

**THE ROLE OF EMPLOYMENT AND LABOR INCOME IN SHARED  
GROWTH: WHAT TO LOOK FOR AND HOW.**

**PREMPR  
Jobs and Migration Group**

**DRAFT  
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## Notation

### National level variables:

- P- Poverty measure
- N – Total population
- U – Total number of unemployed in the economy
- L – Total number of economically active (employed + unemployed)
- E – Total number of employed individuals in the economy
- A- Total number of working age individuals in the economy
- I – Total survey income
- $I^L$  – Total survey labor income
- $I^{NL}$  - Total survey non-labor income
- Y – Total output
- $Y_s$  – Total output in sector S
- $Y_m$  – Total output in region m

### Household variables:

- $N_j$  – Size of household j
- $U_j$  – Total number of unemployed in household j
- $L_j$  – Total number of economically active individuals in household j
- $H_j$  – Total number of hours worked by all members of household j
- $E_j$  – Total number of employed individuals in household j
- $A_j$ - Total number of working age individuals in household j y
- $I_j$  – Total survey income of household j
- $I_j^L$  – Total survey labor income of household j
- $I_j^{NL}$  - Total survey non-labor income of household j
- $\iota_j$  - Total per capita survey income of household j.  $\iota_j = I_j / N_j$
- $\iota_j^L$  – Per capita survey labor income of household j.  $\iota_j^L = I_j^L / N_j$
- $\iota_j^{NL}$  - Per capita survey non-labor income of household j.  $\iota_j^{NL} = I_j^{NL} / N_j$
- $u_j$  – Unemployment rate within household j;  $u_j = U_j / L_j$
- $l_j$  – Participation rate within household j;  $l_j = L_j / A_j$
- $a_j$  – Dependency rate  $a_j = A_j / N_j$
- $\varpi_j$  - Average *labor* income per hour worked for household j (omega bar)  $\varpi_j = I_j^L / H_j$

# **1 Introduction: why do we care about employment, earnings and labor markets in the search for shared growth?**

The degree to which growth is able to translate into poverty reduction depends on how its benefits are distributed among different segments of society. There is little doubt that growth –measured by changes in average income- contributes significantly to poverty reduction<sup>1</sup>. However, it is also clear that countries differ in the degree to which income growth spells have translated into poverty reduction; and although differences in the responsiveness of poverty to income growth account for a small fraction of overall differences in poverty changes across countries, from the point of view of an individual country, these differences may have significant implications for poverty reduction, especially in the short term<sup>2</sup>.

Employment, earnings and labor markets may play a crucial role in poverty reduction both by affecting growth itself and by affecting the effectiveness of growth in reducing poverty within individual countries. This document is mainly concerned with the second of these links, mainly the impact of employment, income from labor and labor markets in enhancing shared growth<sup>3</sup>.

There is a general consensus that the availability of employment opportunities and their characteristics constitute an essential transmission channel from growth to poverty reduction, and in this way play a key role in poverty's response to growth. For one thing, the poor derive most of their income from work, either as self-employed or as employees, so that what happens to their income and employment status seems tautologically relevant. Additionally, the ease with which the poor may take-up the opportunities afforded by growth may depend crucially on i) the structure of employment, ii) returns to labor and their distribution and iii) the existence of imperfections and frictions in the labor markets. For example, one may be inclined to believe that when the poor face flexible labor markets and low barriers mobility across labor market segments, geographic regions or sectors of production, they are in better position to take-up opportunities generated by growth, by 'moving' more easily to the growing sectors. Similarly, the effectiveness of growth in reducing poverty may also depend on whether growth is unskilled-labor-intensive or not, and on whether the poor have or can easily acquire the skills required by the growing sectors. Moreover, there is some evidence of

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<sup>1</sup> Kraay (2006) finds that in the short and medium term income growth accounts for 70% of the variation in headcount poverty, and in the long run, it accounts for as much as 97%.

<sup>2</sup> See for example, Bourguignon (2002), Kakwani, Khandler and Son (2004), Lucas and Timer (2005) and Ravallion (2004), for evidence on the heterogeneity in the poverty impact of growth. See Ravallion (2004) for a discussion on the relevance of this heterogeneity from the perspective of a country: a 1% increase in income levels could result in a poverty reduction of as much as 4.3% or as little as 0.6%.

<sup>3</sup> The impact of labor markets on growth has been treated more systematically in the literature and will not be addressed here. See for example Arias et al. (2005); Besley and Burgues (2004); Caldderon and Chon (2005); Cukierman et. Al (2001); Temple and Satchi (2006); and Temple and Woessmann (2004); among others.

strong links between labor market regulations, such as minimum wages, and the incidence of poverty in developing countries.

Despite of the obvious fact that poor people derive most of their income from work, understanding of the factors that weaken the links between growth, employment/income generation and poverty reduction, and of the policy levers that can help to strengthen it, still remains somewhat lacking. The concern that employment, returns to labor and imperfections/rigidities in the labor markets play a crucial role in the poverty impact of growth, has been reflected in the emphasis given in the policy debate to the idea that 'jobless' growth has been responsible for the disappointing results seen by some countries in terms of the effectiveness of growth in reducing poverty. As a result, debates addressing how to foster employment intensive growth have followed<sup>4</sup>. Country experiences such as the Indonesian in the 1960's, in which poverty reduction was accompanied by labor intensive growth, as well as documented evidence of the link between urban unemployment and urban poverty, have provided support for this view. However, it is also often recognized that poverty is less an outcome of open unemployment than of adequate levels of income and as such, emphasis should be placed not on increasing employment levels but on increasing the productivity of the working poor<sup>5</sup>. The debate has also been concerned with whether policy interventions should concentrate on increasing earnings in the sectors where the poor are (such as agriculture), or whether they should be targeted at sectors where the poor are not, so that more of them can be drawn into the higher-earning sectors (Fields 2006). To date there is very little evidence to illuminate the debate. Moreover, the questions are hard to address both because there is lack of clarity of how to achieve the alternative objectives, and because of the inherent difficulty in identifying the cost and benefits of the possible policy alternatives.

- Which are the growing sectors?
- In which sectors is growth being accompanied by employment generation and/or productivity increases?
- Are the poor benefiting from the observed employment and productivity increases?
- Is poverty more responsive to productivity increases or employment increases?
- Which are the sectors in which the poor are working?
- Which sectors have a bigger effect on poverty?
- Is the incidence of unemployment, underemployment, or low returns among the poor than higher than average? How big are the gaps?
- What has been the role of growth and distributional changes in observed poverty changes? What has been the role of each of the components of labor income?
- What is the role of segmentation? Is there any evidence of segmentation?
- Which are the determinants of the demand for labor (if possible by sectors)?

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<sup>4</sup> One of the core elements of the global employment agenda "Macroeconomic policies for growth and employment" calls for addressing four key questions, one of which is "How can the employment intensity of growth be increased"; ILO (2003).

<sup>5</sup> ILO (2003).

The answers to these questions should serve as inputs in determining whether employment or productivity should be at the top of the policy priority, or whether policy interventions should concentrate on the sectors where the poor are or not. It should also shed some light on the scope for redistributive policies.

## **2 Challenges and policy options**

In designing this ‘guide’ we are faced with several limitations, both theoretical and empirical. On the theoretical side, we are faced with the absence of a unified modeling approach for the analysis of labor markets in developing countries (see Fields 2006). On the empirical side we are faced with significant data limitations. Very few developing countries have panel or longitudinal data either for firms or households and vacancy data is rare. Although household surveys have been very effective in capturing consumption data, income data, and in particular income from labor, is in many cases inadequately captured and in many cases it is not reported at all. The fact that in developing countries income from self employment and income derived from household enterprises, accounts for important fraction of labor income, complicates matters even more, as it is hard to disentangle i) whether reported earnings are net of production costs or not and ii) how to distribute income from household enterprises into individual incomes within the household.

To address these difficulties the approach has been, on the theoretical front, to use a multi-perspective approach, using several modeling strategies and methodological tools. Implicitly, the maximand for the (unspecified) model of shared growth is poverty reduction, which in turn will depend on income growth and its distribution. We will thus look at the evolution of poverty and the distribution of labor income. To address the heterogeneity of data availability and quality, we have opted for assuming that some minimum data is available and suggesting alternative second best approaches if some data is unavailable<sup>6</sup>. A separate document will be devoted to the case where panel data is available. Clearly to do any labor market analysis it is at least necessary to be able to determine who is working and who is not and have some measure or proxy for labor income (which in the worst case can be consumption). Countries whose data is unsuitable to determine who is working and who is not, will be unlikely to do any meaningful labor market analysis.

In addition, to the above mentioned difficulties an important challenge is to be able to provide useful policy guiding points for which there are available policy levers. Much of the policy levers that can help increase earnings and employment and reduce poverty reside outside the realm of labor markets. In particular all the policy levers that promote growth, may promote employment and earnings. Performing a growth diagnostic exercise is beyond the scope of this document and has been approached elsewhere (See Hausmann, Rodrik and Velazco 2002), and indeed a lot may be gained if the analysis proposed here is complemented with growth diagnostics. The more modest objective of

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<sup>6</sup> The assumptions on minimum data available were constructed after reviewing African survey questionnaires and existing Latin American and eastern European labor market studies.

this analysis is to, for given growth, help guide which policy levers can boost earnings and employment. Nevertheless, important insight might be gained from the analysis of the functioning of labor markets that will help guide policy options.

There are 6 policy areas to which the analysis can give input to:

1. Designing and reforming labor market regulations: a) non-labor costs b) firing and hiring restrictions c) minimum wages
2. Assessing the need for reforms of the labor market institutions: a) public employment wages b) the role of unions and e) wage setting mechanisms
3. Educational policy: a) are low returns a consequence of bad education or of segmentation and informality b) is there any evidence of skill mismatch (which are the skills demanded and which are the skills possessed)
4. Industrial policy: a) fomenting particular sectors b) fomenting or not small and medium scale enterprises (e.g. via micro credit) c) fomenting employment/productivity intensive growth.
5. The need for improving information and reducing barriers to mobility: c) are mobility costs too high b) are search costs too high c) is information on what and where are the 'vacancies' a problem.
6. Benefits of strengthening employment and earnings data collection when data is unavailable as well as strengthening analytical capacity.

Each section contains a concluding section (referred to as policy guiding points) highlighting the contribution of the analysis to the above policy areas and in some cases the particular policy levers that can be used. We believe the analysis in this guide represents (i) an essential first step towards evidence based policy making, in the areas of employment generation and (ii) an important element of shared growth strategies for many developing countries.

## **Definitions and Semantics**

Poverty: Through-out the document the term poverty will refer only to the income dimension of poverty. That is, a person is defined to be poor if his income is below a pre-defined threshold.

Labor Markets: when reference is made to labor markets, these are to be understood in a *wide sense*, meaning not just wages, employment and regulation, but more importantly the structure of the labor market and the labor force and the institutional and cultural traits the characterize labor decisions and exchanges.

Labor market structure: We refer to the structure of the labor market to summarize the degree of segmentation, the structure of employment by sectors and segments, the existence of barriers to mobility between sectors and the structure of the labor force.

Labor market's institutional setting: refers to role of unions, the public sector, labor regulation and gender/family structures in setting the rules for labor market exchanges.

Returns to labor/labor earnings: refers to all income derived from work, in kind or in cash, whether as profits from self-employment or as wages from hired labor. This means that output for self consumption is considered a return from labor. Labor income will be used interchangeably.

Employment: Following the ILO definition a person is employed if it has worked at least one hour in the reference week. Some countries however follow different definitions, so depending on the data the definition will need to be adapted.

Underemployment: A person is defined to be underemployed if it was willing and able to undertake additional employment in the reference week of the survey.

Labor Market indicators: describe an agents or an economy's labor situation.

Segmentation: We define two markets to be segmented if returns to individual characteristics depend on the sector of employment. In other words, two markets are defined to be segmented if otherwise 'identical' individuals, have different earning rates depending on the sector in which they work and, such differences can't be explained by other attributes of the job. We will often consider segmentation between good and bad jobs. Since good jobs are rationed, and workers in the good jobs have to 'cue' to get a good job, then mobility between jobs will be restricted in the sense that workers in the bad jobs sector can't instantaneously move to the good jobs sector.

Good Jobs: are those jobs with desirable characteristics, mainly defined in terms of income level, but also in terms of job security and/or other benefits.

God jobs sector: Is comprised of those segments of the labor market in which the big majority of jobs are goods. For empirical purposes the definition will vary depending on the country context. It can be measured either as the formal sector, or as all employment other than waged employment in the informal economy + self employment with no paid employees + employment in family enterprises (with no paid employees). We will often consider the labor market to be segmented between good and bad jobs.

### 3 Country Context

A first section in the country analysis should describe the basic facts about the economy and the labor market. Ideally the section should contain two separate subsections one for general trends in macroeconomic indicators and another one devoted to the most salient features of the labor market.

#### 3.1 Macroeconomic context

- GDP per capita and its evolution
- Main macro indicators
- Output and employment by sectors of production for as many years as possible
- Poverty rates (headcount, poverty gap, poverty incidence) if possible for income and consumption
- Trade statistics, evolution of imports, exports, main sectors of export.

Any important or country specific macro and policy frameworks should also be briefly discussed (any mayor reform, or particular macro difficulties).

