - Share\ of\ class_{c,i,year}} \right) \quad (3)$$

where c is the economic class group, $i=1, \dots, 109$ refers to the countries with available data after the first step is run, $year=1991, \dots, 2011$ refers to the years for which the first step produced an estimate.

¹⁵ This is done by calculating an adjustment factor which equals the ratio of the predicted rate to the actual rate and adjusting the full predicted series by this factor. For countries with more than one observed micro-based rate, the average adjustment factor is used.

¹⁶ While there are more than 584 observations in PovcalNet, some observations were found to be inconsistent due to a number of factors, including changes in survey type. In order to maximize comparability across countries, such observations were dropped prior to carrying out the first step of the model.

¹⁷ Overall, there are 9 cases for which the estimated share is zero. If these were kept as zeros, the logistic transformation would yield missing values. To avoid this problem, we set these 9 shares equal to 0.1 per cent prior to the transformation.

A logistic distribution is selected in order to avoid out of range predictions. The logistically transformed shares of employment by economic class are then regressed on a set of demographic and labour market variables as:

$$\text{Share of class}_{c,i,\text{year}}^T = \ln \left(\frac{\text{Share of class}_{c,i,\text{year}}}{1 - \text{Share of class}_{c,i,\text{year}}} \right) \quad (4)$$

where c , i and year are as defined in eq. (3), α is the constant term, country is a country-dummy to capture fixed-effects, X is a vector of the independent variables and ε is the error term. The independent variables include per-capita GDP (pcGDP) and its square (pcGDP2), the share of employment in agriculture and industry in the working-age population (AGR_p and IND_p), and the demographic variables described earlier (p0-14, p25-54, DEP1 and DEP2).

The choice of independent variables was made on the following basis: the relationship between pcGDP and employment classes is expected to hold via the channel of labour productivity, and we allow for the possibility of a non-linear relationship (see Appendix 1). Per-capita GDP is considered here instead of output per worker to avoid having a common denominator in both the independent and dependent variables. For the classes of the extreme poor, moderately poor and near poor, we expect a significant, negative correlation between these classes and pcGDP, as low productivity employment is often synonymous with poor remuneration, subsistence-oriented activities. For the middle classes, the relationship is expected to be positive. This variable is interacted with regional dummy variables to capture region-specific differences.

Increases in per capita GDP without an accompanying structural employment shift from low productivity employment into higher productivity jobs are less likely to be associated with increased income and reduced poverty among workers.¹⁸ Accordingly, we include the variables AGR_p and IND_p in order to capture structural shifts in employment. We expect a significant, positive relationship between AGR_p and the share of workers in the lowest expenditure classes. Growth in industrial employment is expected to be positively associated with growth in the share of middle class workers. Changes in the shape of a country's population distribution can also impact on the rate of poverty reduction and hence, the distribution of employment across expenditure classes. Bloom et al. (2003) posit that when countries reach a phase of development whereby the fertility rate drops alongside a decline in mortality as health levels improve, the dependency ratio falls, leading to a larger potential workforce relative to dependent segments of the population. This, in turn, can increase economic growth.¹⁹ The demographic variables are utilized to attempt to capture this effect. For example, all else equal, a higher share of the prime age-group (25-54) in the total population is expected to be negatively correlated with the share of workers in poverty.

In order to investigate which combination of the above variables produces the best predictions for each economic class threshold and each region examined, we test 40 different combinations.²⁰ We rank the 40 specifications for each class examined according to the overall in-sample RMSE. We isolate the 15

¹⁸ See for instance, Hull (2009). Much research on the relationship between structural change, economic growth and poverty reduction has relied on the seminal work of Lewis (1954).

¹⁹ See Bloom, et al. (2003). The extent to which a country benefits during this “demographic window” crucially depends on how well labour markets can absorb the increased supply of workers – i.e. whether there are sufficient decent and productive employment opportunities.

²⁰ This follows a similar approach in: Viegelahn, Christian “Estimating and forecasting wages in developing countries: An expectation-based approach”, ILO, Geneva (forthcoming).

top-ranked specifications and calculate the simple average predictions of the 3, 5 and 10 best specifications, for a total of 18 specifications. For these, we calculate the in-sample RMSE by region and class. We find that the calculated average predictions perform best in 64 per cent of the cases, while in the remaining cases the averages perform neither significantly better nor worse than the individual specifications.

To test whether these specifications are robust and not dependent on the available sample of data, we run a bootstrap procedure. The 18 specifications discussed above are run again on the sample, which is randomly reduced by 10 per cent, 20 per cent and 30 per cent. Because the reduction is random, for each level of sample-reduction, the routine runs 100 times. The RMSE by class and region is calculated after each iteration. Finally, we select the average specification (for each class and each region) based on the lowest RMSE produced with the bootstrap procedure. To preserve reported data, the resulting predictions are adjusted to bring the predicted series in line with reported data. This adjustment is done by using the ratio of the predicted share to the real share.

$$\text{Adjustment ratio}_{c,i,\text{earliest year}} = \text{Share of } \widehat{\text{class}}_{c,i,\text{earliest year}} / \text{Share of class}_{c,i,\text{earliest year}} \quad (5)$$

$$\text{Adjustment ratio}_{c,i,\text{in between year}} = \text{Share of } \widehat{\text{class}}_{c,i,\text{in between year}} / \text{Share of class}_{c,i,\text{in between year}} \quad (6)$$

$$\text{Adjustment ratio}_{c,i,\text{latest year}} = \text{Share of } \widehat{\text{class}}_{c,i,\text{latest year}} / \text{Share of class}_{c,i,\text{latest year}} \quad (7)$$

where c and i are as defined in eq. (4). The first and the third ratios are used to adjust the predictions for the earliest and the latest year for which the previous step produced an estimate as well as the preceding and subsequent years, respectively. The second ratio is used to adjust the remaining years in between and is linearly interpolated between the earliest and latest year. As the share of workers in all classes must equal one, we provide a final adjustment by dividing each estimated class share by the total sum of the estimated class shares.²¹

$$\text{Final predicted share of class}_{c,i,\text{year}} = \text{Adj. share of } \widehat{\text{class}}_{c,i,\text{year}} / \sum_c \text{Adj. share of } \widehat{\text{class}}_{c,i,\text{year}} \quad (8)$$

3.3 Robustness tests

3.3.1 Testing the estimations of employment shares by economic class

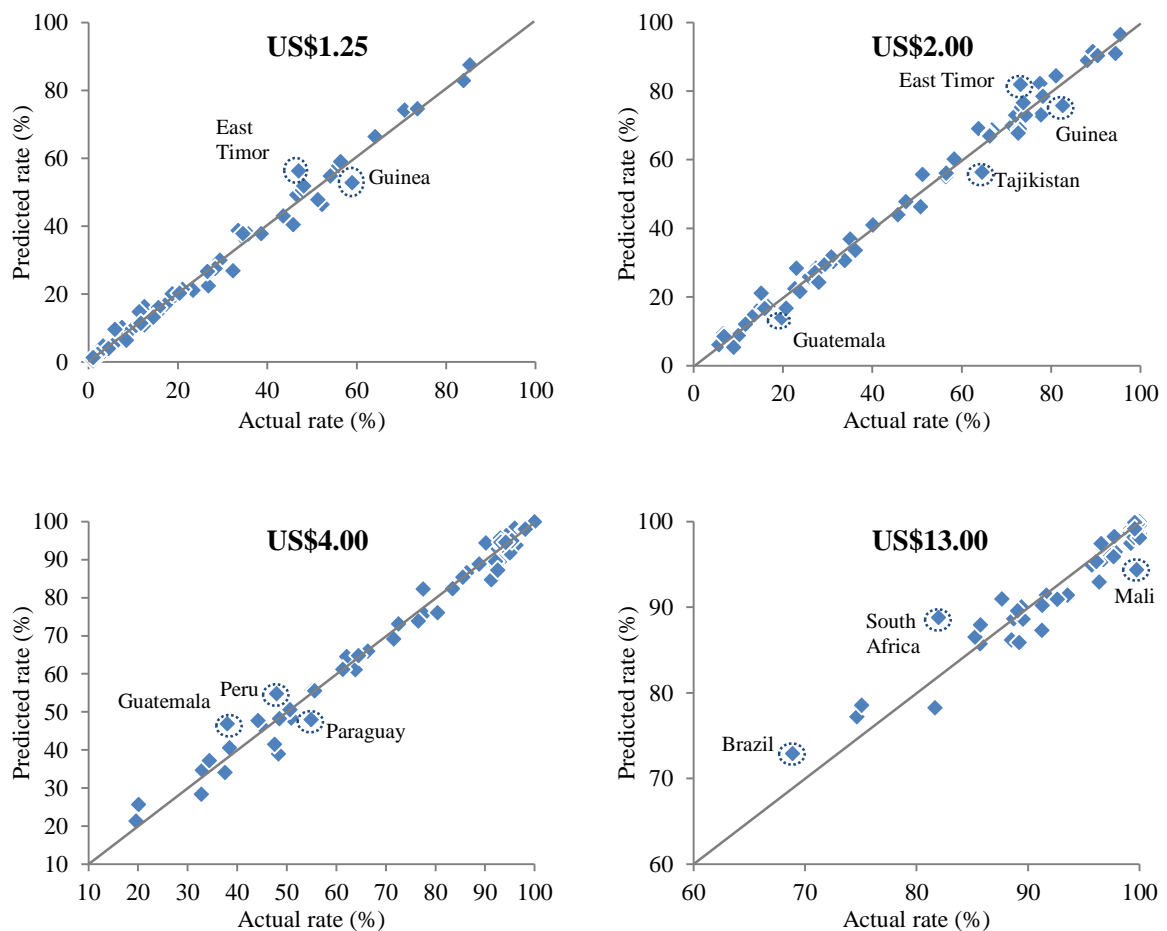
To test the estimations of the shares of employment by economic class, we compare the individual country predictions with the 59 national estimates from the household surveys. That is, we drop each of the 59 real observations sequentially and for each iteration we obtain an estimate for the missing observation. The estimation routine is thus run 59 times. The results of this exercise are shown in Figure 5. If an observation rests precisely on the diagonal line, this indicates that the predicted value is equal to the actual value. Values above the line indicate that the predicted value is greater than the actual value while values below the line indicate that the predicted value is less than the actual value.

For US\$1.25, US\$2.00 and US\$4.00 levels, the values predicted by the model are very close to the actual country values for the majority of the cases. There are some outliers, which have been identified

²¹ The final prediction for eight countries comes from specifications that do not utilise the per capita GDP variable. These countries are: Afghanistan, Angola, Eritrea, Equatorial Guinea, Haiti, Liberia, Maldives and Zimbabwe.

in the figure. Given tremendous heterogeneity in underlying country characteristics, it is not surprising that a single model would not provide a closely matching estimate for all countries. Yet, further examination of potential causes of the larger prediction errors in outlier countries could inform subsequent revisions to the model framework. Nevertheless, as the purpose of this model is to produce reliable regional aggregate estimates of employment by expenditure class, the main aim is to ensure that the estimated values are not systematically biased in comparison with the true values. That is, the errors should be normally distributed around zero.

Figure 5: Robustness test for the estimations of employment by economic class, actual versus estimated rates



Note: The line in the figures indicates the 45^o line.
Source: Authors' calculations.

Although the overall fit of the estimates for the US\$13 and above class (class 5) is inferior as compared with the other class estimates, our tests of the predictions across the economic class groups do not yield evidence of systematic bias (upwards or downwards) in the predictions: For US\$1.25, out of the 59 calculated differences between actual and predicted values, the predicted values exceed the real values in 33 observations, fall below real values in 24 observations and twice they equal the real value at 1-decimal. The mean absolute error is 1.9 percentage points (compared with a simple average across the actual rates of 27.7 per cent). For US\$2.00, the predicted values exceed the real values in 33 observations, fall below real values in 25 observations and once they match the real value at 1-decimal.

The mean absolute error is 2.4 percentage points (compared with a simple average across the actual rates of 46.8 per cent). For US\$4.00, the predicted values exceed the real values in 28 observations, fall below real values in 26 observations and five times they match the real value at 1-decimal. The mean absolute error is 2.4 percentage points (compared with a simple average across the actual rates of 71.8 per cent). For US\$13.00, the predicted values exceed the real values in 17 observations, fall below real values in 32 observations and 10 times they match the real value at 1-decimal. The mean absolute error is 1.3 percentage points (compared with a simple average across the actual rates of 94.5 per cent).

3.3.2 Testing the imputations of employment shares by economic class

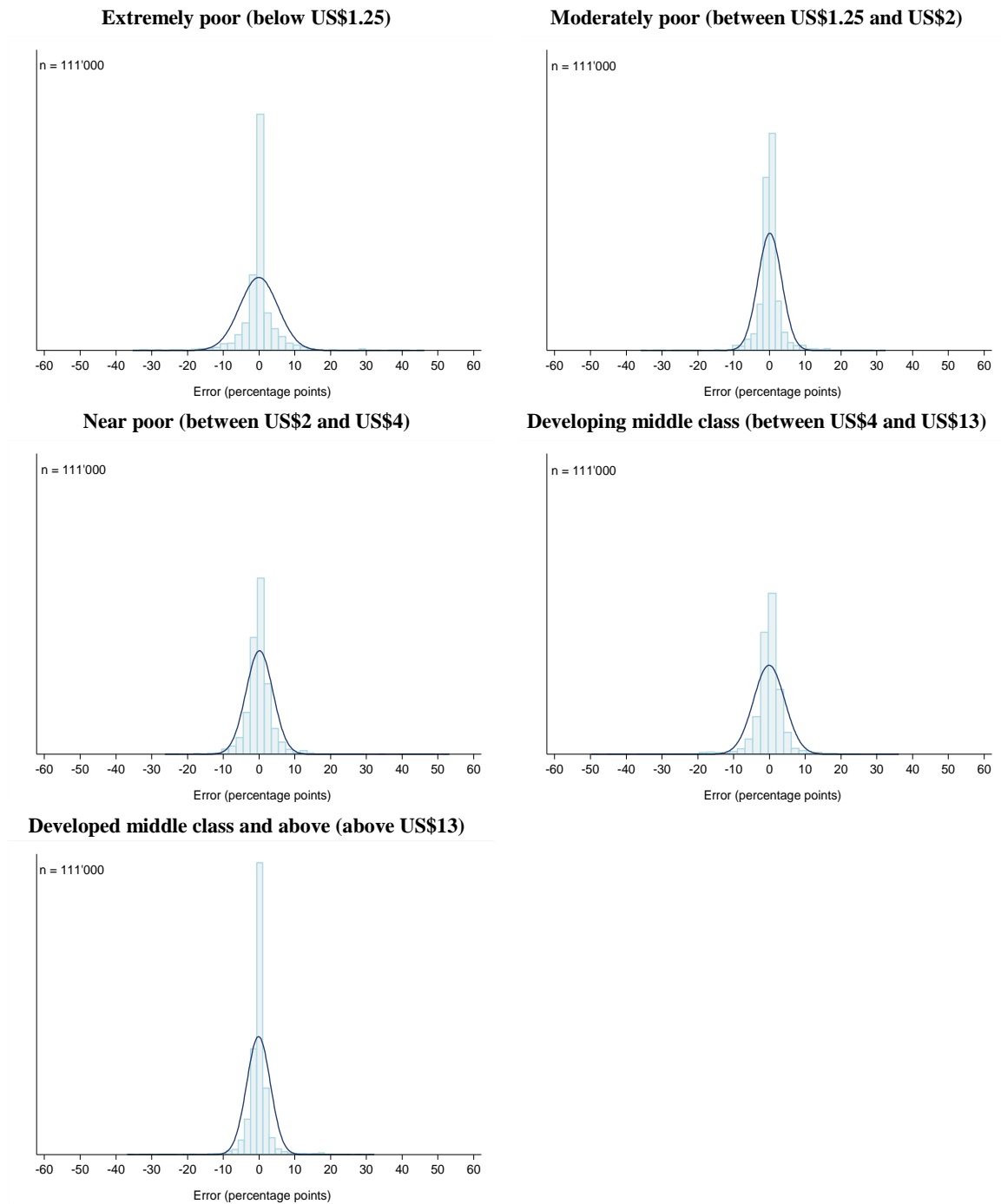
To test the robustness of the imputations of the shares of employment by economic class, we run bootstrap procedure randomly on 80 per cent of the sample and calculate the prediction errors.²² As the sample reduction is random, the routine runs 100 times and the results of this exercise are shown in Figure 6.

For all the classes, on average, the imputed values are not systematically biased, as the errors in all cases are almost equally distributed around zero. The (unweighted) mean errors for the above five classes are: -0.05, 0.13, 0.13, -0.08 and -0.13 percentage points; and the (unweighted) mean shares for these classes are: 16.8, 12.6, 23, 36.1 and 11.6 per cent. The predicted errors for the extremely poor class have the highest standard deviation (visually represented in Figure 6 by the width of the distribution curve) while the errors for the class of workers above the US\$13 a day line have the lowest errors.²³

²² More precisely, using the 584 observations resulting from the estimation phase, we keep the 31 countries for which there is only one year of data available and randomly drop 20 per cent of the remaining sample (i.e. 111 observations dropped), re-run the imputation routine and then calculate the errors for each class. The 31 countries with only one year of data are not dropped as we test the performance of the model on item non-response (i.e. data missing in some years) rather than on unit non-response (i.e. data missing in all years).

²³ The correlations observed in the initial dataset and the final estimates are of the same sign and similar magnitude. The share of the middle class in total employment is negatively correlated with the share of the extremely poor by 0.86 in the initial dataset and 0.79 in the final database. The share of the moderately poor in total employment is negatively correlated with the share of the middle class and above by 0.77 in the initial dataset and 0.65 in the final database.

Figure 6: Robustness test for the imputations of employment by economic class, distribution of errors



Note: The x-axis shows the errors calculated in percentage points as the predicted shares minus the actual shares. The y-axis shows the incidence of observations.

