

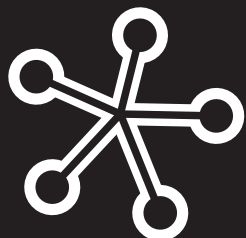


UNIVERSITY OF AMSTERDAM



# Skill-based inequality in job quality

*Haya Stier*

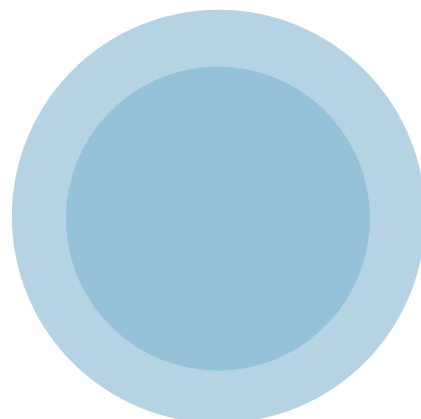
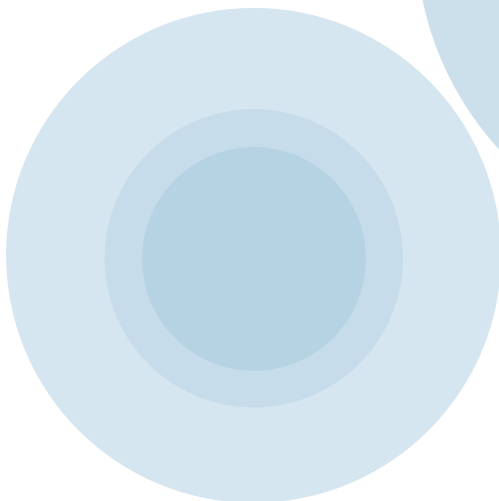
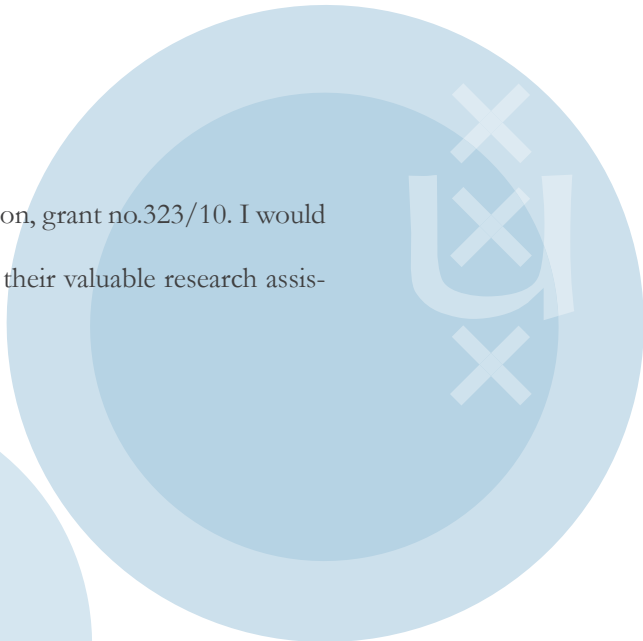


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# **Skill-based inequality in job quality: A multilevel framework**

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# Abstract

This study focuses on skill-based inequality in job quality and the role of social institutions in structuring the relation of skills to job attributes. Four measures of job quality are examined: job security, job achievement, job content and flexibility, and their variation across workers with different level of skills and across countries. The study is based on the 2005 ISSP module on work orientations and encompasses 27 countries. Obtained through multilevel modeling, the findings show that low-skilled workers are disadvantaged in all aspects of job quality. However, skill inequality in the quality of employment depends on countries' characteristics, with declining skill-based inequality in countries at higher levels of technological development and widening skill disparities in times of technological growth and when unemployment is high.

**Keywords:** Job quality; job attributes; skill inequality; institutional arrangements; comparative framework;





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# 1. Introduction

Research on market inequality has concentrated mainly on earnings and occupational positions of individuals and social groups as the main stratifying indicators. Recently more attention has been paid to the quality of employment in a broader sense, in order to understand stratification forces as related to the world of work. Unemployment rates, which were high in the 1970s and 1980s, declined, and the 1990s witnessed a rise in employment rates. This was accompanied, however, by widening wage inequality and a deterioration in work conditions in many countries (Clark, 2005; DiPrete, 2005). The increase in income inequality in most labor markets is attributed to several processes, among which the most pronounced is the rise in knowledge-based technologies that have changed the demand for workers with different levels of skills, and have affected their productivity (Autor, Katz & Krueger, 1998; Howell, 2002; Morris & Western, 1999). The technological transformation, which resulted in growing demand for formal skills (Kalleberg, 2007), was accompanied also by increasing international competition and a general decline in the manufacturing sector (Burtless, 1995). These changes brought about worsening market conditions for workers with low levels of education and skills (e.g., DiPrete et al., 1997; DiPrete, 2002; Sherer, 1996; Gallie, 2007b). Most studies that have examined the impact of new technologies and changes in the organization of work have focused on employment prospects and wage inequalities, as they relate to skill levels (Blank, Danziger & Schoeni, 2006). Relatively few studies have tried to link these changes to other aspects of job quality and to the general perception of workers regarding the attributes of their work.