#### 3.2 Labor market context

The labor market context should contain the most salient features of the employment, and labor market environment. HDNSP, HDNED jointly with PREMPR developed a set of indicators for the analysis of labor markets in developing countries (See World bank 2006). The set of indicators contains a list of basic indicators complemented with further disaggregations and breakdowns. The following (slightly modified) tables from the guide provide and good starting point for the analysis of labor markets and should be included in the labor market context:

**Table 1: Level 1 labor market indicators**

Indicator	Level, $t_2$	Absolute change, $t_2-t_1$	Relative change, $(t_2-t_1)/t_1$
<b>Employment and unemployment</b>			
Unemployment rate			
Employment-to-population ratio			
Child labor rate			
<b>Wage and salaried workers</b>			
Median earnings			
Low earnings rate			
<b>Individual self-employed workers</b>			
Median earnings			

Low earnings rate
<b>Household enterprise workers</b>
Median earnings
Low earnings rate

**Table 2: Hierarchical decomposition of the labor market**

Tier	Level, $t_2$ (in millions)	Hierarchical rates	Change, $t_2-t_1$ (in millions)	Change, $(t_2-t_1)/t_1$ (in percent)
A. Total working population		100%		
B. Child population (5-14 years of age)		B/A		
B1 Child laborers		B1/B		
C. Elderly population (65+ years of age)		C/A		
C1 Employed		C1/C		
D. Working age population (15-64 years of age)		D/A		
D1. Inactive		D1/D		
a) Discouraged		a)/D1		
D2. Active		D2/D		
b) Unemployed		b)/D2		
c) Employed		c)/D2		
C1) Wage and salaried		c1/c		
i) With low earnings		i)/c1		
C2) Individual self-employed		c2/c		
ii) With low earnings		ii)/c2		
C3) In household enterprises		c3/c		
iii) With low earnings		iii)/c3		

**Table 3: Level 2 labor market indicators**

<b>Indicator</b>	<b>Level, <math>t_2</math></b>	<b>Absolute change, <math>t_2-t_1</math></b>	<b>Relative change, <math>(t_2-t_1)/t_1</math> (in %)</b>
<b>Unemployment</b>			
Broad unemployment rate			
Share of long-term unemployed			
Poverty rate among unemployed workers			
<b>Earnings, wage and salaried workers</b>			
Gini coefficient			
Poverty rate among low earners			
<b>Earnings, individual self-employed workers</b>			
Gini coefficient			
Poverty rate among low earners			
<b>Earnings, household enterprise workers</b>			
Gini coefficient			
Poverty rate among low earners			
<b>Non-wage employment characteristics</b>			
Share of workers holding 2 or more jobs concurrently			
Share of workers affiliated to social security			
Share of registered workers			
<b>Sector of activity</b>			
Agriculture			
Industry			
Services			
<b>Occupation-based skill class</b>			
White-collar, high-skill			
White-collar, low-skill			
Blue-collar, high-skill			
Blue-collar, low-skill			
<b>Formal schooling attainment (in levels )</b>			
Level 1			
...			
Level $N$			
<b>Employment status 1</b>			
Wage and salaried worker			
Self-employed worker with employees			
Self-employed worker w/o employees			
Unpaid family worker			
<b>Employment status 2</b>			
Wage and salaried worker			
Individual self-employed worker			

<b>Table 3: Level 2 labor market indicators (continued)</b>	<b>Level, <math>t_2</math></b>	<b>Absolute change, <math>t_2-t_1</math></b>	<b>Relative change, <math>(t_2-t_1)/t_1</math> (in %)</b>
Household enterprise worker			
<b>Employment contract</b>			
Contract type 1			
...			
Contract type $N$			
<b>Panel data indicators</b>			
Proportion of earners with negative earnings change			
Proportion of labor force participants who moved from employed to unemployed			
3x3 transition matrix for formally employed/informally employed/unemployed in base year and final year			

Notes:

See World Bank (2006) for notes on definitions and interpretations. Other additional tables from the guide are reproduced in Annex A.

In addition a description of the most salient institutional features of the labor market should be discussed, in particular:

- Brief description of wage setting mechanisms (indexing, role of public employment wages if relevant and minimum wage)
- A brief description of the framework that regulates employment relationships (standards of work, minimum wages, unions (both public and private).
- A comparative graph of the evolution of minimum wages, average private formal sector wage, and average public sector wage can be illustrative.

More detailed analysis of the institutional framework will be presented in section 6.

#### **4 Has output growth been accompanied by employment generation and poverty reduction?**

One frequently hears the claim that ‘jobless’ growth has been the main culprit for the failure of output growth to translate into poverty reduction. However it is also often recognized that poverty is less an outcome of open unemployment and more an outcome of low earnings. Profiling growth in terms of sectors, regions and employment is needed in order to answer two key questions: i) has growth been accompanied by increases in employment or productivity? and ii) have the poor been able to benefit from expansions in the growing sectors?. Answers to these questions together with information on the sectoral attachment of the poor, their regional distribution and their labor profile (whether employed or not and the level of output per hour worked), will start to shed light on the dilemma of whether employment generation should be at the top of priorities, and which sectors should interventions focus on.

There are three links that must be unraveled to understand the extent to which output growth translates into poverty reduction. The first is to understand how it is affecting productivity and employment at the aggregate level, and by sectors and regions. The second is to understand how increases in output are translating into changes in aggregate consumption. The third is how sectoral/regional output growth is reaching the poor.

#### ***4.1 Stylized facts: Long term trends in output, earnings and employment.***

If data for several years is available it is possible to determine long run trends, which are useful for understanding structural changes in the economy.

A first section should describe the long run trends in employment and output by sectors (and by regions if relevant). If possible, employment trends should be disaggregated by skill levels. Information of employment by skill levels can be obtained from household data. When this information is not available from household data, Enterprise Surveys or Enterprise Census can be used, though these last sources in most cases cover only manufacturing. This will give some light into which are the growing sectors and in which sectors is unskilled employment growing. Additionally, from Enterprise Surveys it may be useful to look at the evolution of employment and of output, by firm size (micro-enterprises and small enterprises, medium and large enterprises) and by unskilled employment intensity. Dynamisms in unskilled intensive industries as small and medium enterprises are believed to have significant impacts on poverty reduction.

It is also useful to understand the evolution of earnings by sector, at least for two employment categories: the waged employed and self employed with no paid employees. This can be done using household data, by assigning each waged earner or self employed with no employees to an economic sector according to the main type of activity they perform. Earnings can then be averaged by sector, for the two (or more) employment categories. The evolution of earnings combined with the information on productivity (see next section) will help in the understanding of whether rises in productivity or the employment share are translating into higher wages/earning or not.

Finally, some cross tabs of the distribution of employed population by sector or poverty level, as well as by education, is useful in illustrating which sectors are the poor more concentrated. The following tables should serve as a guide, with sector definition depending on the aggregation used at country surveys.

**Table 4: Employment by sector of economic activity\***  
**Percentage of people, by sector of employment**

<i>IISC- revision 3</i>	Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor	total
Agriculture								
Mining/ quarrying								
Fishing								
Extractive activities								
Manufacturing/ processing								
Electricity, water, and gas								
Construction / major repair or maintenance								
Wholesale/ retail trade								
Restaurants/ hotel and food sellers								
Transport, storage, and communication								
Finance / insurance/ real estates and business services								
Community/ social and personal services								
Public administration								
Education								
Health								
Housework/ domestic								
<b>Total</b>								<b>100</b>
<i>or IISC revision 2</i>								
Agriculture								
Mining/ quarrying								
Manufacturing/ processing								
Electricity, water, and gas								
Construction / major repair or maintenance								
Wholesale/ retail trade								
Restaurants/ hotel and food sellers								
Transport, storage, and communication								
Finance / insurance/ real estates and business services								
<b>Total</b>								<b>100</b>
* Individuals should be classified by main employment sector or main source of income								

**Table 5: Average earnings, by sector of employment, gender, and school level\***

	No school	Incomplete Primary	Complete Primary	Incomplete Secondary	Complete Secondary	Tertiary and above	Total
Agriculture							
Mining/ quarrying							
Fishing							
Extractive activities							
Manufacturing/ processing							
Electricity, water, and gas							
Construction / major repair or maintenance							
Wholesale/ retail trade							
Restaurants/ hotel and food sellers							
Transport, storage, and communication							
Finance / insurance/ real estates and business services							
Community/ social and personal services							
Public administration							
Education							
Health							
Housework/ domestic							
* Individuals should be classified by main employment sector or main source of income.							

#### ***4.2 Profiling output growth: decomposing growth into employment and productivity changes***

The aim of this section is to understand which sectors are growing, in terms of output, employment and productivity (output per worker), at the aggregate level and by sectors and regions. To do so we propose a stepwise decomposition which is described bellow.

##### **Step1: decompose aggregate growth:**

A simple way of understanding how growth has translated into increases in productivity and employment at the aggregate level and by sectors (or regions), is to perform a simple decomposition of growth in per capita GDP. To do so, note that per capita GDP,  $Y/N=y$  can be expressed as:

$$\frac{Y}{N} = \frac{Y}{E} \frac{E}{A} \frac{A}{N}$$

**Equation 1**

Or:

$$y = \omega * e * a$$

where  $Y_i$  is total value added  $E$  is total employment,  $A$  is the total population of working age and  $N$  is total population. In this way  $Y/E=\omega$  it total output per worker,  $E/A$  is the share of working age population (i.e. the labor force) employed and  $A/N$  is the labor force as a fraction of total population.

Thus change sin per capita value added can be decomposed into changes in output per worker, changes in employment rates and changes in the size of the labor force. Using shapely decompositions this will be equal to:

$$\Delta y = \Delta \omega \left[ \frac{e_{t=1}a_{t=1} + e_{t=0}a_{t=0}}{3} + \frac{e_{t=1}a_{t=0} + e_{t=0}a_{t=1}}{6} \right] + \Delta e \left[ \frac{\omega_{t=1}a_{t=1} + \omega_{t=0}a_{t=0}}{3} + \frac{\omega_{t=1}a_{t=0} + \omega_{t=0}a_{t=1}}{6} \right] + \Delta a \left[ \frac{\omega_{t=1}e_{t=1} + \omega_{t=0}e_{t=0}}{3} + \frac{\omega_{t=1}e_{t=0} + \omega_{t=0}e_{t=1}}{6} \right]$$

The first term in the summation will be the contribution of changes in output per worker, the second term the contribution of changes in the employment rate and the third term the contribution to changes in the demographic component.

With this information we can present aggregate growth in terms of each of these

components:  $\bar{\omega} \equiv \Delta \omega \left[ \frac{e_{t=1}a_{t=1} + e_{t=0}a_{t=0}}{3} + \frac{e_{t=1}a_{t=0} + e_{t=0}a_{t=1}}{6} \right] / \Delta y$  will be the fraction of

growth that can be linked to changes in output per worker,

$\bar{e} \equiv \Delta e \left[ \frac{\omega_{t=1}a_{t=1} + \omega_{t=0}a_{t=0}}{3} + \frac{\omega_{t=1}a_{t=0} + \omega_{t=0}a_{t=1}}{6} \right] / \Delta y$  will be the fraction of growth that can

be linked to changes in the employment rate, and

$\bar{a} \equiv \Delta a \left[ \frac{\omega_{t=1}e_{t=1} + \omega_{t=0}e_{t=0}}{3} + \frac{\omega_{t=1}e_{t=0} + \omega_{t=0}e_{t=1}}{6} \right] / \Delta y$  will be the fraction of growth that can

be linked to changes in the share of total population that is of working age; where the bar denotes the fraction of growth explained by the component. In this way percentage growth between two periods can be expressed as:

$$\frac{\Delta y}{y} = \bar{\omega} \frac{\Delta y}{y} + \bar{e} \frac{\Delta y}{y} + \bar{a} \frac{\Delta y}{y}$$

Once we have decomposed aggregate employment growth we can go further and understand i) the role played by different sectors in changes in employment and ii) the role of capital, Total Factor Productivity and intersectoral shifts in explaining changes in output per worker, both at the aggregate level and by sectors. This amounts to doing a step wise decomposition: first decomposing aggregate growth into employment and productivity changes and the decomposing employment and productivity changes by sectors.

**Step 2: Understanding which sectors contributed most to employment generation.**

To understand which sectors contributed to most of the employment generation we can further decompose employment growth ( $\Delta e$ ) by sectors. The easiest is of course to express the total growth in employment as the sum of employment generation in each sector.

$$\Delta e = \sum_{i=1}^s \Delta e_i$$

Where  $\Delta e_i = \Delta \frac{E_i}{A}$  is just the change in employment in sector  $i$  as a share of total working age population. Let  $\bar{e}_i^e \equiv \Delta e_i / \Delta e$ , denote the fraction of the aggregate employment rate change that can be linked to changes in employment in sector  $i$ . The supra-index  $e$  will make explicit that it is the contribution to employment growth (as opposed to total per capita growth).

**Step 3: Decompose changes in output per worker by sectors and in between and within sector components**

We can further decompose output per worker into sectoral employment shifts and changes in output per worker by sectors by noting that:

$$\frac{Y}{E} = \sum_s \frac{Y_i}{E_i} \frac{E_i}{E}$$

Or equivalently:

$$\omega = \sum_{i=1}^s \omega_i s_i$$

where  $Y_i$  is value added of sector  $i=1 \dots S$ ,  $E_i$  is employment in sector  $i$ , and  $E$  is total employment. This means that  $\omega_i = \frac{Y_i}{E_i}$  will correspond output per worker in sector  $i$ ,

$s_i = \frac{E_i}{E}$  is the share of sector  $i$  in total employment. This equation just states that changes

in output per worker are the weighted sum of changes in output per worker in all sectors, where the weights are simply the employment share of each sector.

Using the shapely approach, changes in aggregate output per worker can be decomposed as:

$$\Delta\omega = \underbrace{\Delta\omega_1 * \left(\frac{S_{1,t=0} + S_{1,t=1}}{2}\right) + \Delta\omega_2 * \left(\frac{S_{2,t=0} + S_{2,t=1}}{2}\right) + \dots + \Delta\omega_i * \left(\frac{S_{i,t=0} + S_{i,t=1}}{2}\right)}_{\Delta\omega_w} + \underbrace{\sum_{i=1}^S \Delta S_i * \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2}\right)}_{\Delta\omega_B}$$

Each terms  $\Delta\omega_i * \left(\frac{S_{i,t=0} + S_{i,t=1}}{2}\right)$  are the change in output per worker due to changes in output per worker in sector  $s$ . The last term in the equation  $\Delta\omega_B$  is the change in output per worker due to intersectoral employment changes (i.e. between sectors). That is employment movements from low productivity sectors to high productivity sectors should increase total output per worker, and the flows from high productivity sectors to low productivity sectors should reduce aggregate output per worker. If this last term is negative the reallocation of employment by sectors was detrimental to overall productivity growth. Finally, the term  $\Delta\omega_w$  corresponds to total changes in output per worker net of relocation effects (or within component).