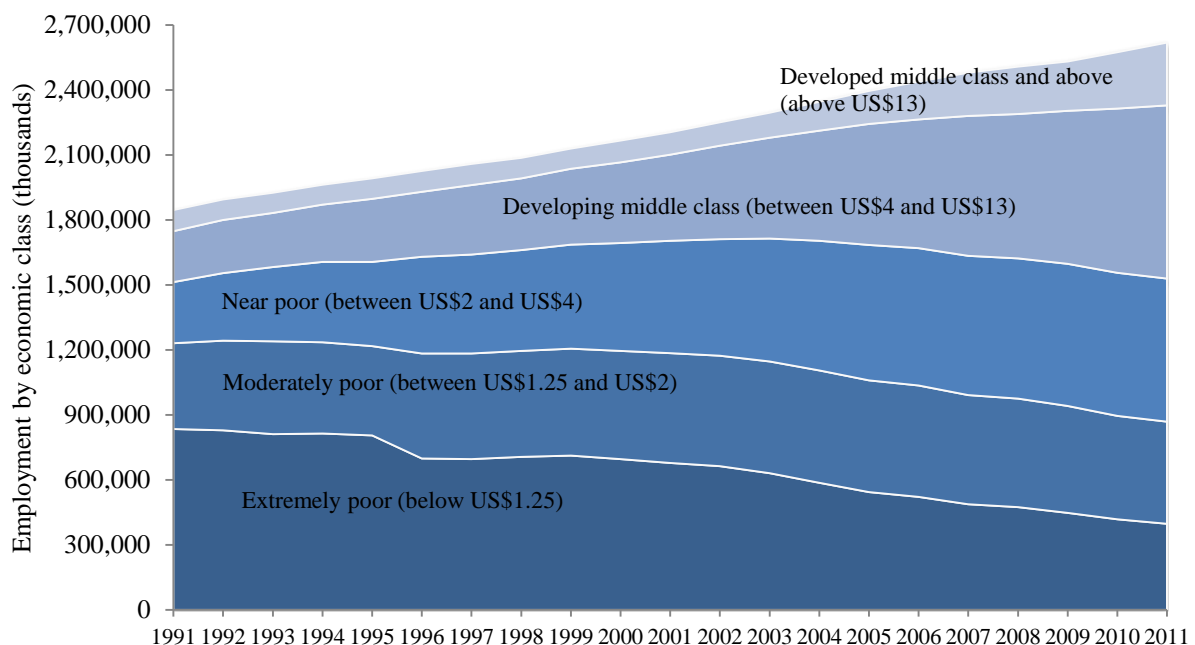
Source: Authors' calculations.

4 Global and regional trends in employment by economic class²⁴

4.1 Estimates of employment by economic class in the developing world

Based on the results of the model, in the developing world as a whole, we estimate that there are 1.089 billion workers classified as either developing middle class or above in 2011, with 800 million (30.5 per cent) in the US\$4 to US\$13 a day developing middle class and 290 million (11.1 per cent) classified as middle class based on a developed world definition of above US\$13 a day (see Figure 7 and Appendix 4, Table D1). Middle class workers in 2011 were 41.6 per cent of the developing world's total workforce, which is an increase from 22.8 per cent in 2001 and from 18 per cent in 1991.

Figure 7: Employment by economic class, 1991–2011, developing world



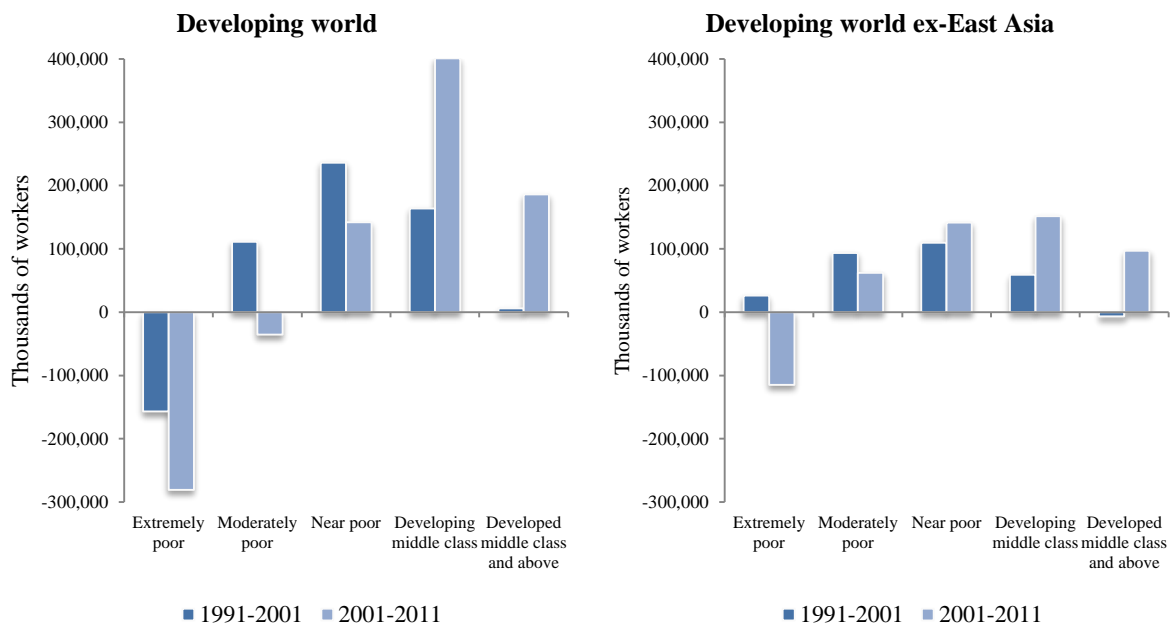
Source: Authors' calculations.

The decade from 2001 to 2011 saw rapid growth in middle class employment, with an increase of nearly 401 million developing middle class workers and an additional increase of 186 million workers above the US\$13 a day line (see Figure 8, left-hand side). This growth in middle class employment occurred alongside a dramatic decline in the number of workers living in poverty: the number of extreme working poor fell by 281 million in the decade to 2011. The number of workers living in moderate poverty also declined, but by a more modest 35 million between 2001 and 2011. However, this decline represented a favourable reversal, as moderate working poverty had increased over the previous period by 111 million. The share of workers in extreme poverty declined sharply over both decades, from 45.2 per cent in 1991 to 30.7 per cent in 2001 and down to 15.2 per cent in 2011, while the share of workers living in moderate poverty rose during the decade from 1991 to 2001 (from 21.4 to 23 per cent), but then declined to 18 per cent in 2011.

²⁴ Regional estimates derived from the model are provided in figures and tables in Appendix 2.

While poverty declined and the middle classes grew over the past two decades, the number of near poor workers increased in both periods, rising by 236 million between 1991 and 2001 and by a further 142 million between 2001 and 2011. Near poor workers made up a slightly more than quarter of the developing world's workforce (25.2 per cent) in 2011, up from 15.3 per cent of workers in 1991.

Figure 8: Change in employment by economic class, developing world and developing world ex-East Asia, 1991–2001 and 2001–2011



Source: Authors' calculations.

Figure 8 also indicates that very rapid economic development in the East Asian region has had a strong impact on trends in employment by class in the developing world as a whole. In the developing world excluding East Asia, the number of workers in extreme poverty actually rose by 26 million between 1991 and 2001, but declined sharply (by 115 million) in the period from 2001 to 2011 (Figure 8, right-hand side). Also in contrast to the developing world average, excluding East Asia, the number of workers in moderate poverty increased in both periods. The number of near poor workers grew substantially in both periods – by 110 million between 1991 and 2001 and 141 million between 2001 and 2011. Given that the number of near poor workers in the developing world as a whole grew by 142 million, these figures together indicate that nearly all of the growth in this economic class occurred outside of East Asia.

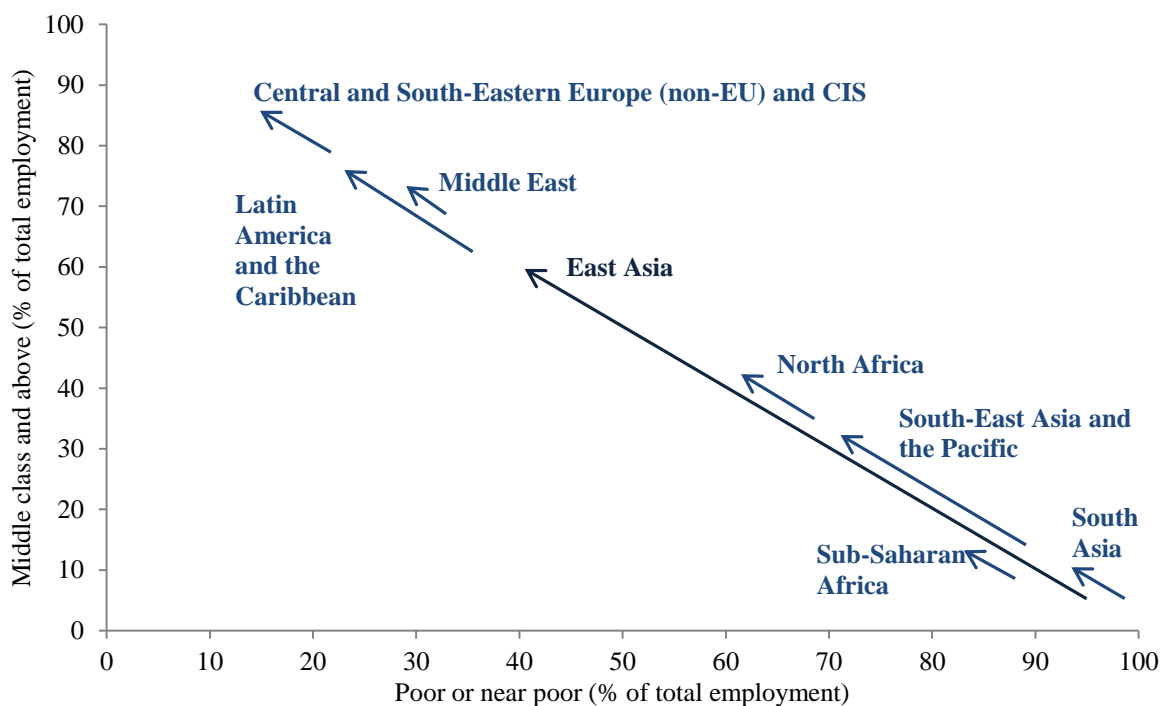
The developing world ex-East Asia also saw an acceleration in middle class employment growth between the two periods, however our estimates show that 62.2 per cent of the total increase in middle class employment in the developing world occurred in the East Asian region, despite this region only accounting for 31.5 per cent of the developing world's workforce.

As the dramatic changes occurring in East Asia, led by China's rapid economic development, have had a major influence on the overall trends in employment by economic class in the developing world, it is instructive to examine trends at the more disaggregated regional level. Figure 9 shows the evolution of the share of the working poor and near poor (below US\$4 a day) versus developing middle class

employment and above (US\$4 and above) in eight developing regions between two points in time: 1991 and 2001. Movement to the left indicates a reduction in the share of workers living in or near poverty between the two years, while movement upward indicates an increase in the share of workers in the developing middle class and above. Longer arrows indicate larger changes in the relative shares in the figure.

Between 1991 and 2011, all regions of the developing world registered a reduction in the share of workers living below US\$4 a day and an increase in the share of middle class workers. East Asia’s tremendous progress in both reducing working poverty and growing middle class employment is evident in the figure, as the region saw the largest changes in both shares among all regions of the world. East Asia began the period with higher shares of poor or near poor workers and lower shares of middle class workers than all regions except South Asia. By 2011 the region had surpassed South-East Asia and the Pacific, Sub-Saharan Africa and North Africa in terms of growing the share of middle class workers and reducing the share of poor or near poor workers.

Figure 9: Employment by middle class vs. poor and near-poor workers in the developing regions, 1991 and 2011



Note: The start of the arrows show the year 1991 and the end of the arrows show the year 2011.

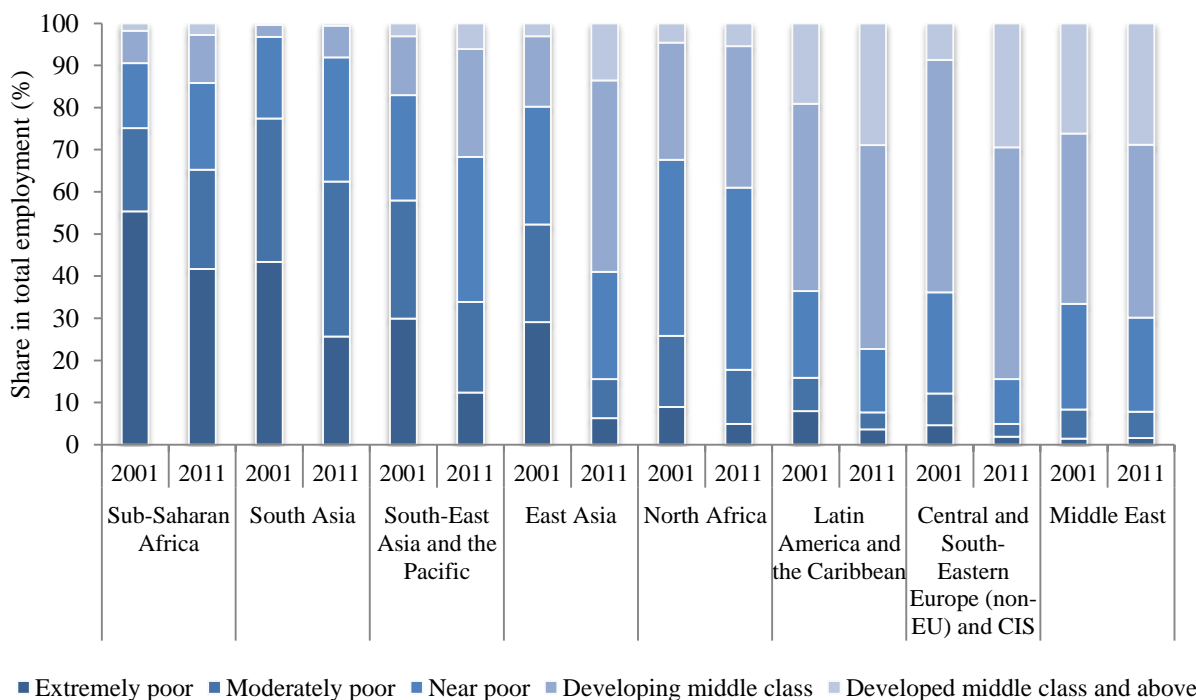
Source: Authors’ calculations.

Among the three regions with relatively low initial working poverty and near poor shares and high initial middle class employment shares (Central and South-Eastern Europe and CIS, Latin America and the Caribbean and the Middle East), Latin America and the Caribbean showed the most progress in reducing the share of workers below US\$4 a day and growing middle class employment, surpassing the Middle East in the share of middle class workers, as the latter region showed comparatively little progress in the period. The highest initial incidence of working poverty and the smallest share of middle class workers was in South Asia, and there was little change over the two decades. The same is true for

Sub-Saharan Africa. The most notable progress in reducing the share of workers in or near poverty and growing the middle class among these regions occurred in South-East Asia and the Pacific.

Figure 10 provides a detailed breakdown of employment by economic class for the eight developing regions for the years 2001 and 2011. There is large variation across regions both in terms of the distribution of employment across the economic classes as well as the changes in the relative sizes of the classes over the decade.

Figure 10: Employment by economic class in the developing regions, 2001 and 2011



Source: Authors' calculations.

In both Sub-Saharan Africa and South Asia, the middle classes comprise a very small segment of the regions' workforce. In Sub-Saharan Africa, 14.2 per cent of the employed were in the middle class and above in 2011, while in South Asia only 8.1 per cent of the region's workers are classified as middle class and above. Despite considerable growth in middle class employment in both the regions, vast majority of workers in these regions continue to remain either poor or near poor.

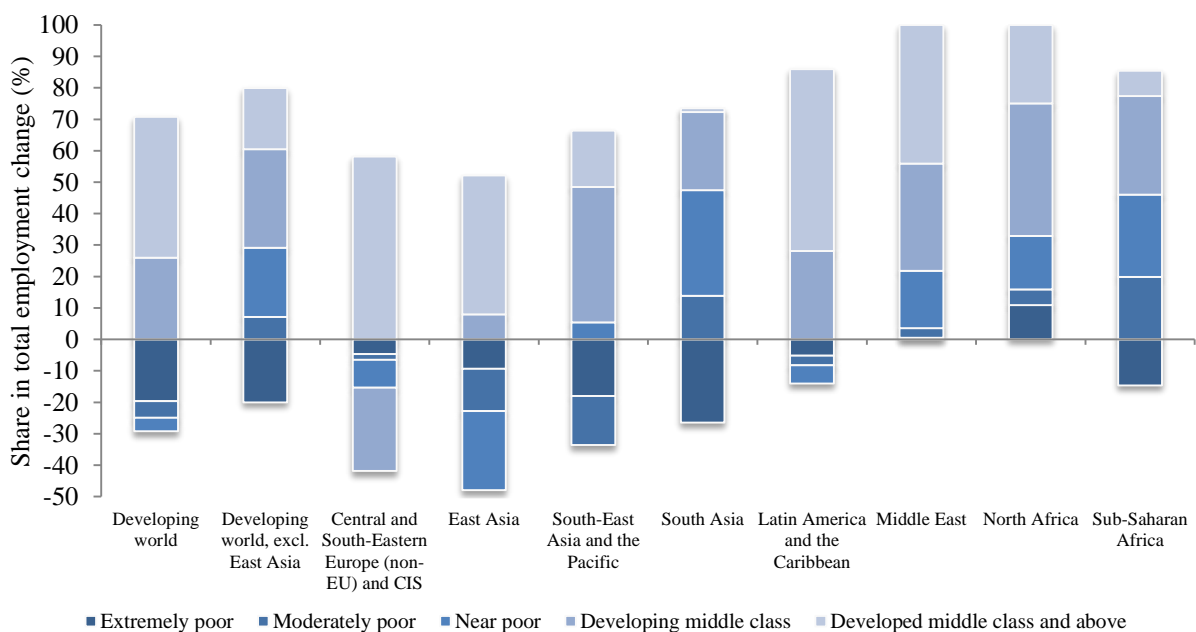
The East Asian region saw tremendous growth in employment for the middle class category, rising from 19.8 per cent in 2001 to 59 per cent of total employment in 2011. The South-East Asia and the Pacific region also experienced rapid growth in these employment categories, with an increase from 17 to 31.7 per cent of the total workforce over the period. East Asia also managed to reduce the proportion of near poor workers over the period, from 28 to 25.5 per cent, while in South-East Asia and the Pacific, the share of near poor rose from 25 to 34.4 per cent. The estimates show relatively little change in the composition of employment by economic class in the Middle East and North African regions. In North Africa, there is a 7 percentage decline in the share of the workforce either poor or near poor in 2011 compared to 2001. The proportion of middle class or above in the Middle East has not changed considerably and was 69.9 per cent in 2011.