The quality of jobs is important for understanding the wellbeing of workers and their families. Wages, which economists see as the main indicator of job quality, do not capture all aspects of work, so other measures of job characteristics such as working conditions, health risks or satisfaction with various job features must be considered to gain a better grasp of what makes a “good job” and the root causes of inequality, which have often been overlooked in past research (European Commission, 2008; Munoz de Bustillo et al., 2011). The growing inequality in work conditions has drawn attention to different aspects of job characteristics, including objective and subjective measures of jobs, such as job security, opportunities for skill enhancement and career advancement, job discretion, job satisfaction and, with the growing number of dual-earner families, issues of work-life balance (Clark, 2005; 2009; Handel, 2005; Gallie, 2007a; Green, 2006; European Commission, 2008; Esser & Olsen, 2011).

While many countries have experienced the changes described above, important country differences in employment characteristics are evident. Theoretical arguments (e.g., Gallie, 2007a,b; Hall & Soskice, 2001) as well as empirical evidence highlight differences in employment conditions associated with institutional arrangements, mainly labor market structures and workers' power (Gallie, 2007b; 2009; Esser & Olsen, 2011; European Commission, 2008; Muhlau, 2009). While these studies demonstrate the effect of institutional arrangements on the general level of work quality, they do not relate directly to issues of skill differences in the quality of employment. The current study builds on this prior work by focusing on skill-based inequality in job quality and the role of a country's technological level and other social institutions in structuring the relation of formal skills, obtained through the educational system, to job attributes. Education is a key asset in labor market success and access to high quality employment (Kalleberg, 2007), and its importance is especially pronounced in economies based on highly developed technologies. This paper therefore focuses in particular on workers with lower levels of education or qualifications and how they fare compared to other workers.

## 1.1. The notion of “job quality”

Before embarking on theory and specific research questions, it is important to define the term “job quality”. Studies point to a variety of attributes that together construct the quality of employment. One dimension that has drawn much attention is the extent to which the job allows self-realization and personal development. This is especially important given the changes in the organization of work that lead to deskilling and the separation of the conception of work from its execution (Gallie, 2007a). Other dimensions are job satisfaction, skill utilization, the variety of work tasks, time pressures, opportunities for learning and job autonomy. Another important aspect is the stability of employment (Doeringer & Piore, 1971; Rubery, 1988; Green, 2006) and the contractual status of jobs (Gallie, White, Cheng & Tomlinson, 1998; Rubery et al., 2002). Lastly, with the growing labor force participation of women, the reconciliation of work and family has arisen as an additional dimension of job quality. Gallie (2007a) points out that the literature on job quality rarely focuses on pay, although recent studies do include actual wage and satisfaction with level of earnings among the key indicators of job quality (Clark, 2005; Handel, 2005; Munoz de Bustillo et al., 2011).

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## 1.2. Skill-based inequality in job quality

The labor market position of low-educated workers has deteriorated in recent decades. As several studies show, low-skilled workers are prone to experiencing job insecurity and unemployment (Solga, 2008; Gesthuizen, Solga & Kunster, 2011) and are more likely to be in low status jobs. The increasing significance of skills, especially those acquired through the educational system, is seen as a product of the major technological developments of the last four decades (Powell & Snellman, 2004; Violante, 2008). These developments resulted in a shift from manual to knowledge-based work and have led to a deterioration of job opportunities available to workers with lower education and low skills (Katz & Autor, 1999; Blau & Kahn, 2002; Atkinson, 2003; Tahlin, 2007; Appelbaum, Bernhardt & Murnane, 2003). Today employment growth is highest in high-skilled occupations, which usually demand academic education. Such occupations are characterized by high-paying jobs and good working conditions (Spitz-Oener, 2006). Furthermore, jobs filled in the past by high school graduates have become automated, leading to a further decline in the demand for workers with lower education (Maxwell, 2008). These trends may have increased competition, especially at the bottom of the occupational distribution. This is especially the case under harsh economic conditions, when those with higher education enter low-skilled jobs as their own market prospects deteriorate (Wolbers, De Graaf and Ultee, 2001; Gesthuizen et al., 2011).

The educational expansion evident in most countries brought about a general trend of up-skilling of the entire workforce (e.g., Gallie et al., 1998). However, a closer look at different classes and occupational groups reveals a growing polarization based on skills. While skilled manual and non-manual laborers have benefited from the technological changes, semi-skilled and unskilled workers have not (Tahlin, 2007). Especially important in gaining access to good jobs are formal skills, both because cognitive skills are mostly relevant to the knowledge-based technologies, and because low educational achievements, especially in a context of expanded education, send negative signals to employers (Kalleberg, 2007; Solga, 2002).

In addition, globalization processes have further increased market competition because technological advances foster the transfer of more routine work to countries around the world, creating pressures for a reduction in production costs and higher flexibility in the work process (Appelbaum et al., 2003). These changes, accompanied by the large supply of cheap migrant labor, have mainly affected the demand for less educated workers and their bargaining power, especially in countries where high education is more prevalent. Lastly, these changes have led to the establishment of new work arrangements, which, while allowing

employers to cope with growing competition and providing them with badly needed flexibility, have eroded the postwar contract with labor and increased job insecurity (Rubin, 1995).