We can then denote the fraction of aggregate output per worker growth that can be linked to growth in output per worker in sector  $i$  as  $\bar{\omega}_i^\omega \equiv \Delta\omega_i * \left(\frac{S_{i,t=0} + S_{i,t=1}}{2}\right) / \Delta\omega$ , where again the bar denotes the fact that we are referring to contributions, and the supra-index denotes the fact that it is a contribution to aggregate output *per worker* growth  $\omega$ , rather than a contribution to output *per capita* growth  $y$ .

Similarly we can define the contribution of within sector productivity growth as  $\bar{\omega}_w^\omega \equiv \Delta\omega_w / \Delta\omega$  and the contribution of intersectoral shifts as  $\bar{\omega}_B^\omega \equiv \Delta\omega_B / \Delta\omega$

**Step 4: understanding the sources of changes in output per worker (net of intersectoral shifts) at the aggregate level and by sectors.**

The terms  $\omega$  and  $\omega_i$ , will capture changes in output per worker, but its interpretation is not so straight forward. Increases in output per worker can come from three different sources: i) increases in capital labor ratio ii) increases in Total Factor Productivity (TFP) and iii) relocation of jobs from bad jobs sectors (low productivity) to good jobs sector (high productivity). To see the first two points, note that under constant returns to scale, if  $Y_t = \Phi f(E_t, K_t)$  where  $K_t$  is the capital stock and  $\Phi_t$  a technological, then output per worker  $Y_t/E_t = \Phi f(1, K_t/E_t)$ . Therefore it will capture changes in capital labor ratio and in TFP growth. Note that it may also capture cyclical behavior of output: firms operating in economic downturns may have underutilized capital, when the demand rises again; it will be reflected as rise in output per worker. The third point is simply the result of worker moving from a low productivity sector (or firm) to a high productivity sector (or firm), so that in the aggregate average output per worker will rise. From step 3 we found that it is possible to isolate the effect of intersectoral shifts:  $\Delta\omega_w$  is just changes in output per worker net of intersectoral shifts.

If data on capital stock is available then we can assume a particular functional form for the production function and separate the contribution of higher capital labor ratios and the rest. For example if we are willing to assume that the production function is Cobb-Douglas then:

$$\frac{Y}{E} = \Phi \left( \frac{K}{E} \right)^\alpha$$

In competitive markets  $\alpha$  the share of payments to capital in total value added. It is usually available from national accounts data or if there are enough time series then it can be estimated by taking logs and estimating:

$$\ln \frac{Y}{E} = \ln \Phi + \alpha \ln \left( \frac{K}{E} \right) + t + \mu$$

Where  $t$  is an (optional) time trend capturing technological change and  $\mu$  is a residual. Once we have a value of  $\alpha$  we can proceed to decompose changes in output per worker net of intersectoral shifts, into changes in Total factor Productivity and changes in the capital labor ration.

Once we have an estimate of  $\alpha$ , we can calculate total factor productivity as a residual: In the first period it will be:

$$\left( \frac{Y}{E} \right)_{t=0} / \left( \frac{K}{E} \right)_{t=0}^\alpha = TFP_{t=0}.$$

In the second period we need however to take into account that part of the change in output per worker was due to relocation shifts so that:

$$\left[ \left( \frac{Y}{E} \right)_{t=1} - \Delta\omega_B \right] / \left( \frac{K}{E} \right)_{t=1}^\alpha = TFP_{t=1}$$

The term in square brackets I just output per worker in period two net of relocation effects. In this way we are able to see whether changes in output per worker net of relocation effects, where due to increases in capital per worker or in total factor productivity:

$$\Delta\omega_w = \Delta k^\alpha \frac{(TFP_{t=0} + TFP_{t=1})}{2} + \Delta TFP \frac{(k^\alpha_{t=0} + k^\alpha_{t=1})}{2}$$

Where k is simply the capital-labor ratio. The first tem in the right hand side is the contribution of changes in the capital labor ratio to growth in output per worker net of relocation effects, and the second term is the contribution of changes in TFP.

This means that changes in total output per worker can be expressed as the sum of changes in TFP, changes in the capita labor ratio and intersectoral shifts:

$$\Delta\omega = \underbrace{\Delta k^\alpha \frac{(TFP_{t=0} + TFP_{t=1})}{2} + \Delta TFP \frac{(k^\alpha_{t=0} + k^\alpha_{t=1})}{2}}_{\Delta\omega^w} + \Delta\omega_B$$

As before let  $\bar{k}^\omega \equiv \Delta k^\alpha \frac{(TFP_{t=0} + TFP_{t=1})}{2} / \Delta\omega$  denote the share of output per worker that

can be linked to changes in the capital labor ratio,  $\overline{TFP}^\omega \equiv \Delta TFP \frac{(k^\alpha_{t=0} + k^\alpha_{t=1})}{2} / \Delta\omega$

denote the share of growth in output per worker that can be linked to TFP changes

$\bar{\omega}_B^\omega \equiv \Delta\omega_B / \Delta\omega$  denote the share of changes in output per worker that can be attributed to intersectoral employment shifts.

### Step 5: Understanding the role of each sector on intersectoral shifts.

It is possible to understand further how changes in the share of employment in the different sectors help explain the overall contribution of intersectoral shifts to per capita growth. An important literature has found that structural change, which is movements of labor force shares from low productivity sectors to high productivity sectors, is an important factor behind growth. Increases in the share of employment in sectors with above average productivity will increase overall productivity and contribute positively to the intersectoral shift term. On the contrary, movements out of sectors with above average productivity will have the opposite effect. By the same token, increases in the share employment in sectors with bellow average productivity should reduce growth, while reduction in their share should contribute positively to growth.

Using the above intuition we can rewrite the intersectional shift as:

$$\Delta\omega_B = \sum_{i=1}^S \Delta s_i \left( \frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right)$$

The term in parenthesis is the difference between a sector  $i$ 's productivity (averaged between the two periods)  $\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2}$  and the average (over the two periods)

productivity of all the economy (note there is no sectoral sub-index)  $\frac{\omega_{t=0} + \omega_{t=1}}{2}$ .

Therefore, the contribution of sector  $i$  to the intersectoral shifts term will be:

$$\Delta s_i \left( \frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right)$$

Thus if sector  $i$  has productivity below the average productivity, and increases its share  $s_i$ , its contribution will be positive, that is outflows from this low productivity sector have contributed to increase output per worker. If on the other hand, if the sector sees an increase in its share, these inflows into this low productivity sector will decrease output per worker and thus have a negative effect on the intersectoral shift term. The magnitude of the effect will be proportional to: i) the difference in the sector's productivity with respect to the average and ii) the magnitude of the employment shift.

As before we can denote the share of intersectoral shift that is explained by sector  $i$  as:

$$\bar{s}_i^{\omega_B} = \Delta s_i \left( \frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right) / \Delta \omega_B$$

### Step 6: putting everything together

Once the above steps are completed the percent contribution of each factor to total changes in GDP per capita can be obtained as follows:

Contribution of	Formula	Comments
1. Demographic shifts	$\bar{a} \equiv \Delta a \left[ \frac{\omega_{t=1}e_{t=1} + \omega_{t=0}e_{t=0}}{3} + \frac{\omega_{t=1}e_{t=0} + \omega_{t=0}e_{t=1}}{6} \right] / \Delta y$	As in step 1
2. Contribution of aggregate changes in output per worker	$\bar{\omega} \equiv \Delta \omega \left[ \frac{e_{t=1}a_{t=1} + e_{t=0}a_{t=0}}{3} + \frac{e_{t=1}a_{t=0} + e_{t=0}a_{t=1}}{6} \right] / \Delta y$	As in step 1
3. Contribution of changes in the employment rate	$\bar{e} \equiv \Delta e \left[ \frac{\omega_{t=1}a_{t=1} + \omega_{t=0}a_{t=0}}{3} + \frac{\omega_{t=1}a_{t=0} + \omega_{t=0}a_{t=1}}{6} \right] / \Delta y$	As in step 1
4. Contribution of increases in sectoral employment	$\bar{e}_i = \bar{e}_i^e * \bar{e}$ $= [\Delta e_i / \Delta e] * \bar{e}$	Is calculated as the contribution of changes in employment in sector $i$ to total employment rate changes (step 2), times the contribution of employment rate changes to changes in total GDP per capita (step 1)

5. Contribution of changes in output per worker within sectors	$\bar{\omega}_w = \bar{\omega}_w^\omega * \bar{\omega}$ $= \left[ \left( \sum_{i=1}^S \Delta \omega_i * \left( \frac{S_{i,t=0} + S_{i,t=1}}{2} \right) \right) / \Delta \omega \right] * \bar{\omega}$	It's the contribution of <i>within</i> changes in output per worker to total changes in output per worker (step 3) times the contribution of aggregate output per worker to GDP per capita (step 1)
6. Contribution of intersectoral employment shifts	$\bar{\omega}_B = \bar{\omega}_B^\omega * \bar{\omega}$ $= \left[ \sum_{i=1}^S \Delta S_i * \left( \frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} \right) / \Delta \omega \right] * \bar{\omega}$	It's the contribution of between changes in output per worker to total changes in output per worker (step 3) times the contribution of aggregate output per worker to GDP per capita (step 1)
7. Within changes in output per worker in sector i	$\bar{\omega}_i = \bar{\omega}_i^\omega * \bar{\omega}$ $= \left( \Delta \omega_i * \left( \frac{S_{i,t=0} + S_{i,t=1}}{2} \right) / \Delta \omega \right) * \bar{\omega}$	It is the contribution of sector <i>i</i> , to within changes to total changes in output per worker (step 3) times the contribution of output per worker to changes in per capita GDP (step1)
8. Contribution of shifts in the share of employment witnessed by sector <i>i</i>	$\bar{s}_i = \bar{s}_i^{\omega_B} * \bar{\omega}_B$ $= \left[ \Delta S_i \left( \frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right) / \Delta \omega_B \right] * \bar{\omega}_B$	It is the contribution of sector <i>i</i> , to the between component of changes in output per worker (step5) times the contribution of the between employment shifts component to total GDP per capita (calculated as above in Numeral 6)
9. Contribution of TFP (net of intersectoral shifts)	$\overline{TFP} = \overline{TFP}^\omega * \bar{\omega}_w$ $= \left[ \Delta TFP \frac{(k^\alpha_{t=0} + k^\alpha_{t=1})}{2} / \Delta \omega \right] * \bar{\omega}_w$	It is the contribution of TFP growth to changes in output per worker net of intersectoral shifts (step 4) times the contribution of within changes in output per worker to total GDP

		(calculate above Numeral 5)
10. Contribution of capital labor ratio	$\bar{k} = \bar{k}^\omega * \bar{\omega}^w$ $= \left[ \Delta k^\alpha \frac{(TFP_{t=0} + TFP_{t=1})}{2} / \Delta \omega \right] * \bar{\omega}^w$	It is the contribution of changes in the capital labor ratio to changes in output per worker net of intersectoral shifts (step 4) times the contribution of within changes in output per worker to total GDP (calculate above Numeral 5)

Equation 1 can be modified to analyze the relation of urban-rural shifts and per capita output. Assuming that output can be differentiated between urban and rural, or that rural output might be proxied as the sum of some economic activities (e.g. agriculture, fishing and forestry) we can rewrite Equation 1 as:

$$\frac{Y}{N} = \frac{Y_{urban}}{E_{urban}} \frac{E_{urban}}{A_{urban}} \frac{A_{urban}}{N} + \frac{Y_{rural}}{E_{rural}} \frac{E_{rural}}{A_{rural}} \left( 1 - \frac{A_{urban}}{N} \right)$$

And the perform shapely decompositions. In this way it is possible to see if shifts in the working age population to the urban sector (that is increases in  $\frac{A_{urban}}{N}$ ) are positively or negatively correlated with per capital output.

It is important to clarify the direction of causality in the interpretation of the sectoral productivity/employment and dependency ratio marginal contributions. We are decomposing an identity and we are not establishing causal links. The terms  $\bar{\omega}_i$ ,  $\bar{a}$  and  $\bar{e}_i$ , should be interpreted loosely as the fraction of growth in per capita income that was accompanied by productivity or employment changes in a given sector, or with changing overall dependency, without any causal implication, rather than the share of growth *due* to changes in productivity/employment or the *impact* of growth in sectoral employment/productivity.

The above decomposition can also be applied using data from enterprise surveys or census. In some cases, data from enterprise census is available by enterprise size and differentiates between small and micro-enterprise, medium enterprises and large enterprises. Instead of decomposing growth by sectors of economic activity we can understand how growth, employment and productivity changes are related to enterprise size. Alternatively if there is data on skill composition of the labor force (blue collar and white collar) one can group firms according to different unskilled labor intensities. These extensions are particularly useful to understand more about the characteristics of the growth process, and link them with poverty changes. In many cases sectoral differences

in the poverty impact of growth are due to differences among sectors on the level of un-skill intensity. Small and medium size enterprises are generally more un-skill intensive and there is some evidence that they have important impacts for poverty reduction.

Once output has been decomposed into its employment and productivity components the next step is to link growth, employment and productivity with poverty.

### ***4.3 Linking employment and productivity growth with poverty.***

If long enough time series are available, a simple regression framework can be used to determine the impact of the sectoral or regional changes in employment or productivity growth, on poverty:

$$\ln P_t = \gamma + \sum_{i=1}^s \alpha_i \ln e_{it} + \sum_{i=1}^s \beta_i \ln \omega_{it} + \delta \ln a_{it} + \gamma X_t + \mu_t$$

**Equation 2**

The  $\alpha$ 's can be interpreted as the elasticity of poverty with respect to employment in sector I, and the  $\beta$ 's can be interpreted as the elasticity of poverty with respect to productivity changes in sector i. The coefficient  $\delta$  will be the elasticity of poverty with respect to the dependency ratio. The vector X, should include other terms to control for differences in inequality and its interactions with per capita income (see Bourguignon 2004). The same approach can be followed to understand the impact on poverty reduction of employment and productivity by skill intensity or enterprise size.