Both the Latin America and the Caribbean and Central and South-Eastern Europe (non-EU) and CIS regions have very large middle classes: 77.3 per cent of all workers are middle class or above in the former and 84.5 per cent of workers in the latter are classified as middle class or above, with around 30 per cent of workers in each region classified as middle class based on a developed world definition. In both, the share of poor and near poor workers declined substantially, and in both regions the middle class workforce grew the most over the period, based on the developed world definition.

4.2 Projections of employment by economic class, 2011–2017

The model developed and described in this paper can also be utilized to produce projections of employment by economic class on the basis of projections in the underlying explanatory variables (see Appendix 2). Two questions are addressed on the basis of current macroeconomic and demographic projections, (i) which economic classes are projected to see the most growth between 2011 and 2017 in the developing world as a whole and across regions?; and (ii) what will the developing world's workforce look like in 2017 in terms of the distribution of employment across different economic classes?

Figure 11: Projected employment growth by economic class and region, 2011–2017



Source: Authors' calculations.

Figure 11 shows the projected change in employment across the economic classes over the period 2011 to 2017 in the eight developing regions, the developing world as a whole and in the developing world excluding the East Asian region. For each region, the shares sum to 100 per cent, with positive values indicating expansion in employment and negative values indicate a contraction in employment in a given economic class.

In the developing world as a whole, the period from 2011 to 2017 is projected to be highly favourable in terms of increased middle class (for both the US\$4-US\$13 and above US\$13 groups). The model projects employment growth of 247 million in the middle class based on the developed world definition and a further increase of 143 million in the middle class between US\$4 and US\$13. Progress towards reducing poverty among workers in line with the MDGs is expected to continue, with the number of workers in extreme poverty projected to decline by 108 million. Workers in moderate poverty and near poverty are forecast to decline by 29 million and 24 million respectively. This aggregate picture of the developing world is highly influenced by the East Asian region, which is projected to see massive growth of 210 million in the middle class (32 million between US\$4 and US\$13 and 178 million above US\$13). It should be noted that the projection for East Asia is influenced by the expectation of continued rapid growth in per-capita GDP in the region, which is projected to grow at an annual rate of 7.2 per cent over the period. If actual growth is substantially lower, we would expect a considerably smaller increase in the number of workers in the above US\$13 class in this region and also in the developing world aggregate.

Excluding the East Asian region from the projection estimates, the new middle class employment is still projected to account for the largest share of total employment growth in the developing world, with an additional 111 million middle class workers in the US\$4 and US\$13 class and 69 million workers above US\$13. The number of near-poor workers is projected to rise by 78 million, while the number of workers in moderate poverty is expected to expand by 25 million. The number of extreme working poor is projected to decline by 71 million.

Looking across the eight developing regions, what is striking is how large a share new middle class employment will comprise of total employment growth in every developing region. In Sub-Saharan Africa, the region in which the share of middle class employment growth in total employment growth is projected to be the smallest, growth in employment in the two middle class categories is expected to account for 55.6 per cent of all employment growth between 2011 and 2017, versus 28.3 per cent of all employment growth between 2001 and 2011. In South Asia, the two middle class employment categories are projected to equal 55.5 per cent of all employment growth versus 33.5 per cent between 2001 and 2011. Importantly, the increase in the number of near-poor workers is projected to exceed the corresponding increase in middle class employment, while the number of workers in moderate poverty will continue to increase, indicating that poverty and vulnerability will remain widespread in the region.

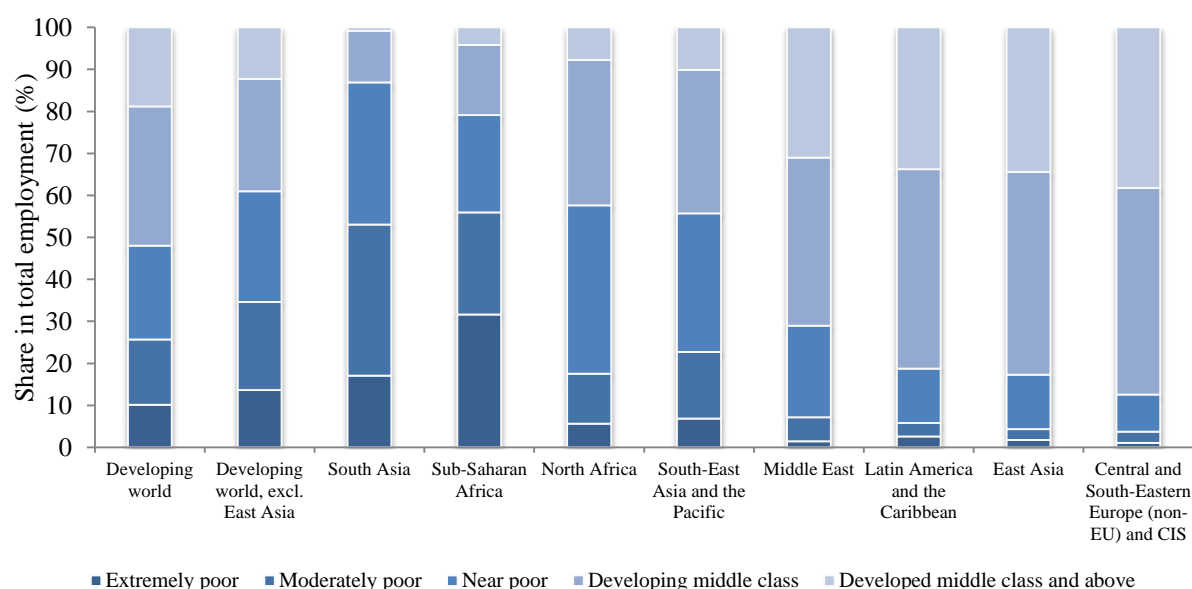
In South-East Asia and the Pacific, the number of workers in the extreme and moderate working poverty classes is expected to decline, while the number of near-poor workers is projected to increase by 4 million. The region is projected to have 49 million additional middle class workers in 2017 as compared with 2011 (35 million living between US\$4 and US\$13 and 14 million above US\$13). In the Middle East and North African regions, growth in middle class employment is projected to equal 78.2 per cent and 67.1 per cent of total employment growth, respectively, with the poor and near-poor classes accounting for the remaining 21.8 per cent of employment in the Middle East and 32.9 per cent in North Africa.

In Latin America and the Caribbean, the poor and near-poor classes are all projected to decline, while middle class employment is projected to increase by 33 million. While this is impressive, the ratio of middle class employment growth to total employment growth, projected at 1.2 between 2011 and 2017, is actually lower than the corresponding ratio (1.3) over the period from 2001 to 2011.

In the Central and South-Eastern Europe (non-EU) and CIS region, the only economic class in which employment is projected to grow is the middle class based on the developed world definition. Over the period from 2001 to 2011 both middle class groups grew, but our model projects that the middle class in the US\$4 to US\$13 category will shrink in the coming years. In this region, which has the highest levels of per-capita GDP among all developing regions, the two middle classes comprised nearly 85 per cent of total employment in 2011 (55 per cent in the US\$4 to US\$13 class and just under 30 per cent in the above US\$13 class). Hence what is projected in the region is growth in the segment of the workforce in the middle class segment above US\$13, with a comparable decline in the share of the middle class workforce in the US\$4 to US\$13 class.

What do our estimates indicate the developing world's workforce will look like in 2017? Figure 12 shows the projected breakdown of employment across economic classes in each of the developing regions, the developing world as a whole and the developing world excluding East Asia. The employment shares for each region sum to 100 per cent.

Figure 12: Employment by economic class in the developing regions in 2017



Source: Authors' calculations.

By 2017, we project that more than half (51.9 per cent) of the developing world's workforce will be middle class and above, with 33.1 per cent in the US\$4 to US\$13 class and 18.8 per cent in the above US\$13 class. This represents a 10 percentage point increase in the share of middle class and above workers versus 2011. About 23 per cent of the world's workers are projected to be in the near-poor class, with 16 per cent in moderate poverty and 10.3 per cent in extreme poverty. Excluding East Asia, 39 per cent of workers are projected to be in the middle class and above, versus 26.4 per cent near poor and 34.6 per cent in extreme and moderate poverty.

We project that the vast majority of workers in South Asia and Sub-Saharan Africa will still be either poor or near poor in 2017, with 86.9 per cent of workers in South Asia and 79.2 per cent in Sub-Saharan Africa in the three lower economic classes. These two regions are projected to account for 82.2 per cent of the developing world's extreme working poor, 77.3 per cent of the moderate working poor and 50.7

per cent of near-poor workers, despite accounting for less than 38 per cent of the developing world's workforce.

North Africa and South-East Asia and the Pacific are projected to have a fairly similar distribution of employment across economic class groups in 2017, owing more to fairly rapid shifts in the shares of employment in South-East Asia where the share of middle class workers and above is projected to increase by 12.6 percentage points. Similarly, East Asia and Latin America and the Caribbean are projected to have a similar distribution of workers across the classes, both projected to have approximately 82 per cent of workers in the middle class and above (82.7 and 81.3 per cent, respectively) and a similar share of workers across the other classes in 2017. Finally, the share of workers in the middle class and above in Central and South-Eastern Europe (non-EU) and CIS and Middle East regions are projected to be 87.4 per cent and 71 per cent respectively in 2017.

Overall, most regions are expected to see a notable rise in the share of middle class workers in the coming years. While the overall picture is highly encouraging, it is important to reiterate that in 2017, we project that around half of the developing world's workforce (and over 60 per cent of the developing world's workers outside of East Asia) will remain either poor or near poor. The development outlook is favourable for the developing world, but much work will remain to further raise productivity and generate sufficient numbers of decent employment opportunities.

5 Conclusions and future work

This paper has introduced a new methodology to produce country-level estimates and projections of employment across five economic classes, building on earlier work to produce global and regional estimates of the working poor. This has facilitated the first ever global and regional estimates of workers across economic classes, providing new insights into the evolution of employment in the developing world. It is hoped that the new estimates of the distribution of employment across classes will enhance the body of evidence on trends in employment quality in the developing world – a desirable outcome given the relative dearth of information on employment quality as compared with indicators on the quantity of employment, such as labour force participation and unemployment rates.

Much of the analysis presented has focused on a developing middle class workforce in the developing world, which we define as workers living with their families on between US\$4 and US\$13 at purchasing power parity, while we consider workers living above US\$13 as middle class and above based on a developed world definition. Growth in middle class employment in the developing world can provide substantial benefits to workers and their families, with evidence suggesting that the developing world's middle class is able to invest more in health and education and live considerably healthier and more productive lives than the poor and near-poor classes. This, in turn, can benefit societies at large through a virtuous circle of higher productivity employment and faster development.

The model developed in this paper utilizes available national household survey-based estimates of the distribution of employment by economic class, augmented by a larger set of estimates of the total population distribution by class together with key labour market, macroeconomic and demographic indicators. A set of explanatory variables was chosen on the basis of relationships with the distribution of employment by class as supported by economic theory and the literature as well as by data availability, with final specifications chosen on the basis of minimizing prediction errors at the national and regional levels. The output of the model is a complete panel of estimates and projections of

employment by economic class for 142 developing countries, which serve as the basis for the production of regional aggregates.

Our estimates provide evidence of very rapid growth in the developing world's middle class, underpinned by tremendous economic development particularly in the East Asian region, but also in South-East Asia and the Pacific. We estimate that 41.6 per cent of the developing world's workers were middle class and above in 2011, more than double the share in 1991 – reflecting robust growth in middle class employment in many developing regions. An alternate view of this statistic, however, is that as of 2011, 58.4 per cent of the developing world's workers remained either poor or near poor. In South Asia, an alarming 91.9 per cent of the workforce was either poor or near poor in 2011, while in Sub-Saharan Africa, 86 per cent of workers were in these categories. Much work remains in terms of raising productivity levels and expanding the number of quality jobs in order to catalyse further growth in the middle class.

By 2017, we project that more than half of the developing world's workforce will be middle class and above, with 33.1 per cent in the US\$4 to US\$13 class and 18.8 per cent in the above US\$13 class. This represents a 10.3 percentage point increase in the share of middle class and above workers versus 2011. Twenty-two per cent of the world's workers are projected to be in the near-poor class, with 15.5 per cent in moderate poverty and 10.1 per cent in extreme poverty. Excluding East Asia, 39 per cent of workers are projected to be in the middle class and above, versus 26.4 per cent near poor and 34.6 per cent either in extreme and moderate poverty.

In terms of future work, the model developed in this paper can be further refined, among others by assessing additional or alternate explanatory variables, which could further improve the fit. The estimates and projections would also be improved through the addition of new national estimates of employment by class on the basis of tabulations from household survey datasets. While this paper has focused on production of regional aggregates, an aim is to ultimately release the national estimates of employment by class to facilitate analysis and inform policymaking at the national level. In addition, though our initial work has focused on five economic classes, the model developed is flexible enough to allow for estimates of employment across more detailed economic classes, which could provide further important insights on trends in employment quality in the developing world.

Although not analysed in depth in this paper, the regressions underpinning the model developed can provide insights on the relationship between developments in employment by class and the various economic, demographic and labour market indicators used as explanatory variables. Analysis along these lines is warranted, particularly at the regional and country levels, to identify potential drivers of growth in middle class employment. The model is also well-suited for scenario building, for instance assessing the impact of a shock to economic growth or other explanatory variables on the future distribution of employment across classes. Further analytical work along these lines could provide evidence as to the relative merits of alternate policy options.

Finally, the present work has not examined trends in employment by class in different demographic groups, such as women, youth and older workers. This omission was largely due to a lack of age and sex-disaggregated international poverty data in the PovcalNet data repository. Nevertheless, as policies and programmes often target specific groups in need, this is an area that deserves considerable attention in future research related to employment and economic class. Future work should utilize the wealth of information in the household survey datasets to estimate and present trends across demographic groups.

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Appendix 1: Input data and model regression tables

Dataset

The table below shows the shares by economic class of the initial input dataset.

Table A1: Employment by economic class, input data

Country	Year	Employment by class (% of total)					Type of survey
		Extremely poor (below US\$1.25)	Moderately poor (between US\$1.25 and US\$2)	Near poor (between US\$2 and US\$4)	Developing middle class (between US\$4 and US\$13)	Developed middle class and above (above US\$13)	
Armenia	2003	5.9	29.2	48.4	15.7	0.8	LSS
Benin	2003	43.6	27.7	21.6	6.5	0.6	CWIQ
Bhutan	2003	26.8	24.0	29.6	17.3	2.3	LSS
Bolivia	2002	21.0	9.8	24.3	33.6	11.3	HS
Bolivia	2005	17.4	9.0	24.2	35.2	14.3	HS
Brazil	2008	3.2	3.5	13.4	48.8	31.1	HS
Burkina Faso	2003	55.5	25.6	14.9	3.7	0.3	CWIQ
Burundi	1998	85.3	10.2	3.6	0.8	0.1	LSS
Cambodia	2004	34.6	29.2	26.4	9.0	0.8	SES
Cameroon	2001	10.1	21.2	40.3	26.0	2.5	HS
Cape Verde	2002	16.3	17.5	30.0	29.7	6.5	IES
Colombia	2003	15.6	11.8	28.2	33.8	10.6	LSS
Congo	2005	52.2	20.7	18.4	7.9	0.8	CWIQ
Côte d'Ivoire	2002	23.3	22.4	31.9	20.2	2.2	LSS
Dominican Republic	2000	4.5	5.6	22.7	48.9	18.3	HS
East Timor	2001	47.0	26.1	21.1	5.6	0.2	HS
Ecuador	1994	12.5	11.3	27.1	38.6	10.5	LSS
El Salvador	2003	9.3	7.3	21.8	46.8	14.8	HS
Gabon	2005	3.6	10.6	30.6	46.8	8.4	CWIQ
Ghana	1998	34.6	23.7	28.0	13.7	0.0	LSS
Guatemala	2000	8.7	11.0	28.7	40.2	11.5	LSS
Guatemala	2006	7.5	7.6	22.9	47.7	14.3	LSS
Guinea	2003	58.9	23.6	13.7	3.5	0.3	HS
India	2005	38.6	35.7	21.1	4.3	0.3	HS
India	2009	29.3	37.0	27.2	6.1	0.4	HS
Indonesia	2002	28.3	38.0	26.8	6.6	0.3	SES
Jordan	2002	1.0	7.9	28.6	53.7	8.7	IES
Kazakhstan	2003	2.0	11.1	37.5	45.7	3.6	HS
Lesotho	2002	33.5	17.7	26.3	19.2	3.3	IES
Liberia	2007	83.8	10.6	4.6	0.8	0.2	CWIQ
Madagascar	2005	64.1	24.0	11.8	0.0	0.0	HS
Malawi	2004	70.7	18.6	8.5	2.0	0.2	HS
Mali	2006	51.3	26.4	17.3	4.7	0.3	HS
Mexico	2004	1.0	4.7	13.9	55.1	25.4	IES
Morocco	1998	5.5	17.1	39.4	33.6	4.3	IES
Mozambique	2003	73.6	16.9	7.7	1.9	0.0	IES
Nepal	2003	48.2	25.6	19.4	6.3	0.5	LSS
Nicaragua	1998	9.8	16.2	35.3	34.8	3.9	LSS
Nicaragua	2001	11.4	17.8	37.1	30.4	3.3	LSS
Nicaragua	2005	9.5	17.7	37.3	32.1	3.4	LSS
Niger	2005	46.6	25.5	20.4	6.9	0.6	CWIQ
Nigeria	2004	56.4	21.1	16.5	5.9	0.1	LSS

Table A1 continued: Employment by economic class, input data

Country	Year	Employment by class (% of total)					Type of survey
		Extremely poor (below US\$1.25)	Moderately poor (between US\$1.25 and US\$2)	Near poor (between US\$2 and US\$4)	Developing middle class (between US\$4 and US\$13)	Developed middle class and above (above US\$13)	
Pakistan	2005	19.3	37.1	35.7	7.4	0.5	LSS
Panama	1997	10.6	5.3	17.0	42.1	24.9	LSS
Paraguay	2002	14.5	13.6	26.9	36.3	8.8	HS
Peru	2002	11.3	11.6	24.9	39.7	12.4	HS
Peru	2006	8.5	12.2	26.8	41.6	10.8	HS
Philippines	2003	18.7	21.4	32.5	24.0	3.4	LFS/IES
Senegal	2001	45.8	26.8	19.7	6.8	0.8	HS
Sierra Leone	2003	54.1	24.0	16.1	5.2	0.6	HS
South Africa	2000	12.5	10.7	21.0	37.8	18.0	IES
Sri Lanka	2002	11.7	24.5	40.4	21.2	2.3	IES
Tajikistan	2003	32.3	32.2	28.0	7.4	0.0	LSS
Thailand	2002	1.2	10.4	36.9	44.1	7.4	SES
Togo	2006	35.8	31.0	25.4	7.9	0.0	HS
Turkey	2002	1.0	5.8	27.5	54.7	10.9	IES
Uganda	2005	47.8	25.5	19.6	6.3	0.7	HS
Viet Nam	2004	26.6	29.9	32.3	10.7	0.4	LSS
Viet Nam	2006	20.3	27.2	38.0	14.0	0.4	LSS

Note: LSS: Living standards survey, IES: Household income and expenditure survey, CWIQ: Core Welfare Indicators Questionnaire (World Bank), HS: Household or labour force survey, SES: Socio-economic survey, LFS/IES: Labour force survey/Household income and expenditure survey.