Handel (2005) proposes two theoretical views regarding the effect of changes in work characteristics on how workers perceive the quality of their employment. The pessimistic view, which he terms the Neo-Fordist approach, expects the technological and labor market changes to result in a deterioration in job quality, particularly in pay, career opportunities and employment security. The more optimistic Post-Fordist approach argues for an enhancement of job quality, especially in intrinsic characteristics, with the rise in skill requirements and higher involvement of workers in the work process (Handel, 2005). Recent studies, however, have found no conclusive evidence of change in the general quality of jobs, some finding no change at all (e.g., Handel, 2005; OECD, 2001), while others report declining job quality in some respects, with no change or sometimes improved quality in other measures, during the 1990s (Clark, 2005; Green, 2006). These inconclusive findings might suggest that the characteristics of labor markets, including the changes in technology and work arrangements, affect workers with different levels of skills differently, with some (mostly the low-skilled) experiencing a deterioration in job quality while the better skilled enjoy an improvement in work conditions, as outlined by the “post-Fordist” approach. The current study focuses on these skill differences in order to explore the sources of skill inequality in contemporary labor markets.

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## 2. Country variation in job quality and formal skill inequalities

The trends discussed above have been perceived as uniformly affecting all capitalist markets, resulting in a growing polarization of labor market opportunities and outcomes based on education and skills (Blau & Kahn, 2002). However, recent studies suggest that the consequences of technological changes and global processes are more complex and depend on the nature of specific labor markets (e.g., Hall & Soskice, 2001; Gallie, 2007a, b; DiPrete, 2005; DiPrete et al., 2006; Doellgast, Holtgrewe & Deery, 2009). First, labor markets vary substantially in the general level of technological development and in the types of technologies employed (Archibugi & Coco, 2005). This variety also affects the organization of work, the demand for skills and, consequently, the types of jobs available to low-skilled workers. Countries differ as well in their social institutions, especially those related to the labor market and social policy, which in turn affect work conditions for the entire workforce, including those with poorer prospects in the labor market, and the overall inequality in economic and noneconomic rewards (Gallie, 2007a, b; Hall & Soskice, 2001; Gesthuizen et al., 2011). Tahlin (2007), for example, argues that the expansion of the service sector and the demand for non-routine tasks complementary to the new technology have *increased* the demand for low-skilled workers in some labor markets. However, wage reduction and the deterioration of work conditions for low-educated and less-skilled workers have resulted in more competitive markets, while in more rigid markets the same economic conditions have led to higher unemployment rates among this group (DiPrete, 2005; DiPrete et al., 2006). Similarly, while some markets have experienced growing skill-based polarization in job characteristics and work outcomes (Andreß & Lohmann, 2008), others have been able to provide better conditions for all workers (Tahlin, 2007; Gallie, 2003).

Past research has confirmed the effect of unions, market regulations and other institutions and economic conditions on the quality of employment. For example, Pontusson, Rueda and Way (2002) found that high levels of unionization, centralized wage bargaining, and a large public sector reduce inequality by boosting the wages of unskilled workers (for similar findings on union membership, see Clark, 2005; Maxwell, 2008). Other studies emphasize the importance of work contracts (Gallie et al., 1998; Rubery et al., 2002), skill specification, workers' power as indicated by union membership (Esser & Olsen, 2011), unemployment rates (Clark, 2005; Erlinghagen, 2008), and the structure of wages (Blau & Kahn, 1995; Diekhoff et al., 2007).

The current study focuses in particular on the role of technology as it affects skill inequality in several dimensions of job quality. Technology, more than other characteristics at the country level, is closely related to the demand for formal skills and therefore has a direct effect on skill inequality in the quality of employment. As stated above, the shift to knowledge-based technologies increased the demand for highly educated employees, with few opportunities left for low-educated workers. This is both because low-skilled jobs disappeared and because workers with an intermediate level of education who could not enter the highly technical jobs replaced the low-educated workers in jobs that demand a lower level of technological skills (see Gesthuizen et al., 2011). From this point of view, technology is expected to increase the overall quality of employment, but also to increase skill disparities in the quality of employment. However, the effect of technology on employment quality is not entirely clear. Kalleberg (2007), for example, argues that the upgrading of skills in the United States was prevalent in the 1970s, but since then the demand for high-skilled jobs has declined, while more low-skilled jobs have been created to cope with economic downsizing and employers' need for flexibility. Moreover, the shrinking demand for high skills did not meet the expansion of higher education, resulting in the over-qualification of workers. These arguments suggest that it is not only the level of technology but also the rate of technological growth that affects the quality of employment. Accordingly, skill inequality in work conditions may be more pronounced during times of technological expansion, since the demand for high-skilled workers increases, sometimes sharply, allowing for further improvement in their work conditions. In a more stable environment, it is possible to see an improvement in work quality also for workers with a lower level of skills who are able to find better employment opportunities or a shrinking gap in job quality by skills because of declining demand for highly skilled workers.