In many cases there will be very few data points for the above regression framework to be used. However, in some instances, enough information is available at the regional levels for a few years. If the country being analyzed has regional accounts, so that sectoral output is available by regions, and there are household surveys for the same years as the available regional accounts, it is possible to obtain employment by sector and region from household surveys and pool together time series data by regions. In this case poverty in region  $m$  at year  $t$ , can be regressed against regional output by sectors in year  $t$ , where regional output can be decomposed into employment and productivity components. Panel data techniques will need to be used to take into account the structure of the data<sup>7</sup>.

In many cases, there is no available time series for poverty and employment by sectors or regions, because household surveys are carried out infrequently or because there are no regional accounts. In these cases the regression analysis suggested above can not be performed. Nevertheless, some insight can be obtained if two or more comparable household surveys are available.

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<sup>7</sup> See the [Annex D](#) for references and a brief discussion.

As it is well known poverty measures of the FGT type are additive. This means that it is feasible to analyze the contribution of various population subgroups to changes in overall poverty. If household surveys have information that permit the classification of households or individuals according to sectors, then poverty changes can be decomposed into changes due to: i) changes in poverty within specific sectors (intra-sectoral poverty changes) and ii) changes in poverty due to changes in the share of people attached to each sector (inter-sectoral changes)<sup>8</sup>:

$$\Delta P = \sum_{i=1}^S \frac{N_{i,t=1} + N_{i,t=2}}{2} (P_{i,t=2} - P_{i,t=1}) + \sum_{i=1}^S \frac{P_{i,t=1} + P_{i,t=2}}{2} (N_{i,t=2} - N_{i,t=1})$$

**Equation 3**

Where  $\Delta$  stand for changes,  $P$  is a poverty measure for the total population,  $P_{i,t}$  is a poverty measure in sector  $i$  at time  $t$ , and  $N_{i,t}$  is the share of poor *households* attached to sector  $i$  at time  $t$ <sup>9</sup>. The definition of sectors can also differentiate between urban and rural sectors of economic activity. In other words manufacturing in the rural sector and manufacturing in the informal sector can be treated as two different sectors. The sectoral attachment of a household can be defined in several ways. Ravallion and Huppi (1991) use a self reported classification based on a survey question which asks respondents to identify their main income source from a list of sectors. If income or hours worked are reported for each employed individual in the household (including imputed value of output for self consumption) the researcher can assign households to sectors depending on the main source of income, or the activity to which the household devotes most time. An alternative way would be to classify households according to the sectoral attachment of the household head.

It is important to note that most households have many sources of income. This implies that results have to be interpreted with care. For example, a household member working in a sector -say sector B- other than the ‘main’ household sector –say sector A-, may benefit from an increase in income that is sufficient to bring the household out of poverty. This would be reflected in sector decrease of poverty within sector A, which is not a result of growth or increases in earnings within sector A. If there is a strong correlation on the sectoral structure of employment within households, that is if all households with a member working in A sector have a member working in B sector as secondary activity, the results may be misleading, in the sense that the sector that would show the within poverty reduction (sector A) is not the one leading it (which in this example is sector B). If correlations in sectoral attachment among household members are small though, it may be safe to assume that the sectors that show within poverty reductions are the sectors actually leading the poverty reduction. Still, poverty within sectors (holding employment

<sup>8</sup> Ideally, the sector classification of individuals from household surveys should be done in a way comparable to the classification from National Accounts.

<sup>9</sup> This decomposition can also be performed using initial shares to weight changes in poverty and initial poverty levels to weight the changes in shares, if so a residual factor, usually interpreted as an interaction term will also be present. The way presented here eliminates the residual. See Shorrocks (1999).

shares constant) can decrease for reasons other than increased earning among the employed. For example, workers within a given sector may have benefited from increased government transfers that would have allowed them to exit poverty or mitigate it by allowing them to increase their total income or consumption, so that interpretation of poverty changes within sectors have to be taken with care and should be complemented with an analysis of the structure of income sources by sectoral attachment of the household<sup>10</sup>.

A more direct approach in disentangling the effect of sectoral growth on poverty reduction, one that avoids many of the above mentioned problems, is to understand which sectors are reducing the *share of low earners*. Low earners are defined as those among the working age population who are working and earning less than the per-capita poverty line (some of which will live in poor households and others not), as a fraction of all the employed among the working age population. With information on the main sector of activity and on labor earnings of each working age individual, it is possible to assign them to a given sector. It is then possible to decompose changes in the percentage of population that are low earners, into changes in the percentage of poor earners within sectors (intra-sectoral changes), and changes in the percentage of poor earners between sectors (inter-sectoral effect), as in Equation 3, P in this case denoting the share of low earners (whether poor or not). The analysis can be taken one step further and instead of decomposing the share of low earners, we can decompose changes in the share of low earners that actually fall within a poor household. In other words, in Equation 3, P would correspond to the share of low earners that are poor (live in a poor household).

Since some low earners may be poor while others not, and some poor individuals may not be low earners, it is important to understand which the distribution of low earners among the population. The following table can serve as guide for these description:

**Table 6: Distribution of low earners by quintile and poverty level\***

		Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor
Low earners	urban							
	rural							
Non-low earners	urban							
	Rural							
Low earners are defined as those individuals working and earning less than the per capita poverty line. They are classified as poor if they live in a poor household and as belonging to quintile X if they live in a household with income or consumption within the X quintile of income								

With information obtained from the analysis described in section 4.2 and Equation 3 we can get an overall picture of output growth by sectors and which of these sectors are having (or not) an impact on poverty and the percentage of low earners. Note however, that with this framework (as opposed to the regression framework explained before)

<sup>10</sup> Once households are classified as belonging to a particular sector, household income can be disaggregated into by sources and averaged across sectors. It is possible to see whether there were important increases in other sources of income like remittances and transfers, among households attached to a given sector.

although we have information on which sectors are affecting poverty and earnings, we can't say anything about the direct impact of sectoral employment  $e_i$  and productivity  $\omega_i$  on poverty reduction or earnings. We can only make indirect claims based on the combined evidence of sections.

#### ***4.4 The link between output growth and consumption/income growth***

Many policy makers have highlighted the fact that although output growth may be increasing, it does not translate into average income growth (as captured either by mean household survey income or consumption), and as such the effect on poverty reduction is small. There are several reasons why we might observe this.

The most obvious reason is that output growth is being accompanied by increases in other components of output: investment, government expenditure and exports or decreasing imports. Although greater exports and investment may ultimately translate into greater consumption there may be large lags before this occurs.

But even though output growth may be reflected in consumption growth according to national accounts, this might not be reflected in consumption as measured from household surveys. There are several reasons why this might be so, among which measurement error, non-response, survey design and in general differences in coverage and definitions among surveys are likely culprits (See Deaton 2002 for a discussion).

Because of these differences between output growth and household consumption or income, it is important to understand and state these issues when analyzing the poverty impact of growth. A complete picture of the links between poverty and growth should include an analysis of how have the different components of growth evolved, as well as a comparison between consumption from household surveys and national accounts.

#### ***4.5 Summary of data needed for section 4***

To perform the analysis described in this section both aggregate data from National Accounts and Household Surveys are needed. Ideally the analysis should be carried out with regional and sectoral aggregate data on output and employment, and with national and regional time series on poverty. Poverty data should come from household surveys and should be measured from consumption when ever possible. Employment data should come from household surveys and be representative of the whole economy. Sectoral and regional output can be obtained from national accounts and regional accounts. Individual earnings should be obtained from household surveys. [Annex B presents an example of how to calculate individual earnings for different types of workers.](#)

The aim should be to obtain sufficiently long time series to perform regression analysis. This often is not the case. In many cases household surveys are conducted only sporadically and all available surveys are not comparable. This results in a limited data points on employment and poverty. When this is the case, the aim should be to obtain as many comparable household surveys, so that decomposition of changes in poverty and output can be obtained for as many "growth spells" as possible. Growth spells can be

illustrative on past changes, but if very few growth spells are available, it will be difficult to understand whether the observed behavior is part of a long run trend or is capturing sporadic shocks.

#### ***4.6 Policy guiding points***

The above section highlights the sectors have been relatively successful in reducing poverty via employment or productivity growth via increasing labor income has been a major component of observed changes in poverty. Sectors that have high impact on poverty reductions might be targets of industrial policy, by for example creating tax incentives to production, targeting key infrastructure to these sectors or allowing special labor regulations to foment employment growth. Additionally, if it is found that employment growth in some sectors has important impacts on poverty; these sectors can be target for special labor legislation. If productivity increases are behind the poverty changes then policies to promote productivity increase might be worth exploring. If data was available by firm size, then it will be possible to understand the aggregate correlation of, for example, micro-enterprises and employment/earnings, which may hint whether there might be room for important policy implications regarding this sector of the economy.

Alternatively, the above section also highlights which are the growing sectors. If it is found that there are dynamic sectors that are not contributing to poverty reduction, it is then worth exploring the reasons behind their apparent ineffectiveness in reducing poverty. Is it segmentation and barriers to mobility that are hampering the poor from benefiting from observed growth? Are demanded skills a problem? etc.

This section also identifies the sectors which should merit further analysis, in the sense that if a given sector has been found to have particular correlations with poverty, it is worth understanding what conditions or policies are behind this behavior, either to support them (if the reduced poverty) or to mitigate their impact (if they are found to be increasing poverty).

### **5 What is the employment and labor income profile of the population?**

Understanding how labor income and its components affect household poverty is useful in understanding which the priority policies are. Is the incidence of unemployment or underemployment higher among the poor than the non-poor? How do the earnings of the poor per hour worked compare with the earnings of the non-poor? Are the poor unemployed or earning too little? Where are the poor working? These questions are answered by analyzing the labor profile of the poor and comparing it with other members of the population.

### 5.1 Stylized facts: the employment and earnings profile of the population

A labor profile of the population should inform policy makers as to how households are distributed among sectors, what their status in employment is and what the determinants of per-capita household labor income are. This can be done by dividing the population between the poor or non poor, or by income deciles and understanding:

- The employment status of working age population by quintile: share of waged workers, share of self employed, share of unpaid family workers and share of inactive. The employment status of the working age population can be calculated at the individual level, and are usually straightforward to obtain from household surveys. The following tables should serve as guide.

**Table 7: Employment status of the working age population**  
Proportion of individuals of working age, by decile and poverty level

		Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor	Total
Employed	Urban								
	Rural								
	Total								
Unemployed	Urban								
	Rural								
	Total								
Inactive	Urban								
	Rural								
	Total								
Average number of months unemployed	Urban								
	Rural								
	Total								
Average number of hours worked per week	Urban								
	Rural								
	Total								

**Table 8: Employment status of the employed population of working age**  
Employed in each category as proportion of employed individuals, by quintile and poverty level of the individual's household\*

Employment Status		Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor	Total
Waged employed private formal sector	Urban								
	Rural								
	Total								
Waged employed	Urban								

private informal sector	Rural		
	Total		
Waged employed public sector	Urban		
	Rural		
	Total		
Self employed with no paid employees	Urban		
	Rural		
	Total		
Self employed with paid employees (other than family workers)	Urban		
	Rural		
	Total		
Family enterprise workers (including unpaid family workers)	Urban		
	Rural		
	Total		
* Assignment of individuals by quintiles and poverty, should be done on the basis of household consumption, i.e. an individual is classified in the first quintile if he lives in a household with income/consumption range falling in the first quintile. The employment status, on the other hand is determined at the individual level.			

- The structure of total household income by quintile: share of wage earnings, share of income from self employment, share of imputed income from auto-consumption, share of in-kind payment and share of non labor income, if possible non labor income should disaggregate remittances and government transfers from other non labor income. The structure of total household income can also be obtained from household surveys. In addition to information about the structure of household income it is useful to understand to what income from labor is enough to bring people out of poverty. A useful characterization of the structure of labor income and its relation to poverty is to calculate a transfer dependency index. The index is constructed by calculating the poverty rate based on household *income* and then calculating the poverty rate based subtracting from total income the amount of transfers received either from the government, from remittances or both and other non labor income. The index is the ratio of the poverty rate based on total income to the poverty rate excluding remittances and transfers. The following tables should serve as a guide.

**Table 9: Structure of household earnings by quintile and poverty level**  
**Share of total household income by sources of income**

	Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor
% Income from waged employment (monetary or in-kind)							
% Income from self employment							
% Imputed income from auto consumption							

% Income from public transfers							
% Income from family remittances							
% Income from other non labor sources							
Total	100	100	100	100	100	100	100

**Table 10: Transfer dependency index**

	Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor
Headcount poverty based on total income							
Headcount poverty based on total income minus remittances and public transfers							
Headcount Total Transfer Dependency Ratio							
Poverty Gap based on total income							
Poverty Gap based on total income minus remittances and public transfers							
Poverty Gap Total Transfer Dependency Ratio							
Headcount poverty based on total income							
Headcount poverty based on total income minus public transfers							
Headcount Public Transfer Dependency Ratio							
Poverty gap based on total income							
Poverty based on total income minus public transfers							
Poverty Gap Public Transfer Dependency Ratio							

Note that this characterization is only possible if data on earnings is available.

- Median and mean earnings of the employed population for different subgroups of the population Aside from the share of workers in each employment status it is important to see the average income level by employment status to understand which employment status can be associated with the lowest earnings. This information should also be available from household labor force surveys. If information on income is not available, then information on average per capita *household* consumption can be used. Individuals can be classified according to their individual employment status or with according to the main employment status of the household. The main employment status of the household can be either self reported, in some surveys, or otherwise calculates as the employment status of the head of household. The following table should serve as a guide.