Additional data

In addition to the above dataset, the following data sources are used in the production of the employment by class estimates:

- ILO, Global Employment Trends Model (GET), October 2012: estimates and projections of labour market indicators (unemployment, employment, employment by sector and status in employment) for 178 countries since 1991.
- United Nations World Population Prospects (WPP), 2010 Revision Database: a database of country-level population estimates and projections.
- ILO Economically Active Population, Estimates and Projections (6th Edition): labour force estimates and projections disaggregated by sex and five year age groups for 191 countries since 1990.
- World Bank/IMF data on GDP (PPP, per capita GDP and GDP growth rates) from the World Development Indicators and the World Economic Outlook October 2012 database.

Table A2 presents the dependent and independent variables used in the estimation procedure that is described in the following section. To construct the variable for the ratio of employed population (aged 15 and above) to the total population (aged 0+) below each economic class threshold, we use tabulations from the national household surveys. We combine the estimates of the share of the employed living

with their families on less than a specific economic class threshold in total employment with estimates of total employment from the ILO's GET Model to calculate the number of employed in the above thresholds. This is done in order to ensure a comparable measurement of employment across countries. Similarly, the shares of the population below the various economic class thresholds from the PovcalNet database are combined with the population estimates from the WPP database to produce estimates of the population below each of the economic class thresholds. To construct the variable for the share of employment by economic class in total employment, we divide the number of employed living within each of the five class groups by total employment.

Table A2: Dependent and independent variables by source

Dependent variables	Source	
Ratio of employed population (aged 15 and above) to the total population (aged 0+) below each economic class threshold	National household surveys combined with PovcalNet data and ILO, Global Employment Trends Model	
Share of employment by economic class in total employment	ILO, Global Employment Trends Model	
Independent variables	Source	
Employment-to-population ratio	(<i>EPR</i>)	ILO, Global Employment Trends Model
Share of employment in agriculture in total employment	(<i>AGR</i>)	
Share of employment in agriculture in working-age population	(<i>AGRp</i>)	
Share of employment in industry in total employment	(<i>IND</i>)	
Share of employment in industry in working-age population	(<i>INDp</i>)	
Share of wage and salaried workers in total employment	(<i>WSW</i>)	
Output per worker	(<i>LP</i>)	
Per-capita GDP (log)	(<i>pcGDP</i>)	World Bank, World Development Indicators and IMF, World Economic Outlook
Per-capita GDP (log, squared)	(<i>pcGDP2</i>)	
Share of population aged 15+ in total population	(<i>WAP</i>)	United Nations, World Population Prospects
Share of population aged 0 to 14 in total population	(<i>p0-14</i>)	
Share of population aged 25 to 54 in total population	(<i>p25-54</i>)	
Share of population aged 0 to 14 and 65+ in total	(<i>DEP1</i>)	
Share of population aged 0 to 14 and economically inactive population aged 15+ in total population	(<i>DEP2</i>)	ILO Economically Active Population, Estimates and Projections

Estimating employment by economic class

The tables below show the OLS regression results from the best-performing specification by region for the estimation regressions. The dependent variable is the ratio of the employed population (aged 15 years and above) in each expenditure class to the total population (including the population aged below 15 years) in each class. For the Tables A3a-d; all the regressions include regional dummy variables. However, their coefficients are not included in the tables.

The difference between RMSE (adj.) and RMSE is that for the former the denominator is the number of observations minus the number of coefficients, and for the latter the denominator is only the number of observations. All the reported information except the last row (RMSE) is based on the full sample and not on the specific region. The shaded areas indicate that the final specification is common across the underlined regions.

Table A3a: Estimation model; US\$1.25

US\$ 1.25	Central and South-Eastern Europe (non-EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South-East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
EPR	0.421***	0.589***	0.540***	0.540***	0.540***
LP	-0.023	-0.027	-0.016	-0.016	-0.016
AGR		0.131**			
WSW	-0.166***	-0.158***	-0.127**	-0.127**	-0.127**
DEP1		-0.595***	-0.673***	-0.673***	-0.673***
DEP2	-0.415***				
CSEE&CIS&MENA regional dummy	0.017	-0.004	-0.006	-0.006	-0.006
East and South-East Asia and the Pacific regional dummy	0.051**	0.031	0.029	0.029	0.029
South Asia regional dummy	0.057***	0.027	0.013	0.013	0.013
Latin America and the Caribbean regional dummy	0.003	0.003	0.017	0.017	0.017
Constant	0.644***	0.567***	0.458**	0.458**	0.458**
R-squared	0.827	0.837	0.824	0.824	0.824
Adj. R-squared	0.797	0.808	0.796	0.796	0.796
RMSE (adj.)	0.044	0.042	0.044	0.044	0.044
RMSE	0.040	0.039	0.040	0.040	0.040
AIC	-200.256	203.775	-201.020	-201.020	-201.020
BIC	-179.147	-182.666	-182.121	-182.121	-182.121
Observations	61	61	61	61	61
RMSE based on bootstrap	0.027	0.038	0.024	0.015	0.031

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A3b: Estimation model; US\$2.00

US\$ 2.00	Central and South-Eastern Europe (non-EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South-East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
EPR	0.575***	0.575***	0.579***	0.579***	0.579***
LP	-0.022*	-0.022*			
AGR	-0.086*	-0.086*			
WSW	-0.161***	-0.161***	-0.166***	-0.166***	-0.166***
DEP1	-0.746***	-0.7467***	-0.713***	-0.713***	-0.713***
CSEE&CIS&MENA regional dummy	0.024	0.023	0.021	0.021	0.021
East and South-East Asia and the Pacific regional dummy	0.033*	0.033*	0.036**	0.036**	0.036**
South Asia regional dummy	0.026	0.026	0.021	0.021	0.021
Latin America and the Caribbean regional dummy	0.011	0.011	0.014	0.014	0.014
Constant	0.586***	0.586***	0.337***	0.337***	0.337***
R-squared	0.892	0.882	0.882	0.882	0.882
Adj. R-squared	0.873	0.873	0.866	0.866	0.866
RMSE (adj.)	0.033	0.033	0.034	0.034	0.034
RMSE	0.031	0.031	0.032	0.032	0.032
AIC	-232.507	-232.507	-230.882	-230.882	-230.882
BIC	-211.398	-211.398	-213.995	-213.995	-213.995
Observations	61	61	61	61	61
RMSE based on bootstrap	0.038	0.039	0.025	0.029	0.032

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A3c: Estimation model; US\$4.00

	Central and South-Eastern Europe (non-EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South-East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
US\$ 4.00					
EPR	0.564***	0.569***	0.546***	0.546***	0.546***
LP	-0.016*	-0.017**	-0.011	-0.011	-0.011
AGR	-0.045	-0.064*			
WSW	-0.121***	-0.127***	-0.111***	-0.111***	-0.111***
DEP1	-0.778***				
WAP		0.613***	0.635***	0.635***	0.635***
CSEE&CIS&MENA regional dummy	0.032**	0.028*	0.024	0.024	0.024
East and South-East Asia and the Pacific regional dummy	0.032**	0.036***	0.036***	0.036***	0.036***
South Asia regional dummy	0.021	0.026**	0.020	0.020	0.020
Latin America and the Caribbean regional dummy	0.014	0.010	0.017	0.017	0.017
Constant	-0.529***	-0.159*	-0.248***	-0.248***	-0.248***
R-squared	0.937	0.938	0.934	0.934	0.934
Adj. R-squared	0.926	0.928	0.924	0.924	0.924
RMSE (adj.)	0.022	0.023	0.024	0.024	0.024
RMSE	0.022	0.021	0.022	0.022	0.022
AIC	-275.058	-276.389	-274.477	-274.477	-274.477
BIC	-253.949	-255.280	-255.480	-255.480	-255.480
Observations	61	61	61	61	61
RMSE based on bootstrap	0.030	0.019	0.024	0.046	0.026

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A3d: Estimation model; US\$13.00

	Central and South-Eastern Europe (non-EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South-East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
US\$ 13.00					
EPR	0.606***	0.606***	0.595***	0.595***	0.595***
LP	-0.008**	-0.008**			
AGR	-0.016	-0.016			
WSW			-0.036***	-0.036***	-0.036***
WAP	0.597***	0.597***	0.599***	0.599***	0.599***
CSEE&CIS&MENA regional dummy	0.002	0.002	0.007	0.007	0.007
East and South-East Asia and the Pacific regional dummy	0.019***	0.019***	0.021***	0.021***	0.021***
South Asia regional dummy	0.007	0.007	0.006	0.006	0.006
Latin America and the Caribbean regional dummy	0.002	0.002	0.007*	0.007*	0.007*
Constant	-0.297***	-0.297***	-0.355***	-0.355***	-0.355***
R-squared	0.985	0.985	0.986	0.986	0.986
Adj. R-squared	0.982	0.982	0.984	0.984	0.984
RMSE (adj.)	0.010	0.010	0.010	0.010	0.010
RMSE	0.010	0.010	0.009	0.009	0.009
AIC	-376.407	-376.407	-383.543	-383.543	-383.543
BIC	-357.409	-357.409	-366.656	-366.656	-366.656
Observations	61	61	61	61	61
RMSE based on bootstrap	0.017	0.007	0.010	0.024	0.021

Note: *** p<0.01, ** p<0.05, * p<0.1

Imputing employment by economic class

The tables below show the OLS regression results from the top-performing specification that is used in the final average prediction. The dependent variable is the logistically transformed share of employment by class in total employment. All the regressions include country dummy variables, but these are not presented below. All the reported information except the last row (in-sample RMSE), is based on the full sample and not on the specific region. The (region-specific) in-sample RMSE is calculated on the shares (in per cent) and is not directly comparable with the regression RMSE (adj.). The shaded areas indicate that the top-performing specification is common across the underlined regions.

Table A4a: Imputation model; extremely poor (below US\$1.25)

Extremely poor (below US\$1.25)	Central and South- Eastern Europe (non- EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South- East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
pcGDP	-1.279***	4.656**	4.017**	3.558*	-1.946***
pcGDP2		-0.424***	-0.429***	-0.424***	
AGR _p	6.291***	6.400***			
IND _p	-3.067	-3.492			
p(25-54)		-5.980*			
DEP1	4.032*		7.247***		6.651***
DEP2				-2.930*	
CSEE&CIS&MENA <i>regional dummy</i>	20.557***	22.014***	22.085***	17.452***	18.331***
East and South-East Asia and the Pacific <i>regional dummy</i>	1.519	-6.757	-11.96***	7.939*	9.791
Latin America and the Caribbean <i>regional dummy</i>	(omitted)	6.766	-10.178*	9.080	(omitted)
CSEE&CIS&MENA <i>regional dummy</i> *pcGDP	-2.106***	-0.885	-0.328	-0.568	-1.661***
East and South-East Asia and the Pacific <i>regional dummy</i> *pcGDP	0.164	0.950*	0.964	0.511	0.155
South Asia <i>regional dummy</i> *pcGDP	0.262	0.851	1.028	0.323	0.451
Latin America and the Caribbean <i>regional dummy</i> *pcGDP	0.080	1.774**	2.318***	1.552**	0.619
Constant	3.593	-24.447	-28.258**	-12.634	6.777
R-squared	0.952	0.953	0.951	0.950	0.949
Adj. R-squared	0.940	0.941	0.938	0.937	0.937
RMSE (adj.)	0.552	0.544	0.559	0.565	0.565
AIC	1'007.913	994.660	1'066.216	1'077.544	1'033.550
BIC	1'421.578	1'417.034	1'571.323	1'582.651	1'438.506
Observations	575	575	575	575	575
RMSE (in-sample)	0.02658	0.03410	0.06055	0.02511	0.06319

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A4b: Imputation model; moderately poor (between US\$1.25 and US\$2)

Moderately poor (between US\$1.25 and US\$2)	Central and South- Eastern Europe (non- EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South- East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
pcGDP	-1.740***	11.713***	12.153***	-1.301***	13.330***
pcGDP2		-0.755***	-0.792***		-0.929***
p(25-54)		1.122			
DEP2	-3.567***		-3.177***		-6.582***
<i>CSEE&CIS&MENA regional dummy</i>		18.064***	15.842***	27.878***	
<i>East and South-East Asia and the Pacific regional dummy</i>		5.858*	4.545	7.799*	
<i>Latin America and the Caribbean regional dummy</i>		2.298	-1.464	(omitted)	
<i>CSEE&CIS&MENA regional dummy*pcGDP</i>		-2.008***	-1.837***	-4.299***	
<i>East and South-East Asia and the Pacific regional dummy*pcGDP</i>		-0.606	-0.588	-1.938***	
<i>South Asia regional dummy*pcGDP</i>		-0.237	-0.263	-1.099*	
<i>Latin America and the Caribbean regional dummy*pcGDP</i>		0.135	0.039	-2.724***	
Constant	15.596***	-47.983***	-45.611***	-4.040	-43.054***
R-squared	0.894	0.929	0.930	0.920	0.923
Adj. R-squared	0.868	0.912	0.913	0.901	0.904
RMSE (adj.)	0.504	0.412	0.409	0.438	0.430
AIC	941.373	715.768	707.437	782.031	760.469
BIC	1'424.708	1'220.875	1'212.454	1'278.430	1'248.158
Observations	575	575	575	575	575
RMSE (in-sample)	0.02928	0.02593	0.02077	0.01551	0.03592

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A4c: Imputation model; near poor (between US\$2 and US\$4)

Near poor (between US\$2 and US\$4)	Central and South- Eastern Europe (non- EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South- East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
pcGDP	13.447***	12.995***	12.140***	12.737***	13.0353***
pcGDP2	-0.862***	-0.839***	-0.784***	-0.812***	-0.832***
AGR _p	1.313	1.370*		0.283	1.011
IND _p	1.986	0.790		-0.060	1.549
p(25-54)		5.939***			
p(0-14)	-5.555***				
DEP1			-4.407***		-5.775***
DEP2					
CSEE&CIS&MENA <i>regional dummy</i>		4.639**	5.143***	6.523***	
East and South-East Asia and the Pacific <i>regional dummy</i>		-3.225	-3.005	-1.580**	
Latin America and the Caribbean <i>regional dummy</i>		-1.985	-2.913	-2.703*	
CSEE&CIS&MENA <i>regional dummy*pcGDP</i>		-0.039	-0.236	-0.004	
East and South-East Asia and the Pacific <i>regional dummy*pcGDP</i>		0.760**	0.627*	0.904***	
South Asia <i>regional dummy*pcGDP</i>		0.629	0.599*	0.979**	
Latin America and the Caribbean <i>regional dummy*pcGDP</i>		0.488	0.372	0.751*	
Constant	-50.404***	-56.461***	-48.049***	-56.441***	-48.690***
R-squared	0.887	0.892	0.891	0.887	0.886
Adj. R-squared	0.859	0.864	0.864	0.859	0.858
RMSE (adj.)	0.306	0.302	0.302	0.307	0.307
AIC	372.540	357.560	355.974	377.193	376.434
BIC	868.938	871.375	861.081	886.654	872.832
Observations	575	575	575	575	575
RMSE (in-sample)	0.04305	0.03678	0.03449	0.02530	0.02818

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A4d: Imputation model; developing middle class (between US\$4 and US\$13)

Developing middle class (between US\$4 and US\$13)	Central and South-Eastern Europe (non-EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South-East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
pcGDP	14.319***	14.051***	3.728***	14.051***	14.473***
pcGDP2	-0.774***	-0.758***		-0.758***	-0.788***
AGR _p		-0.383		-0.383	
IND _p		6.249***		6.249***	
p(0-14)		-1.089		-1.089	-0.077
DEP1			-2.083		
DEP2	1.053				
CSEE&CIS&MENA regional dummy		-2.515	1.258	-2.515	
East and South-East Asia and the Pacific regional dummy		-2.881	-8.307*	-2.881	
Latin America and the Caribbean regional dummy		9.051*	(omitted)	9.051*	
CSEE&CIS&MENA regional dummy*pcGDP		-0.190	-2.682***	-0.190	
East and South-East Asia and the Pacific regional dummy*pcGDP		-0.164	-1.545**	-0.164	
South Asia regional dummy*pcGDP		-1.525***	-2.478***	-1.525***	
Latin America and the Caribbean regional dummy*pcGDP		-0.423	-3.517***	-0.423	
Constant	-67.228***	-61.220***	-9.940**	-61.220***	-66.737***
R-squared	0.938	0.941	0.931	0.941	0.938
Adj. R-squared	0.923	0.925	0.914	0.925	0.923
RMSE (adj.)	0.422	0.416	0.446	0.416	0.422
AIC	738.369	725.687	803.650	725.687	739.472
BIC	1'226.059	1'239.502	1'304.402	1'239.502	1'227.162
Observations	575	575	575	575	575
RMSE (in-sample)	0.06360	0.02455	0.01525	0.03487	0.01929

Note: *** p<0.01, ** p<0.05, * p<0.1

Table A4e: Imputation model; developed middle class and above (above US\$13)