Since previous studies have emphasized the role of workers' power and the general economic conditions as they affect job quality, the study also controls for union density and the unemployment rate (see, for example, Clark, 2005, Esser & Olsen, 2011; Handel, 2005). I expect that in settings where workers are unionized and have more bargaining power, job quality will be higher than in settings with limited protection for workers. In the former countries wage inequality is much lower, and rules and regulations enhance the work environment for all workers (DiPrete, 2005; Tahlin, 2007; Gallie, 2007a). This claim is supported by studies that have examined job-quality issues as well (e.g., Clark, 2005; Handel, 2005; Doellgast et al., 2009; Edlund & Gronlund, 2008; 2010; Esser & Olsen, 2011). I further expect that under harsh economic conditions, job quality will deteriorate while inequality in work conditions on the basis of skills will increase, specifically due to a decline in job quality for those with low education and qualifications.

## 2.1. Data and Method

The methodology in the current study combines macro- and micro-level research, as it attempts to explain relationships at the individual level embedded in specific institutional contexts. On the micro level, the study is based on the 2005 ISSP module on work orientation, which provides a detailed account of job attributes (<http://www.issp.org>). Data were collected from national probability samples in participating countries, and include detailed information on job values, job characteristics, perceptions and outcomes of job characteristics, as well as extensive background information on participants. The very high quality of comparative attitude data, along with comparative social and demographic information, makes it possible to study job quality by multidimensional as well as specific measures, within and between social contexts. The dataset covers 27 countries for which macro-level data was available: Australia, Belgium (Flanders), Bulgaria, Canada, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Japan, Latvia, New Zealand, Norway, Portugal, Russia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, the United States and the United Kingdom. The study encompasses the working population in each of these countries (a total of 18,000 men and women), as measures of job quality pertain only to those holding a job at the time of the survey. For the macro-level data, I used published reports and statistics of formal international organizations such as the OECD publications, and other international reports as outlined below. The data pertain to the economic and technological characteristics as well as industrial relations of the early 2000s to represent the actual settings faced by workers.

*Variables* – The dependent variable is job quality, for which several job characteristics are considered key indicators (Clark, 2005; Handel, 2005; Gallie, 2003; 2007a). Four measures of different aspects of the jobs were examined in this study: job security, job achievement, job content, and job flexibility. Job security was measured in extrapolation from respondents' answers to the following question:

*To what extent, if at all, do you worry about the possibility of losing your job?* (Answers were recoded to range from (1) I don't worry at all, to (4) I worry a great deal.)

I used perceived characteristics of the current job to build a multifaceted concept of job quality. These included quality of pay, promotion prospects, job autonomy, whether the job is interesting, and whether the job enhances skills. Respondents were asked to state to what extent each of the following statements applied to their main job (answers ranged from (1) strongly agree, to (5) strongly disagree)

- a) My income is high.
- b) My opportunities for advancement are high.
- c) My job is interesting.
- d) I can work independently.
- e) My job gives me a chance to improve my skills.

A preliminary factor analysis (not shown here) including these five items yielded two factors. The first pertains to work rewards termed here as “job achievements”, and includes items a and b ( $r=0.48$ ); and the second factor, which I termed ‘job content’, includes items c through e (*Cronbach’s*  $\alpha=0.68$ ). Two indices were constructed to denote the **achievement** and **content** dimensions, by averaging the relevant items. They are recoded so that each ranges from 1 (low quality) to 5 (high quality).

Lastly, job **flexibility** was measured by applying factor analysis to the information from the following three questions ( $\alpha=0.68$ ):

- 1) Does the respondent decide on the starting and ending time of work?  
(1=employer decides ... 3=respondent decides)
- 2) Does the respondent decide how to organize the daily work?  
(1=respondent is free to decide ... 3=respondent is not free to decide)
- 3) How difficult would it be to take an hour or two off during working hours, to take care of personal or family matters? (1=not difficult at all ... 4=very difficult).

Again, a high score implies a high level of flexibility in work organization (one element of a high quality job).

## 2.2. Independent variables

### Micro-level variables

The main *independent variable* of interest is *formal skill level*, which is measured at the individual level by educational qualifications. The ISSP provides comparable as well as country-specific measures on education, one that refers directly to skill level, and another that indicates years of schooling. This information was used to create a set of dummy variables that differentiate three categories of formal skills: high, intermediate, and low. Based on the distribution of the two educational variables, for six countries – Australia, Ireland, Israel, Japan, New Zealand and Slovenia – low-skilled workers were defined as those with none or very



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low qualifications (categories 1 and 2). In countries where the proportion of workers with no qualifications was high (Germany, Portugal, Spain and the U.K.), the low-skilled were defined as those with no qualification (category 1 in the educational variable). In countries with only a few cases of no/low qualification or no information on the degree indicator, years of schooling were used. Accordingly, the low-skilled were defined as those with up to 10 years of schooling (this group includes Cyprus, Finland, Hungary, Latvia, Russia, Switzerland and South Africa). In the remaining countries (Belgium, Bulgaria, Canada, the Czech republic, Denmark, France, Norway, Sweden and the U.S. ), where very few respondents had less than 10 years of schooling or lower qualifications, the low-skilled included those with less than high school education (up to 11 years of schooling). The segment of high-skilled workers included categories 4 and 5 in the qualification variable (pertaining to post high school and university education) for the Czech republic, Germany, Hungary, Portugal, Slovenia, Spain and South Africa; category 5 (university education) for Canada, Denmark, Finland, France, Ireland, Israel, Japan, New Zealand, Russia, the U.K. and the U.S.; 15 years of schooling or more for Hungary, Portugal, Spain and Switzerland; and 16+ years in the case of Belgium, Latvia, Norway and Sweden. The models controlled for other individual-level characteristics as well: age (measured in years); marital status (1=married, 0=otherwise); employment in the public sector (1); union membership (1); and whether respondent has authority (1). All models pertaining to all employees also controlled for gender. A description of them (means or percentage) is presented in the Appendix, Table A1.