**Table 11: Mean and median earnings by employment status  
Employed population of working age**

		Q1	Q2	Q3	Q4	Q5	Poor	Non-Poor	Total
Waged employed in the private formal sector	Mean								
	Median								
Waged employed in the private informal sector	mean								
	median								
Waged employed in the public sector	mean								
	median								
Self employed with no paid employees	mean								
	median								
Self employed with paid employees (other than family workers)	mean								
	median								
Family enterprise workers (including unpaid family workers)	mean								
	median								

- The labor income profile of the population by quintile (as explained below).

The labor income profile is best described at the household level. A simple a useful characterization of households in terms of labor indicators can be obtained by noting that the average labor income of household  $j$ , can be written as (borrowing from Kakwani, Neri and Son 2006):

$$\frac{I_j^L}{N_j} = \frac{I_j^L}{H_j} \frac{H_j}{E_j} \frac{E_j}{L_j} \frac{L_j}{A_j} \frac{A_j}{N_j}$$

**Equation 4**

where  $I_j^L$  is total labor income of household  $j$ ,  $H_j$  is total hours worked by working age members in household  $j$ ,  $E_j$  is the total number of employed in the household,  $L_j$  the number of participants in the labor market and  $A_j$  the number of working age members. In this way  $\varpi = I^L/H$  corresponds to average earnings per hour worked,  $h=H/E$  average hours worked,  $E/L$  is the employment rate,  $l=L/A$  the participation rate and  $a=A/N$  is the ratio of working age members to total household members, or dependency rate. For simplicity let the above equation be re-written as:

$$t_j^L = \varpi_j h_j (1 - u_j) l_j a_j$$

**Equation 5**

where  $(1 - u_j)$  corresponds to the employment rate of household  $j$ , which can be re-written as one minus the household's unemployment rate  $u_j$ . Note that  $\varpi$  (omega bar) is different to  $\omega$  (simple omega) which refers to output per worker in the previous sections.

In many context there is an important fraction of child laborers and elderly workers, and calculating earnings per hour worked by the employed of working age is overestimating real household 'productivity'. In these cases, it might be better to abstract from the structure of the household according to working age ( $A_j$  in Equation 4) and calculate dependency rates as the number of participating individuals over working total household members ( $A_j/L_j$ ), and define  $E_j$  as the number of working individuals irrespective of whether they are of working age or not; and hours worked  $H_j$ , as total hours worked for all employed individuals irrespective of age.

By averaging each of the components of the per capita household's labor income over sub-groups of population we can obtain a full profile of labor market characteristics. For example, if we divide households by quintile of income, it will describe the average labor market characteristics of each quintile. Let  $\Omega$  denote the subset of households belonging to a particular quintile. It is possible to compare deciles by average dependency rates

$$\frac{1}{N_\Omega} \sum_{j \in \Omega} a_j, \text{ average participation rates } \frac{1}{N_\Omega} \sum_{j \in \Omega} l_j, \text{ average hours worked } \frac{1}{N_\Omega} \sum_{j \in \Omega} h_j,$$

$$\text{incidence of unemployment } \frac{1}{N_\Omega} \sum_{j \in \Omega} u_j \text{ and earnings per hour worked } \frac{1}{N_\Omega} \sum_{j \in \Omega} \varpi_j.$$

The following table can summarize the labor profile of the population and its distribution:

**Table 12: labor income profile of the population**

	Q1	Q2	Q3	Q4	Q5	Poor	Non-poor	Total
Average earnings per hour $\varpi$								
Average hours worked by the employed $h$								
Household unemployment rate $u$								
Average participation rate $l$								
Average dependency ratio $a$								
Total per capita labor income $t^L$								

## 5.2 Analyzing the sources of changes in labor incomes

A traditional way to understand how labor markets have affected welfare is to disentangle which sources of labor income growth are responsible for observed changes in total labor income<sup>11</sup>.

<sup>11</sup> See Kakwani, Neri and Son (2006) for an application of this decomposition to the analysis of pro-poor rates of growth.

From Equation 5 the average per capita labor income of the subset  $\Omega$  of households (be it the poor households or non poor households, or the households falling within an income range or with particular demographic characteristics), will then be:

$$\frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln t_j^L = \frac{1}{N_{\Omega}} \left( \sum_{j \in \Omega} \ln \varpi_j + \sum_{j \in \Omega} \ln h_j + \sum_{j \in \Omega} \ln(1 - u_j) + \sum_{j \in \Omega} \ln l_j + \sum_{j \in \Omega} \ln a_j \right)$$

**Equation 6**

It is thus possible to decompose the change in the average per capita household labor income of group  $\Omega$ , into changes in its different components: changes in average log earnings/per hour worked, changes in average of log hours-worked, changes in average log unemployment rates, etc. In particular:

$$\Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln t_j^L = \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln \varpi_j + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln h_j + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln(1 - u_j) + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln l_j + \Delta \frac{1}{N_{\Omega}} \sum_{j \in \Omega} \ln a_j$$

**Equation 7**

In this way we can easily see whether growth in average labor income of the poor (or any group  $\Omega$ ) was due to changes in employment rates, participation rates, hours of work or earnings per hour worked.

We can go a step further and decompose average earnings per hour into earnings per hour from self employment ( $\pi_j$ ) and earnings per hour from waged employment ( $w_j$ ):

$\varpi_j^L = h_j^w w_j + h_j^{\pi} \pi_j$ , with  $h_j^w$  corresponding to the share of waged employment in total hours worked and  $h_j^{\pi}$  the share of self employment. In this case however, log-linearization of Equation 5 is no longer possible and we would have to perform Shapley decompositions to analyze income changes.

Comparing in this way changes in average incomes of the poor and its components, with changes in average income of the non-poor can shed some light on which are the channels through which a growth process is affecting the income of the poor. In many cases however, there might be considerable heterogeneity among employment sectors. In many cases it is useful to perform this decomposition disaggregating household according to other characteristics, for example dividing households depending on their main occupation e.g. differentiating between rural farmers, rural non-farm workers, sector of occupation of household head, etc.

### ***5.3 The role of labor income in poverty reduction***

The above section highlighted how changes in average labor income can be attributed changes in its components. However as mentioned by Ravallion (2004), growth in

average incomes does not satisfy many welfare axioms and as such it is less than an ideal measure, of how the poor are being affected during a growth process.

An alternative way of linking poverty and income from labor is to combine traditional growth-inequality poverty decompositions with Equation 5. As is well known, changes in poverty measures, can be decomposed into distribution and growth components, and further differentiated between *partial* elasticities and changes in growth or income distribution. In the case where the distribution of income can be summarized by the variance, this decomposition is summarized in the following identity:

$$\frac{\Delta P}{P} \equiv \varepsilon_{P\iota} \frac{\Delta \iota}{\iota} + \varepsilon_{P\sigma} \frac{\Delta \sigma_{\iota}}{\sigma_{\iota}}$$

**Equation 8**

Changes are indicated by  $\Delta$ ,  $P$  is a poverty measure (not necessarily the headcount ratio),  $\iota$  (iota) refers to mean survey income for the total population (and hence the absence of any sub-index) and  $\sigma_{\iota}$  is a measure of inequality in the distribution of income, in this case its variance<sup>12</sup>. The first term in the right hand side of Equation 8 would be the growth component, and would correspond to changes in poverty due to changes in mean income holding the distribution of income constant. The second term in the right hand side of Equation 8 is the distribution component, and corresponds to the changes in poverty due to changes in the distribution of income, holding mean income constant. The *partial* elasticity of the poverty measure with respect to mean income  $\iota$ , and the *partial* elasticity of the poverty measure with respect to the distribution measure  $\sigma_{\iota}$ , are  $\varepsilon_{P\iota}$  and  $\varepsilon_{P\sigma}$ , respectively.

On the other hand, total mean survey income  $\iota$ , can be written as the sum of total mean survey labor-income,  $\iota^L$ , and total mean survey non-labor income,  $\iota^{NL}$ :

$$\iota = \iota^L + \iota^{NL}$$

**Equation 9**

where  $\iota^L$  is given (as in Equation 5) by:

$$\iota^L = \varpi h (1-u) l a$$

**Equation 10**

---

<sup>12</sup> When the distribution of income is lognormal, there is a one to one map between the Gini coefficient and the variance.

but where the index has been omitted to make explicit the fact that reference is being made to the total population. As mentioned before, using a Shapley decomposition we can find the contribution of each of the components of total mean survey income to any observed changes this variable. Let  $\bar{x}$  denote the contribution of variable  $x$  to the observed change in total mean survey income, expressed as a fraction of the total change in income, in other words  $\bar{w} + \bar{h} + \bar{u} + \bar{l} + \bar{a} + \bar{i}^{NL} = 1$ . This implies that changes in mean survey income can be fully characterized by changes in its components.

Similarly, in the case where the distribution of income can be fully described by one parameter (for example by the variance) it is possible to characterize the whole income distribution in terms of the distribution of the components of income. The variance of mean survey income will be a function of the variance of each of the labor market components<sup>13</sup>:

$$\sigma_i = f(\sigma_w, \sigma_h, \sigma_u, \sigma_l, \sigma_a, \sigma_{i^{NL}})$$

**Equation 11**

This means that changes in the variance of income can be decomposed into changes in the variances of its different components. Let  $\bar{\sigma}_x$  denote the contribution of the variance of variable  $x$  to the observed change in the variance of total mean survey income, expressed as a function of total observed change in the variance, in other words  $\bar{\sigma}_w + \bar{\sigma}_h + \bar{\sigma}_u + \bar{\sigma}_l + \bar{\sigma}_a + \bar{\sigma}_{i^{NL}} = 1$ .

Then Equation 8 can be re-written as:

$$\frac{\Delta P}{P} \equiv \varepsilon_{P_i} \frac{\Delta i}{i} (\bar{w} + \bar{h} + \bar{u} + \bar{l} + \bar{a} + \bar{i}^{NL}) + \varepsilon_{P\sigma} \frac{\Delta \sigma_i}{\sigma_i} (\bar{\sigma}_w + \bar{\sigma}_h + \bar{\sigma}_u + \bar{\sigma}_l + \bar{\sigma}_a + \bar{\sigma}_{i^{NL}})$$

**Equation 12**

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<sup>13</sup> See Goodman (1960) for the formula of the exact variance of products. The appendix shows the exact formula for the variance of income as a function of the variances of the income components.

In this way changes in poverty can be decomposed into changes in average labor market characteristics and its distribution. For example, the contribution of unemployment to changes in poverty is going to be determined by the contribution of changes in average unemployment rates, and the distribution of unemployment among the poor and non-poor. The contribution of changes in average unemployment will be given by  $\varepsilon_{p_t} \frac{\Delta t}{t} \bar{u}$ , while the effect of differences in the incidence of unemployment among the poor and non-poor will be captured by  $\varepsilon_{p_\sigma} \frac{\Delta \sigma_t}{\sigma_t} \bar{\sigma}_u$ .

#### 5.4 Summary of data needed for section 5

To understand the labor profile of the poor it is crucial to have information on total labor income at the household level. This means having information on wages and hours worked for those working as employees, earning and hours worked for those working as self employed with no employees, and household enterprise modules for those working as self employed either with hired employees or family workers, so that total profits can be computed. Information on non labor income and consumption is also important as poverty is almost always measured in terms of consumption or total income. [Annex B discusses in more detail how to compute total household income by sources as well as how to compute individual labor income.](#)

#### 5.5 What to do if some data is not available

In many cases the analysis is hampered by the lack of adequate information on labor income. The main problems with data are:

- Surveys only record information in income and hours worked from the main activity.
- Surveys do not have information on non-labor income
- Surveys only have information on consumption and savings
- Surveys only have information on consumption
- Surveys do not report hours worked (or the data is unreliable)
- It is not possible to determine participants in the labor market

In general it is possible to determine the reliability of data using the fact that:

$$C = t^L + t^{NL} - S$$

When information on income is only available for the main activity, the researcher must determine how significant the underestimation of income is. A way to do so is to compare total consumption with reported labor income plus non labor income minus savings (if available), if there are significant differences it might be better to use total consumption minus any reported non labor income as proxy for labor income. But solutions to this problem depend on the nature and availability of the data.

When information on non-labor income is not available but there is information on consumption and savings it is not possible to check how well is labor income captured. There are two alternatives i) construct total income as consumption minus savings and perform the analysis for labor income or ii) perform the analysis for consumption. Which one to choose will depend on how accurate the information on savings is.

When only information on consumption is available, or one is forced to use consumption, then the only alternative will be to work with consumption. In this case, however, the relevance of the results for the analysis of the role of labor income and labor in poverty reduction is of limited use. It is still useful as poverty profile.

Very frequently there is no information on hours worked, so that component  $h$  in Equation 10 can not be computed. In this case it is only possible to calculate total labor earnings or consumption per employed household member as a proxy for labor productivity. Results will need to be interpreted with care though as increases in labor productivity may reflect increases in the number of hours worked.

Finally, in many low income countries the participation in the labor force is a murky concept, in particular for women. When comparing data over time it is important that the definition of participation is comparable between surveys, and that what is considered as a participant in the labor market is as clear a concept as possible. Whether one is able to reliably construct labor participation or a proxy for it from the available data clearly depends on the questionnaire and data available. If determining labor participation is not possible, then the terms  $l$ ,  $e$ , and  $h$  in Equation 10 can't be calculated and the only labor market indicator available will be per capita labor earnings/consumption and per working age member labor earnings/consumption, which clearly has very little labor market content. It may still be possible however to know who is working and who is not, and join the unemployed and the inactive under a 'residual' category, so that Equation 4 will become:

$$\frac{I_j^L}{N_j} = \frac{I_j^L}{H_j} \frac{H_j}{E_j} \frac{E_j}{A_j} \frac{A_j}{N_j}$$

And Equation 10 will become:

$$t^L = \varpi h e a$$

Where  $e$  now refers to the employment rate.

