Employment Strategy Papers

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ISBN 92-2-118283-5 (print)
ISBN 92-2-118284-3 (web pdf)

Acknowledgements

Special thanks are owed to Marie-Thérèse Dupré who provided enormous support with the ILO's October Inquiry Database, and Sara Elder who provided substantial comments on the initial draft of the paper. Darjusch Tafreschi provided statistical assistance with the SEGREGAT database. Malte Luebker, Nomaan Majid and Catherine Saget provided very useful comments on earlier versions of the paper. Finally thanks to the entire EMP/TRENDS team for their support and comments on the final draft version of this paper. All remaining errors are solely those of the authors.

Preface

This paper fills a void in the literature by providing an empirical analysis of intra- and inter-country wage inequality. There are in fact very few empirical studies comparing wages and earnings across countries in different regions, mainly because of the limited amount of comparable information and methodological data. Wage and earning indicators tend to be developed based on country- (or region-) specific criteria that are not always comparable.

The few recent empirical studies available at the cross country level show the existence of rising inequality in wages and earnings. In many high- and low/middle-income countries, the wages of high-skilled workers have increased, while those of low-skilled workers have grown relatively more slowly, fallen or remained stagnant.

Using the most recent wage and earning indicators at the occupational level from the ILO's KILM 4th Edition database, this paper shows the recent trends in low- and high-skilled occupational wages across countries, discusses the impact of globalization on wages and analyses the trends in gender equality in pay.

The paper's results show that between 1990 and 2000 there are clear differences in wage growth across occupational groupings. Wages increased faster in high-skilled occupations than in low-skilled occupations for both developed and developing countries. Although these findings do not show a deterioration of the wage position for low-skilled workers in any of these countries, they do suggest widening wage inequality between high- and low-skilled workers during the 1990s.

In light of increased trade and foreign direct investment, these findings might seem contrary since, theoretically, globalization should favour unskilled workers in developing economies by increasing the countries' comparative advantage in the world market (and thus the relative wages of low-skilled workers). Part of the reason for our results may be due to the surplus of labour in developing economies, whereby the initial impact from globalization may be to bring previously underemployed or unemployed people into the formal labour market, which diminishes the growth of wages in low-skilled occupations. An additional reason could be due to latent complementarities in developing economies, where growth in higher skilled complementary industries can increase the demand for workers with higher technical skills.

The analysis also shows that in the majority of countries with available data there have also been strong gains in female wages. But, the average male wage is still higher than the average female wage in practically all countries, leading to a high and entrenched gender gap in most country cases. An analysis of the factors contributing to the gender pay gap finds that women are more highly segregated in low-skilled occupations than are their male counterparts. In addition, in regions where the gender pay gap is highest, women are less represented in the labour market.

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1. Introduction

Since the 1980s, evidence from cross-country studies has shown the existence of rising inequality in wages and earnings. In many high- and low/middle-income countries, the wages of high-skilled workers have increased, while those of low-skilled workers have grown relatively more slowly, fallen or remained stagnant. For example, in the United States, real earnings of low-wage workers have fallen while the earnings of high-wage workers have grown significantly. In Latin America and much of Asia, the same scenario exists. In much of Europe (with the exception of the United Kingdom), where wage-setting institutions are more centralized, the deteriorating position of low-skilled workers is exemplified more through rising unemployment than growing wage gaps.

In addition, the gap in wages and earnings between men and women remains entrenched in many countries. In the EU Member States the gender gap in pay was 15 per cent in 2003.[1] In many countries in Asia and the Middle East and North Africa, the gap was upwards of 40 per cent in some sectors.[2] Even within the same occupations the wages and earnings of women tend to be less than those of their male counterparts.

Wages and earnings constitute a large share of total income in many countries; therefore, wage/earning inequality can be held responsible for much of the inequality that exists in wealth, consumption, healthcare and other well-being indicators associated with income. Also, since households with the lowest wages and earnings generally fall among the poorest households within a country, deteriorating wages and earnings will only further exacerbate their already fragile economic situations.

There has been a growing debate regarding the extent to which workers have benefited from recent trends in the global economy. Particularly the extent to which any gains from globalization, in the form of trade and foreign direct investment, have been passed on to workers in the form of more employment and improved wages and earnings is questionable; rather globalization has been blamed for the deteriorating position of low-skilled workers globally.

Using wage rates and earning indicators at the occupational level from the ILO's KILM 4th Edition database, this paper will discuss the recent trends in wages and wage inequality across countries. It will also discuss the impact of globalization on wages and analyse the trends in gender equity in pay within occupations and sectors.

Part two of this section will discuss the background context of rising wage inequality across countries and follow with a literature review of recent studies on occupational wages in part three. Part four will provide more detail on the wage rates and earning indicators used in the analysis. Parts five and six will provide an analysis of wage trends making comparisons across broad categories (e.g. by high- and low-skilled occupations, and by gender) and finally, part seven will draw the section's conclusions.

[1] Eurostat estimate 2003 (European Commission, 2005).
[2] Author's calculations based on KILM 15.

2. Background context

There has been a global trend towards rising wage inequality. Rising wage inequality has been witnessed not only between workers of different skills but also among workers with the same skills.

The evidence of rising wage inequality in the OECD countries is most pronounced in the US. In the US, low-skilled workers have witnessed an actual decline in their wages, and this has widened the gap between high and low-skilled workers. Even among workers in the same occupation and with the same years of schooling and age, higher paid workers in the US. have seen larger increases in their wages than lower paid workers. In Europe wage growth has been more equitable. Although in the UK and Sweden the wage gap between high and low-skilled workers has also widened, over the last 5 or 10 years Finland and Germany actually witnessed a decline in the wage gap between high and low-skilled workers (Slaughter, 1999).

These trends in wage inequality are not limited to the developed economies. In many of the developing economies there has also been a widening of the gap between low and high-skilled workers. In many economies in Latin America, for example, real wage growth has been stagnating over the past 15 years. Although there have been recent improvements in wages in Brazil and Argentina, real manufacturing wages continue to be below 1990 levels in Argentina, where they are 0.5 per cent below 1990 levels, Paraguay, (93 per cent below), Uruguay (78.5 per cent below) and Venezuela (61 per cent below) (International Labour Office, 2005).

In addition, the literature suggests that following trade liberalization policies of the late 1980s, that there was a change in the wage structure in many economies of Latin America. For example, between 1986 and 1990 wage dispersion in Mexico increased between high and low-skilled workers in all sectors of the economy, but was greater in tradeable than non-tradeable industries (Feliciano, 2001). Hanson and Harrison (1999) also document a rising skill premium after liberalization in Mexico's manufacturing sector, whereby the wages of white collar workers increased relative to their blue collar counterparts. The ratio of white collar to blue collar workers increased from 1.93 to 2.55 between 1984 to 1990, attributable to both an increase in white collar wages of 13.4 per cent and a decrease in blue collar wages of 14 per cent over the same period.

In Colombia, Attanasio, Goldberg, and Pavcnik (2004) find a skill premium of 20 per cent between 1990 and 1998. But they also find that the skill premium alone cannot explain the dispersion in wages. They find that inequality has increased in all educational groups, most notably among the university educated.

In the Asian and Pacific Region, except for a few countries in East Asia, there has also been a general trend towards a widening of the wage gap between skilled and unskilled workers. Evidence from India shows from that earnings inequality rose among regular workers between the early 1980s and late 1990s (Vasudeva-Dutta, 2005); among workers in the manufacturing sector (Galbraith, Chowdury and Shrivastava, 2004); among

university-educated workers and those with a lower secondary qualification in Taiwan, China in the 1990s (Vere, 2005); and among university-educated workers and those in the same age group with only a primary education in Hong Kong, China between 1985-92 (Fan and Cheung, 2004).

Reasons for rising wage inequality in the developed economies have been attributed to skilled-biased technological changes, increased trade with developing countries and increased immigration of low-skilled workers. Increased skilled-biased technological changes have increased the demand for high-skilled labour; while on the supply side immigration and trade have increased the supply of low-waged workers in the world market. Other factors impacting on rising wage inequality, particularly in developing countries are industry wage premiums (resulting from changes in trade policy that favour workers in those industries), and the increasing size of the informal economy (which generally has lower wages and worse working conditions) that has followed trade liberalization, and shortage of high-skilled workers.

Because trade liberalization is regarded as one of the factors of rising wage inequality in both developing and developed economies it is worth taking a look at this issue in more detail. The following section offers a global perspective on rising wage inequality linking it not only with trade, but foreign direct investment (FDI) – two broad indicators of globalization.

3. Literature review on globalization and wage inequality

There are actually very few studies comparing wage rates and earnings across countries in different regions mainly because of the limited amount of comparable information and methodological data. Wage and earning indicators tend to be developed based on country- (or region-) specific criteria that are not always comparable.[3] For example, there are differences between concepts (definition of wage rates and earnings), time units (hourly, weekly), and data sources and methods of collection (household or establishment survey, administrative records) across countries. One of the few studies analysing global wage trends is that of (Freeman & Oostendorp, 2001) who also developed the Occupational Wages around the World (OWW) data file. The OWW data file is basically a standardization of the data contained in the ILO's October Inquiry (as described in box 1) and contains occupational wages in 159 occupations, across over 158 countries from 1983 to 2004.

In their analysis of wages across countries, Freeman and Oostendorp find that, while wage dispersion is inversely related to development across countries (i.e. the more developed the country, the less income inequality exists),[4] within the same country,

[3] In KILM 16 real wage rates are defined as basic wages and salaries / or basic remuneration; while real earnings include some elements of remuneration that are not counted as part of wage rates such as commissions, overtime, bonuses, gratuities and pay for time not worked. In practice there is often little choice but to accept whatever information is available from national sources. Therefore, the term "wages" will be used hereafter to refer to both wage rates and earnings unless otherwise noted.