Developed middle class and above (above US\$13)	Central and South-Eastern Europe (non-EU), Commonwealth of Independent States, the Middle East and North Africa (CSEE&CIS&MENA)	East and South-East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa
pcGDP	2.566***	2.438***	9.455***	12.025***	9.455***
pcGDP2			-0.466**	-0.584***	-0.466**
AGRp	-11.478***		-9.165***		-9.165***
INDp	-0.180		-1.046		-1.046
p(0-14)	10.376***		8.673***		8.673***
CSEE&CIS&MENA regional dummy			2.563		2.563
East and South-East Asia and the Pacific regional dummy			-7.776		-7.776
Latin America and the Caribbean regional dummy			-19.825**		-19.825**
CSEE&CIS&MENA regional dummy*pcGDP			0.647		0.647
East and South-East Asia and the Pacific regional dummy*pcGDP			1.930**		1.930**
South Asia regional dummy*pcGDP			-1.253		-1.253
Latin America and the Caribbean regional dummy*pcGDP			0.846		0.846
Constant	-27.692***	-23.240***	-60.008***	-62.475***	-60.008***
R-squared	0.888	0.880	0.892	0.884	0.892
Adj. R-squared	0.861	0.851	0.865	0.856	0.865
RMSE (adj.)	0.882	0.910	0.868	0.895	0.868
AIC	1'587.497	1'621.389	1'573.389	1'603.328	1'573.389
BIC	2'079.541	2'100.370	2'087.205	2'086.663	2'087.205
Observations	575	575	575	575	575
RMSE (in-sample)	0.04505	0.00939	0.00732	0.03394	0.00880

Note: *** p<0.01, ** p<0.05, * p<0.1

Appendix 2: Exogenous assumptions

Table B: Exogenous assumptions for the independent variables by region, 2001, 2011 and 2017

Central and South-Eastern Europe (non-EU) and CIS						East Asia				
	2001	2011	2017	2001-11	2011-17	2001	2011	2017	2001-11	2011-17
	thousands (constant 2005 international \$)			average annual growth rate		thousands (constant 2005 international \$)			average annual growth rate	
	per cent			average percentage point change		per cent			average percentage point change	
pcGDP	6,953	11,233	13,904	4.9	3.6	3,760	8,459	12,852	8.4	7.2
AGRp	12.5	10.8	9.2	-0.2	-0.2	34.4	23.4	16.8	-1.0	-1.1
INDp	13.3	13.4	15.6	0.0	0.3	16.8	20.9	23.5	0.4	0.5
p0-14	22.9	19.8	20.3	-0.3	0.1	24.7	19.0	17.2	-0.6	-0.3
p25-54	41.4	43.7	43.9	0.2	0.1	45.5	45.7	46.9	0.0	0.2
DEP1	33.2	30.3	31.5	-0.3	0.2	31.9	27.5	27.8	-0.4	0.0
DEP2	55.4	52.2	52.2	-0.3	0.0	43.0	40.6	40.5	-0.2	0.0

South-East Asia and the Pacific						South Asia				
	2001	2011	2017	2001-11	2011-17	2001	2011	2017	2001-11	2011-17
	thousands (constant 2005 international \$)			average annual growth rate		thousands (constant 2005 international \$)			average annual growth rate	
	per cent			average percentage point change		per cent			average percentage point change	
pcGDP	3,254	4,872	6,355	4.1	4.5	1,694	2,915	3,842	5.6	4.7
AGRp	32.1	27.3	24.5	-0.5	-0.5	33.6	28.0	25.7	-0.5	-0.4
INDp	11.4	12.7	14.2	0.2	0.3	9.3	11.5	12.8	0.2	0.2
p0-14	31.3	27.0	25.2	-0.4	-0.3	35.5	31.1	28.9	-0.4	-0.4
p25-54	38.8	42.1	43.0	0.3	0.2	35.4	38.4	40.1	0.3	0.3
DEP1	36.1	32.7	31.7	-0.4	-0.2	39.7	36.0	34.3	-0.4	-0.3
DEP2	51.4	48.9	47.6	-0.3	-0.2	61.2	60.6	59.3	-0.1	-0.2

Latin America and the Caribbean						Middle East				
	2001	2011	2017	2001-11	2011-17	2001	2011	2017	2001-11	2011-17
	thousands (constant 2005 international \$)			average annual growth rate		thousands (constant 2005 international \$)			average annual growth rate	
	per cent			average percentage point change		per cent			average percentage point change	
pcGDP	8,279	10,479	12,362	2.4	2.8	9,419	11,844	13,116	2.3	1.7
AGRp	11.5	9.8	8.7	-0.2	-0.2	9.1	7.0	6.9	-0.2	0.0
INDp	12.5	13.4	13.9	0.1	0.1	10.1	11.2	11.4	0.1	0.0
p0-14	31.4	27.5	25.2	-0.4	-0.4	37.7	31.2	29.9	-0.7	-0.2
p25-54	37.7	40.4	41.2	0.3	0.1	32.7	40.2	42.9	0.7	0.5
DEP1	37.3	34.5	33.4	-0.3	-0.2	41.5	35.1	34.2	-0.7	-0.2
DEP2	55.9	52.0	50.1	-0.4	-0.3	71.2	67.1	65.8	-0.4	-0.2

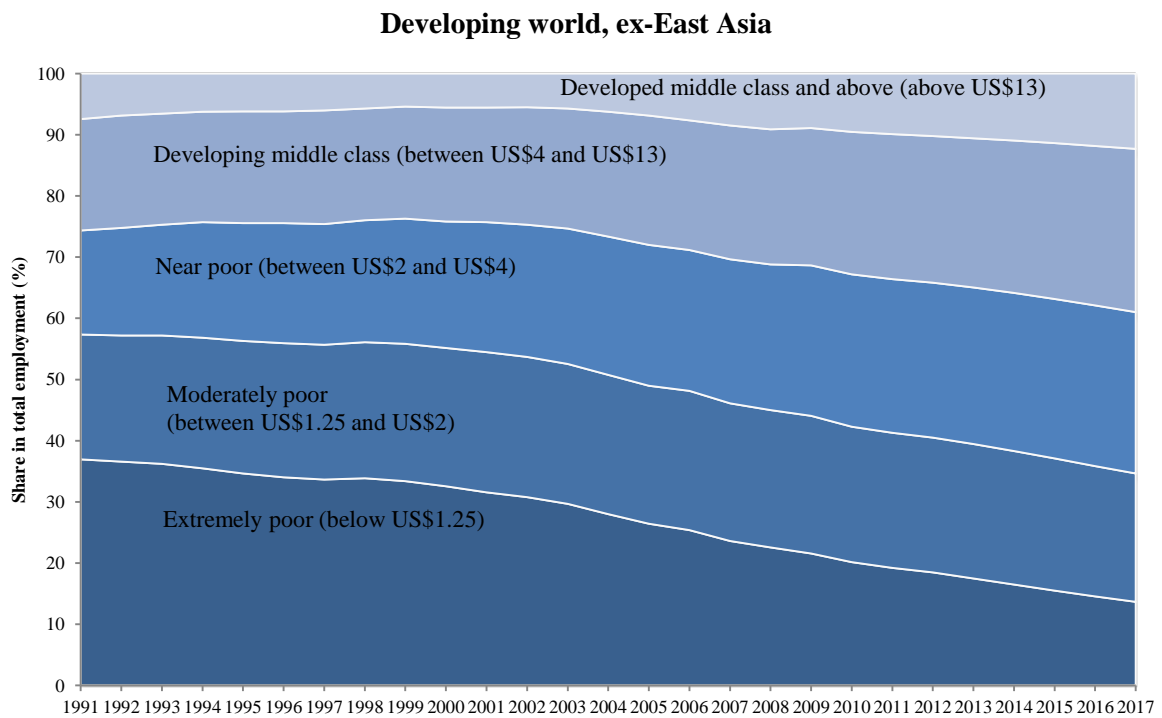
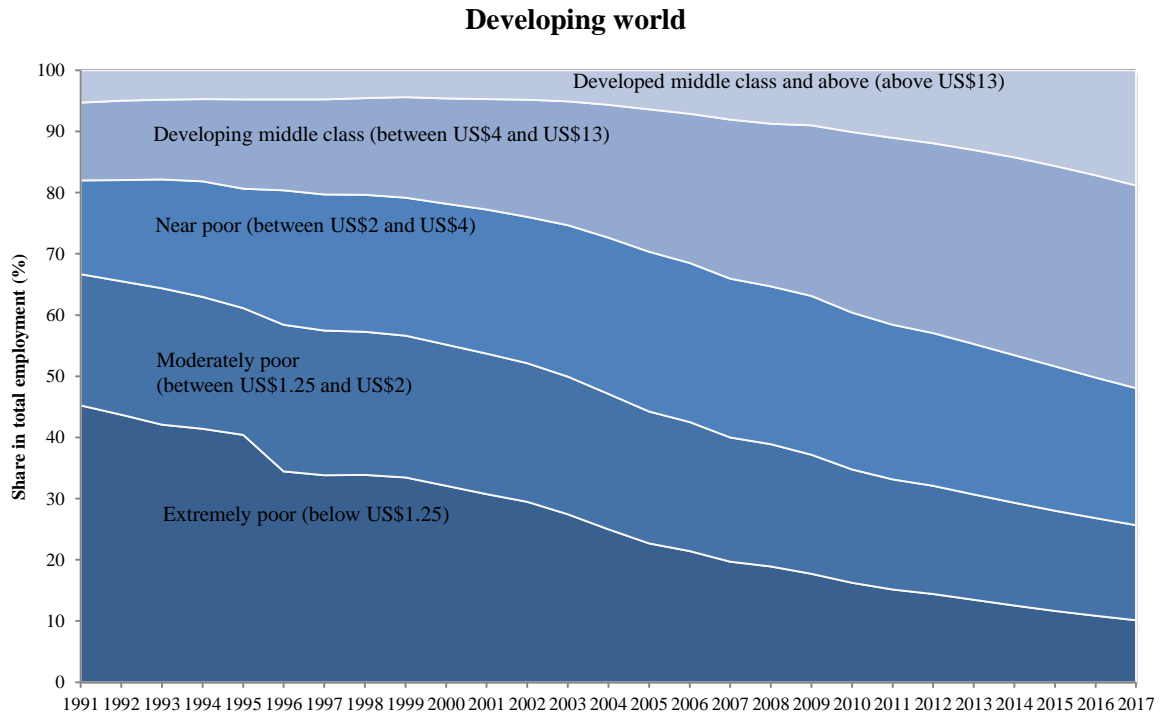
North Africa						Sub-Saharan Africa				
	2001	2011	2017	2001-11	2011-17	2001	2011	2017	2001-11	2011-17
	thousands (constant 2005 international \$)			average annual growth rate		thousands (constant 2005 international \$)			average annual growth rate	
	per cent			average percentage point change		per cent			average percentage point change	
pcGDP	4,164	5,390	7,172	2.6	4.9	1,597	2,055	2,459	2.6	3.0
AGRp	13.2	12.0	12.3	-0.1	0.0	42.1	40.2	39.1	-0.2	-0.2
INDp	8.1	10.6	10.4	0.2	0.0	5.1	5.7	6.3	0.1	0.1
p0-14	35.5	31.4	30.0	-0.4	-0.2	43.9	42.4	41.3	-0.1	-0.2
p25-54	34.2	38.3	39.9	0.4	0.3	29.0	30.2	31.3	0.1	0.2
DEP1	39.8	36.2	35.6	-0.4	-0.1	46.9	45.6	44.7	-0.1	-0.2
DEP2	69.2	66.4	65.3	-0.2	-0.2	60.8	59.5	58.3	-0.1	-0.2

Note: For the full descriptions of the variables, see Table A2.

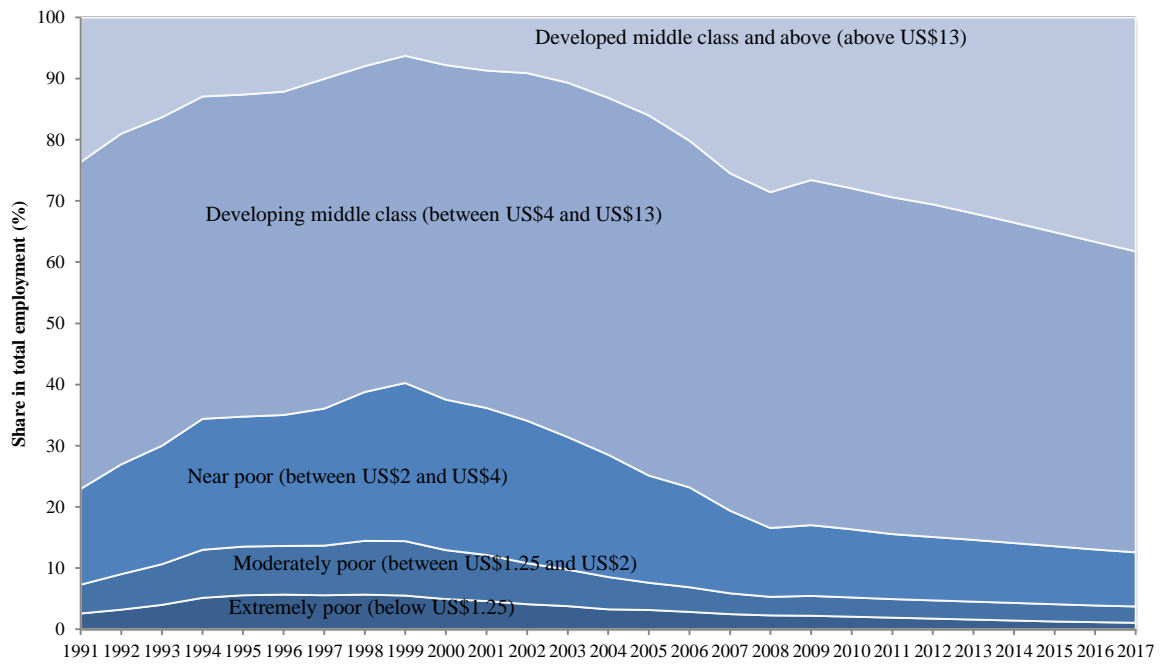
Source: Authors' calculations based on the sources in Table A2.

Appendix 3: Developing world and regional figures

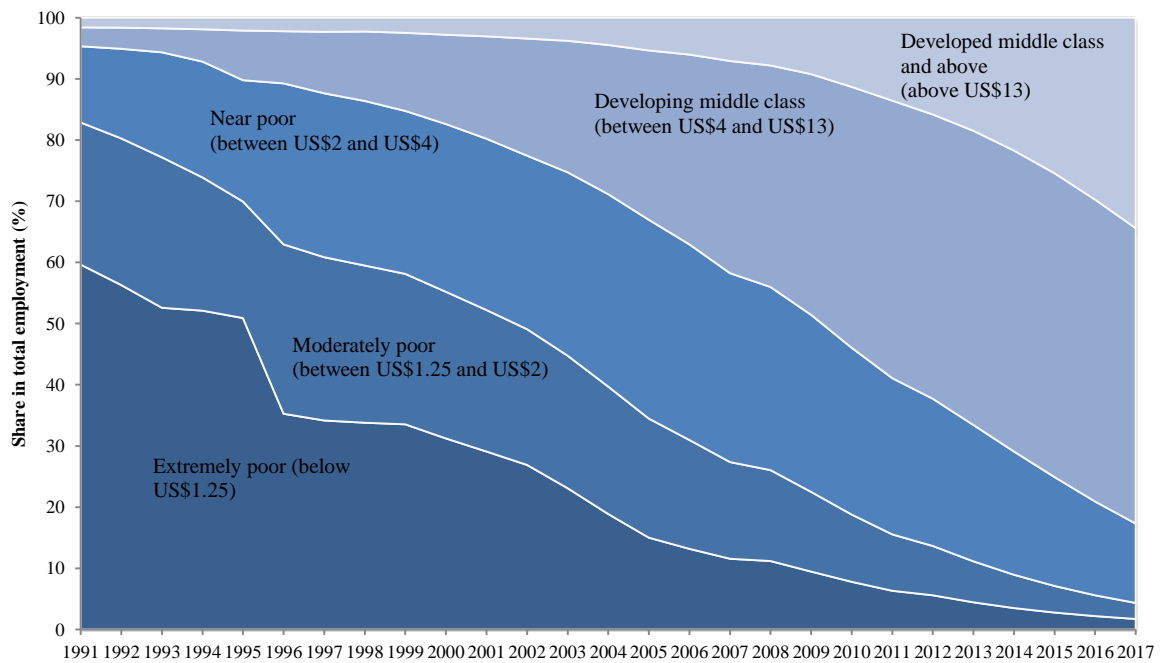
Figure C1: Employment by economic class in the developing world and in each region (% of total employment), 1991-2017



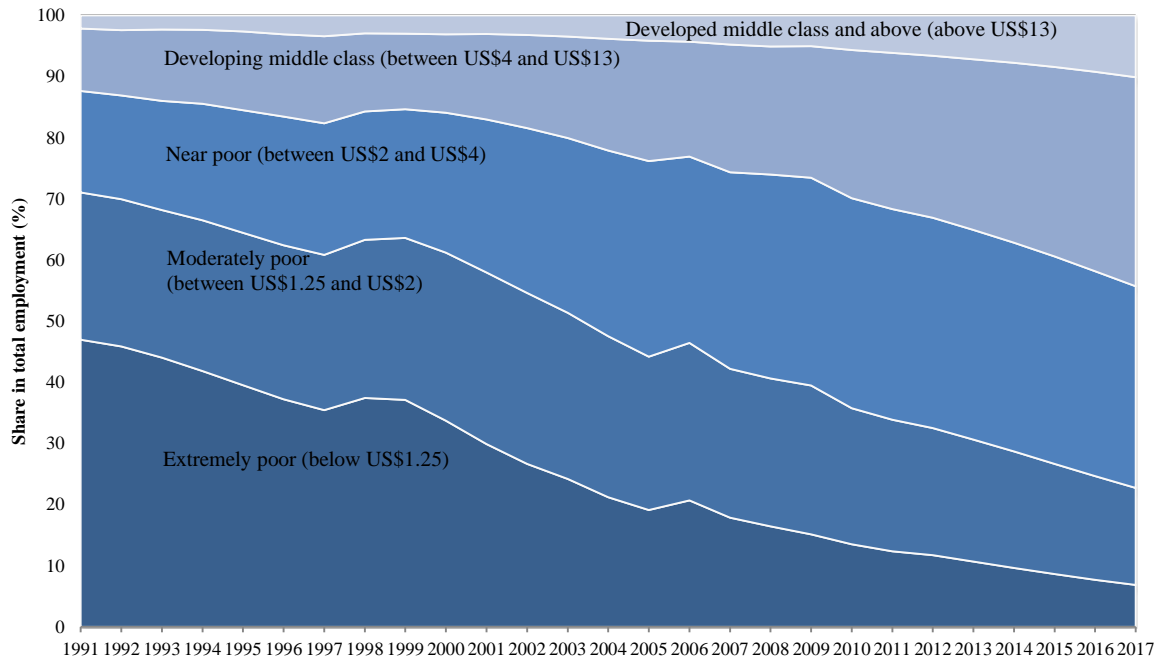
Central and South-Eastern Europe (non-EU) and CIS