To do any labor market analysis it is at least necessary to be able to determine who is working and who is not. Countries whose data is unsuitable to determine who is working and who is not, will be unlikely to do any meaningful labor market analysis.

## 5.6 Policy guiding points

Section 5, on the structure of household income and its change over time, as well as on the labor status of the population, gives important information for policy practitioners.

First help prioritizing the labor indicators of relevance for policy making: unemployment, underemployment or returns to hours worked. Other useful insight may be gained from the comparison of the structure of income between the poor and not so poor. Significant differences may indicate that there may be scope for trying to shift the structure of income of the poor towards a more favorable one. For example if one finds that, the share of income from self employment represents similar fractions of income in the poor and non poor, then promoting waged employment per-se, might not be preferred over increasing the income of the self employed, via for example credit programs for micro-enterprises.

Finally the analysis of which sources of income have increased the most, together with the analysis of section 4 on the profile of growth, will help policy makers understand the channels through which particular growth processes have affected the poor, and should in this way, aid in the design of more efficient policies (i.e those that target the type of growth that increases the income source most important for the poor or more responsive to growth)

## **6 Market forces: what is the role of segmentation, labor supply, skill mismatch and labor demand?**

Section 4 profiles of growth and described its links with poverty; while section 5 presented the labor profile of the population and described its links with income growth. Together they provide a picture of which are the growing sectors, who are the poor and which groups of the population are benefiting from growth. It is however silent on which is the role of important labor market forces such as segmentation within the labor market, supply of labor and mismatch and labor demand, and on how this forces are shaping employment and earnings.

The aim of this section is to try to broaden the understanding of the role of labor supply, labor demand and market imperfections and frictions that might be affection employment generation and earnings. The first step in doing so is to understand the institutional and regulatory framework, that will affect employment and earnings.

### ***6.1 Stylized facts: The institutional framework***

A description of the institutional framework of wage setting mechanisms should be explained with data on (if available):

- Unionization rates
- Minimum wages compared to observed wage distribution (how binding is it, whether it binds both in formal and informal, etc.). As well as who sets it, what is the periodicity etc.
- Magnitude of non-wage labor costs (payroll taxes, social security, etc)
- The size of government employment and wages (share of government employment on total and formal employment, wage gaps (calculated from the previous section)

- Work permits or some measure of out of country labor flows when immigration is an important issue.
- Investment climate and doing business labor indicators which can be compared with main trading partners or with the rest of the region.
- Shares of fixed vs. flexible contracts in the modern sector and costs (hiring and firing) of each if available from either investment climate surveys or other manufacturing surveys. Alternatively some labor force surveys ask the type of contract an employer has.
- Political economy of labor reform: who are the players, what is their power, how do they exert this power
- Any legal restrictions on migration within the country if they exist.

Information for the institutional settings needs to be obtained from a variety of sources. Minimum wages and non-wage labor costs are usually available in the regulation of labor contracts. Often legislation is complex so that talks with officials from labor ministries or non-governmental industrial organizations are useful. Work permits issued are usually available from statistical offices or immigration offices. Investment climate labor indicators can be obtained directly from the World Bank investment climate website or Doing Business indicators. From doing business the following indicators are available: ease of employing workers, difficulty hiring index, difficulty firing index, rigidity of hours index, rigidity of employment index and firing costs. From investment climate there two questions in the questionnaire about main constraints to investment that may be useful to look at: i) skill and education of available labor force and ii) Labor regulation. The questionnaire also has information on total compensation as a fraction of wages, although there are very few countries with surveys. Information on the political economy of reforms can come either from secondary sources or by interviews with government officials, industry representatives and unions.

## ***6.2 Segmentation***

Much of the theoretical literature on labor markets in developing countries has in common that it emphasizes the duality and segmentation of labor. Although segmentation is hard to prove empirically, there seems to be a consensus that in some contexts different parts of the labor market follow their own dynamic and that movement between these segments is limited. There is by no means general agreement that segmentation holds everywhere and always, but these model seems credible enough to have survived strong criticism<sup>14</sup>.

Segmentation models are useful in explaining certain features of the labor market that do not make sense under a unique labor market, such as why increases in productivity may cause wages to fall, why firms may add workers without having to raise wages, why

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<sup>14</sup> See Magnac (1991), Heckman and Sedlacek (1985) for a discussion of test of labor market dualism.

urban employment creation may rise unemployment, among others (see Fields 2004). But within the context of shared growth, segmentation in the labor market is important insofar as they may produce higher poverty rates and higher poverty depth, and reduce the capacity of the poor to benefit from growth. In particular, when the imposition of institutionally set wages, reduces the amount of labor that is hired in the ‘good jobs sector’ (also referred to as the formal, modern or industrial sector) welfare is reduced (see Fields 2004 for a discussion). Equally if segmentation generates history dependence, in the sense that being in sector makes it more unlikely to move in the future, then poverty traps may arise.

Although there may be several reasons for labor market segmentation, the general consequence is that returns to labor and non pecuniary returns to labor do not equalize across segments of the labor market, for workers with seemingly equal characteristics. This implies that a natural starting point to check for segmentation is to look at wage gaps between different segments of the labor market. Of course, wage gaps may reflect other things besides segmentation. Among them, compensating differentials for non pecuniary characteristics of the jobs, unobserved ability, monoposonistic power in one of the markets and transaction costs of moving to another sector (such as acquiring specific skills, cultural costs, transport costs when migration is involved, etc), have probably received most of the attention in the literature. Because it is hard to control for many of these, it is difficult to disentangle how much of wage differentials is attributed to segmentation alone.

Nevertheless it is useful to determine whether different labor markets reward observable characteristics differently. Additionally, it is useful to understand the wage setting mechanisms that operate within a country. Both, analysis may shed some light on the extent to which institutionally set wages may be reducing the effectiveness of growth in reducing poverty.

The following section describes a methodology to determine whether different segments of the labor market reward individual characteristics differently.

### **6.2.1 Estimating differences in returns to individual characteristics**

To determine whether rewards to individual characteristics differ by segments of the labor market, the most common methodology is to estimate earnings equations for different submarkets and test whether the coefficients are significantly different.

Estimation of earnings equations should be performed separately for the following employment categories: waged private formal workers, waged private informal workers, public sector workers, self employed with paid employees other than family members, self employed with no employees and household enterprise workers. Test of whether coefficients are significantly different among groups can then be performed. To account for possible selection bias, a two step procedure should be performed (see next section). In a first step decision to participate are estimated. [Annex C describes this two step procedure in detail](#) In a second step wages are estimated correcting for possible selection

bias. To determine whether the coefficients are significantly different between segments of the labor market a Hausmann test should be performed.

Finally it is possible to determine the share of wage differentials that can be attributed to differences in the rewards to individual characteristics. When estimating earnings equations for different groups, the wage differentials can be attributed to differences in average characteristics among workers or differences in the return to observed characteristics. To disentangle both components the wage differential can be decomposed using the Oaxaca-Blinder method:

$$\ln \varpi_j - \ln \varpi_s = \beta_j(X_j - X_s) + (\beta_j - \beta_s)X_s$$

**Equation 13**

Were the first term in the right hand side of Equation 13 reflect the part of earnings differential that is due to differences in (average) observed characteristics and the second term reflects that part due to differences in returns to individual characteristics. Important wage differences due to differences in returns to individual characteristics may be an indication of segmentation.

### **6.2.2 Summary of data needed for section 6.2**

To analyze the determinants of individual labor earnings household data is needed. The minimum requirements are information on wage earnings, education levels, age and sector of employment. It is however desirable to have information on other non wage labor earnings. As discussed above, the main difficulty in accounting for non-wage income arises when it is derived from family enterprises, so that it is difficult to assign an individual income to any member of the household. In the case of self employed individuals that do not hire employees or work with family helpers, reported income, if reliable, should be included.

When family enterprises are present the suggested approach is to calculate average income for the household (i.e total income from the enterprise divided by number of member working in the enterprise) and assign to each member this level of income. It has often been argued that returns to household enterprise depend on the level of income of the household head or the head of the enterprise. In this line of reasoning there would be two alternatives to assign a level of education to each member of the household enterprise: 1) the observed level of education and 2) define a “head of enterprise” as either the member with the highest level of education or if there is reported “head of enterprise” use the reported one. Once the head of enterprise has been defined use its education level as regressor for each member of the household.

When income from labor is not available the analysis could be performed using average household consumption. To assign households to a given segment of the labor market there are two alternatives: i) some questionnaires ask directly the main sector of

economic activity for the household and, ii) classify households according to head of household main sector of economic activity.

### ***6.3 Labor supply and mismatch of skills***

The traditional analysis of labor supply focuses on estimating decision to participate in the market, and conditional on participation the supply of hours. Both participation decision and supply of hours are usually modeled as a function of wages and individual characteristics, and estimation methods take into account possible selection bias.

However, traditional estimation of labor supply function may not be very informative in terms of policy, for developing countries. First in very low income countries, non-participation is small. As households' income is relatively low, and labor income is the main (if not the only) source of income of the great majority of individuals, most family members have no options but to be employed, regardless of the level of earnings they get. In middle income countries however, participation in the labor market may still be relevant, in particular if benefits to the unemployment or the very poor exist. Second, labor supply estimation assumes that labor markets are competitive and individuals can choose between leisure and work, and accordingly choose the number of hours that maximize their well being. In this way, at the given wage they can work the amount of hours they choose to. In developing countries, however, there seems to be a consensus on the fact that individuals working less hours (than the average) do not work less hours because of choice, but because of unavailability of work. Third, as mentioned before, segmentation in the labor market means that the labor supply curve faced by firms (at least in the formal or good jobs sector) may be perfectly elastic, so that potential employees just accept the going wage when ever they are offered a wage. Finally, even for developed nations it is unclear that hours worked should be treated as a separate characteristic of other job attributes. In non competitive models, where wages are set via bargaining, unions, regulation (e.g. minimum wages) or efficiency wage considerations, the amount of hours one is willing to work are either considered fixed or as another varying attribute of the job (see Manning 2003), in other words, employers offer a fixed package of hours-wage, and as such, observed hours worked will depend on a combination of personal characteristics, and employer characteristics.

The above arguments suggest that maybe insight into labor supply in developing countries may be gained by departing slightly from traditional analysis of labor supply. We believe that insight into policy may be gained by analyzing other features of labor supply that may be more relevant to developing countries and non competitive settings. In particular there are two issues that may be of particular relevance. First, the degree to which skill mismatch is responsible for low employment levels in the formal or 'good jobs' sector. And second, rather than analyze supply of hours in the labor market, it may be more relevant to understand how personal characteristics (as defined by educational level, occupation, gender and age) the probability of participating as self employed (or in the informal sector) or as waged employed (or in the formal sector).

This section presents some methodologies to address the above issues. The first section approaches the description of the labor force and the analysis of mismatch. The second section relates to how personal characteristics affect labor market outcomes, such as the probability of being in a particular segment of the labor market, the rate of arrival of offers and the duration of unemployment or being the ‘bad jobs sector’. Since participation decisions may be important in some middle income countries, these will also be addressed.

### 6.3.1 Stylized facts: composition of the labor force

A first analysis of labor supply should contain a description of the labor force, that is, the working age population and the participation rates, by gender and by level of education. Ideally the description should provide a view of long run trends. The following table should serve as guide.

**Table 13: Structure of the labor force by age, level of education, gender and migration status. Proportion of individuals, by deciles and poverty level**

	Q1		Q2		Q3		Q4		Q5		Poor		Non Poor	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M
<i>By education</i>														
no education														
Incomplete primary														
complete primary														
Incomplete secondary														
Complete secondary														
some tertiary education														
<i>By age</i>														
15-25														
26-35														
36-45														
46-55														
56-65														
<i>Migration status</i>														
Migrant														
Non-migrant														

Ideally however, a graph that shows long run trends in the labor force structure should be provided and discussed. Time series data for total population by age structure is usually

available from United Nations Population Division or World Bank development indicators.

An important issue on the trends in labor force participation is how the labor force distribution between urban and rural has changed over time. A simple way to see long run trends in rural-urban structure is to graph the share of total working age population in the urban or rural sector. A more detailed picture can be obtained with a table that looks at the share of urban (or rural) working age population by level of education, gender and age. The following table should provide a guide:

**Table 14: Proportion of working age population in the urban sector**

	Year 1		Year 2		Year 3		Year 4		Year 5	
	F	M	F	M	F	M	F	M	F	M
<i>By education</i>										
no education	% of total female labor force with no education located in the urban sector									
Incomplete primary										
complete primary										
Incomplete secondary										
Complete secondary										
some tertiary education										
<i>By age</i>										
15-25										
26-35										
36-45										
46-55										
56-65										
<i>Migration status</i>										
Migrant										
Non-migrant										

### 6.3.2 Skill mismatch

As mentioned before under non-competitive settings supply and demand may not equate to 'clear the market'. Instead both market imperfections and frictions may imply that a share of employment ends up either unemployed or if unemployment is not an option in the 'bad jobs' sector. This will mean that markets will be segmented in the sense defined in the previous section, that is, two agents with similar characteristics will end up with different earning depending of the segment of the labor market they end up in ('good jobs' segment vs. unemployed or 'bad jobs segment').

However, although segmentation implies that there may be two identical individuals earning differently because they are in different segments, it is also well known that the composition of labor market segments are different, with the good jobs sector having a lower share of un-skilled workers than the unemployed and the 'bad job' states. A possible explanation for this is that the rigidities that generate the segmentation are more binding for the un-skilled. For example, minimum wages or union set wages affect more the unskilled wage than the skilled wage. If workers in the 'bad jobs sector' could become skilled they would face a higher probability of being hired in the good jobs sector. In terms of demand and supply, this means that excess supply is higher for the unskilled population. This is what is referred to as mismatch of skills.

But skill mismatch matters not only in a static sense, but also and probably most importantly in a dynamic sense. In the presence of skilled biased technical change skill mismatch is likely to increase. The larger the share of agents that don't have or can't acquire the skills demanded by firms, the larger the share that will end up in the 'bad jobs' sector. Rising informality may be a consequence of rising skill mismatch.

