WPS5636

Policy Research Working Paper 5636

How Did the Great Recession Affect Different Types of Workers?

Evidence from 17 Middle-Income Countries

Yoonyoung Cho
David Newhouse

The World Bank
Human Development Network
Social Protection and Labor Unit
April 2011

Policy Research Working Paper 5636

Abstract

This paper examines how different types of workers in 17 middle-income countries were affected by labor market retrenchment during the great recession. Impacts on different types of workers varied by country and were only weakly related to the severity of the shock. Among active workers, youth experienced by far the largest adverse impacts on employment, unemployment, and wage employment, particularly relative to older adults. The percentage employment reductions, for example, were greatest for youth in each sector of the economy, as firms reacted to the shock by substituting away from inexperienced workers. Employment rates, as a share of the population, also plummeted for men. Larger drops in male employment were primarily attributable to men's higher initial rate of employment, although men's concentration in the hard-hit industrial sector also played an important role. Within each sector, percentage employment declines were similar for men and women. Added worker effects among women were mild, even among less-educated workers. Differences in labor market outcomes across education groups and urban or rural residence tended to be smaller. These findings bolster the case for targeted support to displaced youth and wage employees. Programs targeted to female and unskilled workers should be undertaken with appropriate caution or empirical support from timely data, as they may not benefit the majority of affected workers.

This paper is a product of the Social Protection and Labor Unit, Human Development Network. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at ycho1@worldbank.org or dnewhouse@worldbank.org.

How Did the Great Recession Affect Different Types of Workers? Evidence from 17 Middle-Income Countries

Yoonyoung Cho and David Newhouse*

*Social Protection and Labor Team, World Bank, Washington DC, and the Institute for the Study of Labor (IZA), Bonn, Germany. The findings, interpretations, and conclusions expressed here are personal and should not be attributed to the World Bank, its management, its Executive Board of Directors, or any of its member countries. This paper is part of a larger project monitoring the labor market impacts of the financial crisis, carried out jointly by the Social Protection and Poverty Reduction and Economic Management anchor units. We thank David Robalino and Arup Banerji for their support and insights, seminar participants at the 2010 World Bank/IZA conference for additional suggestions, and Ursula Casabonne, Christopher Handy, Andy Mason, Eliana Matulevich, Ririn Purnamasari, Martin Reichhuber, and Eduardo Zylberstajn for their assistance in acquiring the data. Authors can be contacted at ycho1@worldbank.org and dnewhouse@worldbank.org.

1 Introduction

Labor market outcomes are a critical determinant of household well-being during an economic crisis, especially in developing countries where labor is usually the main source of income. Understanding how labor market outcomes changed for different groups during the most recent downturn is therefore an important first step in crafting appropriate and well-targeted policies to respond to future crises. This paper examines *which groups of workers in developing counties were most affected by labor market retrenchment during the great recession*. The analysis sets aside other important dimensions affecting income and household well-being, such as changes in transfers, remittances and consumption patterns, and focuses only on changes in labor market outcomes.

The vulnerability of different types of workers to economic downturns remains subject to debate, and targeted policies in response to the crisis were typically based on ad-hoc or institutional considerations. Labor market assessments and anecdotal evidence typically emphasizes the vulnerability of young, unskilled, or female workers. Although it is widely accepted that youth suffered disproportionate increases in unemployment during the latest downturn, less is known about youths' adjustment along other dimensions, and there is no similar consensus regarding the relative vulnerability of female and unskilled workers. Furthermore, conclusions are often inferred from past crises, data from advanced countries, or data from particular developing countries. Few studies have examined the impact of a recession on different types of workers across a wide range of developing countries, and this is the first to our knowledge that compares disparities in labor market outcomes across several potentially vulnerable groups.

This study examines changes in labor market trends during the crisis for different types of workers, defined by their gender, age, education, and urban or rural residence. Data are taken from 17 middle-income countries that field household surveys at least once per year. The outcomes measure aspects of individuals' main labor market activities and job quality. In particular, the indicators capture labor market activity, as measured by the ratios of employment, unemployment, and non-participation to total population, and unemployment among the active labor force. Proxies for job quality include the share of the labor force employed in the agriculture sector, and importantly, wage employment. Changes in wages, hours worked, and earnings among workers are also presented when available. We focus on how labor market trends for each group changed during the crisis and how these changes affected their relative performance. For example, youth are almost always less likely to be employed than adults, but if the employment gap between youth and adults widened more rapidly after the crisis than before, we conclude that the crisis disproportionately affected youth employment.

Our main findings are as follows: first, youth generally suffered the largest adverse impacts on employment, unemployment, and wage employment, particularly relative to older adults. Youth experienced greater percentage reductions in employment within each sector and status of

employment, but did not experience disproportionate reductions in earnings or wages.[2] This is consistent with firms, facing declining revenue and economic uncertainty, deciding to let go or not hire relatively inexperienced young workers.

Second, a substantially larger share of men than women suffered adverse labor market impacts. Men's greater employment loss stems primarily from men's higher employment rates, and partly from their greater concentration in the hard-hit industrial sector. Gender differences in employment and wage employment, as a share of the population, were surprisingly high, comparable in size to the gap between youth and adults. Among active workers, however, increases in unemployment were only moderately greater for men than women. Unlike youth, men and women experienced roughly equal percentage reductions in employment within each sector, suggesting that individual employers were neither more nor less likely to shed workers of either gender.

Third, added worker effects for women appear to be mild. Labor force participation declined slightly more for men than women. Furthermore, gender disparities in participation were roughly equal for less and more educated workers, suggesting that unlike in past crises, the added worker effect was not particularly strong for less educated workers.

Finally, less educated and urban workers fared unexpectedly well. Although data on urban and rural outcomes are limited, the available evidence shows few systematic differences. In general, differences between less and more educated workers are also smaller than those by age and gender, although very highly educated workers were better protected from employment loss.

These findings suggest two main policy lessons. First, policies targeted to youth that increase labor demand and facilitate informed employment decisions can help mitigate employment loss during the shock. Potential policy options for youth range from active labor market programs, such as job search assistance and the dissemination of labor market information, to sub-minimum wages and wage subsidies. Second, since programs targeted to unskilled or female workers may not benefit the majority of affected workers, expanding or maintaining these programs in response to a crisis should be done with appropriate caution and strong empirical support based on timely country data.

This paper is organized as follows. Section 2 reviews existing studies that investigate explanations of why labor market adjustments vary for different types of workers. Section 3 describes the data and methodology used in the analysis. Section 4 presents basic descriptive statistics on the size of the shock and the nature of the adjustments in aggregate labor market indicators, and Section 5 presents and analyzes disparities in the outcomes of different groups of workers. Section 6 concludes the paper.

[2] It is also possible that the wage differences between groups are also mitigated by selection rather than rigidity. For example, average wages could rise for youth despite greater declines in demand if the lowest-wage youth were rationed out of jobs.

2 What Explains Differential Impacts across Groups?

Studies of past crises and the current great recession typically refer to three potential mechanisms to explain particular groups' vulnerability to economic downturns. These are: Differences in workers' initial exposure to the shock, firms' employment decision during a downturn, and workers' labor market behavior in response to household income declines.

Sectoral employment differences are particularly salient for women.[3] Worldwide, women are moderately more likely than men to work in the service sector rather than the industrial sector (ILO, 2010b).[4] Initially, the brunt of the current crisis was borne by workers in heavily affected sectors such as manufacturing, construction, and financial services. Partly as a result of occupational segregation, both current and past recessions in the United States have caused greater job losses for men, who are disproportionately represented in vulnerable sectors (Elsby et al., 2010). In Canada and Finland, initial reductions in employment during the current recession were also greater in male-dominated sectors such as manufacturing, construction, and finance (ILO, 2010b). However, several studies emphasize the potential vulnerability of women, based on women's increasing participation in the globalized workplace (Sabarwal, 2011), or assertions that women are over-represented in export-oriented manufacturing sectors hit hardest by the crisis (Ghosh, 2010, Whalby, 2009, ILO, 2010). In fact, for 16 of the 17 counties in this analysis, men were more concentrated in the industrial sector than women (See Figure A1.).

In contrast to gender, less evidence exists regarding occupational segregation by age, education, and region. In the 17 countries in our sample, differences in sectoral employment patterns between youth and adults tend to be small (Figure A2). This is consistent with a study of several European and North American countries that found mixed evidence of a link between pre-crisis patterns of youth employment and subsequent increases in youth unemployment; there was a marked relationship for construction but none for manufacturing (Verick, 2009). With respect to differences in education and region, less educated and rural workers are more likely to participate in agriculture, which may help insulate them from this and other downturns. We know of no study, however, that describes in detail how sectoral employment patterns depend on education and region of residence.

The second main mechanism that can explain differential impacts are the profit-maximizing decisions of firms. Firms can respond to a crisis by adjusting employment, wages, and hours. Workers' level of firm specific skills, labor market attachment, and labor market regulations all influence firms' employment decisions. In particular, firms may find young and unskilled workers more dispensable because they have

[3] See, for example, Polochek (1979, 1985) and other references in Altonji and Blank (1999)

[4] The ILO estimates that, in 2009, 47 percent of women worldwide worked in services, while 37 percent worked in agriculture and 16 in manufacturing. The corresponding percentages for men are 40, 33, and 27. Unfortunately, the ILO's Key Indicators of the Labor Market does not disaggregate sectoral employment by age, education, or region.

acquired fewer important firm-specific skills (World Bank, 2009). There are also concerns that firms could shed female workers first because they are less attached to the labor market, due to child-rearing career disruptions, or because they are less likely to be bread winners. During the Asian financial crisis, South Korean women experienced 7 times higher lay off rates than men (Seguino, 2009). Another possibility is that labor regulations affect firms' demand for certain groups during a crisis. Minimum wages, for example, may reduce firms' downward wage flexibility for young and unskilled workers, who tend to earn lower wages. This could lead to greater reductions in employment and increases in unemployment among these groups. Finally, existing employment protection legislation such as severance pay, restrictions on collective dismissals, and conditions for termed contracts can also disproportionally affect new workers vis-à-vis incumbent ones. Indeed, the proportion of youth in temporary contracts, who would have limited benefit packages, is rising in the advanced economies (OECD, 2010). However, there is little evidence on the impacts of labor market regulations on particular groups during a crisis. While one study suggested that employment protection legislation may have prevented a surge of layoffs among young workers in Europe (Verick, 2009), evidence on how these regulations affect different types of workers during a crisis remains limited.

The third main mechanism that can contribute to differential impacts on employment and unemployment is household labor supply decisions. The most commonly invoked pattern is the added worker effect, where women compensate for falls in household income by rejoining the workforce. Studies suggest that female labor force participation is counter-cyclical, especially for poorer, less-educated workers in low income economies (Sabarwal et al., 2011; Choudhry et al., 2010). During Argentina's financial crisis, for example, job exits increased for both men and women, but women experienced smaller employment losses due to an increase in job entry.[5] In theory, youth could face similar pressures; families facing job loss or a fall in real income may withdraw youth from school, or idle youth may be forced to work. Evidence from the Mexican tequila crisis, however, indicates that most of the burden of the adjustment, in terms of increased labor force participation, fell on wives rather than children (Skoufias and Parker, 2006). In rural areas, employment declines may be smaller, if women and youth joining the workforce find it particularly convenient to enter family businesses, which are more common in rural areas.

How have these three mechanisms affected the vulnerability of different groups during downturns? While several studies have examined households' vulnerability to crises, fewer have documented their effects on individual workers.[6] Most studies of crisis impacts focus on Europe and the United States (Verick, 2009, OECD, 2010, Elsby et al., 2010,) or highlight the experience of particular groups or countries (ILO 2010a, 2010b, Ha et al., 2010, Sabarwal et al., 2011, Leung et al., 2009).

The best existing evidence on the effect of past crises on workers' income and employment exploits longitudinal data from Indonesia and Urban Argentina. Men and women experienced equally

[5] See McKenzie (2004).

[6] Households' vulnerability and response to economic crises has been explored in Peru (Glewwe and Hall, 1998), Mexico (Cunningham and Maloney, 2001 and Mckenzie, 2004), Russia (Lokshin and Ravallion, 2003), Indonesia (Strauss et al., 2004) and Argentina (Corbacho et al., 2007), among others.

destructive falls in real wages in both Indonesia and Argentina. Employment patterns were different, however. In Indonesia, female employment fell markedly less than male employment, as women entered self and family employment to offset job losses in the formal sector (Smith et al, 2002). Employment in medium and large manufacturing firms also declined more for men than women, as women were overrepresented in larger and exporting firms, which were more resilient to the crisis. (Hallward-Driemeier et al, 2010). During Argentina's 1995 crisis, however, employment fell equally for both men and women (Mckenzie, 2004).

Most preliminary studies of the current crisis have mostly emphasized large increases in youth unemployment.[7] Most of this evidence is from OECD countries, and indicates that youth unemployment skyrocketed in 2009. In addition, there are some indications that youth were more likely to shift to informal sector employment in six Latin American countries (Ha et al., 2010). This appears to be more consistent with past experience in Indonesia than Argentina. In Indonesia, employment declined slightly more for youth than adults, largely because older women rejoined the labor force in large numbers. Young workers, particularly women, experienced somewhat larger wage declines than their older counterparts. In Argentina, meanwhile, young and old workers experienced similar wage and employment changes.

Existing analyses of the labor market effects of the current crisis on men and women are mixed. Preliminary ILO estimates suggest that men and women have experienced roughly equal increases in unemployment, from which they conclude that the downturn has affected male and female outcomes more or less equally (ILO, 2010). Other studies, mostly drawing on data from Europe and the US, suggest that men suffered larger unemployment increases than women due to their concentration in banking and finance, and export oriented industry sector (Barakat, et al, 2010, Eurostat 2009, Elsby 2010, World Bank 2010c).

The experience of educated workers depends on the nature of the crisis, although some studies suggest the current crisis has led to larger employment reductions for less educated workers. In the US, the current recession reduced employment more for less educated workers (Elsby et al., 2010). Similarly, in South Africa, additional education substantially reduced the risk of employment loss (Leung et al., 2010). Finally, preliminary evidence from China suggests that the crisis disproportionately affected unskilled migrant workers (Cai et al., 2010).[8] This pattern is different from the Indonesian and Argentinian crises, where employment and earnings losses were greatest for better educated women. In both countries, declines in incomes were similar for less educated and better educated men, but significantly larger for educated women than less educated women. Educated women were also particularly likely to lose their job or exit employment.

[7] Examples include Ha et al., 2010, Barakat et al. 2010, IMF and ILO, 2010, Bell and Blanchflower, 2010, Verick, 2010, OECD 2010

[8] Mixed results are also found when looking at household income or consumption. Households with better educated heads experienced smaller consumption drops in Peru and Argentina (Glewwe and Hall, 1998 and Corbacho et al., 2007) but larger income and consumption reductions in Mexico (Mckenzie, 2004)

We know of no analysis of the effects of the current crisis on urban and rural workers. During the East Asian crisis, the initial impact of the crisis was felt particularly hard in the urban manufacturing and construction sectors.[9] In Indonesia, both overall and salaried employment declines were larger in urban areas, and urban women suffered substantially larger wage declines than rural women.

To sum up, existing empirical evidence from past and present crises suggests four hypotheses:

- Men and women experienced roughly equal falls in income and employment, although in some settings, the added worker effect may lead to smaller falls among women.
- Young workers experienced greater increases in unemployment and informal employment than adult workers.
- Impacts on less educated workers were more severe than better educated workers, but the results depend on the country context and the nature of the shock.
- The shock may have reduced employment and earnings more for urban workers than rural workers.