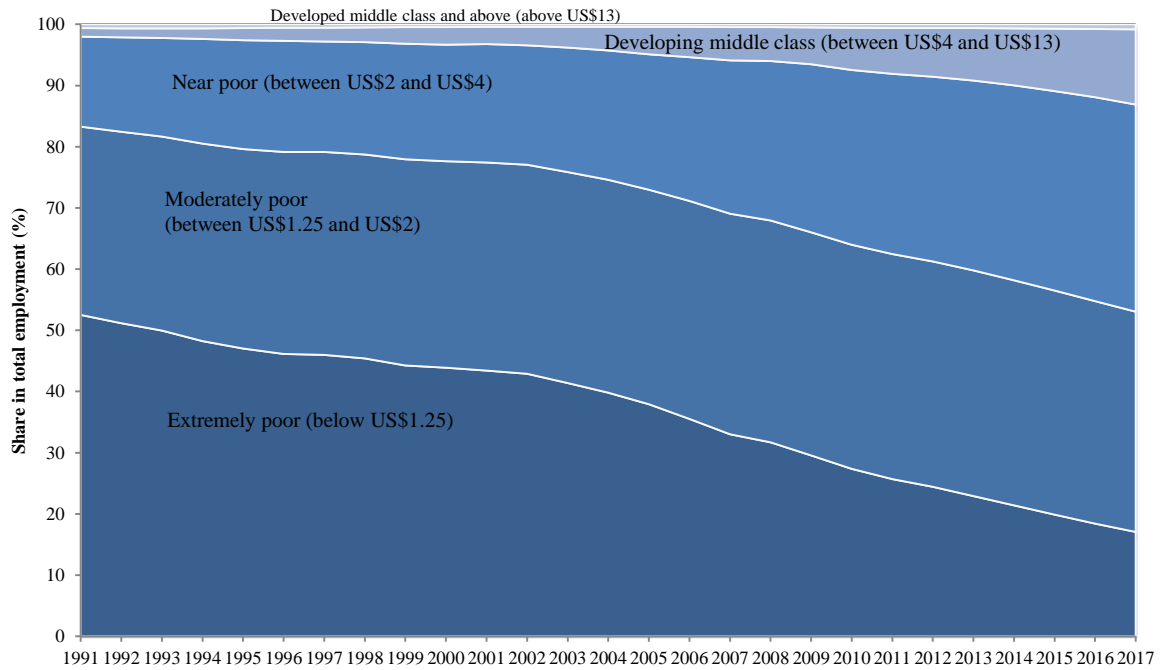
East Asia



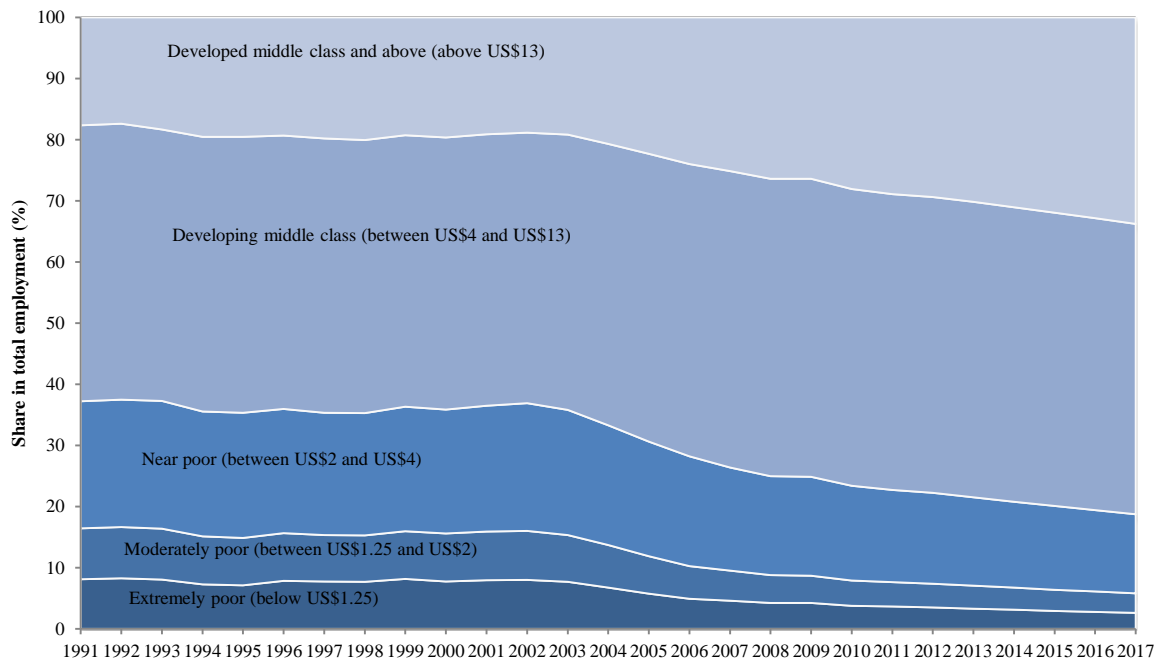
South-East Asia and the Pacific



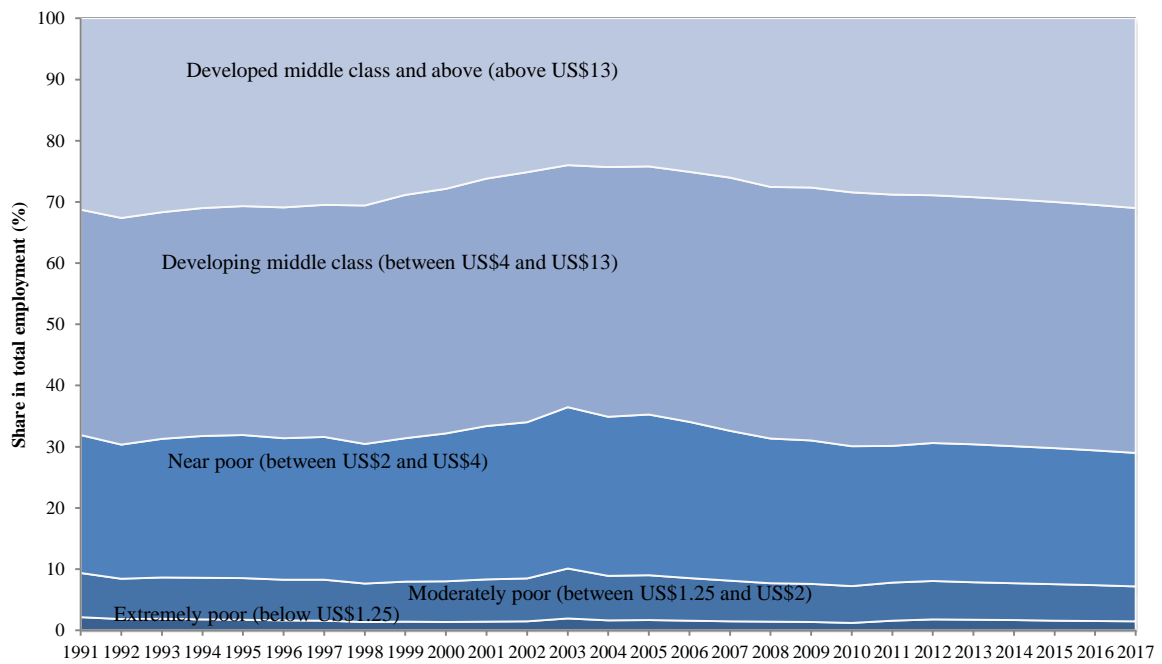
South Asia



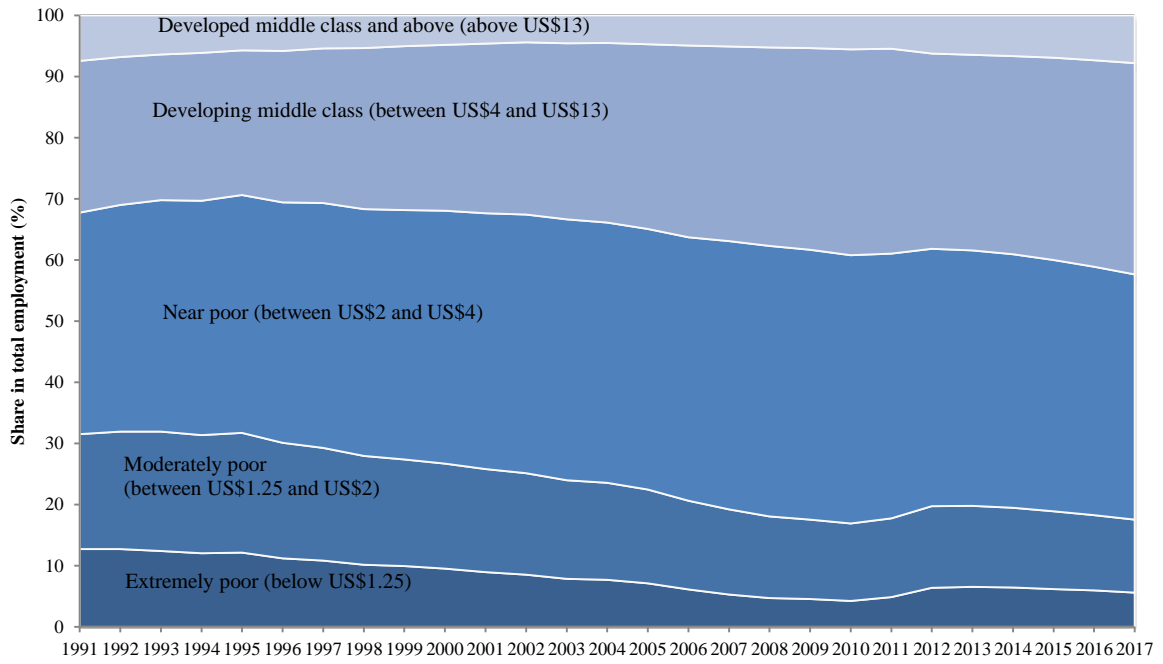
Latin America and the Caribbean



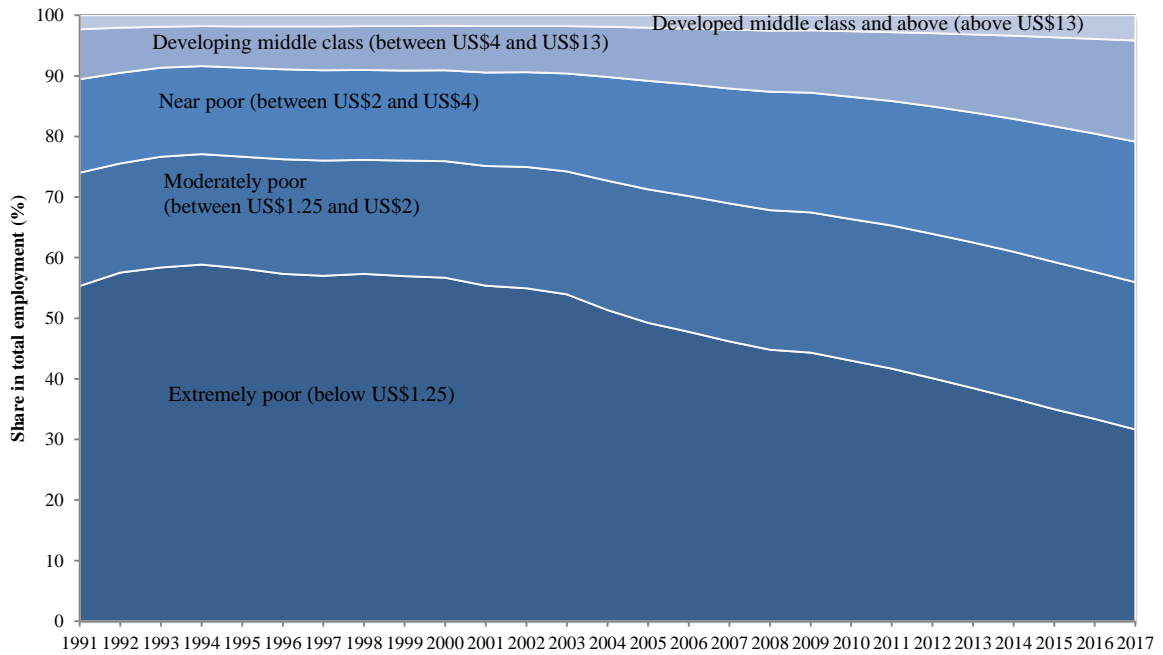
Middle East



North Africa



Sub-Saharan Africa



Appendix 4: Developing world and regional tables

Table D1: Employment by economic class in developing world and regions, 1991, 2001, 2011 and 2017

Region	Year	Employment by class ('000s)					Employment by class (% of total)				
		Extremely poor (below US\$1.25)	Moderately poor (between US\$1.25 and US\$2)	Near poor (between US\$2 and US\$4)	Developing middle class (between US\$4 and US\$13)	Developed middle class and above (above US\$13)	Extremely poor (below US\$1.25)	Moderately poor (between US\$1.25 and US\$2)	Near poor (between US\$2 and US\$4)	Developing middle class (between US\$4 and US\$13)	Developed middle class and above (above US\$13)
Developing world	1991	834,517	395,797	282,852	234,833	97,690	45.2	21.4	15.3	12.7	5.3
	2001	677,609	506,827	518,781	398,628	103,508	30.7	23.0	23.5	18.1	4.7
	2011	396,736	471,563	660,855	799,634	289,557	15.2	18.0	25.2	30.5	11.1
	2017	288,340	442,472	637,290	942,534	536,220	10.1	15.5	22.4	33.1	18.8
Developing world, excl. East Asia	1991	433,414	239,650	199,245	213,879	87,118	36.9	20.4	17.0	18.2	7.4
	2001	459,648	333,093	309,126	273,110	80,537	31.6	22.9	21.2	18.8	5.5
	2011	344,513	395,285	450,383	424,837	177,542	19.2	22.1	25.1	23.7	9.9
	2017	273,787	420,348	528,190	535,700	246,190	13.7	21.0	26.4	26.7	12.3
Central and South-Eastern Europe (non-EU) and CIS	1991	3,842	6,972	23,326	79,471	35,218	2.6	4.7	15.7	53.4	23.7
	2001	6,796	11,134	35,426	81,345	12,860	4.6	7.5	24.0	55.1	8.7
	2011	3,087	4,991	17,433	90,333	48,304	1.9	3.0	10.6	55.0	29.4
	2017	1,777	4,480	14,945	82,946	64,574	1.1	2.7	8.9	49.2	38.3
East Asia	1991	401,103	156,146	83,607	20,954	10,572	59.7	23.2	12.4	3.1	1.6
	2001	217,961	173,734	209,655	125,518	22,971	29.1	23.2	28.0	16.7	3.1
	2011	52,223	76,279	210,473	374,796	112,015	6.3	9.2	25.5	45.4	13.6
	2017	14,553	22,125	109,100	406,835	290,029	1.7	2.6	12.9	48.3	34.4
South-East Asia and the Pacific	1991	93,456	47,937	32,992	20,331	4,309	47.0	24.1	16.6	10.2	2.2
	2001	73,650	69,046	61,591	34,438	7,477	29.9	28.0	25.0	14.0	3.0
	2011	36,807	63,975	102,412	76,001	18,270	12.4	21.5	34.4	25.5	6.1
	2017	22,244	51,390	106,822	110,768	32,807	6.9	15.9	33.0	34.2	10.1
South Asia	1991	220,525	129,128	61,700	5,881	2,614	52.5	30.8	14.7	1.4	0.6
	2001	228,341	179,047	101,749	14,940	2,130	43.4	34.0	19.3	2.8	0.4
	2011	160,946	230,186	184,569	46,917	3,645	25.7	36.8	29.5	7.5	0.6
	2017	119,429	251,989	237,173	85,911	5,697	17.1	36.0	33.9	12.3	0.8
Latin America and the Caribbean	1991	13,196	13,530	33,845	73,334	28,752	8.1	8.3	20.8	45.1	17.7
	2001	16,885	16,783	43,580	94,039	40,540	8.0	7.9	20.6	44.4	19.1
	2011	9,728	10,627	40,263	129,148	77,236	3.6	4.0	15.1	48.4	28.9
	2017	7,738	9,444	38,044	139,945	99,508	2.6	3.2	12.9	47.5	33.8
Middle East	1991	650	2,162	6,784	11,067	9,394	2.2	7.2	22.6	36.8	31.3
	2001	602	2,937	10,671	17,210	11,132	1.4	6.9	25.1	40.4	26.2
	2011	989	3,848	13,896	25,492	17,909	1.6	6.2	22.4	41.0	28.8
	2017	1,046	4,155	15,772	29,004	22,440	1.4	5.7	21.8	40.1	31.0
North Africa	1991	4,782	7,052	13,584	9,323	2,792	12.7	18.8	36.2	24.8	7.4
	2001	4,308	8,117	20,143	13,381	2,213	8.9	16.9	41.8	27.8	4.6
	2011	3,150	8,273	27,820	21,551	3,508	4.9	12.9	43.3	33.5	5.5
	2017	4,107	8,709	29,308	25,243	5,692	5.6	11.9	40.1	34.6	7.8
Sub-Saharan Africa	1991	96,963	32,868	27,015	14,473	4,040	55.3	18.7	15.4	8.3	2.3
	2001	129,064	46,029	35,965	17,758	4,184	55.4	19.8	15.4	7.6	1.8
	2011	129,807	73,384	63,990	35,396	8,670	41.7	23.6	20.6	11.4	2.8
	2017	117,446	90,181	86,126	61,883	15,472	31.6	24.3	23.2	16.7	4.2