Several indicators were considered for measuring the macro-level characteristics. The technological level of a country, a key indicator in the current study, was based on the ArCo Technological Capabilities Index (Archibugi and Coco, 2004; 2005), which takes into account three dimensions of technology: *innovative activity* (based on patents registration and scientific publications; *technology infrastructure*; and the level of *human capital*. Because it was constructed for two decades (1980-90s; 1990-2000s), I used the earlier time point to denote the level of technological development and the growth rate (in percentage) from the past to the more recent period to capture the technological change.<sup>1</sup> Workers' power was indicated by union density, obtained from Visser (2009), and unemployment rates were used to indicate the economic conditions in a country (OECD publications).<sup>2</sup> The figures pertain to the early 2000s to capture the environment in which respondents work. The correlation between the four variables is relatively low, ranging from .052 between

1 The earlier and more recent indices are highly correlated ( $r=0.94$ ), while there is no correlation between the technological level and the rate of growth (-0.057).

2 Other macro-level characteristics were considered and tested in preliminary analyses. These included measures of wage inequality, market regulations, practices of minimum wage, and GDP. Due to the high correlation of these measures with the ones used in the analyses, and the relatively small number of countries, only a few indicators were eventually used in the models.

union density and the unemployment rate to -0.27 between unemployment and the level of technology. The values of these macro-level variables for each country and the correlation matrix are presented in the Appendix, Table A2.

Method of analysis— the study was based on multilevel modeling to test for micro- and macro-level effects and their interaction. For all measures, regression analysis was used, within the framework of hierarchical linear modeling. As stated above, my main interest is in the effect of skills on job quality at the individual level, and the interaction between skill level and country characteristics (i.e., the macro-level effect on the skill-level slopes). This method makes it possible to test which country characteristics directly affect skill-based inequality in job quality.

### 3. Findings

Table 1 presents the average values of the four quality indicators by skill level. The table shows substantial differences in job quality according to skills (all differences are significant at the 0.05 level), where highly skilled workers enjoy a higher level of job quality on all measures while low-skilled workers have the lowest quality. For example, the differences in job security range between a score of 3.22 for the highly skilled compared to 2.95 for the low-skilled, with intermediate skills in between with 3.09. The same pattern can be seen in job achievement, job content (a gap of around 0.40 in favor of the highly skilled) and flexibility. Workers with an intermediate level of skills are sometimes closer to the low-skilled (e.g., in the case of job flexibility and job achievements), but in other instances (e.g., job security) are somewhat closer to the highly skilled, suggesting that the pattern of skill differences is not entirely linear or consistent across measures.

To test the hypotheses regarding the conditions under which education-based skill inequality narrows (or widens), I next applied the multilevel analysis. My main interest here is in examining the effect of the macro-level indicators on skill inequality in the different measures of job quality. Before moving on to examine these parameter estimates, in Table 2 I present the results of the analysis of variance across the two levels.

Table 2 Variance components of the two-level model, by quality indicators and gender

	Job Security	Job Achievement	Job Content	Job Flexibility
Level 2	0.138	0.036	0.083	0.111
Level 1	0.811	0.820	0.615	0.894
% variation due to level 2	14.5	4.2	11.9	10.9
Skill slope	Chi Square			
Low Skills	50.97*	50.10*	118.34*	37.81 <sup>^</sup>
High Skills	94.73*	68.75*	117.18*	81.82*
<b>Skill slope controlling for individual-level variables</b>				
Low Skills	44.19*	43.89*	82.88*	45.54*
High Skills	58.76*	61.39*	92.22*	77.22*

As Table 2 shows, most of the variation in job quality emerges between individuals. Variation in job achievement at the country level is relatively low (less than 5 percent, but the country effect is significant), while in all other indicators it ranges from 11 to 14.5 percent. The variation in the skill slopes, the main interest of this paper, is significant across countries in all indicators of job quality. Furthermore, as the lower

panel of the table shows, cross-country variation in the effect of skills remains significant even after the inclusion of individual-level covariates. In other words, this analysis suggests a substantial country-variation in skill inequality, which could then be explained by the macro-level indicators.

Table 3 sets out the results for job insecurity, job achievement, job content and job flexibility. For each indicator two columns are presented: the first examines the main effect of the macro-level indicators, controlling for individual-level variables, while the second column presents the interaction between the macro-level indicators and skills. Turning first to skill inequality, the table suggests, as expected, that independent of all individual and country characteristics, highly skilled workers have a clear and significant advantage in all measures of job quality – according to columns 1, 3, 5 and 7 they have higher job security ( $b=0.090$ ), achievements ( $b=0.224$ ), content ( $b=0.154$ ) and job flexibility ( $b=0.242$ ). Low-skilled workers have the lowest quality in all measures. Differences between low- and high-skilled workers (not shown here) were also significant in all measures.