Evidence on the vulnerability of different types of workers to this shock remains quite limited. Past crises in Argentina and Indonesia may not be relevant to the current great recession, since the macroeconomic causes and consequences are very different, and most initial evidence on the current crisis has focused on unemployment and is often limited to OECD or European countries.[10]

3 Data and Methodology

3.1 Data

This analysis draws on repeated cross sectional household data from 17 countries (Table 1).[11] These include five Latin American and Caribbean countries (Argentina, Brazil, Chile, Costa Rica and Mexico), seven countries in the Europe and Central Asia region (Bulgaria, Latvia, Lithuania, Macedonia, Poland, Romania and Turkey), two counties in East Asia (Indonesia and the Philippines), two countries in Middle East and North Africa countries (Egypt and Jordan) and South Africa. Countries differ in terms of the indicators collected, span and frequency of data, and coverage of rural areas: ECA countries do not report hours and earnings, and include only the means of key variables by demographic cell rather than individual workers' outcomes; three LAC countries (Argentina, Brazil, and Chile) cover only urban areas; and earnings are often reported for salaried workers (Chile, and Indonesia). The size of the shock is measured as a change in GDP growth rates, and varies widely, from 1.7 percentage points in Indonesia

[9] See Fallon and Lucas (2002).

[10] In particular, exchange rates have changed relatively little during this crisis, while both Argentina and Indonesia experienced extraordinary currency devaluations during their crises.

[11] For European countries, we use Eurostat Survey data instead of individual country's Labor Force Survey, which were not available. Eurostat provides the mean of key labor market indicators by demographic cells. For European countries, age, education, and gender estimates rely on data from the 8 cells defined by the three characteristics, while urban/rural estimates rely on a separate set of 8 cells defined by residence, age, and gender.

to 21.3 percentage points in Lithuania.[12] Europe and Latin American countries are over-represented in the data, but these were the two regions most affected by the shock.

The data contain information on a wide variety of job and worker characteristics. Labor market indicators include job status (e.g., wage employment, self-employment, or family work) sector (agriculture, industry, or service), participation, employment, unemployment, hours, and earnings.[13] The activity indicators are the share of the population that is employed, unemployed, and out of labor force, as well as the standard unemployment rate. Meanwhile, the analysis focuses on four key worker characteristics -- gender, age, education and region (urban/rural) -- which are present in most surveys.[14]

Changes in the evolution of these indicators for different groups shed light on how they were affected by the downturn. For example, group differences in employment loss could reflect both firm employment decisions and household labor supply decisions, but the former is more consistent with increases in unemployment while the latter could be explained by smaller declines in participation. To measure job quality, we examine employment status (the share of labor force working as the wage employed, self-employed or family worker) and sector (the share of working in the agricultural, industry and service sector), as well as average earnings, hours, and wage rates where available. A significant portion of workers in many developing countries are self-employed working poor, earning small profits, such as smallholder farmers or street retailers. Unemployed or idle adults may be forced to take these low paying jobs to cope with the downturn, in order to mitigate losses to household income during recessions, which would appear as an increase in the share of the labor force in self-employed or agricultural work.

Normative interpretation of the results requires care because indicators can have ambiguous welfare implications. Changes in economic activities, in particular, are not straightforward to interpret. Greater employment declines for men than women, for example, do not imply that men were more disadvantaged during the crisis, if for example there was a large increase in female distress work. Compared with changes in employment and unemployment, declines in wage employment, non-agricultural employment, and wage rates can more confidently be interpreted as a welfare loss, largely because wage and salaried jobs and non-agricultural jobs tend to be more productive and offer greater access to benefits.[15] Changes in earnings and wage rates can also be interpreted normatively with greater confidence than employment changes, since they directly impact workers' income.

[12] The slowdown is calculated as the difference between GDP growth rate in 2009 and the average GDP growth rates over 2007-2008. See Appendix Table A1 for calculation of slowdown in GDP growth rates in each country.

[13] In some countries, these data also contain information on household responses to the crises and individuals' labor market transitions during the crisis, but these topics are left for future research.

[14] For detailed information on data construction for our analysis, refer to the technical note in the Appendix.

[15] This does not imply or assume that all self-employed workers are unproductive, or that all self-employed workers are excluded from wage employment, as many workers are self-employed by choice. Workers often choose to start a business, for example, because they have acquired sufficient assets to earn greater profits in self-employment, or because they value time flexibility. The use of wage employment as a proxy for changes in job quality during the crisis is based on the plausible assumption that the downturn, rather than raising preferences for self-employment among workers, reduced demand for wage workers. If wages are rigid, then reductions in demand would ration workers out of wage employment jobs, forcing them to enter self-employment.

Unfortunately, there are important concerns about the coverage and accuracy of earnings data. Fewer countries collect earnings data than employment data, and some countries only collect earnings data for salaried workers. The profits of self-employed workers are notoriously difficult to measure accurately, and inaccurate measures of inflation can also introduce additional noise into earnings data.[16]

3.2 Methodology

Workers are divided into 16 cells, based on their gender, age, education and location of residence. Only workers between age 15 and 64 are included in the sample. Age is broken into youth (age 15-24) and adults (age of 25-64), and education is grouped into the least educated (those that completed elementary or junior high) and more educated (secondary level and above). Average indicators are taken for each cell, country, and survey, weighted according to their sample weights. With the exception of education groups in the European countries, the dataset is defined consistently for all 17 countries.[17]

Labor market activity and type of job indicators are considered both as a ratio of the population and of the labor force. Indicators of interest include the labor market activities over population (employment, unemployment, nonparticipation ratios), sector and status over labor force (share of each sector and status among labor force), and earnings and hours information for workers (earnings, wages, and hours). First we look at trends in employment, unemployment, and non-participation rates as a share of the population. Population trends may be relevant for policies, such as universal transfers, that are delivered outside the labor market. To better understand changes among potential workers and to inform the design of labor market programs, we then examine labor market outcomes for the active labor force. The focus is on shifts in sectors, employment status, and unemployment. Finally, in countries where the data are available, we report changes in average earnings, wages, and hours of work.

The focus is on how disruptions in labor market trends during the crisis varied for different group of workers. A simple way of looking at the crisis impact on various groups of workers is to compare pre and post outcomes for each group. However, this comparison may be misleading if baseline trends and initial labor market performance vary across groups. Even before the crisis, socioeconomic changes in each country were affecting different groups in different ways. For example, in many countries, employment rates were growing faster for women than men, due to trends in educational achievement and cultural norms that encourage greater female employment. To take this into account, the analysis examines how each group's trend changed, relative to their pre-crisis trend. In other words, the key indicator is the rate at which changes in each indicator slowed down or sped up, compared across groups.

[16] Comparing changes in urban and rural earnings is also problematic in countries that only collect price indices in urban areas.

[17] In ECA countries, the least educated group is those with secondary education or below, as their education level is higher than other regions.

The method used to calculate changes in trends is illustrated using data from Mexico. Panel A of Table 2 gives the employment ratios for low educated male youth in urban areas, for each quarter between 2007 and 2009. We then calculate the change of employment ratio relative to the same quarter in the previous year. The employment ratio changed from 57.3 percent in the first quarter of 2007 to 57.8 percent in the same quarter in 2008, yielding a slight increase by 0.5 percentage points. For each cell, we then take the average of these changes across all pre-crisis periods (up until 4th quarter of 2008) and all post-crisis periods (from 1st quarter of 2009 and onwards).In this cell, the average year on year change in the employment rate after the crisis trend in employment ratio is -3.6 percentage points, and the average pre crisis trend is -0.3 percentage points, indicating that for this cell, growth in the employment ratio slowed by 3.3 percentage points. Taking a weighted average over all 16 cells, with weights equal to the cell population in this case, gives the overall change in the employment ratio. Among all Mexican workers, the employment ratio slowed by 1.7 percentage points (Panel B of Table 2). This difference, between the pre-crisis and post-crisis averages of year-on-year changes of the indicator, is used to measure workers' labor market adjustment throughout this paper.

Group Comparison

The analysis examines differences in labor market adjustment by group, controlling for selected observable characteristics. In particular, we regress the change in the trend, described above, for each cell in each country on dummy variables for the four characteristics, separately for each outcome and country.[18] There are therefore 16 observations in each regression. Using regression coefficients rather than simple tabulations isolates changes in the returns to a single characteristic, while holding the other three constant; for example, a rise in the coefficient on youth unemployment cannot be attributed to higher education levels among youth. That is, we estimate the following equation (See Appendix B for more details regarding the specification):

(1) $\widetilde{Y}_i = \gamma_0 + \gamma_1 Men_i + \gamma_2 Young_i + \gamma_3 LowEdu_i + \gamma_4 Urban_i + \widetilde{v}_i$

where $\widetilde{Y}_i$ is the difference in the trend for each cell *i* in each country, and *Men*, *Young*, *LowEduc*, and *Urban* represent dummy variables for each group.

We present the coefficients from the linear regressions to capture the difference between groups. The sign and magnitude of each coefficient indicate each group's relative vulnerability to the crisis compared to their counterparts. For example, a negative coefficient γ_1 on employment ratio suggests that men's employment deteriorated more rapidly than women's. Meanwhile, the relative magnitudes of the coefficients indicate which groups were most exposed to the shock. For example, a value of γ_2 that is greater in absolute value than γ_3 would indicate that age disparities were larger than education disparities in the employment adjustment.

[18] Observations are weighted both by the population weight for that cell, and by the number of unweighted observations used to generate the average, to adjust for heteroscedasticity in the cell mean outcomes.

Decompositions

Two Shapley decompositions are employed to better understand the factors that account for group disparities in adjustments.[19] A natural first step is to decompose the changes in the employment ratio into portions explained by changes in the employment rate and labor force participation.[20] In other words, a decline in the share of the population working can be attributed either to increased unemployment or reduced labor force participation. Formally, using $emp_t = erate_t * lfp_t$ where $emp, erate,$ and lfp denote the employment ratio, employment rate, and labor force participation, respectively, the change in employment ratio can be decomposed as below.

(2) $\Delta emp_t = emp_{t+1} - emp_t = \underbrace{\Delta erate_t \overline{lfp}}_{①} + \underbrace{\overline{erate} \Delta lfp_t}_{②}$

where $\bar{X}$ denotes the average value over *t* and *t+1*.[21] The first term represents the portion explained by the change in the employment rate, while the second part represents the portion explained by change in labor force participation over time. We calculate this decomposition for each group of gender, age, and education.

The second and more novel decomposition builds on the discussion in the previous section to better understand which mechanisms explain group differences in crisis response. We decompose group disparities in the slowdown in employment ratios into three components: Differences in the initial level of employment, differences in the sectoral distribution of employment, and differences in percentage changes in employment within the three sectors.[22] The first of these – the portion of employment change due to initial differences in employment levels – indicates the extent to which absolute disparities would result from equal percentage reduction in each group's probability of working. The second component – the portion of the group disparity due to different distributions across sectors – gives an indication of the importance of occupational segregation in explaining group disparities. Finally, the third component -- the percentage change in employment within firms – reflects both firm's decision and workers' supply side decisions. For example, a small third component for gender might suggest that firms reduce employment proportionally for men and women. However, since men typically comprise a disproportionate share of the workforce, proportional reductions for men and women will lead a greater absolute reduction in employment rates for men, which will be captured by the first component. The decomposition, while far from definitive, provides a useful summary of the

[19] The Shapley approach decomposes the product of several factors by taking the simple average of factors' contribution over all permutations, where one factor is varied while others are held constant. See Appendix B and Shorrocks (1999) for further details.

[20] To fix terminology, the employment ratio refers to the employment to population ratio, while the employment rate refers to employment as a proportion of the active labor force, which of course is the complement of the unemployment rate.

[21] The decomposition actually averages the results of two decomposition equations, of which Equation (2) is one. More detail can be found in appendix B.

[22] The three main sectors are agriculture, industry, and services.

relative importance of these three factors in explaining, in an accounting sense, differential adjustments among groups.

To carry out this decomposition, the difference in the trend of each indicator for a particular group is rewritten as follows:

(3) $\Delta emp_t = emp_{t+1} - emp_t = emp_t r_t = emp_t \sum_i s_{it} r_{it}$

where r_{it} is the percentage employment growth rate within sector i, emp_t is an initial employment level, and s_{it} is the share of the group in sector i (See Appendix B for a detailed explanation of the decomposition). There are three factors that may explain the difference between men and women in the change of employment: the initial level of employment ratio (emp_t), the sectoral distribution (s_{it}), and the employment change within each sector (r_{it}). From equation (3), applying the decomposition to gender differences in employment, we can derive

(4) $\Delta emp_t = \underbrace{(emp_m - emp_f)\sum_i s_{im} r_{im}}_{①} + \underbrace{emp_f \sum_i (s_{im} - s_{if}) r_{im}}_{②} + \underbrace{emp_f \sum_i s_{if}(r_{im} - r_{if})}_{③}$.[23]

The first term is the portion due to the gender differences in the initial employment level, the second part is the portion due to occupational segregation, and the third part is due to the differential growth rate within sector. Equation (4) is one of six potential ways to carry out the decomposition, and we use the average across all six. Of course, the same decomposition methodology can be applied to examine age, education, and location differences. We also calculate a variant that examines the role of segregation among wage or self-employed workers in accounting for group disparities.

4 Aggregate Labor Market Adjustments

We first present basic results on the extent of the shock and the overall nature of the labor market adjustment in the 17 countries. To illustrate how a country's exposure to the crisis affected the labor market adjustments of different groups, the graphs plot the magnitude of the adjustment, on the vertical axis, against the size of the GDP slowdown. Figures 1-4 show the labor market adjustments for all individuals (Figure 1), labor force participants (Figures 2 and 3), and workers (Figure 4), sorting by the magnitude of the shock.[24] The horizontal axis in each figure indicates the severity of the crisis, as shown in Table 1. The vertical axis is defined as slowdown in each indicator as explained in the previous section.[25]

While each country suffered declines in economic growth, the severity of the shock varied substantially from one country to the next. Countries in Asia tended to be less affected by the crisis, while countries in

[23] See equation (A.3) through (A.6) in the appendix for a more detailed derivation.
[24] The labor market adjustments for all individuals, labor force participants, and workers, disaggregated by gender in each country, is presented in table A2 in the appendix.
[25] Recall that the indicator of interest is the difference between pre and post averages for changes in outcomes.

Europe suffered the largest declines in growth. Latvia and Lithuania in particular suffered tremendous economic disruptions, as growth rates in these countries slowed by roughly 20 percentage points in 2009, compared to the average growth rates in the two prior years. Turkey, Romania, Bulgaria, and Mexico also suffered severe slowdowns in growth, due to a decline in exports to Western Europe and the US. In contrast, a larger group of seven countries, including the non-Mexican Latin countries, Poland, Jordan, the Philippines, and South Africa were only moderately affected. Finally, Indonesia and Egypt escaped the brunt of the crisis, as growth only fell around 2 percentage points.

The size of the adjustment in employment and unemployment may be related to countries' labor market institutions. Employment losses varied considerably across countries. Poland, Costa Rica, and Bulgaria, for example, experienced unexpectedly large employment losses, given their moderate decline in growth, while Romania and Turkey experienced larger slowdowns in growth but substantially smaller employment reductions (Figure 1).[26] These patterns suggest that countries with more rigid labor markets fared somewhat better in maintaining employment during the crisis. For example, employment and wage employment growth fell relatively little in Turkey and Romania, even though Turkey is probably among the most regulated labor markets in the OECD, with a low *Doing Business* ranking in employing workers, and 40 percent of Romanian workers belong to a union.[27] Costa Rica and Bulgaria, where employment fell more, have relatively free labor markets among countries analyzed here: both countries score relatively highly on the Fraser index of labor market freedom, and only 13 percent of Costa Rican workers belong to a union (Freeman, 2009).[28] If labor markets with high firing costs responded to the crisis by reducing hours rather than shedding employment, employment loss may have been smaller in more rigid countries.[29] This is line with evidence that employment during the crisis fell slightly less in countries with higher firing costs (Khanna et al, forthcoming) and other studies also casting doubt on the link between existing measures of institutions and worse employment outcomes (Baker et al., 2004, Freeman, 2005).