Table D2: Employment growth, by class in developing world and regions; 1991-2011, 1991-2001, 2001-2011, 2011-2017

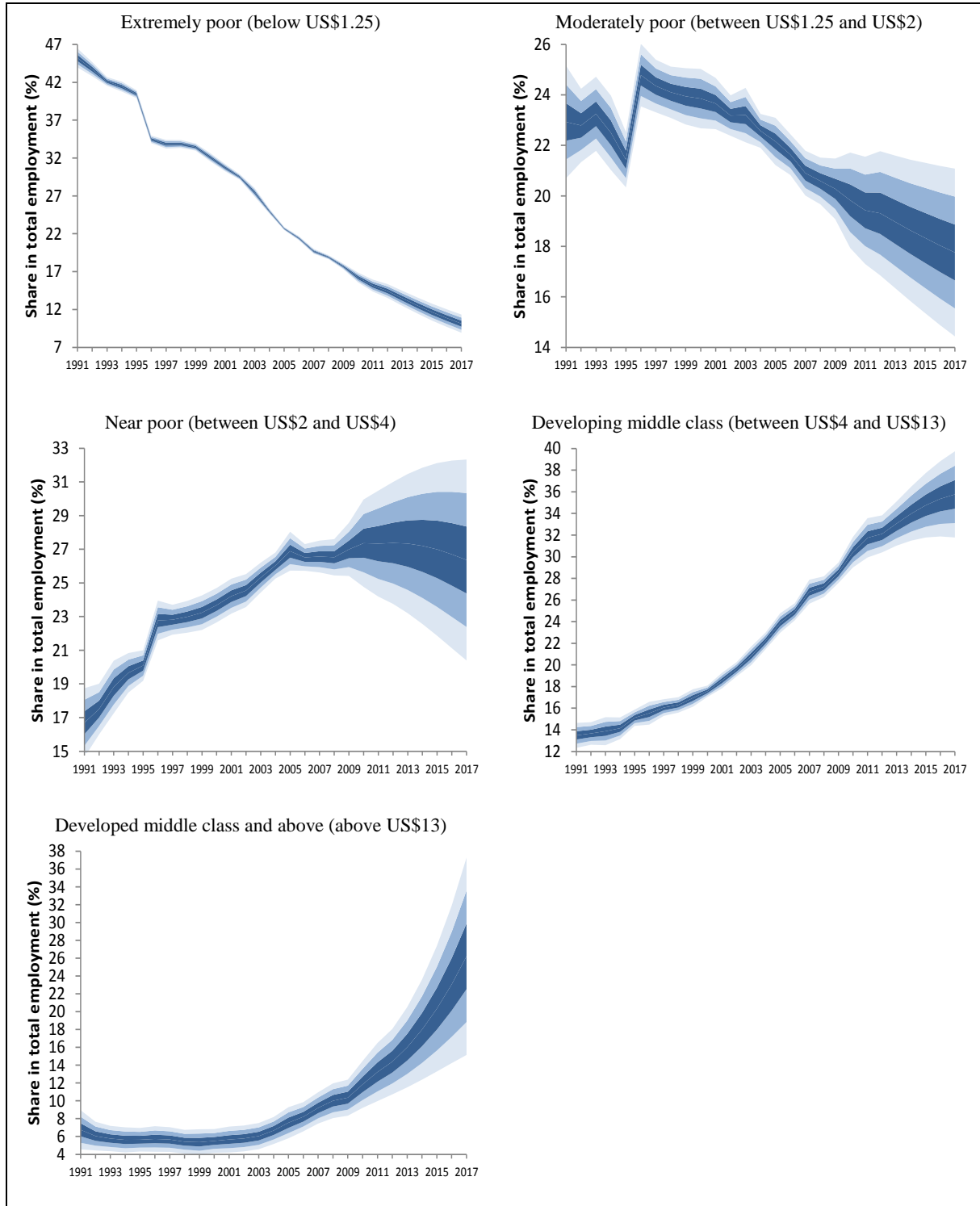
Region	Employment by class change ('000s)					By class share of total employment growth (%)				
	Extremely poor (below US\$1.25)	Moderately poor (between US\$1.25 and US\$2)	Near poor (between US\$2 and US\$4)	Developing middle class (between US\$4 and US\$13)	Developed middle class and above (above US\$13)	Extremely poor (below US\$1.25)	Moderately poor (between US\$1.25 and US\$2)	Near poor (between US\$2 and US\$4)	Developing middle class (between US\$4 and US\$13)	Developed middle class and above (above US\$13)
1991-2011										
Developing world	-437,781	75,767	378,003	564,801	191,867	-56.7	9.8	48.9	73.1	24.8
Developing world, excl. East Asia	-88,901	155,634	251,137	210,958	90,424	-14.4	25.1	40.6	34.1	14.6
Central and South-Eastern Europe (non-EU) and CIS	-756	-1,981	-5,893	10,862	13,087	-4.9	-12.9	-38.5	70.9	85.4
East Asia	-348,880	-79,868	126,866	353,842	101,443	-227.4	-52.1	82.7	230.7	66.1
South-East Asia and the Pacific	-56,649	16,038	69,420	55,670	13,961	-57.5	16.3	70.5	56.6	14.2
South Asia	-59,579	101,058	122,870	41,036	1,030	-28.9	49.0	59.5	19.9	0.5
Latin America and the Caribbean	-3,468	-2,903	6,418	55,814	48,483	-3.3	-2.8	6.2	53.5	46.5
Middle East	340	1,686	7,112	14,425	8,515	1.1	5.3	22.2	45.0	26.5
North Africa	-1,633	1,221	14,236	12,228	716	-6.1	4.6	53.2	45.7	2.7
Sub-Saharan Africa	32,844	40,516	36,975	20,923	4,630	24.2	29.8	27.2	15.4	3.4
1991-2001										
Developing world	-156,908	111,030	235,929	163,795	5,818	-43.6	30.9	65.6	45.5	1.6
Developing world, excl. East Asia	26,234	93,443	109,880	59,231	-6,582	9.3	33.1	38.9	21.0	-2.3
Central and South-Eastern Europe (non-EU) and CIS	2,954	4,162	12,100	1,874	-22,358	-233.3	-328.7	-955.6	-148.0	1765.7
East Asia	-183,142	17,587	126,048	104,564	12,399	-236.4	22.7	162.7	135.0	16.0
South-East Asia and the Pacific	-19,805	21,109	28,599	14,106	3,169	-42.0	44.7	60.6	29.9	6.7
South Asia	7,817	49,919	40,050	9,059	-484	7.3	46.9	37.7	8.5	-0.5
Latin America and the Caribbean	3,690	3,253	9,735	20,705	11,788	7.5	6.6	19.8	42.1	24.0
Middle East	-48	774	3,887	6,144	1,738	-0.4	6.2	31.1	49.2	13.9
North Africa	-474	1,066	6,559	4,058	-579	-4.5	10.0	61.7	38.2	-5.4
Sub-Saharan Africa	32,101	13,160	8,950	3,285	145	55.7	22.8	15.5	5.7	0.3
2001-2011										
Developing world	-280,873	-35,264	142,074	401,006	186,049	-68.0	-8.5	34.4	97.1	45.0
Developing world, excl. East Asia	-115,135	62,192	141,257	151,727	97,005	-34.2	18.5	41.9	45.0	28.8
Central and South-Eastern Europe (non-EU) and CIS	-3,710	-6,143	-17,993	8,988	35,444	-22.4	-37.0	-108.5	54.2	213.7
East Asia	-165,738	-97,455	817	249,279	89,044	-218.2	-128.3	1.1	328.2	117.2
South-East Asia and the Pacific	-36,843	-5,071	40,821	41,563	10,793	-71.9	-9.9	79.6	81.1	21.1
South Asia	-67,396	51,139	82,820	31,977	1,515	-67.4	51.1	82.8	32.0	1.5
Latin America and the Caribbean	-7,157	-6,156	-3,317	35,109	36,696	-13.0	-11.2	-6.0	63.6	66.5
Middle East	387	911	3,225	8,282	6,777	2.0	4.7	16.5	42.3	34.6
North Africa	-1,159	156	7,677	8,170	1,295	-7.2	1.0	47.6	50.6	8.0
Sub-Saharan Africa	743	27,356	28,025	17,638	4,485	0.9	35.0	35.8	22.5	5.7
2011-2017										
Developing world	-108,396	-29,091	-23,565	142,900	246,662	-47.4	-12.7	-10.3	62.5	107.9
Developing world, excl. East Asia	-70,726	25,063	77,808	110,862	68,648	-33.4	11.8	36.8	52.4	32.4
Central and South-Eastern Europe (non-EU) and CIS	-1,310	-511	-2,487	-7,386	16,269	-28.6	-11.2	-54.4	-161.5	355.7
East Asia	-37,670	-54,154	-101,373	32,038	178,014	-223.5	-321.3	-601.4	190.1	1056.1
South-East Asia and the Pacific	-14,563	-12,586	4,410	34,767	14,536	-54.8	-47.4	16.6	130.9	54.7
South Asia	-41,516	21,803	52,604	38,994	2,052	-56.2	29.5	71.1	52.7	2.8
Latin America and the Caribbean	-1,990	-1,183	-2,219	10,797	22,272	-7.2	-4.3	-8.0	39.0	80.5
Middle East	56	307	1,876	3,512	4,531	0.5	3.0	18.2	34.2	44.1
North Africa	958	436	1,488	3,692	2,184	10.9	5.0	17.0	42.2	24.9
Sub-Saharan Africa	-12,361	16,797	22,136	26,487	6,803	-20.6	28.1	37.0	44.2	11.4

Appendix 5: Confidence intervals

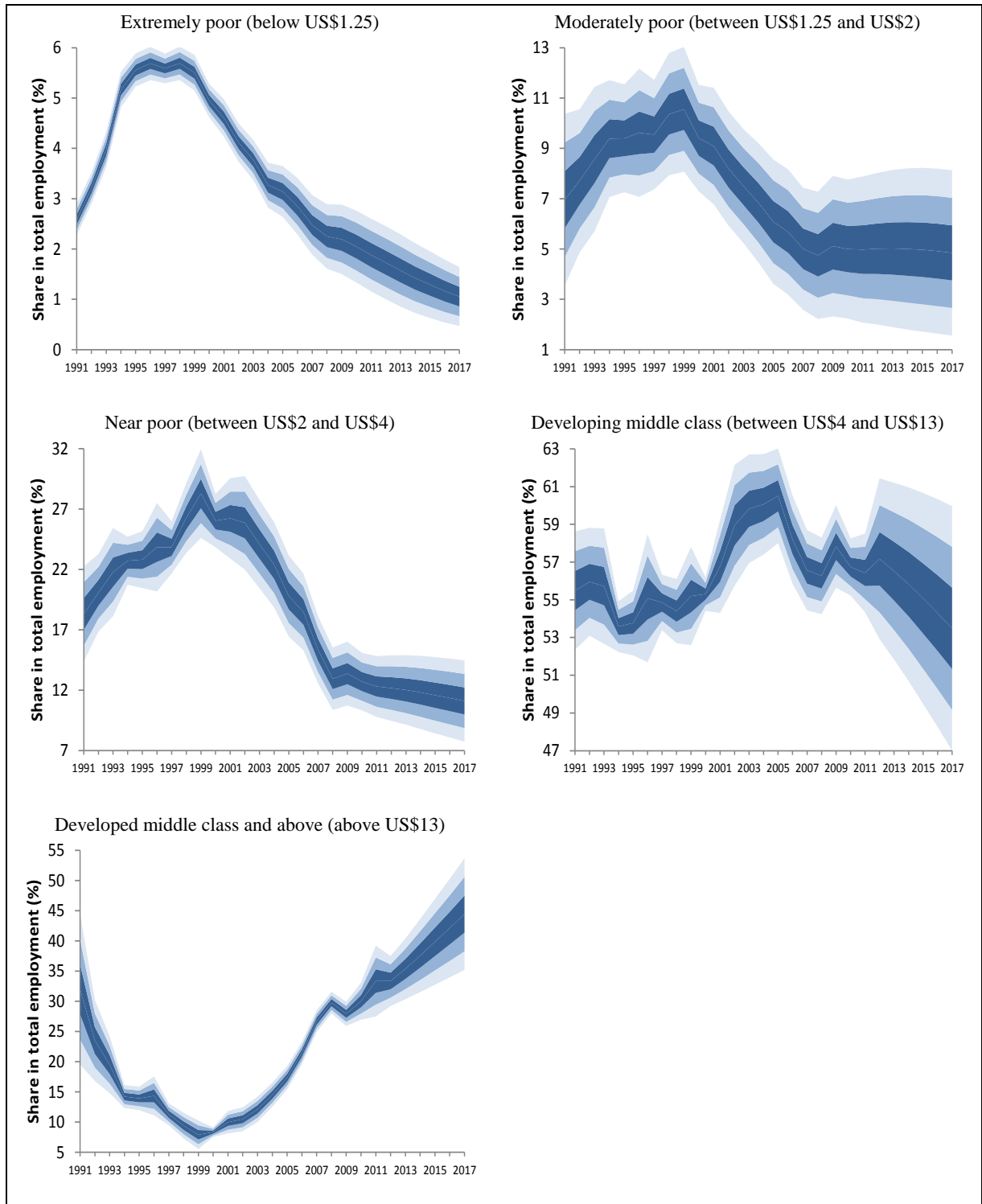
The figure below shows the confidence interval around the developing world and regional estimates and projections of the share of each economic class in total employment. The different colours of the shaded areas represent one third of the confidence interval around the central prediction. The confidence interval is built as one standard deviation around the point estimate. The standard deviation is calculated across the top ten best performing specifications from the imputation model.

Figure E1: Confidence interval around the point estimates and projections in the developing world and in each region, 1991-2017