[4] This conclusion is more or less backed up by the analysis of the relationship between GDP per capita and the Gini index in figure 20c of the KILM 20 manuscript. However, the findings of Freeman and

growth in GDP per capita only slightly reduces inequality of wages. Although these results may seem at odds, one explanation put forth by the authors is that institutional differences between high-income and low-income countries may be a factor. Institutional factors present in economies with high levels of GDP per capita, such as the type of government and the strength of trade unions, might help to explain why gains in GDP within a low-income country may not improve wage inequality.[5] Later studies using the OWW data file follow up on this analysis and focus more on the factors impacting wages and their dispersion across countries, citing particularly globalization in the form of trade and foreign direct investment (FDI). These studies find that in general the impact of globalization on wages:

1. shows a U-type relationship whereby globalization initially has a negative impact on wages, but this effect dissipates over time and eventually the impact of globalization on wages becomes positive;
2. is biased towards high-skilled occupations and has lesser impact on the unskilled and the poor; and
3. has narrowed the gender gap, particularly in low-skilled occupations.

One such finding from Freeman, Oostendorp, and Rama (2001) shows that over time wages grow faster in countries that are more open to trade and FDI. Initially there are negative impacts of trade on wages, but this impact turns positive over time; while FDI has an initially positive impact on wages, but this positive impact diminishes over time. Thus, the authors suggest that two variables are complementary in the sense that FDI can help to alleviate some of the initial wage losses that might occur due to the liberalization of trade. At the same time, however, if the opening up of the economy fails to attract FDI, wage losses could be considerable.

Majid (2004), which also used data from the OWW database, finds that, at the global level, there is an initial negative impact of globalization on wages, but they tend to recover within three to four years of openness. His findings suggest that in developing economies *both* trade and FDI can initially impact negatively on wages.[6] The initial negative impact on wages could be the result of sectoral demand shifts (as a result of import penetration and a move to more profitable sectors) and/or inflation. In the long-run there may be positive impacts due to increased growth, but this may not result in full-fledged enhancement of real wages due to openness. In addition, he finds that the effects of globalization are considerably better in the developed economies, where wage inequality is less and its recovery faster than in the developing economies.

Oostendorp (2001), as well as figure 20c, also show that there is considerable variation in wage inequality across countries with the *same* level of GDP per capita; for example, in the United States and the United Kingdom there is a high level of wage inequality.

[5] Other studies suggest that wage differences across countries could also be due to firm size (wages in large firms tend to be higher than small firms); workforce composition (e.g. gender composition); differences in job characteristics such as contract type, overtime hours, working conditions and accident rates. See, for example, (European Commission, 2003b), Chapter 3.

[6] In contrast to Freeman, Oostendorp and Rama (in process), which shows the crucial importance of FDI in developing countries for wage gains, Majid (2004)finds that FDI is relatively less important than trade for determining wages in developing countries.

Other studies using the OWW database, such as Rama (2003), find that although globalization in the form of FDI and trade increases wages, these benefits are not distributed equitably and can lead to increased inequality. Globally, the evidence shows that higher skilled workers benefit more from globalization than unskilled workers in terms of increased wages. In addition, there is no direct benefit to the poor (and unskilled) from globalization in terms of increased wages. These findings might seem contrary since, theoretically, globalization should favour unskilled workers in developing economies by increasing the countries' comparative advantage in the world market.[7] However, Rama suggests that, since the initial effects of globalization are on wages that accrue to wage and salaried employees, if the number of wage and salaried employees is small, as is the case in many developing economies (see KILM 3 on status in employment), the initial direct impact on the poor (and unskilled) will be minimal. Other studies have also shown that high-skilled occupations in developing economies can act as a complement for trade in goods produced in low-skilled occupations – causing demand for labour in high-skilled occupations to expand as the result of increased trade. Therefore, if globalization leads to increased employment and wages in the skilled occupations, while having little impact on wages in low-skilled occupation, this can also increase inequality.

Another study by Oostendorp (2004) focuses on the impact of globalization on wages, but from a gender perspective. Using the October Inquiry database, he finds that in developing countries the GPG was found to be 8 per cent lower in low-skilled occupations compared to high-skilled occupations; in developed economies the GPG in low-skilled occupations was 2 per cent lower. In addition, he finds that in low-skilled occupations, globalization (in the form of trade and FDI) has narrowed the GPG in both developed and developing economies, while in high-skilled occupations, it has led to a narrowing of the GPG in developed economies, but a widening of the gap in developing economies.

Theoretically, Oostendorp suggests that globalization should narrow the GPG in certain occupations because increasing competitive pressures make it more costly for individuals and firms to discriminate based on sex. In addition, increasing trade can expand job opportunities for women in export-oriented occupations and lead to other indirect benefits, such as economic growth, improvement in infrastructures and availability of public services that can help to decrease the gender disparities in terms of human capital. At the same time, globalization may increase the gender gap in certain occupations if women are concentrated in the occupations that are adversely impacted by trade, because the lack of demand may weaken the bargaining power of women or may cause women to drop out of the labour force altogether or reduce their working time.

[7] Such assumptions are based on Heckser-Ohlin (comparative advantage stems from different relative factor endowments) and Stopler-Samuelson (international trade lowers the real wage of the scarce factor of production) type theorems.

Box 1. The Occupational Wages around the World data file

In their paper, entitled "The Occupational Wages around the World data file", Freeman and Oostendorp discuss the methodology used to develop a database on wages based on the information contained in the ILO's October Inquiry.

The October Inquiry is a questionnaire that the ILO sends to national governments requesting information on wages in detailed occupations. The coverage of the October Inquiry increased from 18 occupations in 15 countries at the beginning in 1924 to 159 occupations in 158 countries at the end of the twentieth century.

As a result of the expansion, the October Inquiry database is rich with information, but also problematic for the following reasons:

- Countries respond to the ILO's request in inconsistent ways because they report data from a variety of national sources. Consequently, recorded wages in different occupations are sometimes not even comparable in the same country for the same year.
- Countries do not report consistently from year to year. During the 1983-99 period, only five out of 158 countries reported wages every year. Moreover, some countries do not provide national data, choosing to cover only particular regions instead.
- The October Inquiry does not cover all components of earnings (annual bonuses, for example, are missing).
- Even with the ILO's detailed specification of skills, the work performed in a given occupation can vary from one country to another.
- There is a difference in the quality of the data coming from different sources (government agencies, collective agreements, etc.). This is why the ILO deems 15 per cent of the data as being of "poor quality".
- Because of the different ways to report the wages (minimum wage rates, average, prevailing wage by hours, days, weeks, months, earnings for men, women, both), only 5.7 per cent of the observations are directly comparable.

Consequently, Freeman and Oostendorp developed a methodology to make the data in the October Inquiry more comparable. They standardized the wage rates of all occupations across countries based on the most common form of data in the Inquiry, the monthly average wage rates for male workers.

How did they standardize the data?
They calculated adjustment coefficients that measure how non-standard forms of data diverge from the standard rate for different countries, occupations and time periods. As an example, consider the change made for "cloth weavers" in China in the 1990 data. The reported mean wage rate was 171 yuan per month for female workers, there was no mean wage rate for males. But using their base calibration, they estimated that female wage rate should be raised to 201 yuan per month to be on the same basis as the monthly average wage rates for male workers. Finally they developed a huge country-occupation-time matrix of wages. Unfortunately, the matrix contains many missing elements that they were not able to replace or estimate.

As a general conclusion, the OWW data file can be considered as a plausible alternative way of standardizing the October Inquiry data because variant standardizations yielded similar results. Nevertheless, this database is not perfect, and one main problem remains: estimating the missing values. Therefore, their conclusions have to be considered with prudence because they are only taking sources from 75,000 observations out of the possible 432,000.

The OWW data file as well as other studies on occupational wages is available from the NBER website at http://www.nber.org/oww/.

Source: (Freeman and Oostendorp, 2001).

The author's findings suggest that in low-skilled occupations where women are generally more highly represented, globalization has helped to improve their wages vis-à-vis their male counterparts. At the same time, there are still significant gender gaps in human capital within the high-skilled occupations in developing economies, such that any increased demand for high-skilled labour will disproportionately favour male workers, leading to larger GPGs.

4. Global wage trends across occupations

This section examines the trend in wages and earnings across countries and occupations since the 1990s, focusing specifically on whether certain occupations witnessed increases in wages and if these occupations were the same across countries.

Nominal wages and earnings data are taken from KILM 16, which reports data across 19 occupations between the years 1980 and 2003 in the KILM 4th Edition.[8] These 19 specific occupations and their correspondent wages and earnings data are extracted from the October Inquiry based on four strict selection criteria: reliability, comparability, geographical coverage and availability of data by sex. All efforts are made to ensure within country as well as cross country comparability between occupations. But, in spite of the strict criteria for selecting occupations to include in the KILM 16, the data extracted still require "cleaning" in order to address some of the problems inherent in the October Inquiry. Thus, the following steps were taken to better harmonize the nominal occupational wages:

- Countries reporting minimum or maximum wage rates for occupations are excluded from the database.
- Double reporting of wages and earnings were eliminated.
- Erratic movements were investigated for incorrect reporting, adverse price fluctuations and currency changes.
- Reporting periods were standardized (e.g weekly, monthly, yearly).
- Estimates based on large cities are minimized.