Employment declines translated more into increased unemployment than reduced participation (Figure 1).[30] However, the extent of this adjustment also varies across countries. Bulgaria and Poland, for example, experienced greater employment losses than would be expected based on the severity of the shock. While Bulgaria's employment losses were largely explained by an increase in nonparticipation, large employment losses in Poland were entirely linked to unemployment increases. These patterns may

[26] This is consistent with findings from previous studies. See World Bank (2010a). Two letters in Figures represent each country: AR (Argentina), BG (Bulgaria), BR (Brazil), CH (Chile), CR (Costa Rica), EG (Egypt), ID (Indonesia), JO (Jordan), LT (Lithuania), LV (Latvia), ME (Mexico), PH (Philippines), PL (Poland), RO (Romania), SA (South Africa), and TR (Turkey).

[27] Turkey ranked at 145 out of 183 countries in 'employing workers' in *2010 Doing Business,* which reflects labor market rigidity with substantial hiring and firing costs.

[28] Labor market rigidity measures should be interpreted with caution because they may mask complex dynamics within the labor market. For example, Costa Rica experienced particularly large employment slow down among traditionally vulnerable group such as youth and least educated, which is in line with World Bank (2010b). This may suggest labor market flexibility or lack of protection, is concentrated among vulnerable group of workers.

[29] Unfortunately, hours information on these rigid countries mentioned is not available.

[30] Note by definition that the share of employed, unemployed, and out of labor force workers sums up to one, and the changes of each share sums up to zero.

be related to their labor market policy such as unemployment insurance. Poland's unemployment insurance has relatively high coverage and impacts compared to other East European countries, which may reduce the incentive of unemployed workers to leave the labor market (Vodopivec, 2009).

Substantial declines in the share of wage employment among the labor force led to greater increases in unemployment than self-employment (Figure 2). Declines in the share of wage employment and corresponding increases in unemployment were greater for more severely affected countries. Latvia and Lithuania experienced large declines in wage employment and slight shifts to self-employment. In other countries, declines in wage employment did not lead to an increase in self-employment. This suggests that self-employment did not serve as an informal safety net by absorbing displaced workers, except to a limited extent in the most severely affected countries.[31]

Declines in industrial sector employment, in most cases, were not absorbed by the service or agricultural scetors. The service sector did expand in Lithuania and Latvia, absorbing 60 percent of the decline in industrial employment (the remainder were absorbed by increases in unemployment). Excluding Lithuania and Latvia, there was little change in agriculture and service sector, and large decrease in industry tended to be reflected in increased in unemployment.

Earnings slowed due to declines in both hours and wage growth, but there was no discernible relationship between these indicators and the severity of the GDP shock. Figure 4 shows changes for earnings, hours, and wage rates, which unfortunately is limited to 8 countries. In some countries, such as Argentina and Costa Rica, earnings decreases were driven by declines in hours, while in other countries such as Mexico, Jordan, and Egypt earnings declined were mainly due to decreased wage rates. Wage rate declines do not appear to be systematically related to shifts to less productive self-employment and agricultural employment. Self-employment rates changed little in Jordan, despite a large decline in wage rates. Egypt, on the other hand, experienced even larger declines in wage rates despite falling into self-employment and agricultural employment, illustrating the extent to which declines in labor demand translate into wage declines varies from country to country.

Overall, the aggregate indicators suggest that retrenchment reduced employment, particularly in the industrial sector, and increased unemployment. There is little indication that the agricultural sector or self-employed jobs increased dramatically during the crisis, or that the crisis led workers to withdraw from the labor force.

[31] Egypt is an outlier where wage employment increased and share of self employment and agricultural employment decreased. Given the openness of Egypt to the international financial market, economic slowdown in Egypt must be largely affected by the food price crisis rather than the financial crisis, which may explain a large slowdown in agriculture. A decrease in agriculture is probably highly associated with a decline in self employment and a slight increase in wage employment.

5 Group Differences in Labor Market Adjustments

This section examines how adjustments varied for different types of workers. As discussed above, we examine how trends in indicators changed, conditional on gender (men relative to women), age (young relative to older workers), education (less educated relative to more educated workers), and location (urban relative to rural workers). A key distinction is whether labor market changes are measured relative to the population, as in the employment to population ratio, or relative to the active labor force. The former shows which groups were most affected by the shock overall, while the latter measures how the crisis affected different types of active workers. Finally, we investigate how initial differences in employment rates, systematic differences in sector of work, and percentage employment reductions within sector contributed to group differences in employment rates.

5.1 Group Differences in the Population

There are striking differences between different groups' employment, wage employment, and unemployment outcomes. Figures 5, 6, and 7 show how these three indicators varied for different groups. As in the previous section, the vertical axis shows the percentage point adjustment in a particular labor market indicator and the horizontal axis shows the slowdown in GDP growth. Each point represents a coefficient from a regression for a particular country, in which the dependent variable is the difference in the rate in which the indicator slowed or accelerated during the crisis, as indicated in equation (1). The independent variables are dummy variables for men, youth, less educated, and urban residence.[32] For convenience, throughout this section we refer to these as changes for particular groups as if they were simple unconditional trends, even though they are in fact conditional regression coefficients.[33] Also for simplicity, the terms slowdown, fall, acceleration, rise, and change and adjustment are all used interchangeably during the discussion, and all refer to the change in the rate of year on year change.[34]

As a proportion of the population, employment and wage employment slowed most for men and youth. The left two panels of Figure 5 show that both men and youth experienced larger falls in employment, as a share of population, in 13 of the 17 countries. This is reflected in the average disparity across the 17 countries, which is about 1 percentage point for youth and slightly greater for men. The labor market impacts on men and youth are even more apparent when examining wage employment (Figure 6). A greater percentage of women lost wage jobs than men in only two countries – Jordan and Egypt – and wage employment fell noticeably more for adults than youth only in South Africa. Age disparities are

[32] As mentioned above, there are 16 observations in each regression, one for each of the 16 cells defined by these four characteristics. In European countries, the full 16 cells are unavailable. In these countries, cells defined by gender, age, and education are used for those three groups, while cells by urban residence, age, and gender are used to generate urban/rural disparities.

[33] We also generated unconditional results and the patterns are qualitatively similar to the conditional results in all cases.

[34] For example, a negative coefficient on the youth dummy in the employment regression is described as "youth employment fell" or "Youth employment slowed".

even greater when comparing youth with older adults aged 45 to 65 (see Figure A3), as firms retained their most experienced workers.

Better educated and urban residents, to a lesser extent, also suffered disproportionate employment losses. The third panel of Figure 5 tells a similar story for better educated workers, where employment slowed more than it did for less educated workers in 14 of 17 countries. Breaking education into three groups, as shown in Figure A3, shows a slightly more nuanced story: The best educated and least educated workers experienced the smallest employment losses, while it was the workers in the middle of the education distribution, typically with a junior high education, that experienced the greatest losses in employment.[35] Finally, the rightmost panel shows that in 8 of 10 countries, employment slowed more in urban areas than rural areas, though differences were small in several cases.[36]

Disparities in employment adjustments between groups were sizeable, in comparison with overall employment declines. This is true even in Latvia and Lithuania, where overall employment rates fell by a hefty 5 to 9 percentage points (Figure 1). In these two countries, employment, for example, fell by 6 percentage points more for men, 2 to 4 percentage points more for youth, and 2 to 6 percentage points more for least educated. In Costa Rica, where overall employment fell by about 2.5 percentage points, the 4 percentage point disparity faced by young workers is very large in comparison.

Added worker effects for women appear to be mild. Men, youth, and urban workers experienced slightly larger increases in nonparticipation (Figure 7). For youth, this suggests that increased school attendance and discouragement slightly outweighed any added worker effect. Women, on the other hand, were slightly less likely to drop out of the labor force than men, reflecting small added worker effects. Group differences in participation, however, tend to be small as employment declines for male and youth were reflected mostly in increased unemployment rather than nonparticipation.

Even among less educated women, there is no evidence of a strong added worker effect. Experiences form past crises indicate that, during crises, better educated women tend to exit and less educated women tend to enter the labor market (Sabarwal et al., 2011). Figure A4 shows gender disparities in employment, wage employment, and non-participation for less educated and better educated women. For each of the three indicators, there are few differences between less and better educated women. This suggests that in contrast to previous crises, that in this sample of middle and upper-middle income countries, there were weak added worker effects even among less educated women.[37]

[35] In the European countries, the middle education group has a high school education.
[36] See Figure A1 in Appendix for three group comparisons in age and education groups.
[37] See Figure A2 in Appendix for the patterns of gender disparities in employment, unemployment, and nonparticipation ratios disaggregated by education group.

5.2 Group Differences among Active Workers

Youth experienced by far the largest rise in unemployment. Unemployment rates also increased more for men and urban workers, but the differences were much smaller than those by age. The second panel of Figure 8 shows large disparities in the increase of youths' unemployment rate relative to adults, averaging about 3 percentage points. Disproportionate unemployment increase for youth occurred in all countries except Egypt. There is no clear relationship between the size of the shock and the increase in youth unemployment, however. Disparities were largest in Latvia and Lithuania, but they were also large in Costa Rica, Poland, and Indonesia – countries that escaped the full brunt of the crisis. Gender disparities in unemployment rates were not as large, with male increases typically one half to one percentage point greater. Urban workers also experienced larger rises in unemployment, in 7 of the 10 countries for which data are available, but the disparity tended to be small.

A large percentage of active youth also shifted out of wage employment (Figure 9). In 15 of 17 countries, wage employment rates, as a proportion of the active labor force, declined more for youth than adults. Differences between youth and adults were particularly large, as increases exceeded 3 percentage points in seven countries. Although declines were larger for men than women in 13 countries, gender differences tend to be small. The average gender and education disparities are largely driven by Latvia and Lithuania, and education disparities in other countries are less clear. Similarly, differences in wage employment between urban and rural residents are not systematic.

Men and less educated workers, to a lesser extent, also experienced larger increases in unemployment and declines in wage employment. Unemployment rose at least as much for men as women in 16 of the 19 countries, though differences tend to be small particularly, compared to the age disparities. Education disparities are more muddled, as in several countries unemployment and wage employment outcomes were worse for better educated workers. On average however, in large part because of large disparities in Latvia and Lithuania, unemployment increases were larger for less educated workers. While group disparities in Latvia and Lithuania are larger than others in most indicators, the education gap in wage employment declines were particularly large, reflecting the extreme distress experienced by less educated workers in these severely hit countries.

Disparities in earnings, hours, and wages across groups are less pronounced than those in activity, sector, and status of employment. Youth, despite greater reductions in employment and wage employment, did not experience a larger earnings reduction than adults, and there is no sign of a decrease in the wage rate of youth. This, with a large increase in youth unemployment, suggests that downward wage rigidity impinged on labor flexibility and denied youth the opportunity of remaining employed at lower wages.[38]

[38] Given the cross-sectional nature of the data, it is also possible that higher-wage youth were better able to maintain employment during the crisis, masking the drop in earnings due to declining wages. However, this appears less likely for two reasons: First, the regressions control for education, gender, and urban/rural location. Second, it is not clear a-priori why selection on unobservables would differ between youth and adults.

5.3 Explaining Disparities in Employment Loss

This section presents results from two decompositions that seek to better understand how changes in employment, as a share of the population, differed across groups. As explained in the methodology section above, the first one decomposes the change in the employment to population ratio into portions explained by changes in employment rates (as a proportion of the labor force) and participation rates within each group. The second one revisits group disparities and decomposes differences in employment ratios with differences in initial level of employment, employment patterns in sector (or status), and within sector (or status) employment growth.

For all types of workers, falls in employment mainly led to increased unemployment rather than reduced participation. Recall that falls in employment, as a percentage of the population, can either lead to increased unemployment or withdrawal from the labor force. Table 3 shows the result of this decomposition for different groups.[39] For example, in the average country, men's employment ratio slowed by -2.5 percentage points, of which 2 percentage points (about 80 percent) was due to accelerating unemployment and the remaining -0.54 percentage points (about 20 percent) was due to slowing participation. The results reinforce the aggregate trends displayed in Figure 1, which shows larger changes in unemployment than participation. Over the six groups, on average, 82 percent of the slowdown in employment as a share of the population was due to increased unemployment, while only 18 percent was due to declines in participation.

Declines in participation were surprisingly large for youth. Youth may have reacted to the downturn by remaining in or returning to school, while the opportunity cost of schooling is lower. Although data on educational attendance is unavailable, changes in participation rates are consistent with a delay of youth's entrance into labor market or the exit from it. In particular, more than a quarter of youth's employment slowdown is attributable to the slowdown in participation, which is slightly higher than the average 18 percent for all workers (Table 3). In other words, displaced youth are more likely to leave the labor market than the displaced adults. Men, meanwhile, also experienced slightly larger reductions in participation rates than women, in line with the mild added worker effect shown in Figure 7.

The particularly large slowdown in men's employment can primarily be attributed to higher initial levels of employment. Table 4 decomposes the gender disparities in employment loss into three components: The initial employment gap, differences in sector (status) of employment, and differences in employment growth rates within sector (status).[40] The first component, shown in the 4th column of

---

[39] In table 3, unemployment increases are shown as declines in the share of the labor force employed, which is the same thing.

[40] Note that the average gender gap in employment as a share of population of the 17 countries is -1.16 percentage points, indicating that employment slowed 1.16 percentage points more for men than women. employment slowdown for men than women by 1.16 percentage points. This is consistent with figure 5. Since

Table 4, is what the gender disparity would be if men and women experienced the same percentage reductions in employment. Because men have higher initial rates of employment, equivalent percentage reduction will lead men to greater reductions in employment, as a share of the population, for men. The large part of the average gender disparity in employment -- roughly 58 percent – can be explained by men's higher rates of initial employment (fourth column of the top row).

Men's greater presence in the industrial sector, however, also led to significant employment losses. The fifth column of Table 4 gives the portion of the gender employment disparity attributable to different sectoral work patterns. This indicates what the employment disparity would be if men and women had the same initial level of employment and the same percentage employment reductions in each sector, while maintaining their actual pre-crisis sectoral employment patterns. On average, the difference in sectoral employment patterns accounted for 37 percent of the total gender disparity. This is mostly due to the greater percentage of men that work in the industrial sector as seen in Figure A1, and industrial sector experienced a large employment loss.

There is scant evidence that women suffered greater employment losses than men within sectors. The sixth column of Table 4 shows what the disparity would have been had men and women had the same initial rates of employment and the same propensity to work in the three main sectors. This gives an indication of whether percentage reductions in each sector's employment favored men or women. Considering only percentage changes in sectoral employment, on average men would have had about a -0.1 percentage point greater reduction in employment, accounting for 6 percent of the total disparity in employment. The results are similar for the decomposition by employment status. While there are a few exceptions, gender disparities caused by within sector (status) differences in employment growth rates were generally small.[41] In other words, percentage changes in employment did not consistently favor men or women, and in most countries they were close to gender-neutral.

Unlike men, youth suffered far larger employment losses than adults within each sector and status of employment. Table 5 shows the same decomposition of the large age disparity in employment by status (the left half of Table 5). Overall, percentage employment reductions within status were much larger for youth than adults, and this accounted for an enormous average employment disparity equal to 2.8 percentage points. A larger proportion of adults than youth works, however, which mitigates these age disparities as a share of the population. Finally, differences in employment status played only a marginal role in explaining differences by age group. In results not shown, similar results were found for decompositions by sector. Overall, the results are consistent with firms in each sector reducing employment disproportionately for youth.