These models also show the effect of the four macro-level variables – the technological development index and technological growth, unemployment rate (to indicate economic difficulties) and union membership (as an indicator of workers' power) – on the general level of job quality. As mentioned above, the general expectation is that higher technological development and technological growth and a higher rate of union density will also be associated with higher quality of employment, while a negative association is expected between work quality and the unemployment level. The expectations regarding a country's level of technology are, by and large, supported by the findings. As can be seen in the main-effect columns, a high level of technological development benefits workers in terms of job security ( $g=1.711$ ), job content ( $g=0.852$ ) and job flexibility ( $g=2.037$ ), with no significant effect only on job achievement. Technological growth increased job quality only in the case of job security ( $g=0.016$ ) and job flexibility ( $g=0.014$ ), but has no effect on the way workers perceive their achievement on the job or its content. Harsh economic conditions, measured by the rate of unemployment, negatively affect only the general perception of job security, but have no effect on other indicators of job quality, indicating that in general workers feel less secure in their jobs when unemployment is high. Union membership is positively associated with two job quality indicators: job security and job achievement. That is, in countries with a high rate of union membership, workers feel higher job security and perceive their jobs as providing better salaries and better opportunities for promotion.

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The main interest of this paper, however, is in the effect of the macro-level characteristics on education-based skill inequality in job quality. These interactions are presented in columns 2, 4, 6 and 8. In these models, macro-level variables entered as both main and interaction effects, therefore the “effect on the intercept” indicates outcomes for workers with an intermediate skill level (the reference group of the skill variable), and the interaction effects (effects on the slopes) pertain to the deviation of each skill group from the main effect. The models contain three of the macro-level variables: the technological development index, technological growth and unemployment rate (to indicate economic difficulties). The measure of union membership was not included in the interaction since preliminary analysis revealed no interaction with skills in any of the quality indicators.

Turning first to the technological level, I expected a growing polarization between workers on the basis of their skills when it is high. This expectation did not gain support. As already seen, technology has no effect on work achievement, and it improves job security and job flexibility for all workers without affecting skill differences in job quality. Only in job content does the technological level affect skill inequality, and not in the expected direction – the gap between workers with different levels of skills narrows with an increase in the level of technology, as the highly skilled have lower quality in their job content compared to those in the middle ( $g=-0.491$ ), while those with low skills have better quality jobs ( $g=0.544$ ). However, above and beyond the level of technological development, the findings depict a growing polarization in job content and job flexibility in countries that experience a high rate of technological growth ( $g=-0.003$  and  $-0.004$ , respectively). This may indicate a process of adaptation to advanced technologies, whereby the work conditions of low-skilled workers deteriorate when labor markets adopt more advanced technologies, but improve later on when the economy stabilizes.

The economic conditions, measured by the rate of unemployment, have a significant effect on skill inequality in three measures of job quality – job achievement, job content and job flexibility. The effect is consistent across these measures, but not entirely in the expected direction. In countries with a higher level of unemployment, the job quality of both the highly skilled and the low-skilled workers declines in comparison to workers with an intermediate level of skills. This decline means that under harsh economic conditions the gap between highly and intermediate skilled workers narrows, with less favorable work conditions for the strongest group in the labor market (the unemployment effect is  $-0.019$  on job achievement,  $-0.016$  (significant only at the 0.09 level) on job content, and  $-0.018$  on job flexibility). At the same time, however, the work conditions of the low-skilled deteriorate as well ( $g=-0.007$  in achievement,  $-0.011$  in job content, and

-.025 in job flexibility). In other words, while inequality is reduced at the top of the distribution, it increases at the bottom, so the jobs of the low-skilled become worse compared to the rest of the labor force.

Table 3. Results of a multilevel regression predicting job quality among employees in 27 countries, ISSP 2005