In KILM 16, real wages are defined as basic wages and salaries or basic remuneration; while real earnings include some elements of remuneration that are not counted as part of wage rates, such as commissions, overtime, bonuses, gratuities and pay for time not worked. The most appropriate indicator to use for analysis would, theoretically, depend on the specific questions being explored; in practice, however, one must often accept whatever information is available from national sources. Therefore, the term "wages" will be used hereafter to refer to both wage rates and earnings, unless otherwise noted.

[8] The occupational wage and earning indicators (KILM 16) are based on information extracted from the ILO's October Inquiry, which contains data on wages, earnings and hours of work in 159 different occupations and over 158 countries from 1983-2004. For further information on the October Inquiry see KILM 16.

Comparability across countries was maximized by converting nominal wages into US dollars using constant value consumption purchasing power parities (PPPs). The constant value consumption PPPs take into consideration both the exchange rate *and* price changes. They are based on the prices of a basket of consumption goods specific to each country, which allows comparisons of the standard of living in each country relative to the United States in a specific base year (in this case 1996). Thus, PPP consumption wages are a better indicator of the standard of living than wages, based simply on exchange rate conversions to US dollars (which better reflect competitiveness).[9] Additionally, because they take into consideration the relative prices in the country, real wages based on PPPs give higher wage rates than those based on exchange rates. The real wages in PPP dollars were calculated as follows:

(1) PPW = NW / CPPP

(2) CPPP = (PC / 100) *XRAT

Where PPW are wages in PPP, NW are nominal wages, CPPP are consumption PPPs, PC are price level of consumption, and XRAT are exchange rates. The price level of consumption and exchange rate data needed to calculate the consumption PPPs are taken from the Penn World Tables 6.1.[10] Consumption PPPs are more appropriate for transforming wages than using the general PPPs because they omit expenditures for government and investment goods.

In addition, data on average nominal wages in manufacturing are taken from KILM 15, which reports data from 1980 to 2003.[11] In general, wage indicators for manufacturing employees are more widely available than for other sectors of the economy because of the countries' desire to produce a measure of the level of industrial development. Similar to occupational wages and earnings, real manufacturing wages are estimated using consumption PPPs.

In both cases wages were standardized to a common measurement period (i.e. hourly, daily, weekly, monthly) based on working time information that can also found in the October Inquiry. Where no working time information was available, assumptions were made based on standard hours of work.[12]

[9] For further information on the use of PPPs to convert wages, see Majid (2004) and (Oostendorp and Przybyla, 2002).

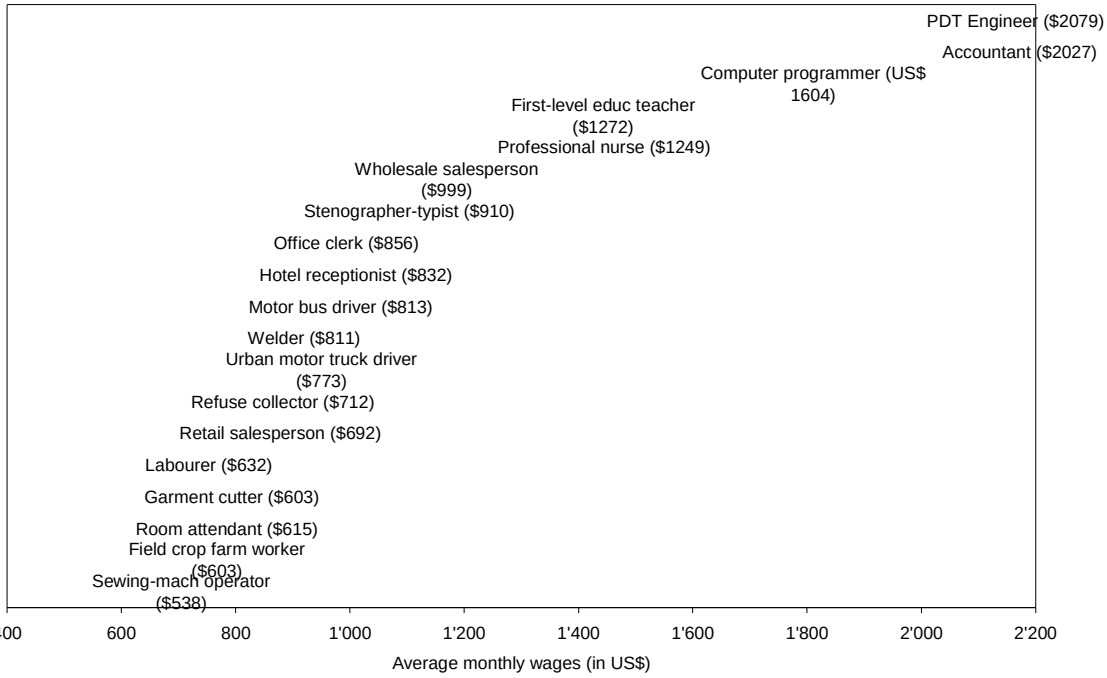
[10] The Penn World Tables are available at http://pwt.econ.upenn.edu/php_site/pwt_index.php. For further discussion of consumption PPPs see the Data Appendix for a Space-Time System of National Accounts: Penn World Table 6.1 (PWT 6.1) at the same link.

[11] The data are extracted from the ILO Database of Labour Statistics (LABORSTA); website: http://laborsta.ilo.org.

[12] Where working hours information is aggregated on a monthly or yearly basis, we estimate reference period wages by dividing yearly wages by 12 months, and monthly wages by 4.333 weeks. It was not possible to standardize the wages and earnings measured per day as it was impossible to determine how many hours per day people worked.

Figure 1 shows the rankings of occupations according to their average monthly wage between the period 1990 to 2000.[13] The full ten-year period was taken into consideration to smooth yearly fluctuations in wage growth that might occur. Based on the average monthly wages, it is evident that there are five occupations (power distribution and transmission (PDT) engineer, accountant, computer programmer, first-level education teacher and professional nurse) with considerably higher monthly wages than the other occupations in the sample. Thus, in spite of the regional differentiation in the sample, the wage premium given for more technically skilled workers prevailed. The average of the monthly wages in these five occupations was more than double the average in the remaining 14 occupations.

Figure 1. Average monthly wages in US$ per month (1996 US$ PPP), 1990-2000



Source: Author's calculations.

Table 1 shows the educational levels and professional qualifications that are expected of a person performing the work in each of the occupations, as described in the International Standard Classification of Occupations (ISCO-88).[14] This prerequisite information suggests that the power distribution and transmission (PDT) engineer, accountant, computer programmer, first-level education teacher and professional nurse occupations require more specialized training and a higher level of education than the other

[13] The occupations in KILM 16 are specific to particular industries and may not represent the wages of similar occupations in other industries. For a full list of occupations and sector designation see box 16a in the manuscript for KILM 16.

[14] (International Labour Office, 1999); see also the Resolution concerning future work on the International Standard Classification of Occupations, adopted by the 17th International Conference of Labour Statisticians, Geneva, December 2003, in which the ILO committed to make available an updated version of ISCO-88 by the end of 2007; website: http://www.ilo.org/public/english/bureau/stat/download/res/futisco.pdf.

14 occupations in the sample. These results are in line with other studies showing that higher wages are generally found within the services sector (where four of the five technical occupations lie). One EU report, for example, found that in the majority of Western, Central and Eastern European countries, average wages in the services sector generally exceed those in industry.[15] The report elaborates that wages are generally above average in financial intermediation industries (occupations such as accountant and computer programmer in banks), but lower than average in manufacturing of textiles (sewing-machine operator and garment cutter) and hotels and restaurants (room attendant). Some of the wage differences in the lower skilled occupations can be attributed to lower levels of productivity as well as higher proportions of female employees (who might work less hours and are generally weaker at negotiating increases in pay than their male counterparts). There was also more inter-occupational wage variation between higher and lower skilled occupations.

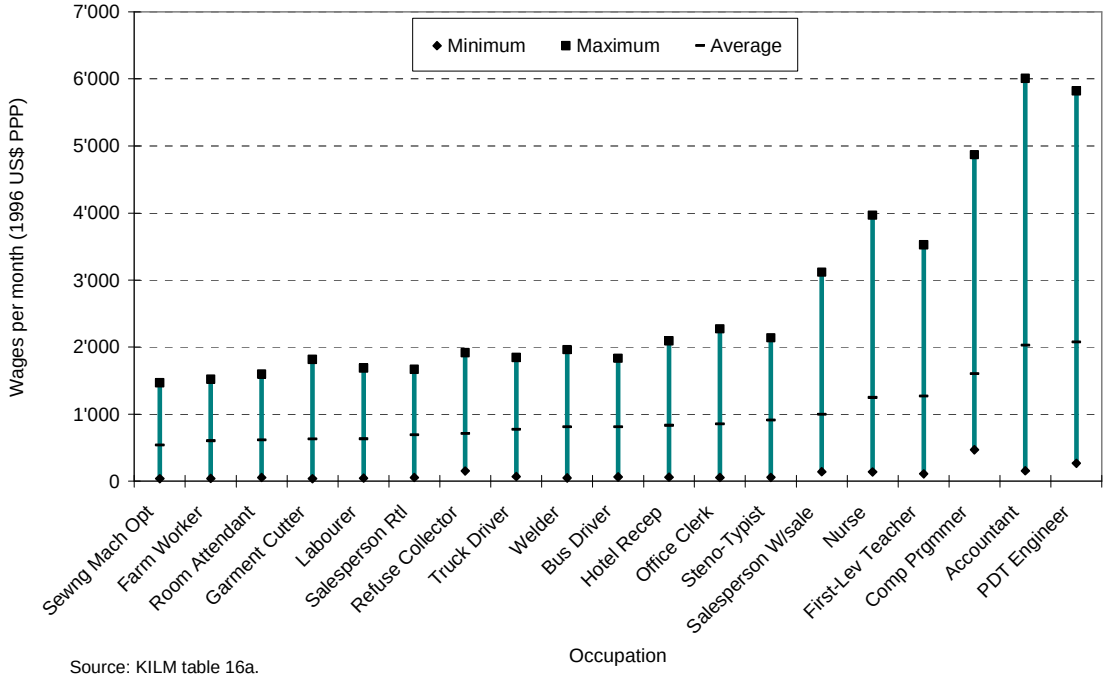
Table 1. ISCO Occupational Skill Levels

Occupation	ISCO skill level
• Accountant • Power distribution and transmission engineer • Computer programmer • First-level education teacher • Professional nurse	4th (University degree required)
• Stenographer-typist • Office clerk • Hotel receptionist • Salesperson (Wholesale) • Salesperson (Retail) • Field crop farm worker • Garment cutter • Sewing-machine operator • Welder • Motor bus driver • Urban motor truck driver	2nd (Secondary education and/or formal training such as on-the-job training and experience, or apprenticeships)
• Labourer	1st (Primary school education)