Higher initial employment rates, as well as a greater tendency to work in wage employment, contributed to greater employment reductions among the better educated. Although the differences were not as

sector information is missing among 3 countries (Macedonia, Poland, and South Africa), the average gender gap of the remaining 14 countries, -1.29 percentage points, are used for decomposition by sector.

[41] The exceptions include three countries – Latvia, Lithuania and Turkey–where men experienced much larger employment slowdown within sector (status) than women, and three countries– Indonesia, Costa Rica, and Jordan – where within sector (status) employment slowdown was sigfificantly larger for women.

stark as the gender and youth disparities, better educated persons experienced surprisingly large reductions in employment rates, and the right half of Table 5 sheds some light on the factors causing the larger employment reductions among the better educated. Like youth, but to a lesser extent, less educated workers experienced greater percentage reductions in employment within both wage and self-employed work. Like men, however, people with more education are more likely to work than those with less education. This alone would have negated the employment disadvantage faced by less educated workers within each sector. The deciding factor in this case is that better educated workers tended to be clustered in wage employment jobs; since employment reductions were greater in wage employment than self-employment, this led to greater employment reductions among better educated workers.

6 Conclusion

This paper identifies groups in 17 middle-income countries that experienced the greatest labor market dislocations during the 2009 financial crisis. Most conjectures about the vulnerability of different groups are based on three potential mechanisms: uneven exposure to the shock across sectors or status of employment, firms' employment decisions, and households' labor supply decisions in response to the crisis. Previous findings from this and previous crises, particularly the two well-documented cases in Indonesia and Argentina, suggested four hypotheses: Employment outcomes were similar for men and women, youth experienced greater increases in unemployment, adjustments for less educated workers were more severe, and that the shock reduced employment more in urban areas.

Youth experienced the greatest employment dislocations. As in past crises, young workers experienced large reductions in employment, and their shift from wage employment to unemployment during this crisis was particularly striking. For most dislocated youth, self-employment did not provide a buffer to compensate for fewer wage jobs. Supply side factors also may have contributed to increases in youth unemployment during the downturn. For example, youth may have less access to information about the labor market than adults, leading them to delay adjusting their reservation wages, and youth likely benefited more than adults from parents' largess during the downturn.

Unlike past crises, in which men and women experienced similar employment changes, overall employment rates declined markedly more for men. Men experienced substantially larger declines in the percentage of the population that is employed. Unlike for youth, however, percentage employment declines within sector were nearly equal for men and women. There is no evidence that firms systematically discriminated against women when reducing employment.

Women were only slightly more likely to remain in the labor force than men, and they did not enter self-employment except in the worst-hit countries. Gender differences in participation were small, even among the less educated. In this respect, added worker effects during this crisis generally were more similar to the past crisis in urban Argentina, where there was little increase in female self-employment, than Indonesia, where female self-employment increased substantially. The exceptions are Latvia and

Lithuania, which experienced GDP slowdowns exceeding 20 percentage points, and women experienced much larger increases in self-employment.

There were few striking differences by education or urban residence. Disparities between less and more educated groups tended to be small, partly because of offsetting responses among middle and highly educated workers. Workers with medium levels of education – typically junior high school graduates – were impacted most by the crisis, as measured by declines in employment and increases in unemployment, while workers at the extremes of the education distribution suffered smaller declines. The evidence for urban and rural disparities is mixed, although in most countries, urban workers experienced greater falls in employment but greater increases in hours and earnings than rural workers.

Firm decisions, initial employment rates, and occupational segregation all can contribute to group disparities. In absolute terms, youth and men experienced the largest declines in employment and wage employment as a percentage of the population, which is arguably the indicator most relevant for assessing mitigation policies that apply to the entire population. For youth, larger percentage reductions in employment were partially mitigated by the fact that a larger percentage of adults work. For men, on the other hand, both their concentration in the industrial sector and even more importantly, higher initial employment rates, contributed to greater employment reductions.

To address the decline in youth employment, policies can either seek to increase labor demand for youth, or assist youth in making better career decisions. Youth experienced declines in employment in each sector and status of employment, but the limited evidence available shows no systematic declines in hours and wages. This suggests that firms reacted to reports of economic instability by laying off or freezing the hiring of their least experienced employees. Sub-minimum wages and job subsidies for youth can partially counteract these layoffs by encouraging firms to retain or hire youth during the downturn. Educational subsidies can also encourage youth to respond to acquire additional schooling, rather than remain idle, during periods of declining employment opportunities. Finally, job search assistance, including the dissemination of accurate information on labor market conditions, can help youth make more informed decisions during tumultuous economic times.

Scaling up existing programs targeted to disadvantaged groups, such as unskilled, female, or urban workers, may not benefit those most affected by job loss due to crisis. Training or other active labor market programs are often targeted to youth, unskilled, and female workers, who are perceived to be at a disadvantage in the labor market. However, with the exception of youth, these programs are not always well-targeted to the industrial and wage workers who sufferred the largest employment contractions during the crisis. Turkey, for example, responded to the crisis in part by extending a wage subsidy program that reduces working women's social security contributions. Although this subsidy may have been effective in boosting low participation rates prior to the crisis, it did not benefit the majority of those that sufferred job loss, and may have exacerbated employment loss for Turkish men.

Finally, the results confirm the importance of country-specific information when targeting policy responses to crises. Outside Latvia and Lithuania, the size of disparities between groups was usually weakly related to the size of the shock. Although there were no consistent patterns across countries for

many indicators and groups, disparities were often large. Although the analysis focused on general patterns, groups in each country responded differently to the shock, meaning that country-specific data are critical to help policymakers gauge the optimal policy response. Furthermore, this study only covers 17 countries, selected on the basis of data availability, and the patterns of adjustment in other countries may be different. Further development of data collection and dissemination systems will enable the policy response to this and future crises to better serve the needs of the most severely affected workers.

References

Baker, D, Andrew Glyn, David Howell, and John Schmidt, 2004. "Labor Market Institutions and Unemployment" in D. Howell (ed.) Questioning Liberalization: Unemployment, Labor Markets, and the Welfare State, Oxford, University Press.

Barakat, Bilal, Johannes Holler, Klaus Prettner, and Julia Schuste, 2010, "The Impact of the Crisis on Labour and Education in Europe", Vienna Institute of Demography Working Paper.

Bargain, Olivier, Herwig Immervoll, Andreas Peichl, Sebastian Siegloch, 2010. Who are the losers of the labour-market downturn? A scenario analysis for Germany. Mimeo.

Bell, David and David Blanchflower, 2009. Youth Unemployment: Déjà Vu. Working paper. Dartmouth University.

Buvinic, Mayra, 2009. The Global Financial Crisis: Assessing Vulnerability for Women and Children, Identifying Policy Responses. Commission of Status of Women, United Nations.

Cai, Fang, Yang Du, John Giles, Albert Park, and Meiyan Wang, 2010, "Shock and Recovery in China's Labor Market: Flexibilty in the Face of a Global Crisis," mimeo

Corbacho, Ana, Mercedes Garcia-Escribano, and Gabriela Inchauste, 2007, "Argentina: Macroeconomic Crises and Household Vulnerability," *Review of Development Economics*. vol 11 no. 1.

Cunningham, Wendy and William F. Maloney (2000) "Measuring vulnerability: who suffered in the 1995 Mexican crisis?" Mimeo, The World Bank, Washington, D.C.

Choudhry, Misbah, T., Enrico Marelli, and Marcello Signorelli, 2010. "The Impact of Financial Crises on Labor Markets- A Gender Perspective" The 11th bi-annual EACES conference, University of Tartu.

Elsby, Michael, Bart Hobijn, and Aysegul Sahin, 2010, "The Labor Market in the Great Recession", NBER Working Paper 15979.

Fallon, Peter and Robert Lucas, 2002. The Impact of financial Crisis on Labor Markets, Household Incomes, and Poverty: Review of Evidence. *The World Bank Research Observer*, 17(1). pp 21-45.

Freeman, Richard. 2005 "Labour Market Institutions without Blinders: The Debate over Flexibility and Labour Market Performance", NBER working paper 11286

Freeman, Richard. 2009, "Labor Regulations, Unions, and Social Protection in Developing Countries: Market Distortions or Efficient Institutions", NBER working paper 14789

Ghosh, Jayati, 2010. "Financial Crises and the Impact on Women" *Development,* v. 53(3) p. 381-385.

Glewwe, Paul and Gillette Hall, 1998. Are Some Groups More Vulnerable to Macro Shocks Than Others Hypothesis Tests Based on Panel Data from Peru. *Journal of Development Economics, 56.* pp. 181-206

Hallward-Driemeier, Mary, Bob Rijkers, and Andrew Waxmen, 2010. "Women in Crisis: Firm level Evidence on the Labor Market Impacts of the Indonesian Crisis." Mimeo. World Bank.

International Labour Organization, 2010a, "Global Employment Trends: 2010"

International Labour Organization, 2010b, "Women in Labour Markets: Measuring Progress and Identifying Challenges"

International Monetary Fund and International Labour Organization, 2010, "The Challenges of Growth, Employment, and Social Cohesion", Background discussion paper.

Ha, Byung-jin, Caroline McInerney, Steven Tobin, and Raymond Torres: "Youth Employment in Crisis", ILO discussion paper 201/2010

Leung, Ron, Marco Marco Stampini and Désiré Vencatachellum. 2009. Does Human Capital Protect Workers against Exogenous Shocks? South Africa in the 2008-2009 Crisis. IZA working paper no. 4608.

Lim, Joseph. 2000, "The Effects of the East Asian Crisis on the Employment of Women and Men: The Philippine Case." *World Development.* 28(7), p. 1285-1306.

Khanna, Gaurav, David Newhouse, and Pierella Paci, forthcoming, "Fewer jobs or smaller paychecks? Aggregate Impacts of the Crisis in Selected Middle-Income Countries"

Lokshin, Michael and Martin Ravallion, "Welfare Impacts of the 1998 Financial Crisis in Russia and the Response of the Public Safety Net," *Economics of Transition,* vol. 8 no. 2.

McKenzie, David, 2004, "Aggregate Shocks and Urban Labor Market Responses: Evidence from Argentina's Financial Crisis", *Economic Development and Cultural Change.* 52, p. 719–758

McKenzie, David, 2003, "How do Households Cope with Aggregate Shocks: Evidence from the Mexican Peso Crisis", *World Development*, Vol. 31 no. 7.

Sabarwal, Shwetlena, Nistha Sinha, and Mayra Buvinic, 2011. "How do Women Weather Economic Shocks: What We Know" Economic Premise no. 46. World Bank

Scarpetta, Stefano, Anne Sonnet and Thomas Manfredi. 2010 "Rising Youth Unemployment during the Crisis: How to Prevent Negative Long Term Consequences on a generation?", OECD Social Employment and Migration Papers. No 106. OECD. Paris.

Schultz, Theodore, 1975, "The Value of the Ability to Deal with Disequilibria", Journal of Economic Literature, Vol. 13 No. 3, pp. 827-846

Seguino, S. 2009. "The Global Economic Crisis, Its Gender Implications, and Policy Responses." Paper prepared for *Gender Perspectives on the Financial Crisis* Panel at the Fifty-Third Session of the Commission on the Status of Women, United Nations

Shorrocks, Anthony. 1999, "Decomposition Procedures for Distributional Analysis: A Unified Framework based on the Shapley Value", mimeo, University of Essex, Department of Economics.

Skoufias, Emmanuel, and Susan Parker, 2006, "Job Loss and Family Adjustment in Work and Schooling During the Mexican Peso Crisis", Journal of Population Economics. 19: p. 163-181

Smith, James P, Duncan Thomas, Elizabeth Frankenberg, Kathleen Beegle, and Graciela Teruel. 2002 "Wages, Employment, and Economic Shocks: Evidence from Indonesia," *Journal of Population Economics,* vol. 15, no. 1.

Strauss, John, Kathleen Beegle, Agus Dwiyanto, Yulia Herawati, Daan Pattinasarany, Elan Satriawan, Bondan Sikoki, Sukamdi, Firman Witoelar. 2004. Indonesian Living Standards: Before and After the Financial Crisis Rand Corporation, and Institute of Southeast Asian Studies.

Verick, Sher. 2009, "Who is Hit Hardest during a Financial Crisis? The Vulnerability of Young Men and Women to Unemployment in an Economic Downturn," IZA DP No. 4359.

Walby, Silvia, 2009. Gender and the Financial Crisis, mimeo, Lancaster University.

World Bank, 2009, *Averting a Human Crisis during the Global Downturn: Policy Options from the World Bank's Human Development Network*, World Bank. Washington DC.

World Bank, 2010a, *Household Welfare in the Face of Economic Slowdown: Result from Five Urban City Centers in Turkey*, World Bank. Washington DC.

World Bank, 2010b *Opening the Door to Good Quality Jobs: The Role of Human Capital Investment and Social Protection Policies*, mimeo, World Bank, Washington DC.

World Bank, 2010c. Coping Well or Barely Coping: Household and Government Responses to the Great Recession in Europe and Central Asia. World Bank, Washington DC.

Table 1: Data used for the analysis

Region	Country	Slowdown in GDP growth	Source	Period	Frequency	Note
LAC	Argentina	-6.9	Household survey (EPH)	2006 Q4 - 2009 Q2	Quarterly	-Urban only -rotational panel -self employed and family worker combined
	Brazil	-4.7	Monthly Survey of Employment (PME)	1/2006 - 8/2009	Monthly	-Urban only -Rotational panel -No agricultural sector
	Chile	-5.7	National survey of Employment (ENE)	2006 Q1 - 2009 Q3	Quarterly	-Urban only -No earnings info
	Costa Rica	-5.4	Multi –purpose Household survey (EHPM)	2006-2009	Annually	
	Mexico	-11.2	National Survey of Occupation and Employment (ENOE)	2007 Q1 - 2009 Q1	Quarterly	-Rotational panel
EAP	Indonesia	-1.7	Indonesian Labor force Survey (Sakernas)	Feb 2006 - Feb 2009	Biannually	-Earnings only for wage and salary workers
	Philippines	-4.5	Philippines Labor force Survey	2006 - 2009	Biannually	-Daily wage rate for earnings
MENA	Egypt	-2.5	Egyptian Labor Force Survey (ELFS)	2006-2009	Quarterly	-rotational panel
	Jordan	-5.6	Jordanian Employment and Unemployment Survey (JEUS)	2006-2009	Quarterly	
ECA	Bulgaria	-10.7	Eurostat	2006 - 2009	Annually	- Cell means by gender, education, and age reported by Eurostat - Urban/rural breakdown only available for selected outcomes - No earnings and hours information
	Latvia	-20.7				
	Lithuania	-21.3				
	Macedonia	-6.1				
	Poland	-4.2				
	Romania	-12.2				
	Turkey	-7.4				
AFR	South Africa	-8.2	Labor force Survey and Quarterly labor force survey	2006 - 2009	Biannually	-Earnings not available -urban/rural information not available -sector information is not available

Note: Slowdown in GDP growth rate due to the recession is calculated as GDP growth rate in 2009 compared from the average GDP growth rates in 2007-2008. For detailed numbers, see Appendix Table A1.