	Job Security		Job Achievement		Job Content		Job Flexibility	
Intercept	2.978 (0.040)	2.978 (0.041)	2.566 (0.039)	2.568 (0.039)	3.536 (0.047)	3.536 (0.045)	-0.005 (0.046)	-0.004 (0.045)
Female	0.007 (0.018)	0.007 (0.017)	-0.177* (0.012)	-0.178* (0.012)	0.003 (0.019)	0.003 (0.019)	-0.117* (0.020)	-0.117* (0.019)
Low skills	-0.048* (0.022)	-0.048* (0.021)	-0.153* (0.021)	-0.154* (0.018)	-0.170* (0.025)	-0.171* (0.017)	-0.162* (0.024)	-0.157* (0.018)
High skills	0.090* (0.024)	0.090* (0.022)	0.224* (0.028)	0.222* (0.025)	0.154* (0.027)	0.155* (0.024)	0.242* (0.033)	0.240* (0.027)
Age	-0.002* (0.001)	-0.002* (0.001)	-0.009* (0.001)	-0.009* (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.005* (0.001)	0.005* (0.001)
Married	0.067* (0.019)	0.067* (0.019)	0.073* (0.017)	0.072* (0.017)	0.059* (0.011)	0.059* (0.010)	0.046* (0.014)	0.045* (0.014)
Children	-0.050* (0.020)	-0.050* (0.020)	0.011 (0.018)	0.011 (0.018)	0.016 (0.016)	0.016 (0.017)	0.037* (0.017)	0.037* (0.017)
Public	0.111* (0.034)	0.111* (0.034)	0.004 (0.045)	0.004 (0.045)	0.118* (0.018)	0.117* (0.018)	-0.144* (0.033)	-0.144* (0.033)
Authority	0.134* (0.023)	0.133* (0.023)	0.367* (0.029)	0.367* (0.029)	0.271* (0.026)	0.270* (0.026)	0.321* (0.028)	0.321* (0.027)
Union density	-0.059* (0.027)	-0.060* (0.027)	0.036 (0.025)	0.035 (0.026)	-0.013 (0.018)	-0.014 (0.018)	-0.258* (0.026)	-0.259* (0.026)
Hours of work	-0.002* (0.001)	-0.002* (0.001)	0.006* (0.001)	0.006* (0.001)	0.002* (0.001)	0.002* (0.001)	0.001 (0.001)	-0.001 (0.001)
<b>Effect on Intercept</b>								
Tech level	1.711* (0.352)	1.545* (0.399)	0.008 (0.356)	0.041 (0.384)	0.852* (0.327)	1.442* (0.424)	2.037* (0.433)	2.013* (0.422)
Tech growth	0.016* (0.003)	0.016* (0.004)	0.001 (0.002)	0.001 (0.003)	0.001 (0.003)	0.005 (0.003)	0.014* (0.003)	0.014* (0.003)
Unemployment	-0.020* (0.009)	-0.015 (0.014)	-0.011 (0.007)	0.005 (0.009)	0.000 (0.006)	0.007 (0.009)	0.009 (0.010)	0.007 (0.009)
Union density	0.005* (0.001)	0.005* (0.001)	0.003* (0.001)	0.003* (0.001)	-0.002 (0.002)	-0.002 (0.002)	0.002 (0.002)	0.002 (0.003)
<b>Effect on Low Skill slope</b>								
Tech level		0.244 (0.213)		0.230 (0.233)		0.544* (0.164)		-0.094 (0.185)
Tech growth		0.001 (0.002)		-0.002 (0.002)		-0.003* (0.001)		-0.004* (0.001)
Unemployment		-0.003 (0.006)		-0.007* (0.003)		-0.011* (0.003)		-0.025* (0.009)
<b>Effect on High Skill slope</b>								
Tech level		-0.470 (0.278)		-0.199 (0.274)		-0.491* (0.226)		-0.073 (0.205)
Tech growth		-0.001 (0.002)		-0.002 (0.002)		-0.003 (0.002)		-0.002 (0.002)
Unemployment		-0.006 (0.006)		-0.019* (0.007)		-0.016^ (0.009)		-0.018* (0.009)
N (27 countries)	16,000		15,800		16,000		15,800	
X2 Intercept	449.40*	435.08*	402.01*	343.33*	747.97*	650.94*	427.88*	428.23*
X2 Low skills	44.23*	40.05*	43.96*	32.09	82.94*	34.87	45.53*	26.75
X2 High skills	58.81*	52.76*	61.48*	51.01*	92.26*	75.86*	77.09*	61.48*

\*  $p < 0.05$     ^  $p < 0.10$

While the main interest of this paper lies in macro effects on job quality, some individual-level relationships deserve mention. First, there are no significant gender differences in the overall level of job security and job content, but women lag behind men in their achievement and job flexibility. Second, job quality is higher in all measures for married workers and those holding positions of authority. Job security and job content are higher also for public sector employees, but the latter have lower job flexibility than other workers. Job security tends to be lower for older workers, for those who have children at home, for workers who are union members, and for those working long hours. Older workers also have lower job achievements, but those working longer hours perceive their jobs as providing better wages and opportunities for advancement. Longer hours are also associated with better job content. Job flexibility is higher among older workers and among parents, but tends to be lower for union members, probably due to the type of occupations most likely to be unionized.





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## 4. Summary and Conclusions

Skills are important in determining opportunities in the labor market, in terms of both the availability and quality of jobs. In this study I have examined inequality in various employment attributes to ascertain the conditions under which workers with lower formal skills have access to decent employment. I investigated whether workers with low skills, who usually have low wages, suffer from further disadvantages, or if they are compensated by other job attributes such as job security, material rewards, or other aspects of the job such as autonomy, interest, skill enhancement or flexibility in work schedules and the organization of the working day. The findings show that low-skilled workers lag behind those with higher skills in every aspect of their employment. They have lower job security, and their jobs provide fewer opportunities for achievement, worse job content and less flexibility.

However, the findings indicate that inequalities between workers who possess different levels of skills are not uniform across labor markets. In countries at a higher level of technological development, workers usually enjoy better work conditions: their jobs are more secure, and offer better content in terms of autonomy, interest and skill enhancement, and greater control over the organization of the daily tasks. This finding supports the Post-Fordist claim that the upgrading of jobs affects those at the bottom, too (Handel, 2005). Furthermore, a higher level of technological development is associated with narrowing gaps in job content between workers with different levels of skills. This finding means that labor markets in countries with highly developed technologies offer better-quality jobs in terms of interest, autonomy and skill enhancement for the entire labor force, not only those with the skills in high demand. It is important to keep in mind, nonetheless, that this does not mean that low-skilled workers have better job opportunities in the labor market, since the study population includes only those who were employed at the time of the survey.