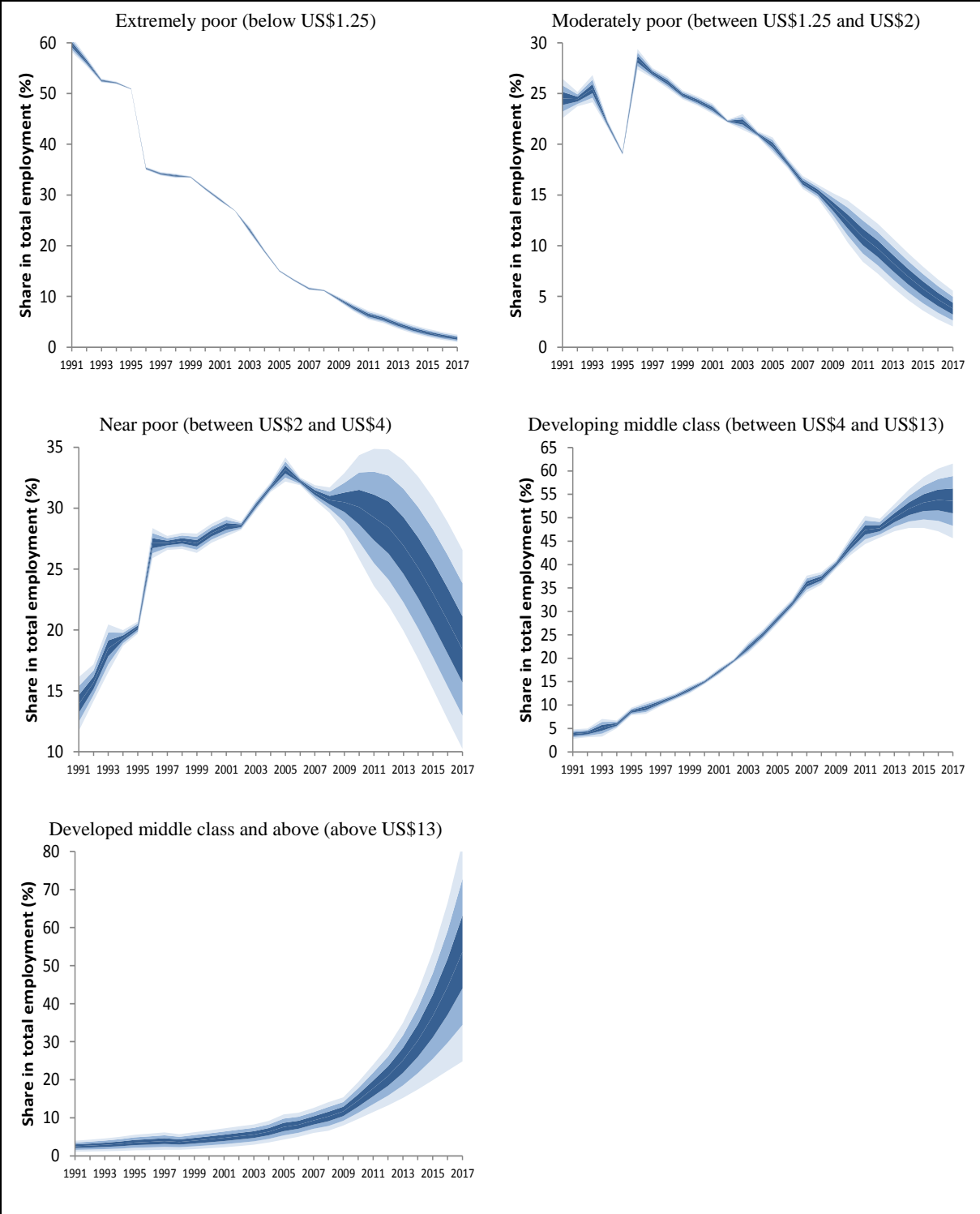
Developing world



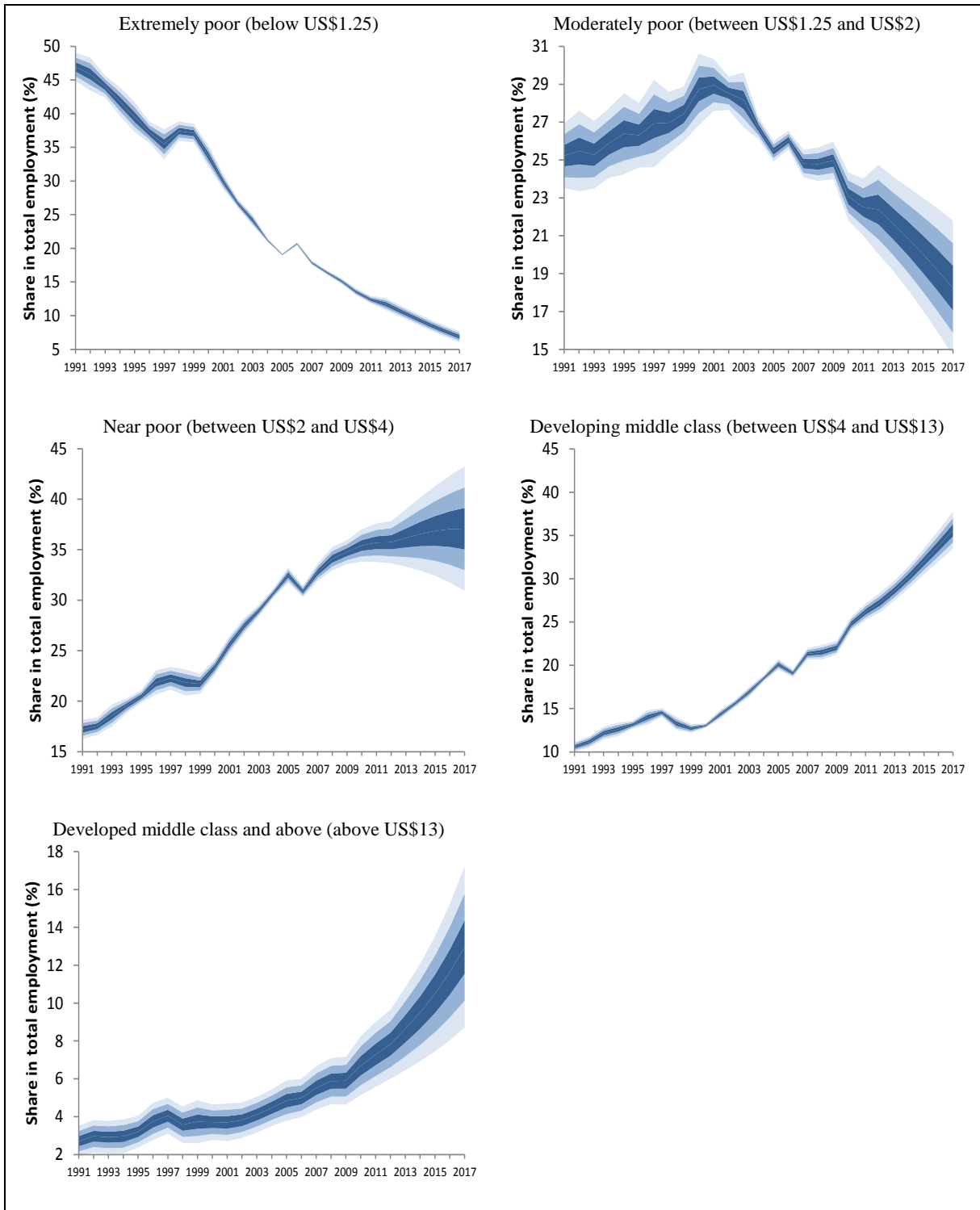
Central and South-Eastern Europe (non-EU) and CIS



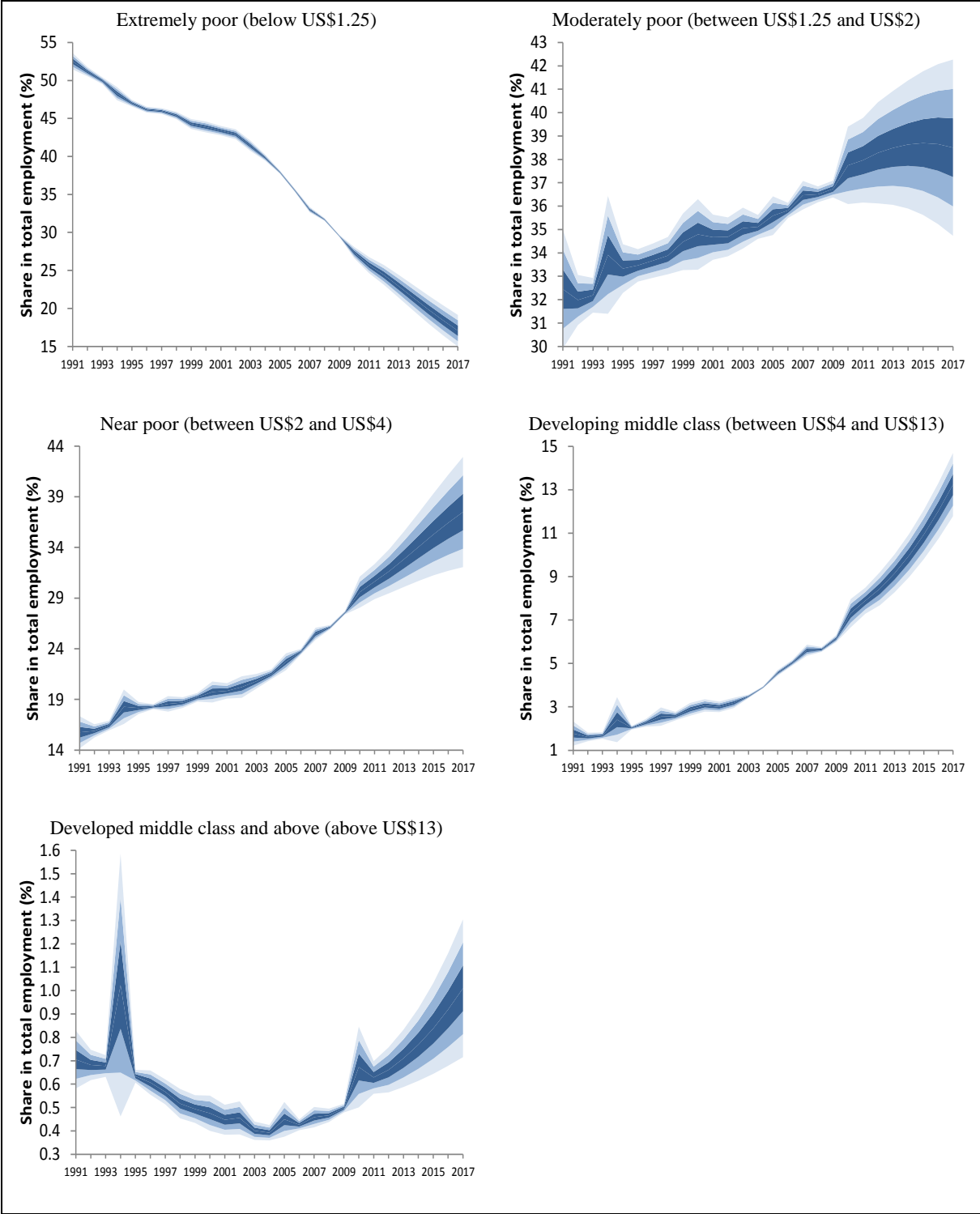
East Asia



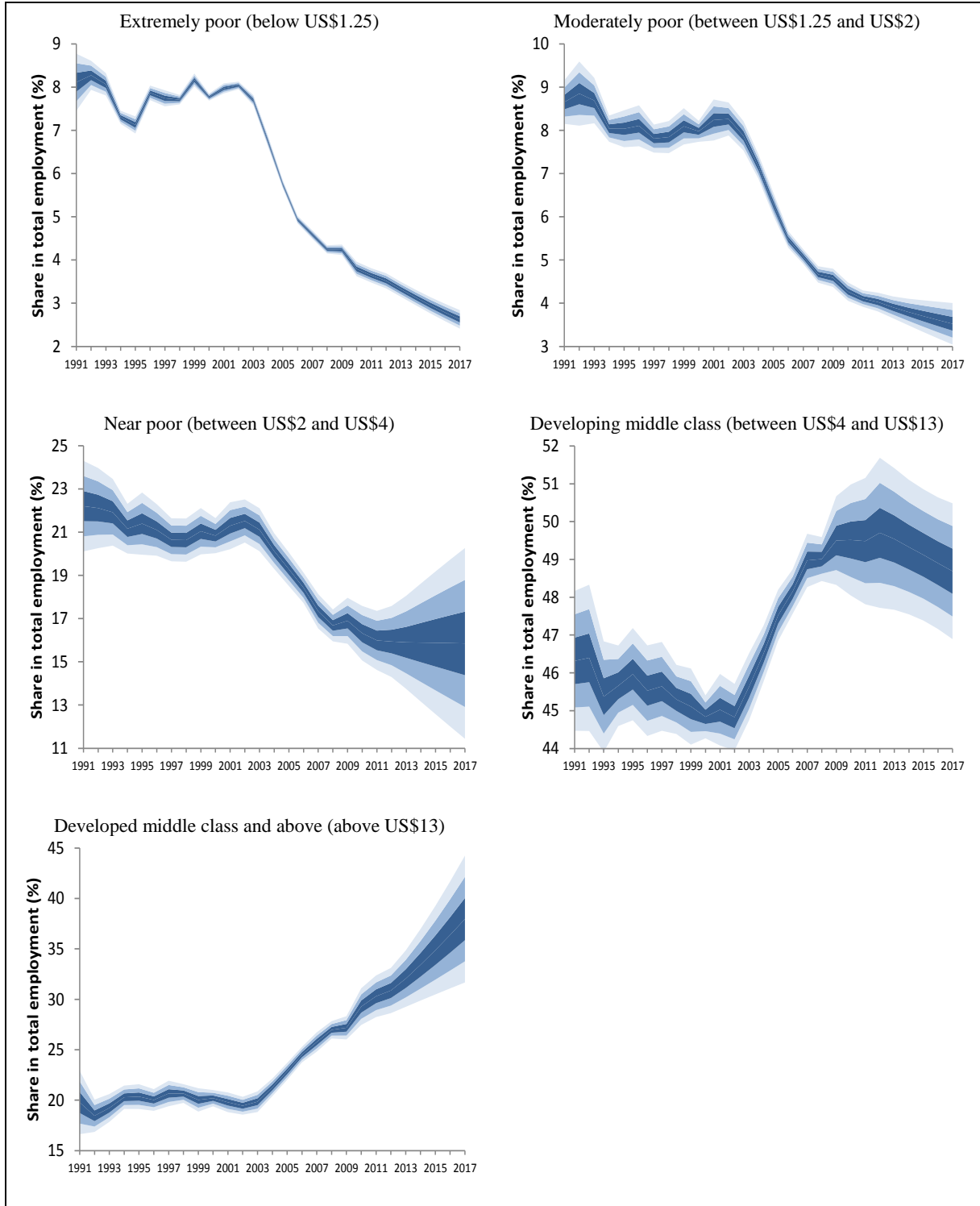
South-East Asia and the Pacific



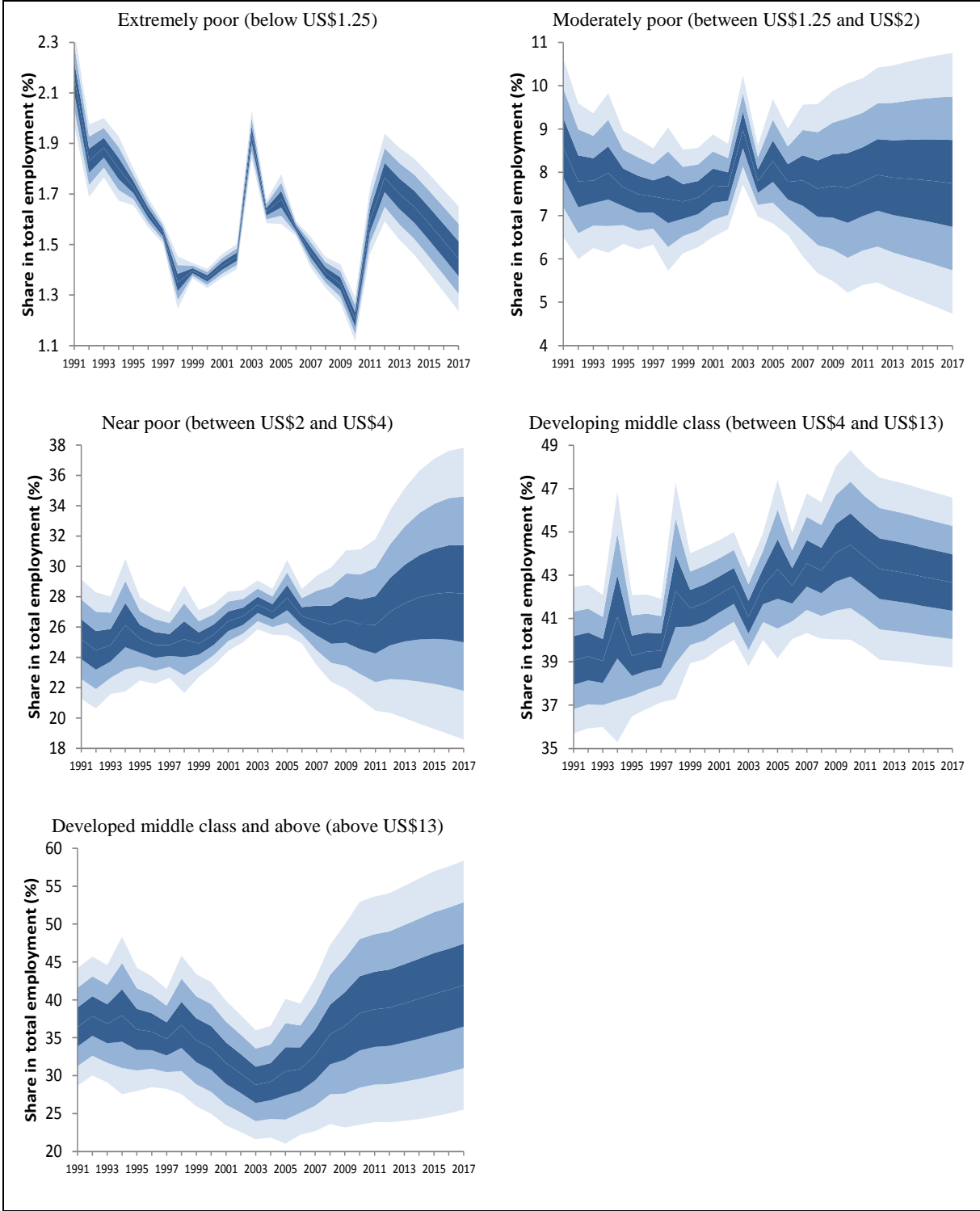
South Asia



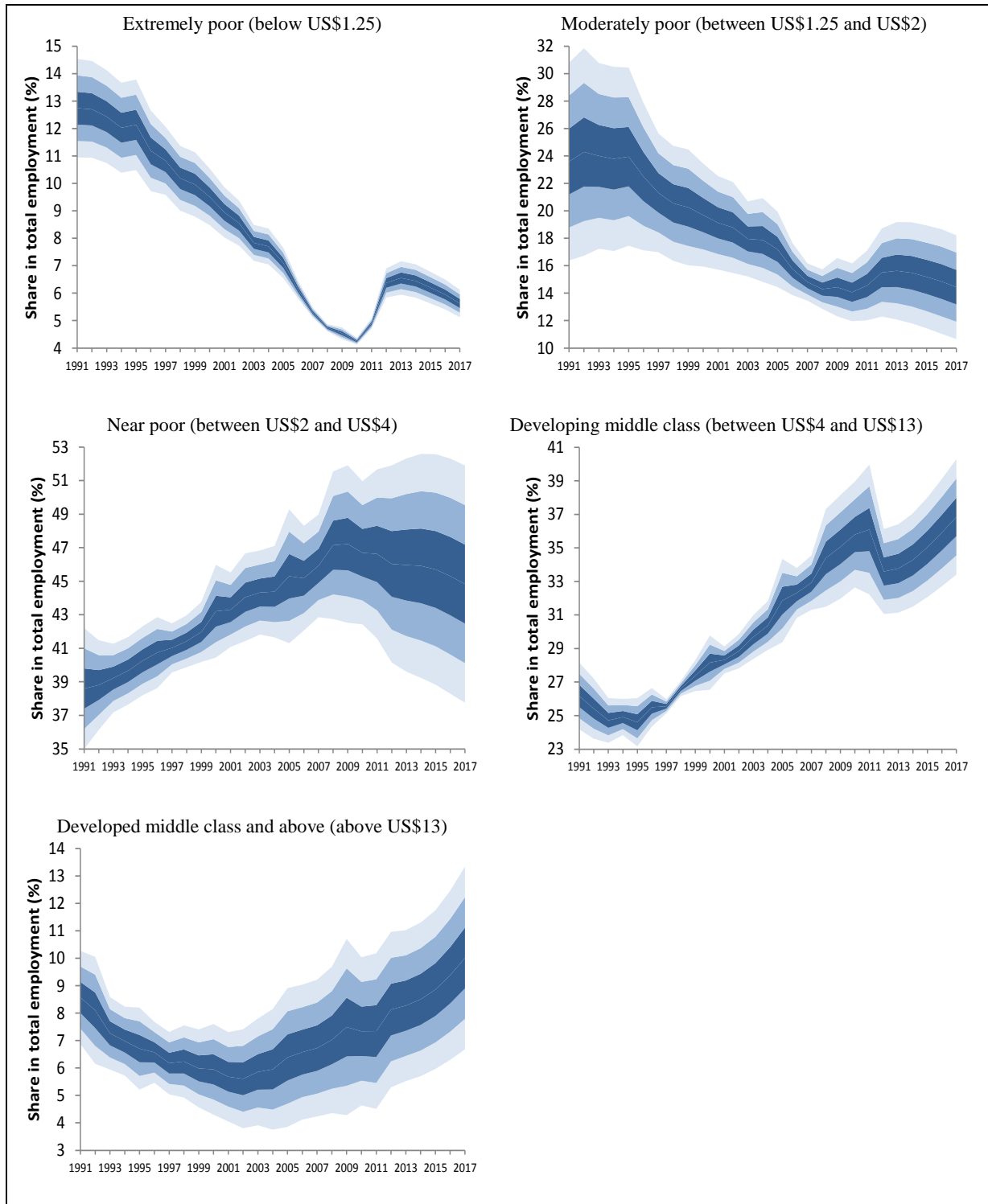
Latin America and the Caribbean



Middle East



North Africa



Sub-Saharan Africa