Table 2. An Example: changes in trend from pre to post crisis in Mexico

	Employment ratio (percent)				Year-on-Year Change (percentage points, pp)				Average pre-crisis trend (pp)	Average post-crisis trend (pp)	difference (post-pre)
Year/Quarter	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	2007-2008	2009	
A. One cell: Low educated male youth in urban areas											
2007	57.3	57.4	58.2	60.8	-	-	-	-			
2008	57.8	58.3	57.8	57.0	0.5	0.9	-0.4	-2.2	-0.3		
2009	54.2	53.9	54.1	-	-3.6	-4.4	-2.7	-		-3.6	-3.3
B. All: weighted average of 16 cells											
2007	61.3	61.7	61.6	63.0	-	-	-	-			
2008	61.8	62.4	62.0	61.4	0.5	0.7	0.4	-1.6	0.0		
2009	60.2	60.4	60.6	-	-1.6	-2.0	-1.4	-		-1.7	-1.7

Table 3. Decomposition of Employment Ratio between Changes due to Employment Rate and Labor Force Participation

	(1) Precrisis (2006-2008)			(2) Post (2008-2009)			(3) Difference		
Group	employment ratio change	changes due to employment rate	changes due to Participation	employment ratio change	changes due to employment rate	changes due to Participation	employment ratio change	changes due to employment rate	changes due to Participation
Men	0.67	0.38	0.29	-1.87	-1.62	-0.25	-2.54	-2.00	-0.54
	[100%]	[56.8%]	[43.2%]	[100%]	[86.4%]	[13.6%]	[100%]	[78.6%]	[21.4%]
Women	1.02	0.45	0.56	-0.36	-0.73	0.36	-1.38	-1.18	-0.20
	[100%]	[44.1%]	[54.9%]	[100%]	[202.8%]	[-100.0%]	[100%]	[85.5%]	[14.5%]
Young	0.72	0.50	0.21	-1.91	-1.46	-0.45	-2.62	-1.96	-0.66
	[100%]	[69.9%]	[30.1%]	[100%]	[76.5%]	[23.5%]	[100%]	[74.7%]	[25.3%]
Old	0.78	0.34	0.45	-0.96	-1.13	0.17	-1.74	-1.47	-0.27
	[100%]	[43.0%]	[57.0%]	[100%]	[118.1%]	[-18.1%]	[100%]	[84.4%]	[15.6%]
Low Edu	0.39	0.24	0.15	-1.13	-1.07	-0.06	-1.52	-1.31	-0.21
	[100%]	[60.5%]	[39.5%]	[100%]	[95.1%]	[4.9%]	[100%]	[86.2%]	[13.8%]
High Edu	0.82	0.52	0.30	-1.28	-1.22	-0.06	-2.10	-1.74	-0.36
	[100%]	[63.5%]	[36.5%]	[100%]	[95.4%]	[4.6%]	[100%]	[82.9%]	[17.1%]

Note: Numbers are for average over all 17 countries. Each proportion of change explained by employment rate and labor force participation is presented in the brackets.

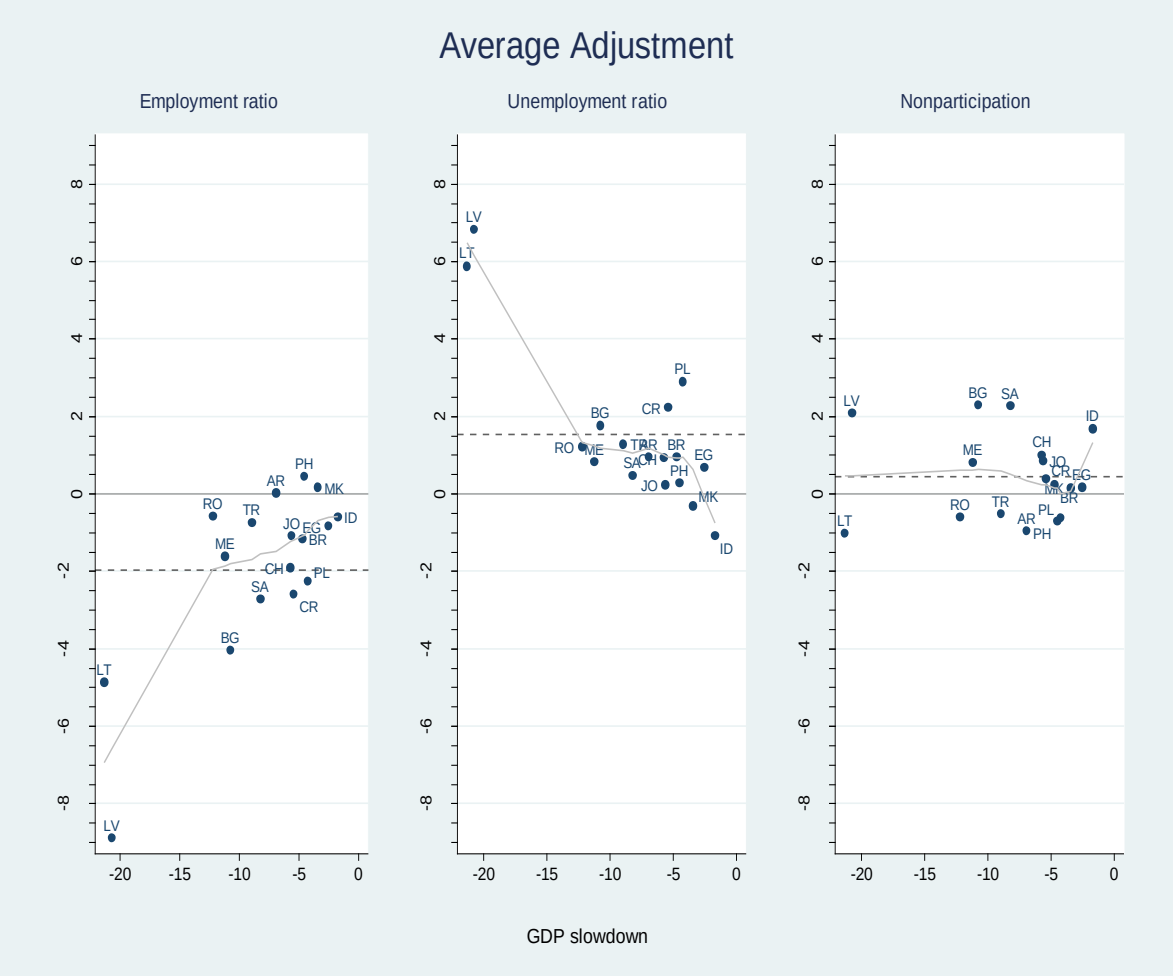
Table 4. Decomposition of Gender Disparities in Employment Ratio Changes by Sector and Status

		Sector				Status			
			changes due to				changes due to		
Region	country	Differences in employment ratio change	employment level gap	sectoral distribution	within sector growth rate	Differences in employment ratio change	employment level gap	status distribution	within status growth rate
Average		-1.29	-0.74	-0.48	-0.07	-1.16	-0.65	-0.18	-0.33
(Percent)		(100%)	(57.6%)	(36.9%)	(5.5%)	(100%)	(55.8%)	(15.6%)	(28.6%)
LAC	Argentina	-0.82	0.03	-1.10	0.26	-0.82	0.07	0.15	-1.03
	Brazil	-0.99	-0.39	-0.15	-0.45	-0.99	-0.41	-0.05	-0.52
	Chile	-0.92	-1.25	-0.50	0.83	-0.92	-1.19	-0.66	0.92
	Costa Rica	-0.29	-1.93	-1.47	3.11	-0.29	-0.98	-3.79	4.47
	Mexico	-0.79	-1.00	-0.35	0.55	-0.79	-0.84	-0.05	0.10
EAP	Indonesia	2.22	-0.63	0.02	2.83	2.22	-0.69	-1.17	4.08
	Philippines	-0.72	0.32	-0.26	-0.78	-0.72	0.25	-0.03	-0.93
MENA	Egypt	0.26	-1.82	1.36	0.72	0.26	-1.67	1.56	0.37
	Jordan	-0.10	-2.27	0.06	2.11	-0.10	-2.16	0.28	1.78
ECA	Bulgaria	-0.92	-0.57	-1.21	0.86	-0.92	-0.56	0.14	-0.50
	Latvia	-5.80	-0.83	-1.67	-3.29	-5.80	-0.87	0.85	-5.78
	Lithuania	-6.31	-0.05	-0.76	-5.50	-6.31	-0.05	0.83	-7.08
	Macedonia					1.16	0.00	-0.07	1.24
	Poland					-1.18	-0.52	0.05	-0.72
	Romania	-0.68	-0.12	-0.71	0.16	-0.68	-0.12	-0.03	-0.52
	Turkey	-2.23	0.10	0.06	-2.40	-2.23	-0.33	-0.59	-1.32
AFR	South Africa					-1.66	-0.93	-0.51	-0.22

Table 5. Decomposition of Age and Education Disparities in Employment Ratio Changes by Status

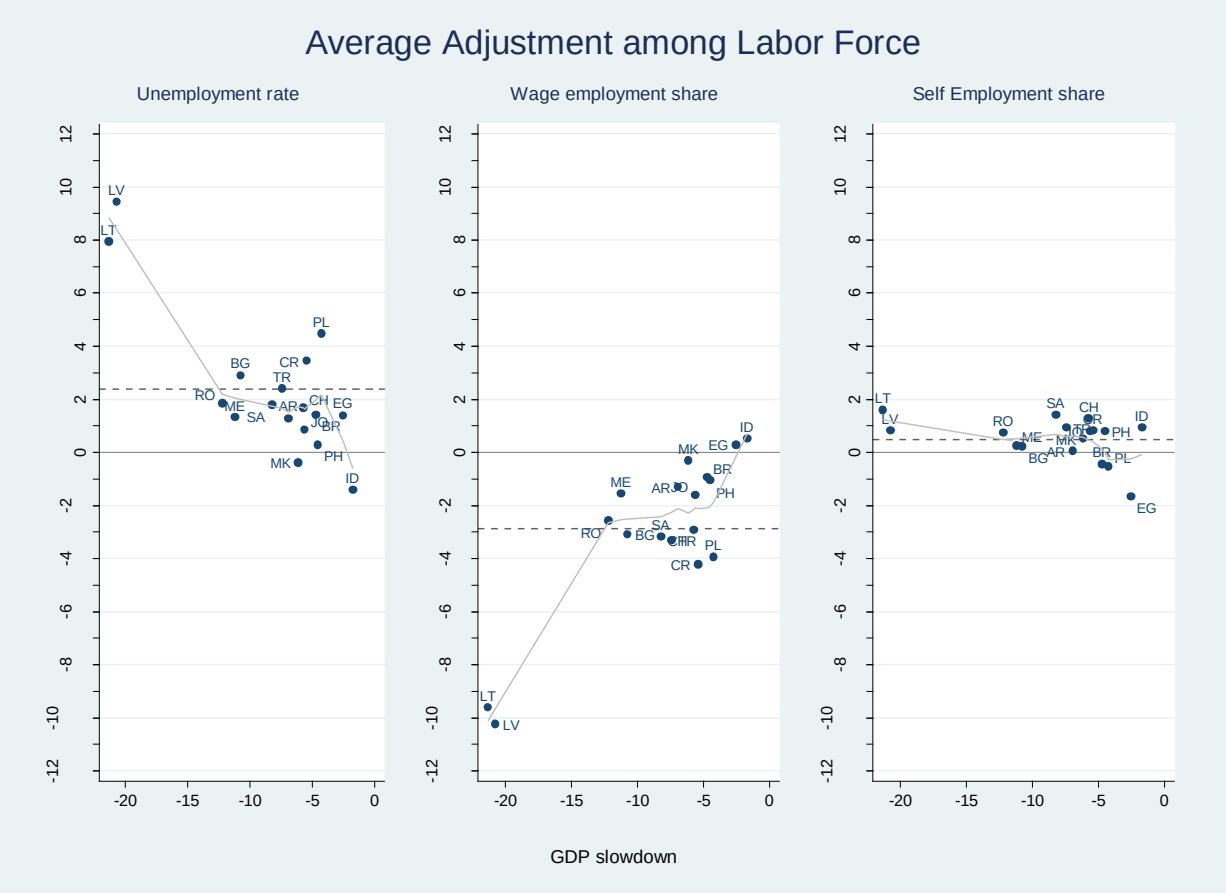
		Youth (vs. adults)				Least educated (vs. more educated)			
			changes due to				changes due to		
Region	country	Differences in employment ratio change	employment level gap	status distribution	within status growth rate	Differences in employment ratio change	employment level gap	status distribution	within status growth rate
Average		-0.88	2.14	-0.23	-2.79	0.58	1.13	0.55	-1.10
(Percent)		(100.0%)	(-242.8%)	(26.6%)	(316.2%)	(100.0%)	(194.6%)	(95.2%)	(-189.8%)
LAC	Argentina	0.68	-0.29	-0.32	1.28	-1.05	0.00	0.02	-1.08
	Brazil	-1.28	0.70	0.26	-2.24	0.77	0.21	-0.14	0.70
	Chile	-0.47	1.81	-1.23	-1.05	0.27	0.15	1.53	-1.41
	Costa Rica	-4.01	1.67	-1.66	-4.01	-0.92	0.13	1.54	-2.59
	Mexico	-1.48	0.97	-0.40	-2.06	0.71	0.21	0.13	0.37
EAP	Indonesia	-2.40	0.98	0.85	-4.23	-0.98	-0.16	0.29	-1.11
	Philippines	0.00	-0.58	-0.54	1.13	0.91	0.16	0.75	-0.01
MENA	Egypt	-1.00	1.45	0.11	-2.56	0.37	0.21	-2.87	3.02
	Jordan	0.51	0.51	-0.44	0.43	-0.39	0.39	-0.20	-0.57
ECA	Bulgaria	1.31	4.27	-0.10	-2.87	1.73	3.16	0.23	-1.66
	Latvia	-1.42	7.95	-0.75	-8.62	0.91	7.20	0.20	-6.48
	Lithuania	-4.03	7.88	-0.68	-11.23	3.58	3.95	1.59	-1.96
	Macedonia	-0.91	0.92	0.73	-2.56	1.43	0.31	1.68	-0.56
	Poland	0.08	2.48	0.07	-2.47	0.40	2.71	0.76	-3.07
	Romania	-0.01	0.84	0.52	-1.37	0.97	-0.20	1.34	-0.18
	Turkey	-0.86	0.50	-0.60	-0.75	0.58	0.20	1.41	-1.03
AFR	South Africa	0.29	4.37	0.19	-4.27	0.58	0.58	1.13	-1.13

Figure 1. Overall Adjustments among Population: employment indicators



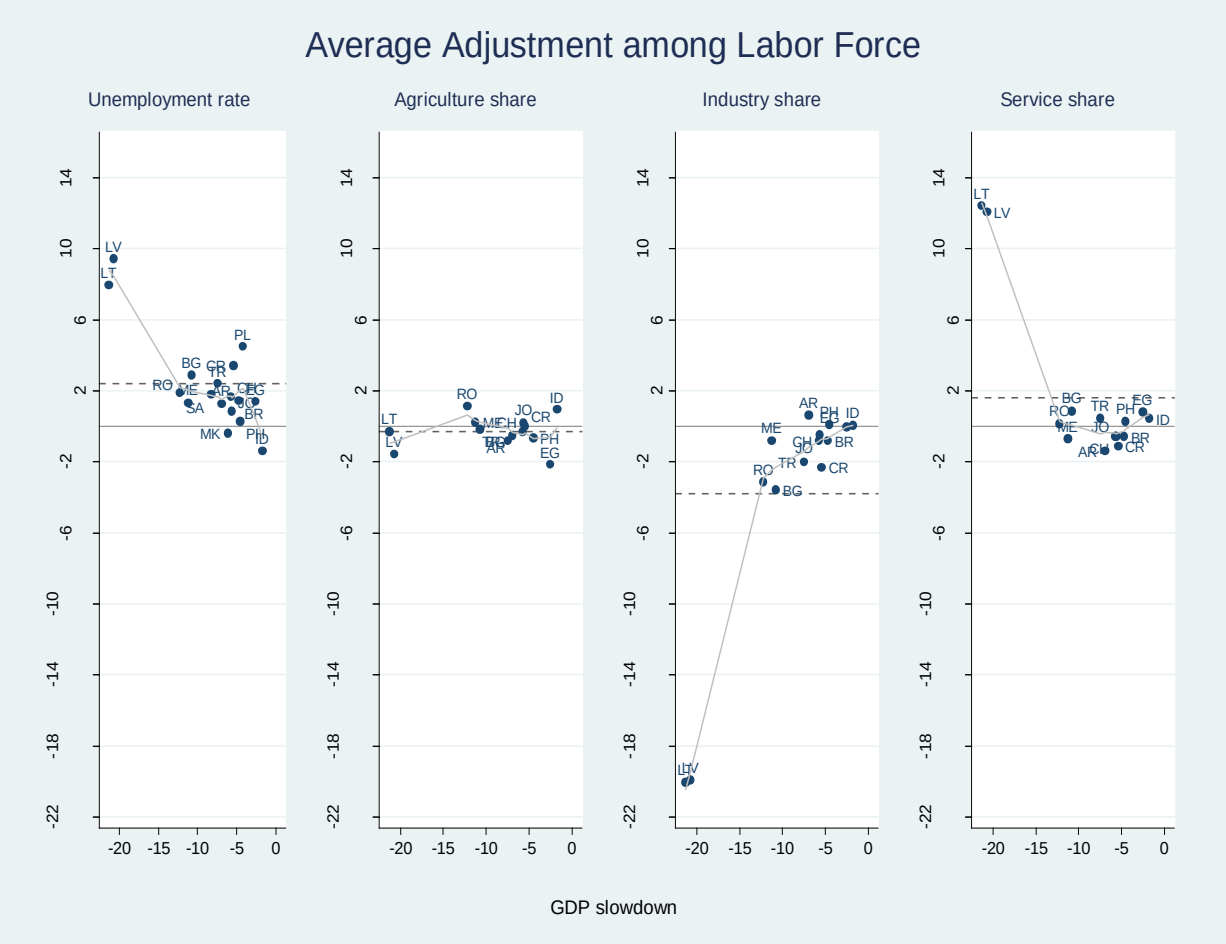
Note: The horizontal axis represents the slowdown in real GDP growth rate as defined in Table 1. The vertical axis is analogously defined as slowdown in the indicator. Two letter codes represent countries.