There are several ways to explore the degree and evolution of skill mismatch. We will review two of those methods. The first method is an adaptation based on the work of Katz and Murphy (1992) and Murphy and Welch (1993). The general idea is that if relative demand of two educational categories was stable, then an increase in the relative supply of a group must lead to a reduction in the relative wage of that group. For example, if the amount of skilled labor is increasing with respect to unskilled labor, and there is no change in the demand for either, then wages of the skill must fall in response to the greater relative supply. So a very simple test of this hypothesis is to check whether relative the product of the change in the skill premium and the change in relative supplies is negative. Rising wage gaps due to relative demand shifts may be interpreted as increasing skill mismatch, (i.e. the demand for skills is rising more rapidly than the supply of skills).

Since the changes may be associated with changing quality of the relative education of each together withn changing shares of skilled population it is useful to calculate these changes within cohorts. The following table would provide a guide:

**Table 15: Testing stable relative demand for skills**

	<b>A. change in wage ratio skill/unskilled</b>	<b>B. change in supply of skills/Supply of unskilled</b>	<b>C. Product of A and B</b>
Cohort 1			
Cohort 2			
Cohort 3			

If the result in column C is negative then the observed changes in wages can be explained solely by changes in relative supplies, otherwise relative demands are playing a factor<sup>15</sup>. Since we are concerned basically with rising skill mismatch in the ‘good jobs’ sector, Column A should be calculated using only average income from workers in the ‘good jobs sector’ (which ever definition is used), while relative supply should be calculated using the total population participating in the market<sup>16</sup>.

The second methodology is based on the work of Layard, Nickell and Jackman (1991) and Jackman, Layard and Savouri (1991). The authors construct a measure of skill mismatch based on a model of non-competitive labor markets, where the equilibrium level of unemployment and wages is determined by a combination traditional firm labor demand and a wage setting equation that responds to bargaining, efficiency wages and labor supply. The resulting model yields a measure of skill mismatch that corresponds to the variance in relative unemployment rates among different educational groups, so a first measure of mismatch *mm1* could be calculated as:

$$mm1 = \frac{1}{2} \text{var} \left[ \frac{u_i}{u} \right]$$

As discussed before, however, unemployment may not be an adequate measure of excess labor supply for developing countries. A better measure of excess labor supply might be given by the total share of working population in the ‘bad jobs’ sector (whether this is defined as the informal sector or the self employed with no paid employees) plus the unemployed. The above measure of mismatch can be complemented with an additional measure *mm1*:

<sup>15</sup> For more detailed methods to decompose changes in relative wages between supply and demand components see Katz and Murphy (1992), but the whole model relies on the competitive model.

<sup>16</sup> The good jobs sector can be defined as all employment excluding the self employed with no paid employees, or as all employed in the formal sector.

$$mm2 = \frac{1}{2} \text{var} \left[ \frac{u_i + b_i}{u + b} \right]$$

Where  $b_i$  refers to the rate share of workers in the skill group  $i$ , which are employed in the bad job sector, and  $b$  corresponds to the total share of workers employed in the “bad jobs” sector.

### 6.3.3 The decision to participate and the probability of getting a ‘bad job’

As mentioned above for developing countries it is more relevant to understand how personal characteristics affect the decision to participate and the probability of ending up in a ‘bad job’<sup>17</sup>.

The underlying model for the estimation of participating decisions assumes that the decision to work or not comes from an underlying decision to supply hours of work. Let  $H_i^*$  denote desired hours of work, which we observe only if the hours of work are positive, that is if the individual is working; and let  $Z_i$  denote the individual characteristics that determine the wage rate (usually years of education, age, age squared and gender) and  $X_i$  denote the individual characteristics that determine participation decisions other than the wage rate (usually age, marital status, gender, number of children role in the household and other non labor income available). The model can then be written as:

$$H_i^* = \alpha_0 + \alpha_1 \varpi_i + \alpha_2 Z_i + \varepsilon_i$$

**Equation 14**

$$\varpi_i = \beta_0 + \beta_1 X_i + \mu_i$$

**Equation 15**

$$H = 1 \quad \text{if} \quad H_i^* \geq 0$$

$$H = 0 \quad \text{otherwise}$$

**Equation 16**

Equation 14 determines desired hours of work, as depending on the wage and other personal characteristics, Equation 15 determines the wage as a function of personal characteristics and Equation 16 represents the dichotomous variable that states that we observe actual desired hours only in the case where they are positive, in other words it reflects the decision to participate.

The estimation of decisions to participate has to take into account two issues, first the fact that the right hand side variable is not continuous and second that we observe wages (a determinant of participation) only for those currently working. To take into account the dichotomous nature of Equation 16 we use a Probit model. To take into account the fact that we do not observe wages for those not working we need to use modeled wages.

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<sup>17</sup> Neverthe less the appendix discusses estimation of hours of work and wages.

Combining Equation 14 and Equation 15, the probability that a worker will not work will be given by<sup>18</sup>:

$$P[H = 0 | X_i, Z_i] = \Phi(\delta_i)$$

**Equation 17**

$$\text{With } \delta_i = -(\alpha_0 + \alpha_1(\beta_0 + \beta_1 X_i) + \alpha_2 Z_i) / \sigma_v$$

**Equation 18**

This probit model is estimated by log-likelihood methods using information for all working and non-working individuals (See Annex C for a description of the likelihood function)<sup>19</sup>. The results will inform us whether given individual characteristics such a gender, or the number of children affects your decision to participate in the market.

In addition to decision to participate it is interesting to understand whether the probability of having a bad jobs sector depends on your skills. Following the same Probit approach we can define a variable 0/1 that denotes whether you are employed in the bad jobs sector or not as a function of individual characteristics  $Z_i$ . It will inform policy makers, for example, how important is education, on the likelihood of getting a good job.

## 6.4 Labor demand

A final component in determining labor outcomes is labor demand. Under competitive settings, as long as the supply for labor is not infinitely elastic, supply and demand will interact to determine prices. In the case where supply of labor is infinitely elastic (e.g. flat), or wages are set exogenously by unions or other institutional settings, then labor demand will determine the amount of employment at the going wage. The traditional approach is to assume that labor is paid its marginal product and firms take wages as given, thus choosing the amount of labor that will equalize the marginal value of the product of labor to the going wage.

The assumption that firms take wages as given is not innocuous it has both empirical implications as well as theoretical ones. On the theoretical side, it means that monopsonistic behavior by firms is excluded. On the empirical side it means that special care must be taken about possible endogeneity of wages. Ideally the estimation of labor demand should be performed as a system together with supply equations. This however requires matched employer-employee data, which is rarely available. As discussed by Hamermersh (1996), the problem then boils down to whether price (wage) or quantity

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<sup>18</sup> This comes from the fact that:

$$P[H = 1 | X_i, Z_i] = P[H_i^* > 0] = P[\varepsilon_i + \beta_1 \mu_i > -(\alpha_0 + \alpha_1(\beta_0 + \beta_1 X_i) + \alpha_2 Z_i)]$$

and the fact that the probit model assumes that the joint distribution of the error  $v_i \equiv \varepsilon_i + \beta_1 \mu_i$  is normal with mean zero and variance  $\sigma_v$ .

<sup>19</sup> Probit estimation techniques are readily available in STATA and most other statistical packages. Note that we will only be able to estimate the ratios  $\alpha_j/\sigma$ .

can be viewed as exogenous in the problem under consideration. In studies based on small units such as firms, plants or low level aggregation of sectors, it might not be too harsh an assumption to take the supply of labor as infinitely elastic, so that the wage rate might be treated as exogenous. Instead, in studies using aggregate data this assumption will not be valid. For this reason labor demand estimation, when not performed as part of a system that also specifies demand, should be performed at low levels of aggregation.

There are two approaches in estimating labor demand: i) the static approach or estimation of long run labor demand, and ii) the dynamic approach or short term labor demand.

The idea behind the estimation of long term labor demand is to understand how *steady state* labor demand is affected by wage increases, increases in product demand, technological change and changes in other inputs of production. The analysis is usually carried out by estimating own wage demand elasticities, output elasticity of labor demand and elasticities of substitution among inputs of production. It has clear implications in terms of policy design. For example, the output elasticity of demand tells us the required increase in demand to raise employment by x%. The own wage elasticity would indicate what would be the response of employment if payroll taxes or other non wage costs paid by employers were to be reduced, etc.

It is however recognized that employment levels may take some time to adjust to shocks, and as such short run dynamics are important. One way to analyze how labor demand adjustment takes place, is by estimating dynamic labor demand models. The main objective of labor demand equations is to analyze the persistence of shocks

#### 6.4.1 Static Framework<sup>20</sup>

The analysis of static labor demand, is useful in understanding the effect of changes in relative prices and output on the demand for labor in the long run, that is when firms can adjust labor to optimal levels.

To estimate elasticities of labor demand it is necessary to assume functional forms for the production or cost function. When information on more than two inputs of production is available a common choice is a Generalized Leontief (GL) cost function. The derived demand for GL cost function can be written as (see appendix for details):

$$\frac{X_{it}}{Y_t} = \sum_j b_{ij} \left( \frac{p_{jt}}{p_{it}} \right)^{1/2} + \alpha_i Y_t + \gamma_i T$$

Equation 19

where  $X_{it}$  is the quantity of factor  $i$  used in period  $t$ ,  $y_t$  is output in period  $t$ ,  $p_{it}$  is the price of input  $i$  in period  $t$ , and  $T$  is a time trend (which is usually interpreted as factor augmenting technological change). In this way, changes in relative prices, output or technological change, can affect the input output ratio. The GL cost function has the

<sup>20</sup> This and the next section draw heavily from Cardenas and Bernal XX and Cardenas and Gutierrez XX.

advantage over other functional forms that is very flexible, and encompasses other cost functions as special cases (see Diewert 1971).

With the coefficients from Equation 19, which can be estimated by OLS, we can construct the different elasticities:

The own wage elasticity is given by:

$$\eta_{ii} = -\frac{Y \sum_{j \neq i} b_{ij} \left( \frac{p_j}{p_i} \right)^{1/2}}{2X_i}$$

**Equation 20**

The elasticity of substitution between inputs j and i will be:

$$\sigma_{ij} = \frac{\frac{Y}{2X_i} b_{ij} \left( \frac{p_j}{p_i} \right)^{1/2}}{s_j}$$

**Equation 21**

where  $s_j$  is the cost share of input i in total costs. Finally the elasticity of input i with respect to output is given by:

$$\phi_i = 1 + \frac{\alpha_i Y^2}{X_i}$$

**Equation 22**

Hamermesh (1986) discusses the main measurement issues for static labor demand. Ideally labor should be measured by hours worked. If workers are heterogeneous with respect to hours worked, using number of workers will lead to bias if hours worked are correlated with output or factor prices. When using time series data (where variations of hours worked are small) or if there are not significant differences in hours worked within industries the issue may not be so relevant. Measurement issues about ages, on the other hand, are harder to overcome. Ideally the measure should refer to the total cost to the employee of an hour of labor used in production. Some countries have wage and total compensation indexes that capture precisely this. In other cases however this is not available. The idea should be to get as close as possible to measuring total cost of hours worked. It should include, regular wages, other compensation (such as social security, health contributions and payroll taxes) which if not directly available should be constructed based on available regulation, and bonuses and other non-regular payments<sup>21</sup>.

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<sup>21</sup> Constructing total compensation from regulation can be done under the assumption that ll firms used in the estimations re formal and comply with regulation.

## 6.4.2 Dynamic labor demand

To take into account stickiness in adjustment process as in Bentolila and Saint Paul (1992). Dynamic labor demand takes into account that hiring (posting vacancies, recruiting, training etc.) and firing (mostly legal) generate costs above the wage. This implies that firm's demand for labor depends not only on current exogenous factors but also on the initial size of the workforce and about expectations of future exogenous factors. For example, given this costs, firms may be reluctant to hire labor even under increasing product demand, because there is uncertainty about how long this increased demand may last. In this way inflexibilities in the labor market may generate stickiness in the labor demand of the firm.

A traditional analysis of dynamic labor demand aims at understanding this persistence in labor adjustments, a common empirical framework for doing so is by estimating the following labor demand equation (see Bentolila and Saint-Paul 1992):

$$\ln E_{it} = \alpha_0 + \alpha_1 \ln E_{i,t-1} + \alpha_2 \ln w_{it} + \alpha_3 \ln price_{it} + \alpha_4 \ln K_{it} + \alpha_5 \Delta \ln Y_{it} + \alpha_6 t + v_{it}$$

**Equation 23**

Labor demand by firm  $i$  at time  $t$ ,  $E_{it}$  will thus depend on the level current wages ( $w_{it}$ ), prices of intermediate inputs and capital ( $K_{it}$ ), past employment and changes in (log) output  $Y$  as proxies for shocks with  $v_{it}$  an error term. Changes in sales instead of output should be used as proxies for shocks when ever available.

The coefficients of interest are the one on lagged employment and on shocks. Higher persistence indicates and lower responsiveness to shocks are indicators of inflexibilities in the labor market. The estimates can be compared to other results in the literature (cite studies to compare). If mayor changes in labor flexibility were introduced the above framework may be used to test whether these changes had significant impact on labor markets or not. If the data differentiates workers depending on the type of contract (formal/informal or permanent/temporary) it is possible to infer something about the magnitude of the inflexibility in labor contracts on employment generation, by running the regression by type of workers and testing whether there are significant differences. A difference in difference approach can also be explored.

Since Equation 23 contains lags of the dependent variable, OLS estimation will produce biased estimates. Arellano and Bond (1988) develop an estimator for dynamic models which should be used<sup>22</sup>.