Figure 2 provides a useful snapshot of the mean as well as the intra- and inter-occupational distribution of monthly wages for all countries.[16] For each occupation the horizontal line in the middle indicates the mean of the sample. The endpoints on the lines indicate the variation in wages within the occupations. The mean and spread vary a great deal between occupations and it is evident that there is more variation in wages in the technically skilled occupations. For example, the variation of wages within garment cutters was less than the spread within the engineering and accounting occupations.

[15] (European Commission, 2003b).
[16] We calculated the mean by region and found similar rankings to those shown for all countries.

Figure 2. Intra- and inter-occupational wage differentials, 1990 to 2000



Source: KILM table 16a.

Table 2 displays the actual values for the lower- and upper-limit wages. The wages across countries for garment cutters were between US$37 and US$1,816 per month, while in the engineering occupation the range of wages was between US$266 and US$5,823 per month. Thus, in most parts of the world, wages in the low-skilled occupations tended to be low, as compared to the technical occupations where the variation across countries (in absolute terms) was much greater. At the same time the *relative* intra-occupational wage differences are higher in low-skilled occupations than in high-skilled occupations: the best paid garment cutter earns almost 50 times more than the lowest paid garment cutter; while the best paid engineer earns "only" 22 times that of the lowest paid engineer.

Table 3 shows growth in hourly wages in 1990 and 2000 for five selected occupations. The occupations selected are a mix of the technical and low-skilled occupations. The figures in the table show that between 1990 and 2000 wages increased in accounting and computer programming occupations by 30 per cent and more over the ten-year period for countries with available data. Some of the largest increases were witnessed in Hungary and Mauritius where wages more than doubled.[17] Comparatively, in the motor bus driver, garment cutter and sewing machine operator occupations wages were generally lower and wage growth was much less than in the technical occupations; wage growth was over 30 per cent in only two incidences and declined in a number of cases. From the selected

[17] All figures are measured in PPP as opposed to exchange rates. In developing economies where the cost of living is often much less than in developed economies, the PPP generally gives higher wage rates than those based on exchange rates because it takes into consideration the difference in the cost of living across countries.

occupations in the table it would seem that the technical occupations not only have higher wages, but have also witnessed stronger wage gains in the decade from 1990 to 2000 than in the low-skilled occupations.

Table 2. Lower and upper wage limits by occupation in US$ per month (1996 US$ PPP), 1990-2000

Occupation	Lower wage limit	Upper wage limit
Sewing-machine operator	37	1469
Field crop farm worker	39	1520
Room attendant or chambermaid	54	1597
Garment cutter	37	1816
Labourer	46	1687
Salesperson (retail)	55	1670
Refuse collector	151	1915
Urban motor truck driver	70	1843
Welder	48	1961
Motor bus driver	63	1832
Hotel receptionist	60	2092
Office clerk	55	2273
Stenographer-typist	57	2138
Salesperson (wholesale)	134	3119
Professional nurse	138	3969
First-level education teacher	108	3526
Computer programmer	470	4871
Accountant	155	6010
Power distribution and transmission engineer	267	5823

To examine this trend more closely it is necessary to look at the wage trends across all occupations in the database. One way of doing this is to separate the occupations into two groups based on their average level of wages. The technically skilled group will consist of the five occupations with the highest average wages (PDT engineer, accountant, computer programmer, first-level education teacher and professional nurse), while the low-skilled group will comprise the remaining 14 occupations.

Using the occupation groupings discussed above in countries with comparable data over the period 1990 to 2000, figure 3 shows that there has been stronger growth in wages in the technically skilled occupations than in low-skilled occupations across our sample.[18] Figure 3 shows the growth rate in technical and low-skilled occupations in seven countries at various stages of development. Only in Austria does one find growth in low-skilled occupations outstripping that of technically skilled occupations during the period.

[18] Countries had to have at least two occupations in each of the groups in order to be included in the analysis. The mix of occupations in the low- and high-skilled group remained the same within countries over the period, but between countries the mix of occupations may differ. For example, country A may contain three low-skilled and five high-skilled occupations, while country B may contain 6 low-skilled and 3 high-skilled occupations.

Wage growth in technically skilled occupations was between 15 and 60 per cent, while wage growth in low-skilled occupations was between 0 and 50 per cent. The Czech Republic, Mauritius, Nicaragua and the Philippines had particularly strong wage growth in both high-skilled as well as low-skilled occupations. One of the reasons for this may be because these countries are high traders and trade contributed more to GDP (over 80 per cent) than in Austria, Sri Lanka and Venezuela.

Table 3. Hourly wages and earnings in selected occupations (in 1996 US$ PPP)

Occupation		Austria	Hungary	Nicaragua	Mauritius	U.S.	Mexico	Sri Lanka	Philippines	Venezuela	Czech Rep
		Wages					Earnings				
	1990	13.79	4.48	5.03	13.95	n.a.	n.a.	n.a.	n.a.	3.12	n.a.
Accountant	2000	18.54	10.44	6.63	28.12	19.88	n.a.	3.72	n.a.	5.56	n.a.
	% Change	0.34	1.33	0.32	1.02	n.a.	n.a.	n.a.	n.a.	0.78	n.a.
	1990	11.84	6.57	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.92	5.95
Computer Programmer	2000	15.68	14.98	17.48	n.a.	27.06	6.69	n.a.	n.a.	5.15	9.94
	% Change	0.32	1.28	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.31	0.67
	1990	6.60	3.45	2.34	n.a.	n.a.	n.a.	2.62	2.41	2.44	n.a.
Motor bus driver	2000	8.42	3.77	4.49	n.a.	11.09	3.34	n.a.	2.93	1.53	n.a.
	% Change	0.28	0.09	0.92	n.a.	n.a.	n.a.	n.a.	0.22	-0.37	n.a.
	1990	n.a.	1.95		n.a.	n.a.	n.a.	0.94	n.a.	1.96	3.05
Garment cutter	2000	5.49	2.36	2.33	n.a.	8.98	1.69	1.34	n.a.	1.61	4.15
	% Change	n.a.	0.21	n.a.	n.a.	n.a.	n.a.	0.43	n.a.	-0.18	0.36
	1990	4.05	n.a.	n.a.	n.a.	n.a.	n.a.	1.58	2.22	1.81	n.a.
Sewing-machine operator	2000	5.00	n.a.	1.95	n.a.	7.42	1.69	1.21	2.94	1.34	3.61
	% Change	0.23	n.a.	n.a.	n.a.	n.a.	n.a.	-0.23	0.32	-0.26	n.a.

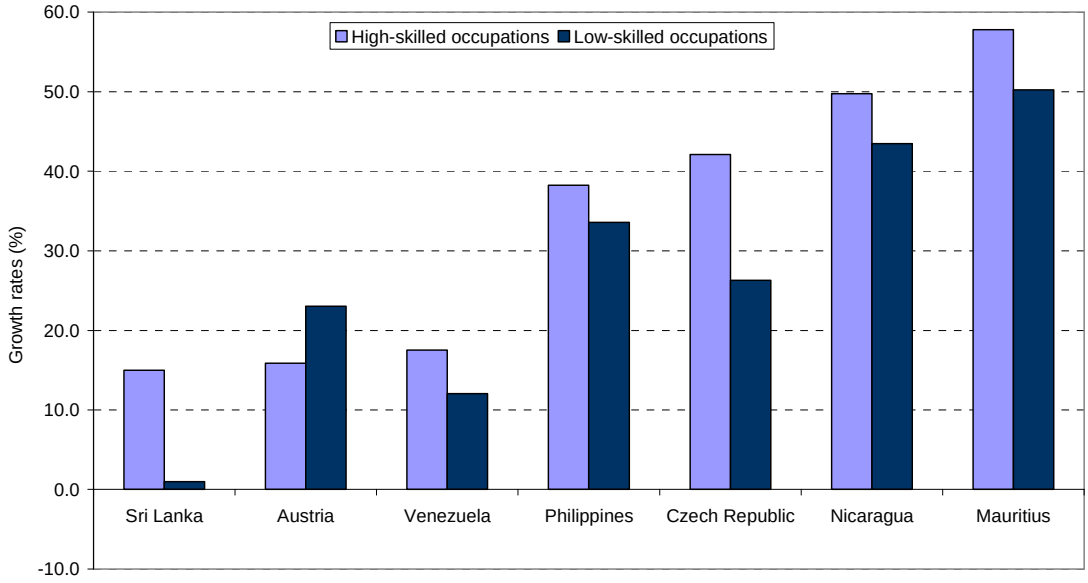
n.a. = Not available.