Figure 2. Overall Adjustments among Labor Force: Unemployment rate and employment status



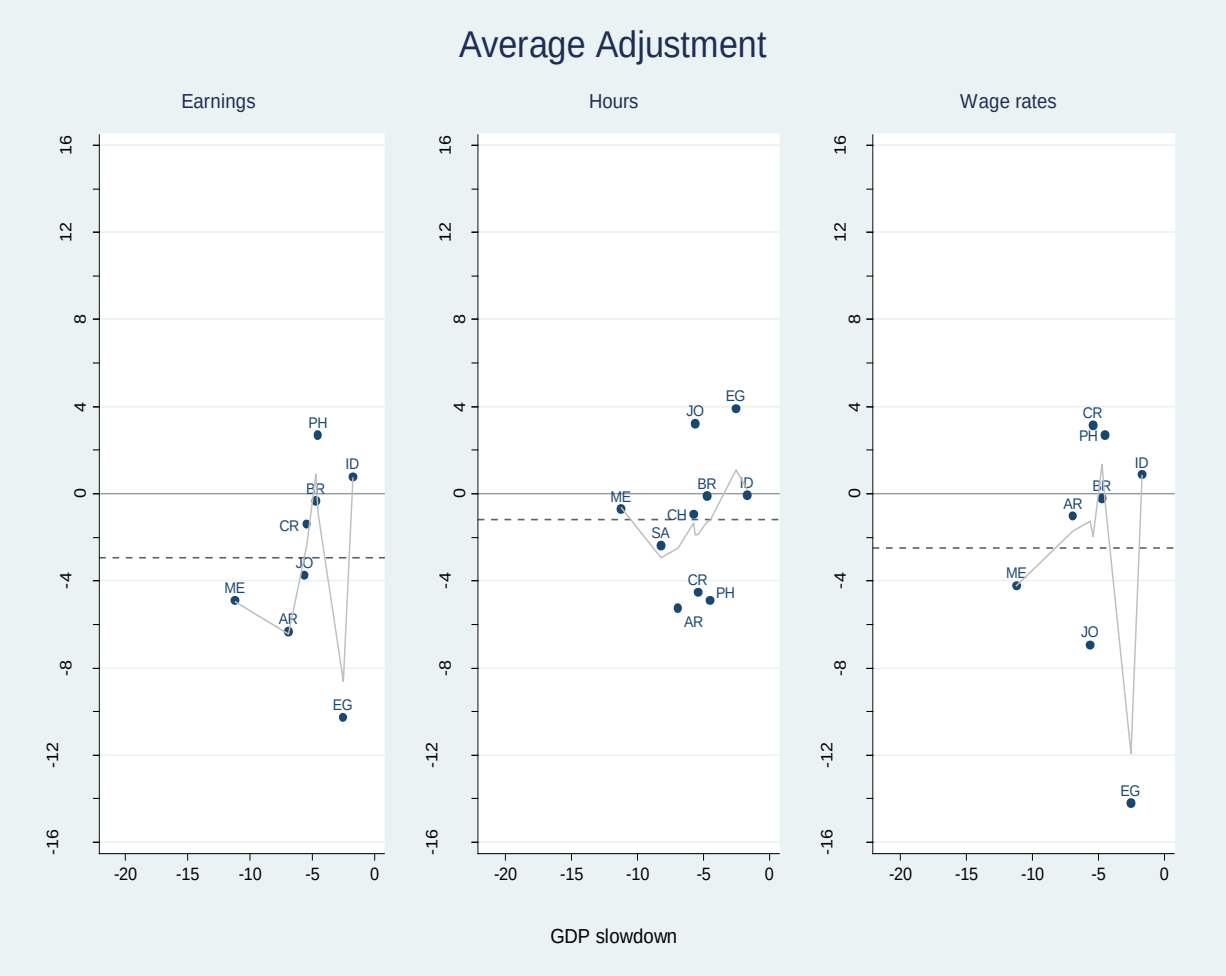
Note: See note for figure 1. All four indicators are measured as a share of the active labor force. Self-employment includes self-employed and unpaid family workers.

Figure 3. Overall Adjustments among Labor Force: Unemployment rate and employment sector



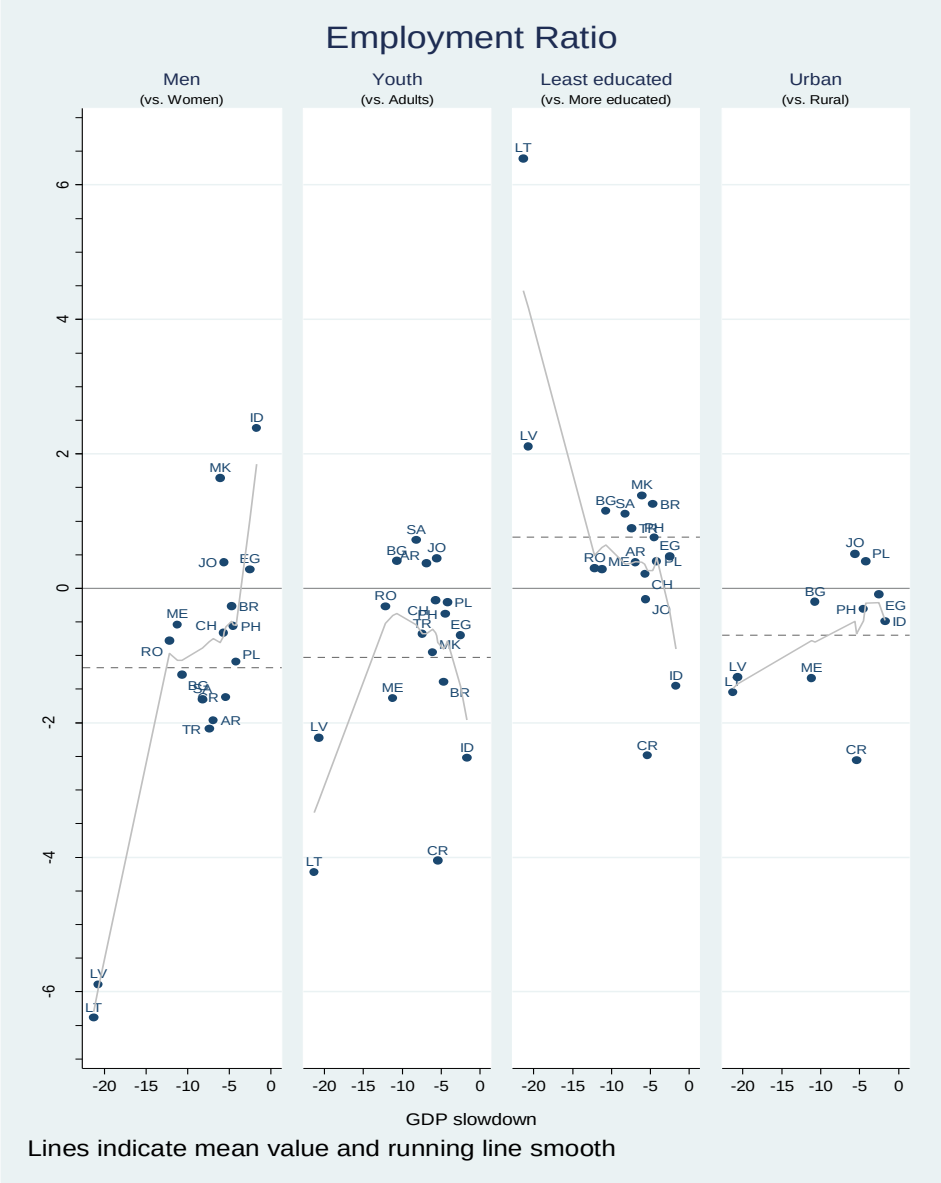
See note for figure 1

Figure 4. Overall Adjustments among Workers: Earnings, hours, and wage rates



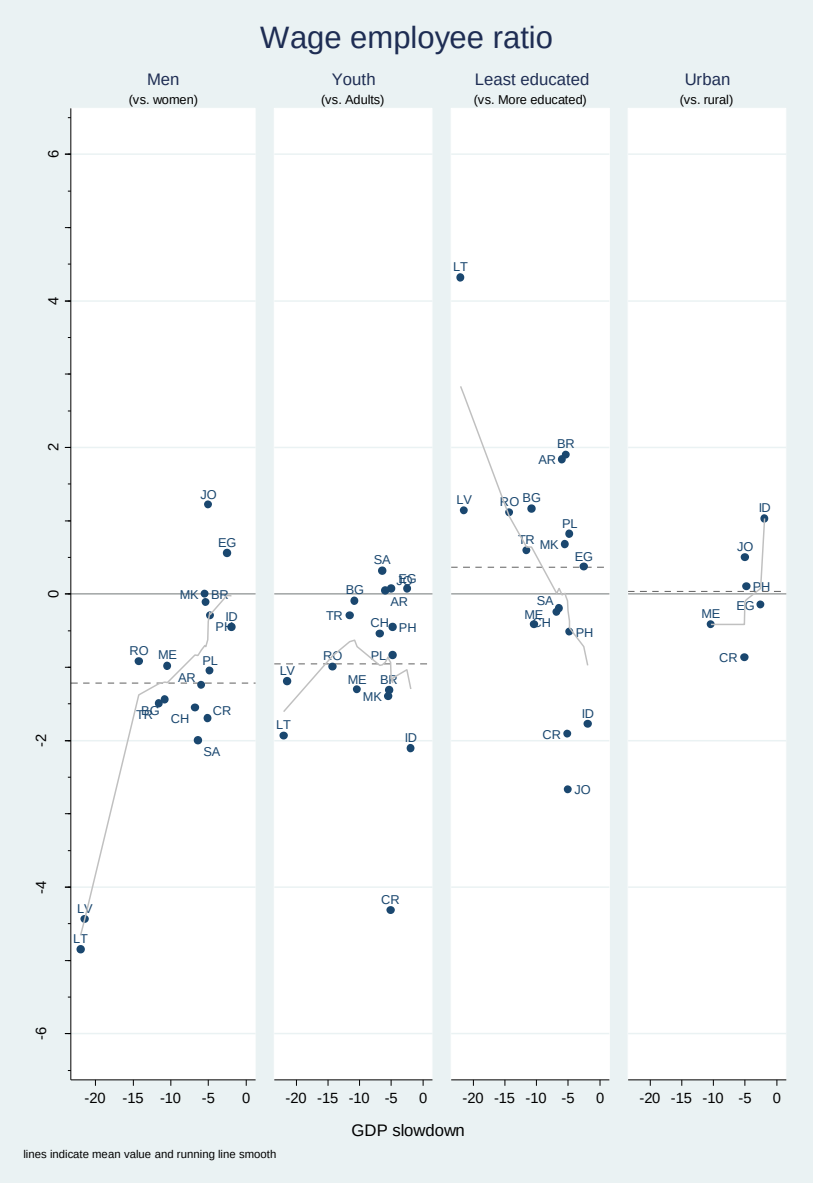
See note for figure 1

Figure 5. Group comparisons: employment to population ratio



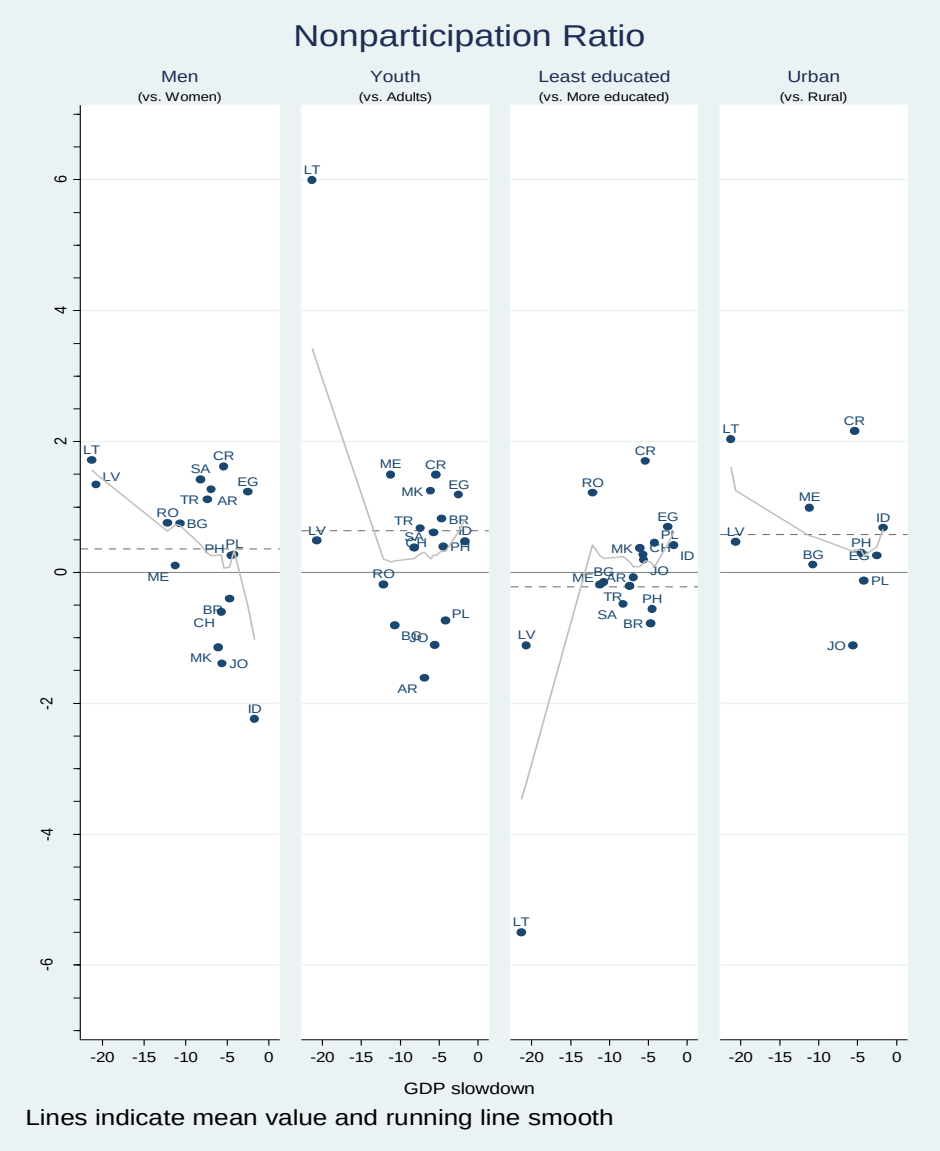
Note: The figure shows the disparity between groups, controlling for other characteristics, in the slowdown in the employment to population ratio. The plotted number is the coefficient from regression for each country (equation (3) in Appendix B). The horizontal axis represents the slowdown in real GDP growth rate as defined in Table 1. Two letter codes represent countries.

Figure 6. Group comparisons: Wage employee to population ratio



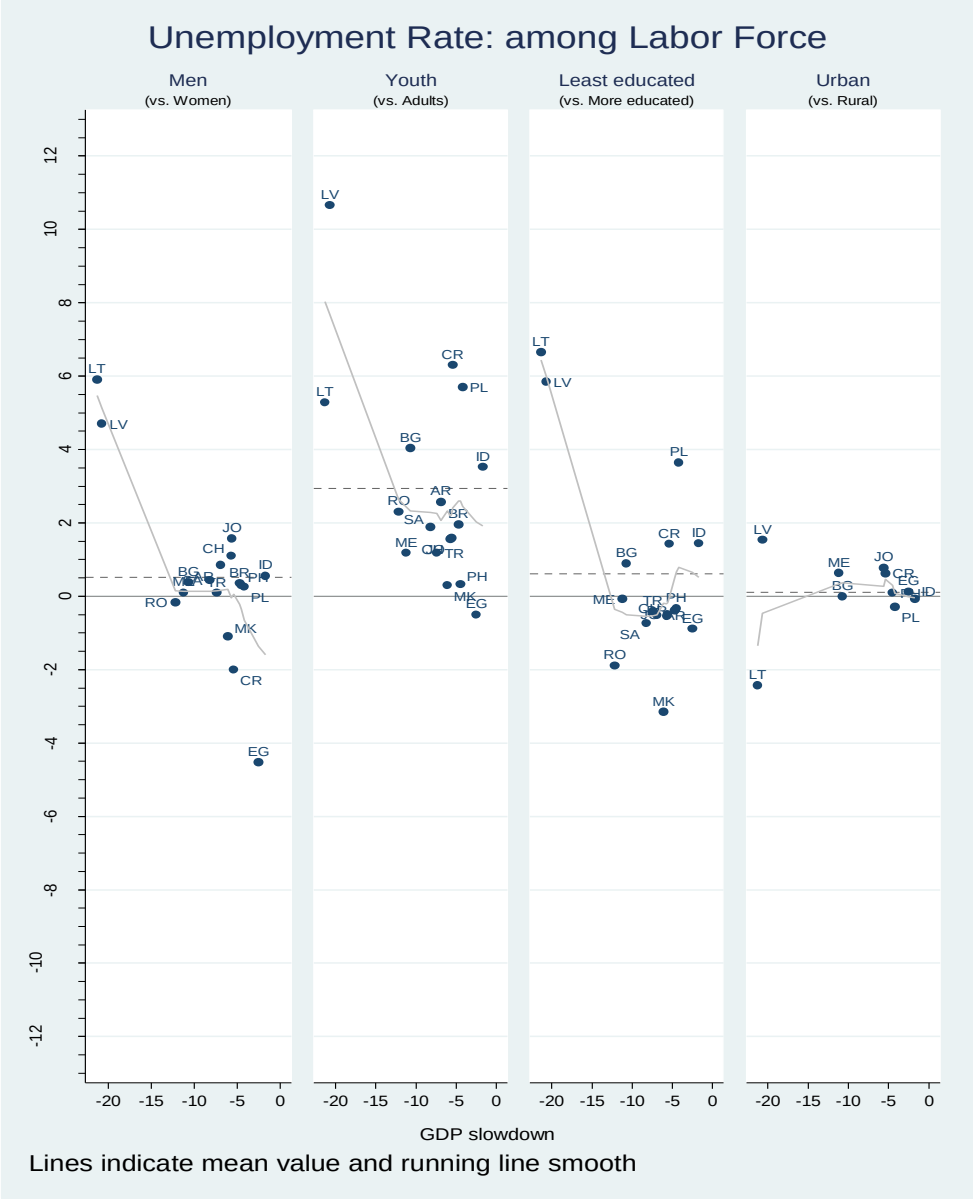
See notes for figure 5.

Figure 7. Group comparisons: Non-participation to population ratio



See notes for figure 5.

Figure 8. Group comparisons: unemployment rate



See notes for figure 5.

Figure 9. Group comparisons: share of wage employment among labor force

See notes for figure 5.

Appendix A. Labor Market Adjustment by Gender

Table A1. GDP growth rates and their slowdown

	Annual GDP Growth Rates			Average GDP growth rates		
	2007	2008	2009	2007-2008	2009	slowdown
Argentina	8.7	6.8	0.9	7.8	0.9	-6.9
Brazil	6.1	2.8	-0.2	4.5	-0.2	-4.7
Bulgaria	6.2	5.1	-5.0	5.7	-5.0	-10.7
Chile	4.6	3.7	-1.5	4.2	-1.5	-5.7
Costa Rica	7.9	0.7	-1.1	4.3	-1.1	-5.4
Egypt	7.1	7.2	4.7	7.1	4.7	-2.5
Indonesia	6.3	6.0	4.5	6.2	4.5	-1.7
Jordan	8.9	7.8	2.8	8.3	2.8	-5.6
Latvia	10.0	-4.6	-18.0	2.7	-18.0	-20.7
Lithuania	9.8	2.8	-15.0	6.3	-15.0	-21.3
Macedonia	5.9	4.8	-0.7	5.4	-0.7	-6.1
Mexico	3.3	6.0	-6.5	4.7	-6.5	-11.2
Philippines	7.1	3.8	0.9	5.5	0.9	-4.5
Poland	6.8	5.0	1.7	5.9	1.7	-4.2
Romania	6.3	3.8	-7.1	5.1	-7.1	-12.2
South Africa	5.5	7.3	-1.8	6.4	-1.8	-8.2
Turkey	4.7	0.7	-4.7	2.7	-4.7	-7.4

Source: World Economic Outlook Database

Table A2. Labor Market Adjustments by Gender

Region	country	Among Population						Among Active Labor Force						Among Workers							
		Employmenmt		Unemployment		Nonparticipation		Unemployment		Wage employment		Self Employment		Agriculture		Earnings		Hours		Wage Rates	
		Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
LAC	Argentina	-0.59	0.81	1.31	0.70	-0.72	-1.51	1.45	1.56	-1.29	-2.17	-0.17	0.61	-0.92	-0.06	-9.20	-5.67	-5.72	-7.39	-3.48	1.73
	Brazil	-1.65	-0.81	1.28	0.59	0.37	0.22	1.72	0.96	-1.14	-0.50	-0.57	-0.46	.	.	-0.99	-0.12	-0.18	-0.18	-0.81	0.06
	Chile	-2.51	-1.47	1.57	0.34	0.94	1.13	2.36	1.17	-3.79	-2.76	1.42	1.59	-0.42	-0.49	.	.	-0.96	-1.44	.	.
	Costa Rica	-3.15	-1.37	2.25	2.17	0.90	-0.80	3.27	5.44	-4.53	-6.28	1.26	0.85	0.55	-1.52	-5.27	-2.20	-6.25	-7.43	0.98	5.23
	Mexico	-1.95	-1.24	1.09	0.56	0.86	0.68	1.53	1.31	-1.70	-1.43	0.17	0.12	0.42	-0.45	-5.24	-4.54	-0.91	-0.30	-4.33	-4.24
EAP	Indonesia	0.71	-1.75	-1.25	-1.05	0.54	2.80	-1.04	-1.48	-0.46	1.30	1.49	0.17	1.81	-0.45	3.33	-4.47	0.14	-0.35	3.19	-4.12
	Philippines	0.14	0.90	0.33	0.15	-0.48	-1.06	0.39	-0.06	-1.18	-0.88	0.79	0.94	-0.79	-0.03	3.63	2.12	-5.07	-4.95	3.63	2.12
MENA	Egypt	-0.74	-0.93	0.02	1.44	0.73	-0.51	0.14	5.11	1.18	1.32	-1.32	-6.42	-2.13	-6.00	-8.64	-13.25	3.11	8.79	-11.75	-22.04
	Jordan	-0.03	-0.39	0.36	-0.03	-0.33	0.43	0.26	0.30	-0.95	-0.35	0.69	0.06	0.12	0.00	-2.83	-4.12	3.37	2.56	-6.20	-6.68
ECA	Bulgaria	-4.68	-3.40	2.02	1.48	2.66	1.92	3.19	4.08	-3.54	-4.00	0.36	-0.08	.	.	.	.	.	.	.	.
	Latvia	-12.24	-6.46	9.14	4.63	3.10	1.83	14.14	8.69	-14.15	-10.52	0.01	1.83	.	.	.	.	.	.	.	.
	Lithuania	-7.86	-1.63	7.98	3.38	-0.11	-1.75	12.29	5.52	-12.63	-7.65	0.34	2.13	.	.	.	.	.	.	.	.
	Macedonia	0.60	-0.88	-0.56	-0.26	-0.03	1.14	-0.90	0.70	-1.07	-0.81	1.97	0.11	.	.	.	.	.	.	.	.
	Poland	-2.94	-1.85	3.30	2.47	-0.36	-0.63	5.40	4.72	-5.02	-4.19	-0.39	-0.52	.		.		.		.	
	Romania	-0.85	-0.05	1.28	1.15	-0.43	-1.10	1.75	1.73	-2.54	-1.71	0.79	-0.01	.		.		.		.	
	Turkey	-1.79	0.39	1.83	0.78	-0.04	-1.17	2.56	2.41	-2.92	-3.19	0.36	0.78	.		.		.		.	
AFR	South Africa	-3.83	-2.21	0.56	0.37	3.27	1.83	2.57	2.42	-4.70	-3.87	2.13	1.45					-4.41	-2.81		

Notes: The difference between the annual percentage point change in 2009 and the average annual change between 2006 and 2008 for each outcome by gender is presented.