The level of technology notwithstanding, technological growth also affects the quality of employment. When the economy changes in this respect, workers enjoy better job opportunities as their job security increases. However, at times of technological change, in terms of job content and job flexibility skill-based inequalities widen between the low-skilled and other workers. These findings suggest that technology, in itself, does not necessarily harm the labor market conditions of the less-skilled workers; it is mainly when the economy changes that their work conditions deteriorate. It is possible, as Kalleberg (2007) suggests, that after the economy stabilizes, the skill distinction narrows, either because the highly skilled lose their advantage when the demand for their skills is no longer high, or because more jobs are created for the low-skilled to

accommodate new services and operations associated with new technologies. In other words, technological development may increase inequalities in work conditions in the short run, but in the long run all workers enjoy better working lives. Interestingly, technology had no bearing on job achievement, that is, workers perceive their wages and opportunities for advancement as depending more on their own skills and market position and less on the general structure of production.

The effect of economic stability can also be seen when unemployment rises. The low-skilled suffer under lacking employment. Not only are their employment prospects worse than those who are more qualified (Gesthuisen et al., 2011), but the jobs they do find are of the lowest quality. However, harsh economic conditions also affect the highly skilled who lose many of their advantages in the labor market. Again, the findings suggest that economic instability (either in terms of declining employment opportunities, or at times of change in the structure of employment during the shift to a knowledge-based economy) also results in disparities and harms mainly the low-skilled workers.

To summarize, macro-level characteristics of countries have complex and not necessarily consistent effects on job quality and on inequalities among different groups of workers. There is an important debate in the literature as to whether the changes occurring in most Western (and non-Western) labor markets have harmed or improved the quality of employment, and whether the effect is similar for all workers (Handel, 2005). The findings of the current study suggest that in general technological developments improve the quality of employment, while economic instability impairs work conditions.

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# Tables

Table 1 Means (standard deviations) of job quality indicators by formal skills, ISSP 2005

	Job Security*	Job Achievement*	Job Content*	Job Flexibility*
High skills*	3.22 (0.91)	2.90 (0.93)	3.92 (0.76)	0.23 (1.01)
Intermediate Skills	3.09 (0.96)	2.65 (0.91)	3.71 (0.82)	-0.03 (0.98)
Low skills	2.95 (1.02)	2.49 (0.90)	3.52 (0.88)	-0.16 (0.99)
N				

\*Differences between each pair are significant at the 0.05 level.





## Appendix Table A1 Descriptive statistics for independent variables at the individual level

	Mean or % (Standard error)
% Females	51%
Age	41.01 (11.91)
Married	62%
Children	46%
Public sector	34%
% with authority	30%
% union members	35%
Work hours	39.49 (11.27)
N	18,000

Source: ISSP 2005.

# Appendix Table A2 Macro-level variables by country

	Technology Index	% Technological growth (last decade)	Unemployment rate	Union density	Number of respondents
<b>Country</b>					
Australia	0.561	21.9	5.1	22.7	1031
Belgium (Flanders)	0.523	22.7	8.4	53.1	687
Bulgaria	0.435	3.2	10.1	22.4	449
Canada	0.678	9.4	6.8	29.6	512
Cyprus	0.384	14.4	5.3	65.1	467
Czech Republic	0.432	9.9	7.9	21.0	593
Denmark	0.584	20.6	4.8	71.7	993
Finland	0.614	35.2	8.4	73.3	643
France	0.499	21.0	8.8	7.8	989
Germany	0.593	15.0	11.1	22.2	691
Hungary	0.402	16.8	7.2	16.9	390
Ireland	0.450	26.0	4.3	35.5	478
Israel	0.669	12.2	9.0	34.0	523
Japan	0.569	26.8	4.4	19.1	420
Latvia	0.423	3.7	8.7	20.0	594
New Zealand	0.570	13.3	3.7	20.8	720
Norway	0.581	24.6	4.6	55.0	761
Portugal	0.346	30.0	4.6	21.4	889
Russia	0.464	3.4	7.2	59.8	897
Slovenia	0.412	23.1	5.7	40.3	474
South Africa	0.334	11.1	26.4	37.0	735
Spain	0.410	25.8	9.2	15.5	484
Sweden	0.681	27.2	7.7	78.1	778
Switzerland	0.735	8.7	4.4	19.5	592
Taiwan	0.436	52.6	4.1	20.9*	1008
United Kingdom	0.562	19.8	4.6	29.5	406
United States	0.663	12.6	5.1	12.0	845
<b>Correlation matrix</b>					
Technology		-0.057	-0.269	0.267	
Technology growth			-0.271	0.054	
Unemployment				0.052	

Sources: Technology and technological growth obtained from Archibugi and Coco 2005; Unemployment – OECD 2001; Union density – Visser 2009.

\*Data for Taiwan obtained from Chen, ko and Lawler, (2003).

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