These findings are also in line with trends in other studies, such as Majid (2004) and Rama (2003) who found that in developing economies the impact of trade on wages in high-skilled occupations has been greater than in the low-skilled occupations. Theory suggests that with increased trade those countries with a comparative advantage in low-wage labour (i.e. developing economies) should have higher wage growth in low-wage occupations than in high-wage occupations. Majid and Rama consider that this might not be the case because of the surplus labour in the developing economies, whereby the initial impact from globalization (and growth) may be to bring previously underemployed or unemployed people into the formal labour market, with no direct effect on wages.

Another reason for the wage premium in high-skilled occupations in developing economies may be the result of growth in complementary industries that require workers with technical skills. For example, if growth in low-skilled industries attracts complementary high-skilled industries then wages in the high-skilled industries may rise

at a faster rate due to the shortage of technical labour in developing economies. In support of this theory, studies have found that only about 7 per cent of the labour force has a university degree in developing economies (McKinsey Global Institute, 2005; verified by the data available in KILM table 14a). Since employment in the high-skilled industries generally requires a university degree or advanced training, the scarcity of university graduates may contribute to a wage premium in the labour market for high-skilled workers.

Figure 3. Wage and earning growth in high- and low-skilled occupations (1996 US$ PPP), 1990-2000, total/combined growth over the period



Notes: Czech Republic and Sri Lanka refer to earnings and all other countries to wages. Venezuela (1990-1998); Philippines (1990-1999); Czech Republic (1993-2000); Nicaragua (1993-2000).
Source: Author's calculations based on KILM tables 16a and 16b.

5. The gender pay gap by sector and occupation

In addition to wage equity across occupations with different skill sets, another important issue is the equity within occupations between the sexes. This section focuses on gender equality within occupations in terms of pay. The *gender pay gap* (GPG) is considered to be one of the most important structural indicators in the analysis of the discrepancies between the position of men and women in the labour market. It is defined as the ratio of the average gross hourly wage rates (or earnings) of female and male paid employees across occupations in a given country and year.

The main challenge in determining the GPG is to make a distinction between discrepancies in female and male wages resulting from different labour market characteristics (skills, education, participation rates, etc.) and indirect or direct wage

discrimination due specifically to gender.[19] For this reason using the occupational wages database can be useful and provide a more accurate reflection of the gap in wages between men and women than indicators at the more aggregate level, particularly if one assumes that males and females in the same occupation possess similar labour market characteristics. This can, of course, also be a strong assumption because men and women in the same occupation may indeed have dissimilarities that account for the differences in pay. For example, if females earn lower wages in a particular occupation, due to less tenure than their male counterparts, then the gender wage gap can be attributed more to different labour market characteristics than direct discrimination. Thus, care must be taken in analysing the indicators until more reliable information on the labour characteristics of male and female workers within occupations is available.

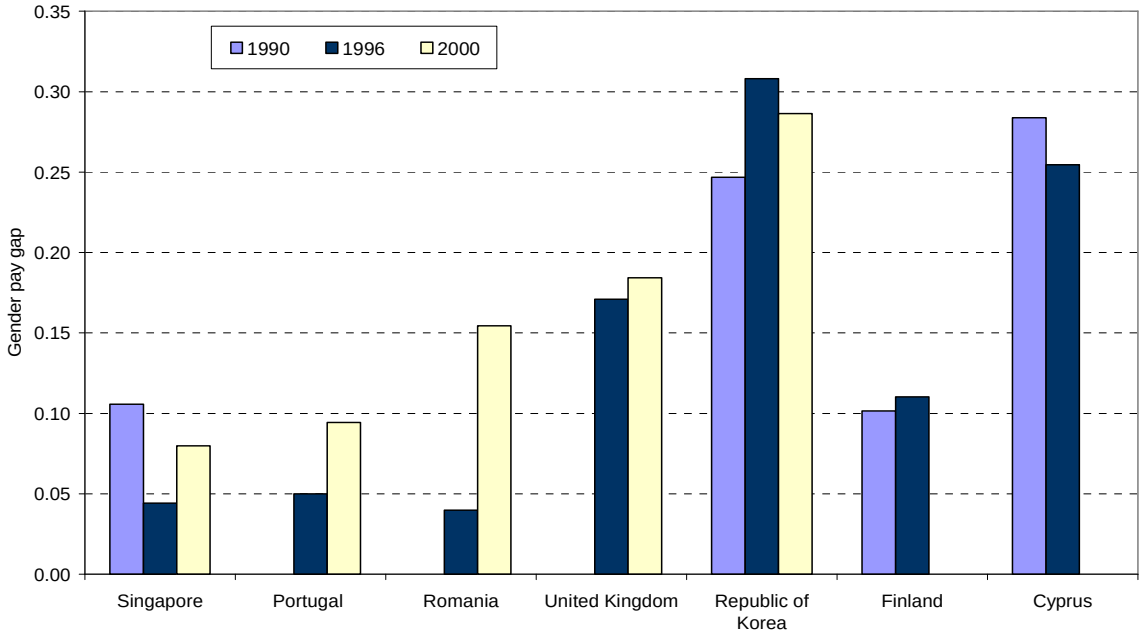
In the analysis, the gender pay gap is measured as:

$$GPG = 1 - \sum ((FPPW/MPPW)/n)$$

Where FPPW and MPPW are the female and male wages in PPP and *n* is the number of observations in the sample. The equation calculates the average ratio of female to male wages across occupations, by country and year. Using this methodology a gap of 0 represents complete wage equality between male and female wages; as the gap increases between 0 and 1, the less are female wages relative to male wages. For example a 15 per cent gender wage gap means that females earn 15 per cent more than their male counterparts, or alternatively female wages are only 85 per cent of their male counterparts. Figures 4 and 5 show the gender wage gap in various years using the occupational groupings described in the previous section.

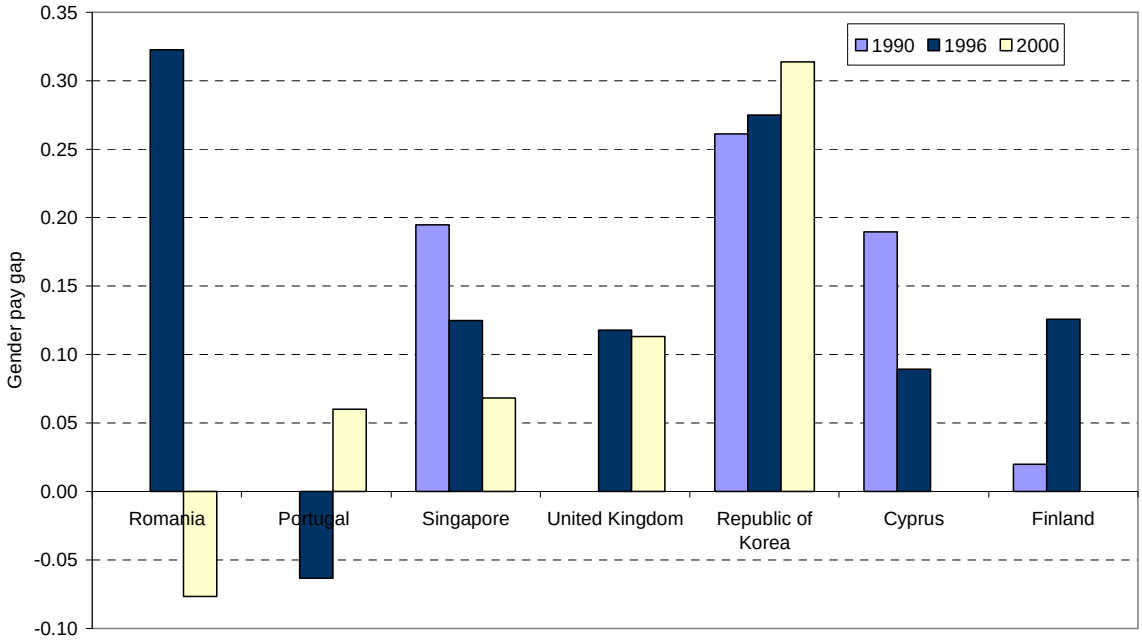
[19] Indirect discrimination includes institutional settings, pay policies or social norms, which could contribute to a difference in female and male wages. Direct discrimination refers to a situation in which women and men with similar education, skills and work experience receive different wages for the same job position.

Figure 4. Gender pay gap in low-skilled craft occupations, 1990, 1996 and 2000



Source: Author's calculations based on KILM tables 16a and 16b.

Figure 5. Gender pay gap in high-skilled technical occupations, 1990, 1996 and 2000



Source: Author's calculations based on KILM tables

From the figures above it can be seen that those countries with a higher relative GPG in low-skilled occupations also had a high gender gap in the high-skilled occupations. However, in terms of the most recent year of data (2000), the majority of countries had a

higher GPG in the low-skilled than the high-skilled occupations. In addition, in a number of countries the gap was shown to be increasing. These findings are at odds with some other studies (e.g. Oostendorp, 2004), which find that the GPG in low-skilled occupations has been declining; while the pay gap in high-skilled occupations has been increasing. However, when one considers that the countries experiencing increases in the GPG in figure 4 are European, the results seem more plausible.

The European Commission recently published findings showing that the pay gap between men and women has remained virtually unchanged at 15 per cent across all sectors (European Commission, 2005). The anaemic wage conditions for women have been attributed to the slowdown in economic growth in the EU and, in particular, the worsening labour market conditions in the new Member States. In addition, even in many European countries, women are still disproportionately employed in sectors where wages are lower and have been declining. For example, in the United Kingdom, 60 per cent of women workers are employed in ten occupations, with the majority concentrated in "the five Cs": caring, cashiering, catering, cleaning and clerical (United Kingdom House of Commons, 2005). Many of these jobs are in smaller non-unionized firms, where women have less bargaining power and less possibility to improve their economic situation vis-à-vis their male counterparts.[20]

The ILO's SEGREGAT database provides detailed statistics on employment by occupation according to the ISCO-88 classification system. Although this database does not correspond directly to the occupational groupings within the October Inquiry, the data do match closely with many of the occupations and are useful for gaining a better understanding of the gender mix within low and high-skilled occupations. Comparable data are available for five of the seven countries shown in figures 4 and 5; and of these representative data are available for 17 of the 19 occupations used in our analysis. Table 4 shows the country female-to-male employment ratios by occupation, along with a cross-country weighted average. A ratio greater than 1 means that there is a greater proportion of female workers within the occupation than male workers. The average is a weight (based on share in total employment) of the female-to male employment ratio for Cyprus, Finland, Portugal, the Republic of Korea and the United Kingdom.

The strongly male-dominated occupations are similar across countries; this includes driver, welders, labourers in construction, engineers, computing professionals and garbage collectors. Two of these occupations (computing professionals and engineers) are among the highest paid occupation across all countries (according to table 1), while drivers, welders, and garbage collectors are within the mid-range of pay within the occupations; and. labourers are in the bottom third of pay across all occupations. Among business professionals (includes accountants), salespersons, and hotel housekeepers and restaurant services, there is more diversity across countries in the gender make-up of employees, e.g. in Finland and Portugal a business professional is just as likely (if not

[20] Other studies have found these results to hold in the United Kingdom, in spite of the introduction of the National Minimum Wage (NMW) in 1999, where fully three-quarters of the beneficiaries are women. For example see, (Dickens and Manning, 2003), which finds the impact of the NMW to have closed the average wages between men and women by only 0.5 percentage points between 1998 and 2002.

more) to be female as male; while in Cyprus a hotel housekeeper or restaurant service worker is more likely to be male. The remaining occupations are more strongly female dominated, and employees are at least five times more likely to be female than male within the countries represented. Of these occupations, two (primary teacher and nurse) are among the highest paid occupation across all countries, while garment workers and salespersons are among the lowest paid.

Table 4. Female-to-male employment ratios by occupation, weighted average, 2000

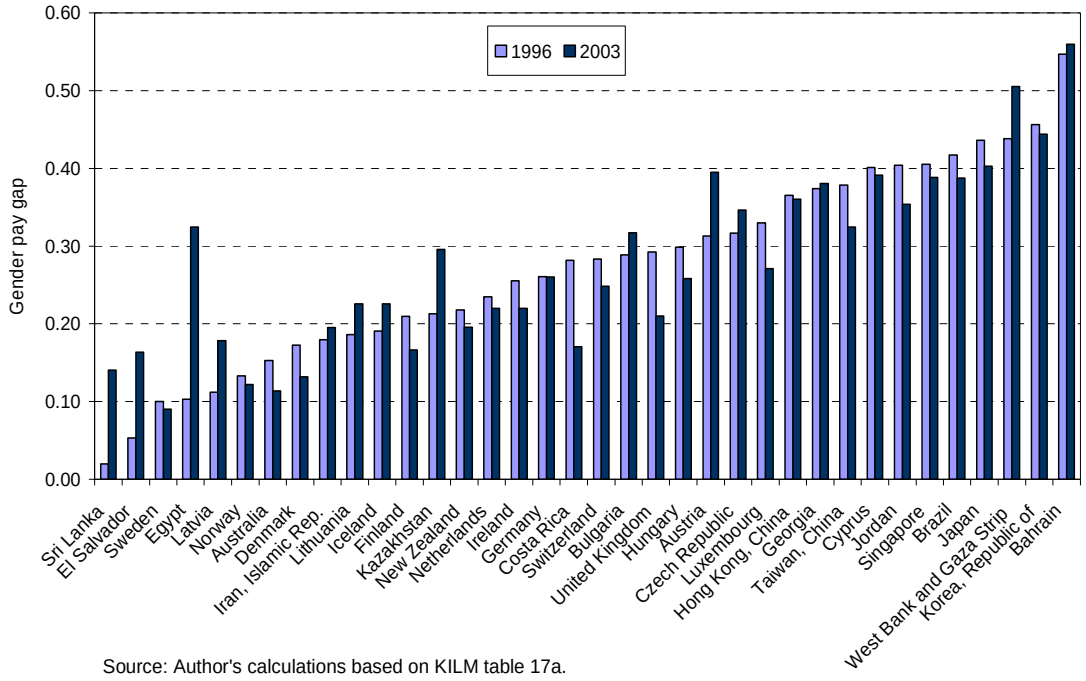
ISCO Classification	Title	Cyprus	Finland	Portugal	UK	Rep of Korea	AVG	Occupational Gender Mix
832	Motor vehicle drivers	0.0	0.0	0.0	0.0	0.0	0.0	
721	Metal moulders, welders and related workers	0.0	0.0	0.0	0.0	0.1	0.0	
931	Mining and construction labourers	0.1	0.1	0.0	0.0	0.1	0.0	
214	Architects, engineers and related	0.2	0.1	0.4	0.1	0.1	0.1	
213	Computing professionals (includes programmers)	0.3	0.3	0.6	0.2	0.27	0.2	***Highly Male Dominated Occupations***
916	Garbage collectors and related labourers	0.0	0.3	0.2	0.0	0.5	0.3	
241	Business professionals (includes accountants)	0.3	1.3	1.0	0.5	0.1	0.5	
522	Shop salespersons and demonstrators	1.0	2.7	1.5	2.4	1.0	1.6	***More Gender Equity***
512	Housekeeping and restaurant service workers	0.7	4.5	2.2	2.1	n.a.	2.2	
233	Primary and pre-primary education teaching	5.2	4.5	n.a.	5.9	4.2	5.2	
743	Textile, garment and related workers	1.0	8.4	12.0	2.0	1.9	5.3	***Highly Female Dominated Occupations***
422	Client information clerks	2.1	16.6	3.3	9.8	2.3	8.2	
411	Secretaries and keyboard operating clerks	13.7	34.9	5.4	11.7	n.a.	13.0	
223	Nursing and midwifery	5.0	19.1	n.a.	10.1	57.8	18.8	

Source: ILO, Laborsta

Gender pay gap at the sectoral level

Given the limited number of countries and observations available at the occupational level, such observations may not be fully representative; therefore analyzing the GPG at the more aggregate level, where more observations are available, would be more appropriate. Comparable data on wages by sex are more widely available for the manufacturing sector. For the period 1996 to 2003, KILM 15 contains data for 36 developed and developing countries. Figure 6 shows the GPG for 1996 and 2003 across countries in the manufacturing sector, based on indicators in KILM 15.

Figure 6. Gender pay gap in manufacturing industries, 1996 and 2003



Source: Author's calculations based on KILM table 17a.

The majority of countries in figure 6 exhibited a decline in the GPG between 1996 and 2003. Noticeable exceptions, however, include countries in the region of Central and Eastern Europe (non-EU) and CIS countries (former transition economies) and new EU Member States where the gender gap has actually increased. The increase is mainly because these countries had very low gender gaps in terms of pay and other labour market characteristics prior to the transition period. The increases in the gender gaps are, therefore, the result of the worsening labour market conditions resulting from the adjustments to a market economy, which have disproportionately impacted on women.[21] In some of the EU countries the GPG was also high and entrenched, but there has been a strong policy effort as part of the Lisbon Strategy (see box 2 below) to improve gender equity in the labour markets and narrow gender gaps in pay by improving the education and training of women in the labour market and eliminating occupational segregation.

[21] For further information, see (Newell & Reilly, 2001).

Box 2. The gender pay gap in the EU

The European Commission recently released a report on equality between women and men in the European labour market. According to EUROSTAT data, the pay gap between women and men in unadjusted form in EU Member States is still very high, 15 per cent in 2003, although there is a 3 per cent decline compared to 1998 figures. In part, this decrease could be explained by the European Union's enlargement in 2004 since the new Member States from the former Soviet bloc have a slightly lower GPG. Despite the general trend of narrowing the GPG between 1998 and 2003, there are six countries (Belgium, Denmark, Finland, Germany, Portugal and Spain), in which it increased, and two (France and Slovakia) in which it stayed the same. A study by the European Commission in 2003 provided information about the pay gap in the different sectors of the economy. In 2000, the GPG was narrower in the public sector (11 per cent) than in the private sector (22 per cent). The most affected groups were the older workers (25 per cent), the high-skilled (22 per cent) and the people with supervisory job status (17 per cent). According to the same study, the major factors contributing to the GPG in the EU are (1) earning differences between women and men with family responsibilities, (2) gender segregation by sectors and occupations, with women being underrepresented in high-paying sectors and occupations, and (3) relatively lower earnings of women in female-dominated sectors and occupations, which are not due to different productivity rates between sectors and occupations.

The EU's long-standing commitment to promote gender equality was further reaffirmed in the Lisbon Agenda, approved by the European Council in March 2000. The Agenda has a special focus on productivity and employment, aiming at the increase of the overall employment to population ratio to 70 per cent and the female employment to population ratio to 60 per cent by 2010. Regarding the difference in female-male wages, all Member States are encouraged to apply a comprehensive policy towards a major reduction in the GPG by 2010 with the objective of its final elimination. Special consideration should be given to issues such as better education and training, employment segregation by sector and occupation, job definitions and payment schemes, as well as more awareness of the gender pay inequality problem among the public.

Source: (European Commission, 2003a;European Commission, 2005).

In general, studies have shown that the GPG is affected by, among other factors, the labour market characteristics of males and females, in particular:

- the composition effect, i.e. differences in the composition of the male and female workforce;
- the remuneration effect, i.e. differences in the pay of men and women with similar characteristics; and
- the selection effect, i.e. differences in the labour market participation behaviour of men and women.[22]

The composition and remuneration effects are normally referred to as "explained" and "unexplained" components of the GPG, respectively. The composition of the workforce in this context means the difference in labour force participation rates of women and men and can plausibly explain some of the differences in GPGs. Differences in pay among males and females of similar characteristics are not as easily explained (thus the term "unexplained") and are often seen as direct forms of discrimination. In an attempt to

[22] (European Commission, 2003a).

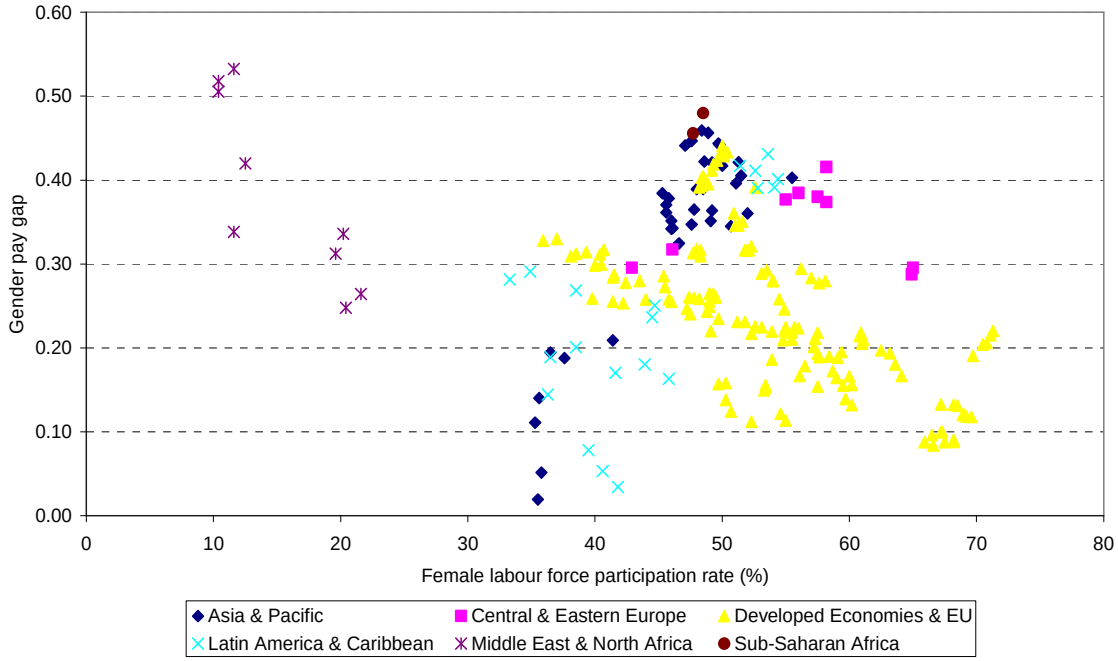
explain the gender gap across the countries shown in figure 6, the relationship between the gender gap and the female unemployment rate, as well as the female labour force participation rate, are further explored. Figures 7 and 8 show these relationships and give an indication of the labour market composition effects on the GPG, which along with the remuneration effect has been shown to comprise the bulk of the explanation for the gap.

In figure 7 there is a very clear negative relationship between the female labour force participation rate and the gender gap. In countries with low female labour force participation rates, such as those in the Middle East and North Africa, the GPG was relatively higher. However, in countries in the Developed Economies and European Union and Central and Eastern Europe where the female labour force participation rate was higher the gender gap in pay was lower. This result is consistent with other studies, which attribute negative correlation between female labour force participation and wages to the "selection effect" – i.e. those women who enter into the labour market tend to have, on average higher education and better work-related skills than women outside the labour market, thus improving their chances for higher wages.[23]

In figure 8 there is a positive relationship between the GPG and the female unemployment rate. This means that at higher levels of female unemployment there is a higher GPG. This relationship, however, does not hold across all regions. In the Asia and Pacific region there was a negative relationship between the GPG and the female unemployment rate. The positive relationship can exist because of the weaker bargaining position of women relative to their male counterparts. When the female unemployment rate is high the bargaining power of women can be even weaker, which will drive down female wages relative to males. At lower levels of unemployment the demand for female labour increases as does their bargaining power and their wages relative to men.

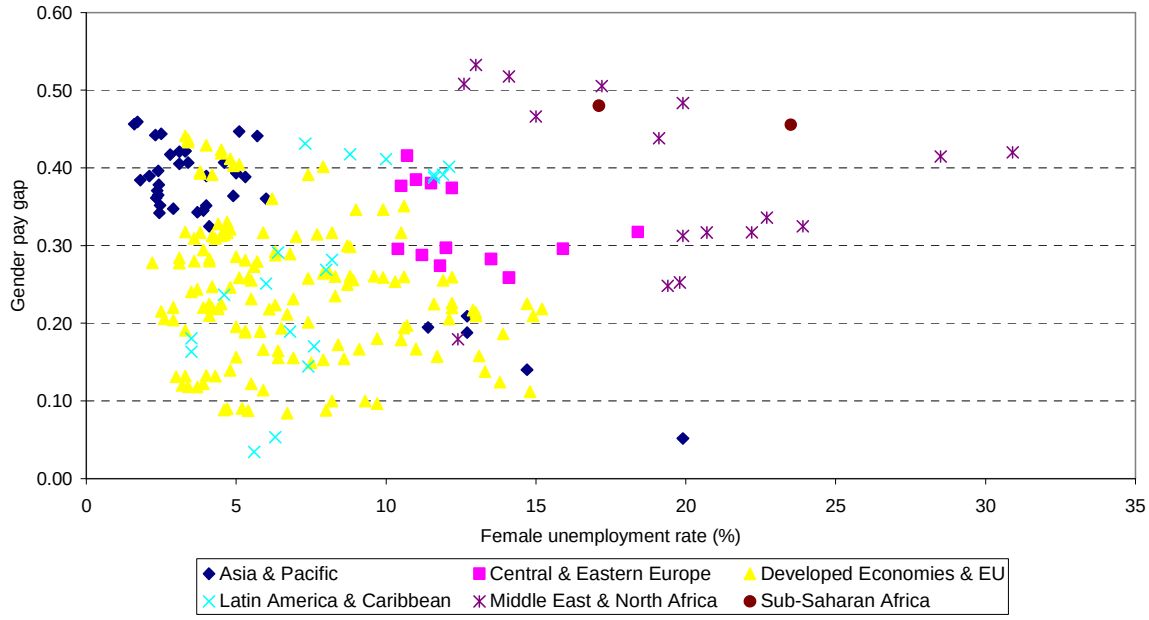
[23] ibid.

Figure 7. Relationship between the gender pay gap and female labour force participation rates



Source: Author's calculations based on KILM tables 16a and 16b (pay gap) and KILM table 1c (flpr).

Figure 8. Relationship between the gender pay gap and female unemployment rates



Source: Author's calculations based on KILM tables 16a and 16b (pay gap) and KILM table 8a (unemployment rate).

To determine the joint impact of the female labour participation rates and female unemployment rate on the GPG, we perform a regression analysis assuming a linear relationship between the dependent and explanatory variables. The equation to be estimated is:

$$GPG_{it} = \alpha + \beta FLPR_{it} + \delta FU_{it} + \lambda \sum_{i=1}^{n} DREG_{it} + \varepsilon_{it}$$

where FLPR is the female labour force participation rate, FU is the female unemployment rate, and DREG are regional dummy variables which capture the effects of regional specific characteristics such as culture, labour market institutions, etc, that may impact on the gender pay gap.

Although these factors do not explain all of the differences in the GPG in the manufacturing sector, they do go some way to understanding some of the causes. Institutional differences, differences in the status of employment (e.g. full-time vs. part-time work), and direct discrimination are other factors that should be explored. For this reason dummy variables are particularly important because they will pick up some of the effects of these missing variables. It should be mentioned; however, that variable selection is influenced by the availability of data for many of developing countries in the sample.

All explanatory variables are taken at the beginning of the relevant time period between 1994 and 2003. The summary statistics for the full sample of 40 countries is shown in Table 5. The summary statistics show that there is significant variability within the sample for both the female labour force participation rate (FLPR) and the female unemployment rate (FU). The highest female labour force participation rate is close to 7 times the minimum rate, while the highest female unemployment rate is about 20 times the minimum value. Given the high maximum value of the unemployment rate and the low mean of the female unemployment rate this suggests that the maximum is somewhat of an outlier and that the majority of values are significantly less than the maximum.

Table 5. Summary statistics

Statistics	**Female labour force participation rate *(FLPR)***	**Female unemployment rate *(FU)***
Mean	50.2	7.9
Standard Deviation	11.2	5.2
Minimum	10.4	1.6
Maximum	71.3	30.9

We first estimate the regression equation using a simple OLS model, including regional dummy variables for Asia and the Pacific; the Middle East and Northern Africa; sub-Saharan Africa; Latin America and the Caribbean and the developed economies and the European Union. The results of running the regression are shown in column two of

table 6. The results show that both female unemployment rates (FU) and female labour force participation (FLPR) have a significant effect on gender pay gaps; however the female unemployment rate is the wrong sign from what we originally predicted. The coefficients measure the change with respect to the gender pay gap, so that a 1 percentage point increase in the female unemployment rate will decrease the gender pay gap by 0.01; while a 1 percentage point increase in the female labour force participation rate will decrease the gender pay gap by 0.004. Both variables are significant at the 1 per cent level. The explanation of the negative sign for the female unemployment rate is quite puzzling; however the impact on the gender pay gap is quite minimal, and this is the case for both variables. In spite of this, the adjusted R^2 shows that 42 per cent of the gender gap can be explained by the variables in the model.

The regional dummies are all significant at the 1 per cent level, with the exception of Middle East and Northern Africa. The values on the coefficients of the regional dummies reflect the differences in the means of the gender pay gaps with respect to the omitted Asia and Pacific region, which allows us to compare the differences across regions. The mean gender pay gap in the developed region is -0.07 less than that in the Asian and Pacific region; while the mean gender pay gap in Latin America, Central and Eastern Europe & CIS and the sub-Saharan African region are 0.08, 0.11 and 0.26 more, respectively.

It must be noted that OLS estimation is biased when using panel data (cross-section time-series) because it does not consider that there exists heterogeneity between countries over the time. Basically, this means that for all 40 countries in the sample a 1 percentage point increase in the female unemployment rate will lead to a decline in the GPG by the same amount, i.e. 0.01. However, if we were to estimate separate country regressions we would obtain different results for each of the countries due to the differences *within* and *between* the countries in the sample. Therefore when estimating a regression using panel data it is better to use a generalized least square (GLS) methodology which takes into consideration the random (between and within) effects. This still allows us to retain the regional dummies, which are important in order to compare the differences across regions. In practice there are tests (e.g. Hausmann specification test) to determine whether to use random or fixed effects regression equation, but given that the purpose of the estimation is to show preliminary results rather than develop the techniques extensively we will assume random effects in the model.

With this in mind, we re-estimated the original equation using a random effects GLS model with dummy variables to capture the regional effects. The results are shown in the third column of table 6. Including the random effects in the model lowers the coefficients on the female unemployment rate and the female labour force participation rate, as well as all the dummy variables. Using the GLS methodology a 1 percentage point increase in the female unemployment rate and the female labour force participation rate both reduce the gender pay gap by 0.003. In addition, the female unemployment rate is now significant at the 5 per cent level. While some of the regional dummy variables have lowered or lost their significance. The adjusted R^2 is slightly reduced at 39 per cent. In

general the GLS model produces slightly lower coefficients and levels of significance, but the direction and impact remain the same.

The results of both models can be seen as preliminary estimates in an attempt to explain how the "selection" and "composition" effects above might impact on the gender pay gap in the manufacturing sector, as mentioned above. Further study is required to include additional variables that are relevant in determining the gender pay gap.

Table 6. Results of OLS and GLS estimation, dependent variable: gender pay gap

Variables	OLS	GLS
intercept	0.6111*** (0.0396)	0.5043*** (0.0717)
FU	-.0092*** (0.0017)	-.0029** (0.0014)
FLPR	-.0045*** (0.0007)	-.0031*** (0.0012)
DMENA	0.0487 (0.0465)	.0172 (0.0731)
DDE	-.0652*** (0.0171)	-.0771** (0.0446)
DLAC	-.0796*** (0.0243)	-.0850 (0.0634)
DCEE	0.1059*** (0.0342)	0.0351 (0.0664)
DSSA	0.2636*** (0.0648)	0.1726* (0.0988)
Adjusted R^2	0.42	0.39
Observations	212	212

Note: Standard errors are in parenthesis
* significant at the 10% level, **significant at the 5% level, ***significant at the 1% level.

6. Conclusions

This section uses the most recent data from the KILM 4th Edition to show that between 1990 and 2000 wages increased faster in high-skilled occupations than in low-skilled occupations (within the seven countries used in the analysis). Although these findings do not show a deterioration of the wage position for low-skilled workers in any of these countries, they do suggest widening wage inequality between high- and low-skilled workers during the 1990s.

The findings here seem to negate the proposition that globalization will lead to a convergence of wages (as discussed in part two). In general, other studies on the impact of globalization on wages found that:

1. There exists a U-type relationship whereby globalization initially has a negative impact on wages, but this dissipates over time and eventually the impact of globalization on wages becomes positive.

The findings of this analysis do not refute the above proposition, i.e. we found evidence of wage growth across all occupations and particularly in those countries with a high portion of GDP dependent on trade. At the same time, the evidence shows that there are clear differences in wage growth across occupational groupings.

2. Wage growth is biased towards high-skilled occupations and has lesser impact on the unskilled and the poor.

The evidence shown in this analysis would lend support to this proposition. In general, we find that high-skilled occupations not only have higher wages, but also witnessed stronger wage gains in the decade from 1990 to 2000, than the low-skilled occupations. Part of the reason for this may be due to the surplus of labour in developing economies, whereby the initial impact from globalization (and growth) may be to bring previously underemployed or unemployed people into the formal labour market, with no direct effect on wages. Another reason could be due to the growth in complementary industries that demand workers with higher technical skills.

3. Globalization has narrowed the gender pay gap, particularly in low-skilled occupations.

The findings of this analysis show that there is evidence of high and widening wage inequality among males and females, particularly in the low-skilled occupations in EU countries. The findings show that some of the increase in the gender gap can be attributed to the slowdown in economic growth in the EU and the worsening labour market conditions in the new Member States. At the same time, many of these low-skilled jobs may be in companies facing competitive pressures to keep wages down and where women have less bargaining power and less possibility to improve their economic situation vis-à-vis their male counterparts.

A further analysis of the factors contributing to the GPG at the sectoral levels finds a clearly negative relationship between the participation rate of women in the labour market and the gender pay gap. For example, in the Middle East and North Africa, where women are less active in the labour market, the gender pay gap was relatively higher than in other regions. In addition, in all regions except Asia, higher levels of female unemployment are associated with a higher gender pay gap. This relationship, however, does not hold across all regions. Such a relationship can exist because of the weak bargaining position of women at high rates of unemployment.

Further research should focus on the employment composition within specific occupations, taking into consideration the breakdown in male and female employees. With this in mind more and better quality indicators on wages and employment at the global level are necessary to improve the understanding of labour market dynamics

resulting from global changes in developing and developed economies. This will greatly improve the analysis and provide a better framework for policy interventions.

References

Attanasio, O., Goldberg, P. and Pavcnik, N. 2004. "Trade Reforms and Wage Inequality in Columbia", *Journal of Development Economics*, Vol. 74, pp. 331-366.

Dickens, R. and Manning, A. 2003. "Minimum Wage, Minimum Impact", in Dickens, R., Gregg, P. and Wadsworth, J., editors, *The Labour Market Under New Labour: The State of Working Britain*, Palgrave Macmillan, Hampshire, pp. 201-213.

European Commission. 2003a. *Gender pay gaps in European labour markets: Measurement Analysis and Policy Implications*. Brussels.

European Commission. 2003b. *Employment in Europe 2003: Recent Trends and Prospects*. Brussels.

European Commission. 2005. *On Equality between Women and Men, 2005*. Brussels.

Fan, C. S. and Cheung, K.Y. 2004. "Trade and Wage Inequality: The Hong Kong Case", *Pacific Economic Review*, Vol. 9, No. 2, pp. 131-142.

Feliciano, Z. 2001. "Workers and Trade Liberalization: The Impact of Trade Reforms in Mexico on Wages and Employment", *Industrial & Labour Relations Review*, Vol. 55, No.1, pp. 95-115.

Freeman, R.B. and Oostendorp, R.H. 2001. "The Occupational Wages Around the World data file", *International Labour Review*, Vol. 140, No. 4, pp. 380-401.

Freeman, R.B., Oostendorp, R.H., and Rama, M. (in process). Globalization and Wages. World Bank Working Paper, Washington, D.C.

Galbraith, J., Chowdury, R., and Shrivastava, S. 2004. Pay Inequality in the Indian Manufacturing Sector, 1979-1998. University of Texas Inequality Project Working Paper No. 28, Texas.

Hanson, G.H. and Harrison, A. 1999. "Trade Liberalization and Wage Inequality in Mexico", *Industrial & Labour Relations Review*, Vol. 52, No. 2, pp. 271-288.

International Labour Office. 1999. *International Standard Classification of Occupations: ISCO-88*. Geneva.

International Labour Office. 2005. *Labour Overview*. Lima.

Majid, N. 2004. *What is the Effect of Trade Openness on Wages?*, Employment Strategy Department Working Paper, December, Geneva.

McKinsey Global Institute. 2005. *The Emerging Global Labor Market*. McKinsey and Company.

Newell, A. and Reilly, B. 2001. The Gender Pay Gap in Transition from Communism: Some Empirical Evidence. IZA Discussion Papers Series. Bonn, Germany.

Oostendorp, R.H. 2004. Globalization and the Gender Wage Gap. World Bank Policy Research Working Paper No. 3256, Washington, D.C.

Oostendorp, R.H. and Przybyla, M. 2002. Comparing Standards of Living Across Occupations and Countries Using the ILO October Inquiry 2000. ILO unpublished manuscript, Geneva.

Rama, M. 2003. Globalization and Workers in Developing Countries, World Bank Policy Research Working Paper No. 2958, Washington D.C.

Slaughter, M. 1999. Globalisation and Wages: A Tale of Two Perspectives. Centre for Research on Globalisation and Labour Markets Research Paper 99/5, Nottingham.

United Kingdom House of Commons. 2005. *Jobs for the Girls: The Effect of Occupational Segregation on the Gender Pay Gap*. London, The Stationary Office Limited.

Vasudeva-Dutta, P. 2005. Accounting for Wage Inequality in India. Poverty Research Unit of Sussex Working Paper No. 29, Sussex, UK.

Vere, J. 2005. "Education, Development, and Wage Inequality: The Case of Taiwan", *Economic Development and Cultural Change*, Vol. 53, No. 3, pp. 711-736.