Figure A1: Sectoral employment shares in 2007, by gender

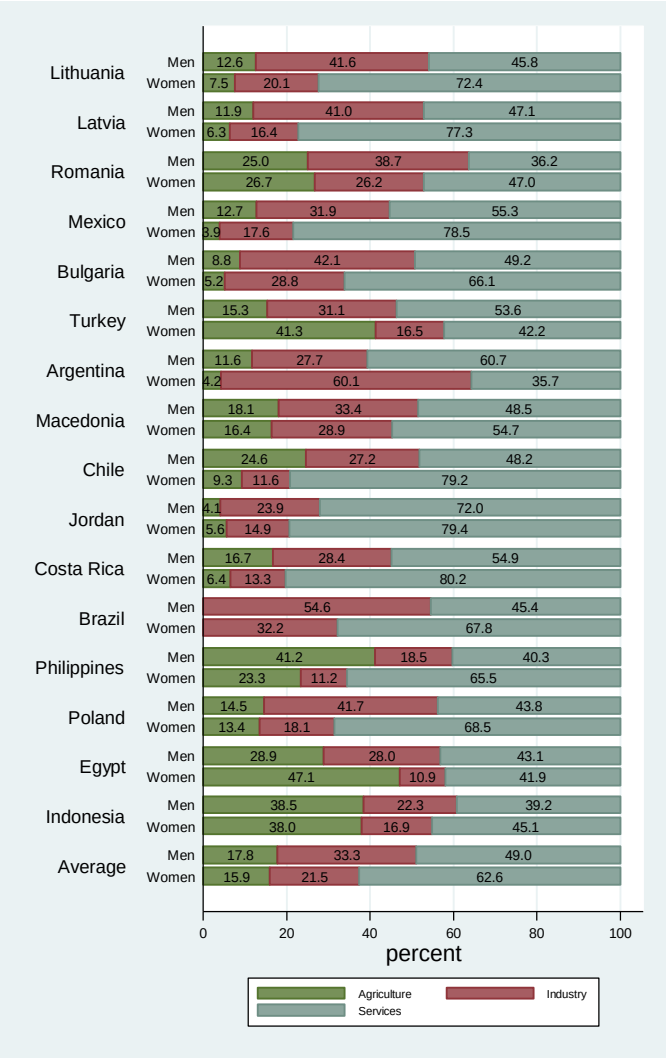


Figure A2: Sectoral employment shares in 2007, by age group

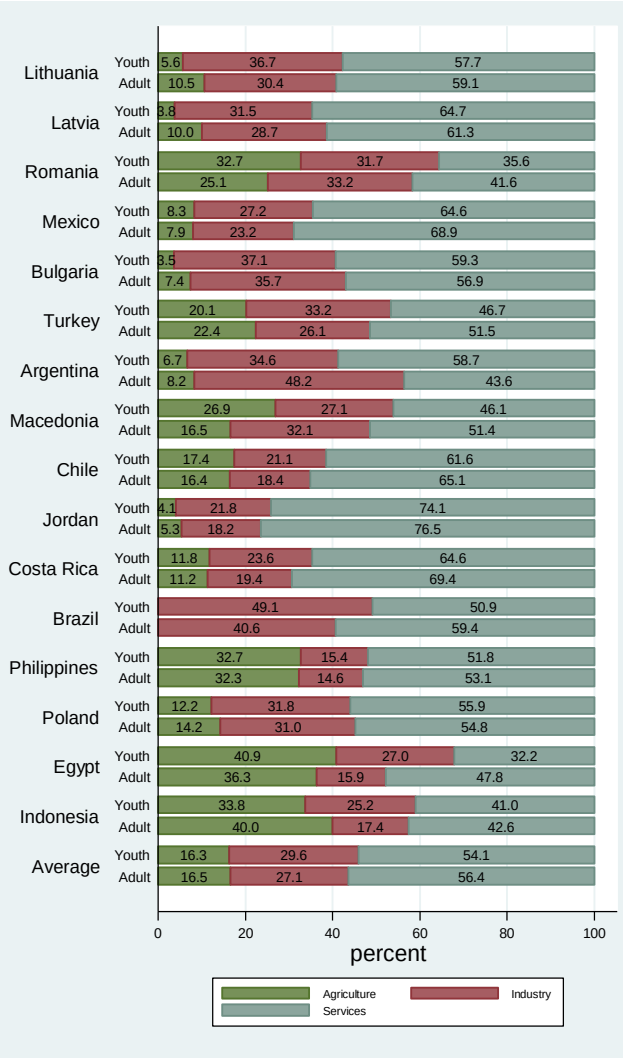
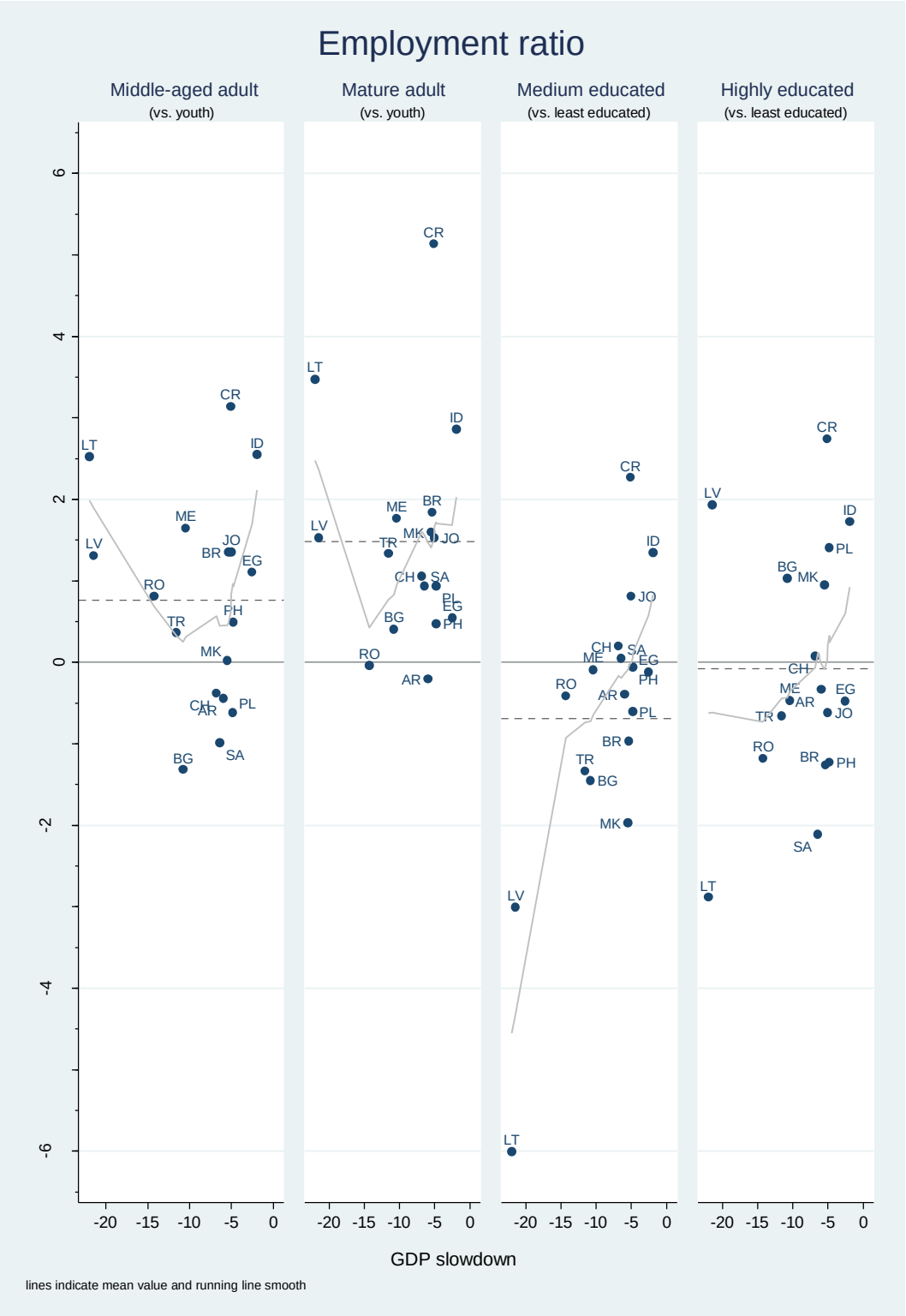
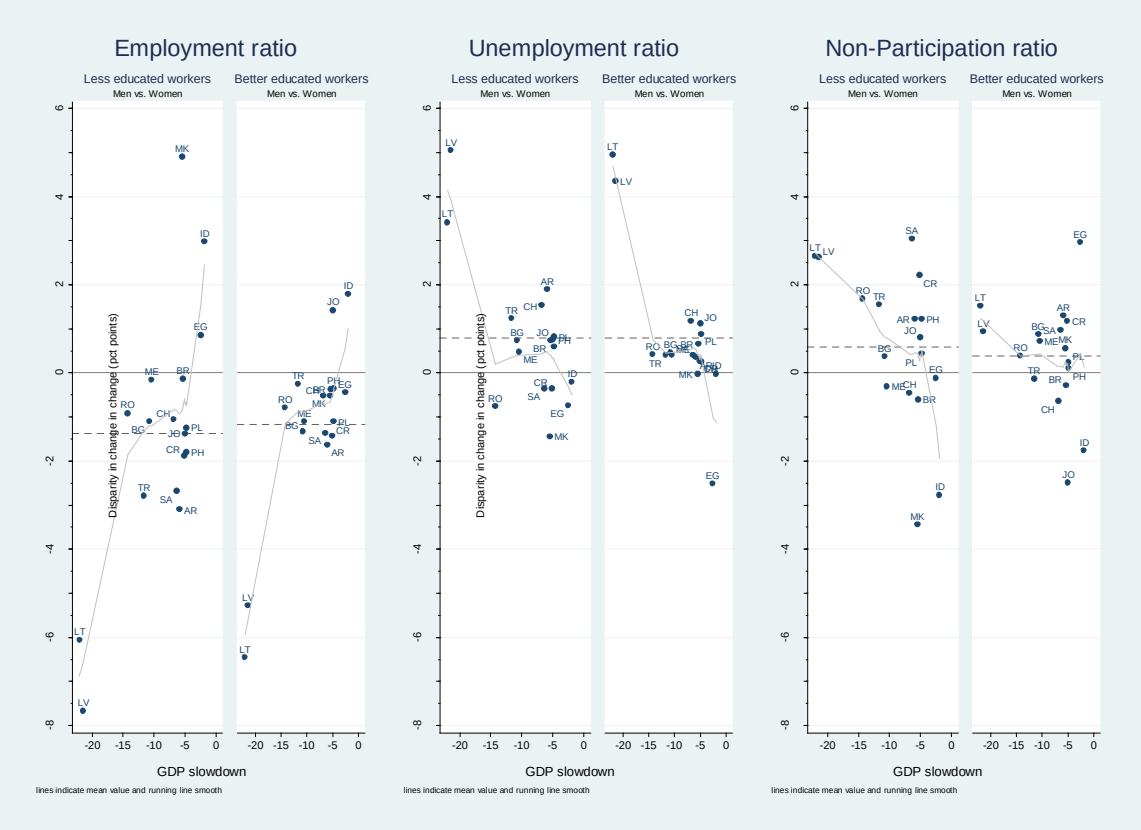


Figure A3. Age and gender comparisons with three groups: Employment Ratio



See notes for figure 5.

Figure A4. Gender comparisons by education: Employment, Unemployment ratio, Non-participation



See notes for figure 5.

Appendix B. Technical Note

(1) Regression

Our analysis is based on the estimated coefficients from descriptive regressions of year on year outcome changes on worker characteristics for each outcome of interest. Each regression is conditioned on four worker characteristics: their gender, age group – a youth (15 to 24) or adult (25 to 64), education group – least educated or better educated, and urban or rural residence.[42]

$$(1)\quad \Delta Y_{i,t} = \alpha + \beta_{1,t} Men_i + \beta_{2,t} Age_i + \beta_{3,t} Educ_i + \beta_{4,t} Rural_i + \upsilon_{i,t}$$

where $\Delta Y_{i,t}$ is an average year on year change in labor market outcome for a cell i and time t in each country. When annual data is used and t=2008, $\Delta Y_{i,2008} = Y_{i,2008} - Y_{i,2007}$. If quarterly data is used, then we use average year on year change, and t=2008, $\Delta Y_{i,2008} = \sum_{q=1}^{4} (Y_{i,2008,q} - Y_{i,2007,q})/4$.

In order to estimate how the great recession changes the effect of each worker characteristics on the trend of outcomes, we estimate the following equation pooling all periods for each country:

$$(2)\quad \begin{aligned} \Delta Y_i = {} & \tilde{\alpha} + \tilde{\beta}_1 Men_i + \tilde{\beta}_2 Age_i + \tilde{\beta}_3 Educ_i + \tilde{\beta}_4 Rural_i \\ & + I(Crisis = 1) \times (\gamma_1 Men_i + \gamma_2 Age_i + \gamma_3 Educ_i + \gamma_4 Rural_i) + \tilde{\upsilon}_i \end{aligned}$$

where $I(Crisis = 1)$ indicates the experience of the recession, that is $t \geq 2009$. Each γ is our coefficient of interest that reflects the change of the relationship between worker characteristics and outcomes. In figures 5 through 9, we plot all γ's for each country and labor market outcomes.

Given the linearity of the equations above, note that estimating γ's from the equation (2) is equivalent to the following equation

$$(3)\quad \tilde{Y}_i = \gamma_0 + \gamma_1 Men_i + \gamma_2 Age_i + \gamma_3 Educ_i + \gamma_4 Rural_i + \tilde{\upsilon}_i$$

where $\tilde{Y}_i = \overline{\Delta Yi} \,|\, (crisis = 1) - \overline{\Delta Y_i} \,|\, (crisis = 0)$. Note that $\overline{\Delta Y_i} \,|\, (crisis = 1)$ is an average of $\Delta Y_{i,t}$ over $t \geq 2009$ and $\overline{\Delta Y_i} \,|\, (crisis = 0)$ is an average of $\Delta Y_{i,t}$ over $t \leq 2008$.

[42] Relatively well educated workers are those who graduated from junior secondary or above, except in Eastern European countries. In these countries, the vast majority of workers attended junior high school. Therefore, well educated workers are those that graduated from high school or college.

Observations are weighted according to the product of the cell's survey weights and the number of observations used to generate the average, when available.[43] The outcomes are the ratio of the employed, unemployed, and non-participants among population, the proportion of unemployed, wage employed, and self employed among the labor force, and hourly wage, hours of work, and monthly earnings for the employed.

We repeat the same exercise of estimation separately by gender, assuming that the effects of demographic characteristics on outcomes may vary by gender. Based on the results for each country separately by gender, Table B2 presents the median of each γ's.

(2) Decompositions

The main outcome of interest is $\left(\Delta emp_t|_{m,post} - \Delta emp_t|_{m,pre}\right) - \left(\Delta emp_t|_{f,post} - \Delta emp_t|_{f,pre}\right)$ where *emp* denotes the employment ratio for each gender (*m, f*) for each time period of pre and post crisis as defined in the text, and $\Delta X_t = X_{t+1} - X_t$ for all variables.

We first examine to what extent the change in employment ratio is explained by changes in employment rate and labor force participation.

$$\Delta emp_t = emp_{t+1} - emp_t$$

$$(A.1)\ \Delta emp_t = \Delta erate_t lfp_{t+1} + erate_t \Delta lfp_t$$

$$(A.2)\ \Delta emp_t = \Delta erate_t lfp_t + erate_{t+1} \Delta lfp_t$$

where $emp, erate,$ and lfp denotes employment ratio, employment rate, and labor force participation, respectively, using $emp_t = erate_t * lfp_t$. Taking an average of equations (A.1) and (A.2) yields

$$(A.3)\ \Delta emp_t = \underbrace{\Delta erate_t \overline{lfp}}_{①} + \underbrace{\overline{erate} \Delta lfp_t}_{②}.$$

The first term is the portion of the change in the employment ratio that is explained by change in employment rate, while the second term is the portion explained by the change in labor force participation. We show this decomposition for each group of gender, age, and education.

We then move on to another type of decomposition exercise, examining differences across groups. We note that the initial level of employment and distribution across sector and status of employment vary by each group.

[43] Weighting by the number of unweighted observations corrects for heteroscedasticity in the dependent variable, which is a cell mean. In countries where the number of unweighted observations is unavailable, we assume they are proportional to the group's population proportion.

Let $s_{it} = \frac{EMP_{it}}{EMP_t}$ be a share of sector *i* for each gender at *t,* where $\sum s_{it} = 1$. The relationship between an employment ratio in each sector and overall employment ratio is

(A.4) $emp_{it} = s_{it} emp_t$

where $emp_{it} = \frac{EMP_{it}}{Pop_t}$, the share of the population employed in sector *i*, and $emp_t = \frac{EMP_t}{Pop_t}$, the employment to population ratio.

The growth rate of overall employment and sector specific employment are denoted by r_t and r_{it}, respectively: $r_t = (emp_{t+1} - emp_t)/emp_t$ and $r_{it} = (emp_{it+1} - emp_{it})/emp_{it}$.

Using an equation (3), the following relationship holds for each gender

$$r_{it} + 1 = \frac{s_{it+1}}{s_{it}}(r_t + 1) \xrightarrow{yields} s_{it}(r_{it} + 1) = s_{it+1}(r_t + 1)$$

Given that $\sum s_{it} = 1$, taking summation in both sides, $\sum_i s_{it}(r_{it} + 1) = \sum_i s_{it+1}(r_t + 1)$, yields

(A.5) $r_t = \sum_i s_{it} r_{it}$

A.5 indicates that the percentage change in the employment to population ratio is equal to the weighted average of each sector's percnetage employment changes, as a share of total employment. The employment change in each period can then be expressed

(A.6) $\Delta emp_t = emp_{t+1} - emp_t = emp_t r_t = emp_t \sum_i s_{it} r_{it}$

Each term represents three factors that combine to explain the difference between groups' employment change: Different initial employment level (emp_t), different sectoral distributions (s_{it}), and different percentage employment changes within each sector (r_{it}).

Since there are three factors whose product is the change in employment, we utilize a Shapley decomposition to examine the contribution of each factor in explaining group disparities. This involves averaging the contribution of each of three factors over 6 unique permutations in which one variable is varied while others are held constant. The first permutation involves first varying initial employment rates (using male values for sectoral distribution and within-sector changes), then varying the sectoral distribution, and finally varying the within-sector percentage employment changes.

For simplicity, the time subscript *t* is omitted and the gender difference is decomposed as

(A.7) $\Delta emp_m - \Delta emp_f =$

$$\underbrace{(emp_m - emp_f)\sum_i s_{im} r_{im}}_{①} + \underbrace{emp_f \sum_i (s_{im} - s_{if}) r_{im}}_{②} + \underbrace{emp_f \sum_i s_{if}(r_{im} - r_{if})}_{③}$$

Then ① is the difference due to the initial employment gap, ② is due to the differences in sectoral distributions, and ③ is due to differences in within sector employment growth rates.

There are a total of six permutations of the decomposition, which are listed below:

(A.6) $\Delta emp_m - \Delta emp_f = emp_m \sum_i s_{im} r_{im} - emp_f \sum_i s_{if} r_{if}$

$$= (emp_m - emp_f) \sum_i s_{im} r_{im} + emp_f \sum_i (s_{im} - s_{if}) r_{im} + emp_f \sum_i s_{if} (r_{im} - r_{if})$$

$$= (emp_m - emp_f) \sum_i s_{im} r_{im} + emp_f \sum_i (s_{im} - s_{if}) r_{if} + emp_f \sum_i s_{im} (r_{im} - r_{if})$$

$$= (emp_m - emp_f) \sum_i s_{if} r_{if} + emp_m \sum_i (s_{im} - s_{if}) r_{if} + emp_m \sum_i s_{im} (r_{im} - r_{if})$$

$$= (emp_m - emp_f) \sum_i s_{if} r_{if} + emp_m \sum_i (s_{im} - s_{if}) r_{im} + emp_m \sum_i s_{if} (r_{im} - r_{if})$$

$$= (emp_m - emp_f) \sum_i s_{if} r_{im} + emp_m \sum_i (s_{im} - s_{if}) r_{im} + emp_f \sum_i s_{if} (r_{im} - r_{if})$$

$$= (emp_m - emp_f) \sum_i s_{im} r_{if} + emp_f \sum_i (s_{im} - s_{if}) r_{if} + emp_m \sum_i s_{im} (r_{im} - r_{if}).$$

For the decomposition exercise in the text, we report the average share for each of the three components of these six equations.