## 6.4.3 Extensions: analyzing the effect of public sector wages and minimum wages on the share of 'bad jobs' employment

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<sup>22</sup> Stata has an Arellado and Bond estimator for dynamic models

A useful extension to the analysis of labor demand explained below can be performed if there are long enough long series data on employment and wages, for both the public sector and the minimum wage. The labor demand analysis gives a generic picture of how employment responds to increases in average wages. However, average wages can respond to several institutional factors in the wage setting mechanism, in particular the minimum wage and average wages in the public sector (when set above labor productivity). Both can generate a pull in formal sector or 'god jobs' sector wages thus reducing employment generation. Thus it is interesting to see whether average public sector wages and minimum wages may be reducing employment in the good jobs sector and as such generating increases in unemployment or employment in the 'bad job' sector (or the informal sector).

There are two methodologies that can be used, the first one is two perform the estimations of static labor demand in two stages. In a first stage, wages for each skill level ( $P_{it}$  in Equation 19) are estimated as a function of minimum wages lagged one period, average public sector wages lagged one period, the unemployment rate, the share of employed in the 'bad jobs' sector and lagged real GDP as a measure of the business cycle. In the second stage, the fitted value of those wages (call  $\hat{P}_{it}$ ) are used to estimate Equation 19. Reduced form coefficients can then be obtained that indicate how minimum wages and average public sector wages are affecting employment in the 'god jobs' sector.

A second methodology that can be used to explore the above mentioned links is a cointegration analysis, between unemployment or/and employment in the bad jobs sector, and minimum wages and average wages in the public sector. Cointegration analysis is used to explore whether there is a linear long run equilibrium relationship between a set variables, when these are integrated of order one (i.e they both depend on their lagged values. See World Bank 2005b).

#### **6.4.4 Summary of data needed for section 6.3**

The most frequently data used to make labor demand analysis comes from enterprise surveys or census:

- Data on employment by skill level (blue and white collar). Rarely hours of work are available, but if available they should be used as they are a better measure of labor demand.
- Capital stock, sales and purchases (machinery, transport and computer and office equipment)
- Output if purchases of intermediate goods are available or value added if not
- Payments to labor (total compensation or wages plus regulation on payroll taxation).
- A measure of user cost of capita if available. Otherwise price index of capital goods, interest rates and taxes on capital and output.
- For dynamic labor demand it is useful if employment and payments to labor can be separated into temporary and permanent workers.

For long term (static) labor demand estimations one cross section at the firm level, or at least 2 ISCS digits aggregation may be enough to estimate a labor demand equation but, it is better to have several cross sections. The use of several cross sections or/and a high level of disaggregation has the advantage of permitting estimations by sectors, which can be coupled with the results of previous sections to give a good panorama of sectoral policy alternatives. More over, and perhaps more importantly, when estimating long run (static) labor demand, the underlying assumption is that the economy is in its steady state, that is any lags in adjustment of employment have taken place. Adequate estimation of demand elasticities therefore, are better calculated as averages or moving averages for several years. The smaller the unit of observation (greater disaggregation at ISCS levels or plant level data) the less likely endogeneity bias will arise. For dynamic labor demand at least 10 consecutive data points of *firm or industry level data* should be used, with quarterly data preferred over yearly data.

[Appendix E](#) discusses how to construct capital stock series using perpetual inventory method, with data from establishment surveys. Alternative measures for the user cost of capital are also discussed. The data needed for user cost of capital requires macro time series on interest rates, taxes and exchange rates (if important shares of capital are imported).

## **6.5 Policy guiding points**

This section gives direct input for labor and educational policy.

The analysis of skill mismatch together with that of returns to schooling and the Doing Business indicator on perceived difficulty of hiring skilled labor will show whether there is room for educational policy. At which level is education paying off; is it in primary, secondary or at the higher levels? Are returns to education convex or not? The level of education of the population by income/poverty level from section 5 should give further indications of whether education is a binding constraint for both producers and the poor.

If the analysis points towards the existence of segmentation induce by wages institutionally set above market clearing levels, then further studies should be performed to identify the main cause of segmentation. The section that describes and analyzes the institutional settings should shed some light as the likely culprits.

Calculation of demand elasticities will show whether there is scope for reducing non wage mandatory labor costs, and will provide estimates of the impact of such reductions. Elasticities of substitution between unskilled labor and other factors (skilled and capital) as well as their trends will indicate whether, unskilled labor is being substituted for other factor and why. Together with own wage elasticities for unskilled labor it can provide the necessary information when choosing between reducing the cost of unskilled labor or increasing the quality and education of the labor force. It will also indicate the possible impact of policies such as reducing the cost of imported capital.

Analysis of how binding the minimum wage is, how important is the effect of public sector wages and the effect of unions on wages will directly lead to policy recommendations regarding changes in institutional settings that might foster employment creation. This, together with information on the sources of income for the poor (wages or self employment) and employment status (unemployed, underemployed or waged employed) will highlight the possible tradeoff when deciding whether to lower wage pressures in order to increase employment.

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**Annex A: Additional Cross Tabulations from “A guide for Assessing Labor Market Conditions in Developing Countries” Developed by HDNSP, PREMPR and HDNED.**

**Level 1 indicators: Shells for detailed tables**

Suggested table shells for the disaggregated examination of Level 1 indicators are provided below. These tables should be relegated to the appendix of the country study unless some clear uncommon patterns emerge. See World Bank (2006) for definitions and concepts.

**Table A1: Unemployment**

Group	Unemployment rate by group		Group share among unemployed workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Female				
Male				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				

Notes: Provide information on the precise definition of unemployment used even if it is consistent with the definition suggested in the guide.

**Table A2: Employment**

Group	Employment-to-population ratio by group		Group share among employed workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				

Notes: Provide information on the precise definition of employment used even if it is consistent with the definition suggested in the guide.

**Table A3: Child labor**

Group	Child labor rate by group		Group share among child laborers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
5-11				
12-14				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group <i>N</i>				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Attending school</b>				
Yes	--	--		
No	--	--		
<b>Household poverty</b>				
Poor	--			
Non-poor	--	--		
<b>Type of work</b>				
Economic work only	--	--		
Domestic work only	--	--		
Economic & domestic work	--	--		
<b>Sector (if economically active)</b>				
Agriculture	--	--		
Industry	--	--		
Services	--	--		
<b>Employment status (if economically active)</b>				
Wage and salaried worker	--	--		
Self-employed worker	--	--		
Unpaid family worker	--	--		

Notes: Provide information on the precise definition of child labor (work) used even if it is consistent with the definition suggested in the guide.

**Table A4: Earnings, wage and salaried workers**

Group	Median monthly earnings by group		Gini coefficient for monthly earnings by group	
	Level, $t_2$ (in 2005 US\$)	Change, $(t_2-t_1)/t_1$ (in percent)	Level, $t_2$ (in units)	Change, $(t_2-t_1)/t_1$ (in percent)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A5: Low earnings rate, wage and salaried workers****Low earnings line:** Official individual poverty line × representative household scaling factor

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on what the value of the low earnings line is, including the values of the representative household scaling factor in years  $t_1$  and  $t_2$ .

**Table A6: Earnings, individual self-employed workers**

Group	Median monthly earnings by group		Gini coefficient for monthly earnings by group	
	Level, $t_2$ (in 2005 US\$)	Change, $(t_2-t_1)/t_1$ (in percent)	Level, $t_2$ (in units)	Change, $(t_2-t_1)/t_1$ (in percent)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A7: Low earnings rate, individual self-employed workers****Low earnings line:** Official individual poverty line × representative household scaling factor

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on what the value of the low earnings line is, including the values of the representative household scaling factor in years  $t_1$  and  $t_2$ .

**Table A8: Per-worker earnings, workers in household enterprises**

Group	Median monthly per-worker household enterprise earnings by group		Gini coefficient for monthly per-worker household enterprise earnings by group	
	Level, $t_2$ (in 2005 US\$)	Change, $(t_2-t_1)/t_1$ (in percent)	Level, $t_2$ (in units)	Change, $(t_2-t_1)/t_1$ (in percent)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A9: Low earnings rate, workers in household enterprises****Low earnings line:** Official individual poverty line × representative household scaling factor

Group	Low earnings rate by group		Group share among workers with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on what the value of the low earnings line is, including the values of the representative household scaling factor in years  $t_1$  and  $t_2$ .

**Table A10: Short and long hours among low earners, wage and salaried workers**

Group	Share of low earners who have low earnings due to short hours (<x hours/week)		Share of low earners who work full-time+ (x+ hours/week)	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total				
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group <i>N</i>				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region <i>N</i>				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level <i>N</i>				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A11: Short and long hours among low earners, individual self-employed workers**

Group	Share of low earners who have low earnings due to short hours (<x hours/week)		Share of low earners working long hours (x+ hours/week)	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total				
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group <i>N</i>				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region <i>N</i>				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level <i>N</i>				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

## Level 2 indicators: Definitions of important concepts, procedures and measures

### Level 2 indicators: Shells for detailed tables

Suggested table shells for the disaggregated examination of Level 2 indicators are provided below. These tables should be relegated to the appendix of the country study. See World Bank (2006) for definitions.

**Table A12: Broad unemployment**

Group	Broad unemployment rate by group		Group share among broad unemployed workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				

Notes: Provide information on the precise definition of broad unemployment used even if it is consistent with the definition suggested in the guide.

**Table A13: Long-term unemployment**

Group	Share of long-term unemployed by group		Group share among long-term unemployed workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				

Notes: Provide information on the precise definition of long-term unemployment used even if it is consistent with the definition proposed in the guide.

**Table A14: Poverty and unemployment**

Group	Poverty rate among unemployed workers by group		Group share among poor unemployed workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				

Notes: Provide information on the precise definition of household poverty used even if it is consistent with the directions (definition) provided in the guide.

**Table A15: Poverty and low earnings, wage and salaried workers**

Group	Poverty rate among low earners by group		Group share among poor low earners	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on the precise definition of household poverty used even if it consistent with the directions (definition) provided in the guide.

**Table A16: Poverty and low earnings, individual self-employed workers**

Group	Poverty rate among low earners by group		Group share among poor low earners	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on the precise definition of household poverty used even if it is consistent with the directions (definition) provided in the guide.

**Table A17: Multiple jobs**

Group	Multiple jobs rate by group		Group share among multiple job holders	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				
<b>Employment status (primary job)</b>				
Wage and salaried worker				
Self-employed worker				
Unpaid family worker				
<b>Employment contract (primary job)</b>				
Contract type 1				
...				
Contract type $N$				

Notes:

**Table A18: Worker registration**

Group	Share of registered workers by group		Group share among registered workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				
<b>Employment status (primary job) (if eligibility applies to multiple employment statuses)</b>				
Wage and salaried worker				
Self-employed worker				
Unpaid family worker				
<b>Employment contract (primary job) (if eligibility applies to multiple contract types)</b>				
Contract type 1				
...				
Contract type $N$				

Notes: Provide information on the precise definition of worker registration even if it is consistent with the definition suggested in the guide.

**Table A19: Social security participation among workers**

Group	Social security participation rate by group		Group share among social security participants	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				
<b>Employment status (primary job) (if eligibility applies to multiple employment statuses)</b>				
Wage and salaried worker				
Self-employed worker				
Unpaid family worker				
<b>Employment contract (primary job) (if eligibility applies to multiple contract types)</b>				
Contract type 1				
...				
Contract type $N$				

Notes: Provide information on the precise definition on social security participation even if it is consistent with the definition proposed in the guide.

### **Additional detailed tables**

The following section provides tables provide information on the incidence of low earnings and the socio-demographic composition of low earners separately for wage and salaried employees and individual self-employed workers using alternative low earnings lines, namely \$2.13 per day (PPP 1993 \$), with and without the representative household adjustment factor proposed in the guide. Without the adjustment factor, the application of the low earnings line answers a much more direct question: does the individual worker earn enough to support a minimum standard of living for him- or herself alone? The appendix also includes a detailed table on the incidence of unpaid family work and the socio-demographic composition of unpaid family workers. This table should be included in the country study if unpaid family work constitutes a non-trivial share of total employment.

The following tables are to be discussed in the text of the country study at the discretion of the researcher(s), depending on whether the statistics reported here provide additional insights which would be useful for the policymaker in understanding how the labor market has fared in general as well as for specific groups of workers.

**Table A20: Low earnings rate, wage and salaried workers****Low earnings line:** \$2.13 per day (1993 PPP \$) × representative household scaling factor

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Level 1				
...				
Level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on what the representative household scaling factor is in years  $t_1$  and  $t_2$ .

**Table A21: Low earnings rate, wage and salaried workers**

**Low earnings line: \$2.13 per day (1993 PPP \$)**

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A22: Low earnings rate, individual self-employed workers****Low earnings line:** \$2.13 per day (1993 PPP \$) × representative household scaling factor

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on the representative household scaling factors in years  $t_1$  and  $t_2$ .

**Table A23: Low earnings rate, individual self-employed workers**

**Low earnings line: \$2.13 per day (1993 PPP \$)**

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				
<b>Sector of activity</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A24: Low earnings rate, household enterprise workers**

**Low earnings line:** \$2.13 per day (1993 PPP \$) × representative household scaling factor

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				

Notes: Provide information on the representative household scaling factors in years  $t_1$  and  $t_2$ .

**Table A25: Low earnings rate, household enterprise workers**

**Low earnings line: \$2.13 per day (1993 PPP \$)**

Group	Low earnings rate by group		Group share among earners with low earnings	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				

Notes:

**Table A26: Unpaid family workers**

Group	Incidence of unpaid family work		Group share among unpaid family workers	
	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)	Level, $t_2$ (in %)	Change, $t_2-t_1$ (in % points)
Total			--	--
<b>Gender</b>				
Male				
Female				
<b>Age group</b>				
15-24				
25-54				
55-64				
<b>Ethnicity/race (if relevant)</b>				
Ethnic group 1				
...				
Ethnic group $N$				
<b>Urban/rural</b>				
Urban				
Rural				
<b>Region (if relevant)</b>				
Region 1				
...				
Region $N$				
<b>Formal schooling (in levels based on the country's educational system)</b>				
Schooling level 1				
...				
Schooling level $N$				
<b>Sector of activity (primary job)</b>				
Agriculture				
Industry				
Services				

Notes: