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Heather Joshi\* - Pierella Paci\*

**WAGE DIFFERENTIALS BETWEEN****MEN AND WOMEN:****Evidence from British Birth Cohort Studies\*\***

\* Social Statistics Research Unit, City University  
Northampton Square, London EC1V 0HB  
Email: [hj@ssru.city.ac.uk](mailto:hj@ssru.city.ac.uk)  
[pp@ssru.city.ac.uk](mailto:pp@ssru.city.ac.uk)

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**ABSTRACT:** This study of the gender wage gap in Britain was occasioned by the release of data gathered in 1991 in the fifth sweep of the National Child Development Study, when they had reached age 33. We have been able to compare the latest findings with those emerging from the equivalent sweep of the MRC National Survey of Health and Development. This was carried out in 1977-78, when the cohort members were approaching 32. Having access to both cohorts has enabled us to situate each cohort's experience relative to each other, and to see how nationwide trends are manifested in two large longitudinal samples of adults at a similar age, thirteen years apart. The focus is on trends and determinants of wage differentials between men and women and, amongst the latter, between full-time and part-time workers and between mothers and non-mothers. The comparison of the pay gaps in 1978 and 1991 has enabled us to monitor the effectiveness of equal opportunities legislation, its progress and limitations.

A number of possible explanations for the 'unexplained' component of the uncovered wage gaps are analysed. Each may have arisen from a variety of causes, and we have not been able rigorously to reject any one explanation. Among those we think are important, are occupational segregation and labour market segmentation. These affect women part-timers particularly, who may also be at a disadvantage, working in local labour markets, from facing monopsonistic employers. We also suspect that imperfect information is generating statistical discrimination against classes of workers. Our impression is that the fully equal treatment of men and women, in these cohorts, and by extension their British compatriots, has yet to be achieved.

**KEY WORDS:** discrimination, equal pay, gender, wage gaps

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**TIIVISTELMÄ:** Tutkimuksessa tarkastellaan miesten ja naisten välisiä palkkaeroja Isossa-Britanniassa vertailemalla kahden samanikäisen kohortin työmarkkinakokemuksia vuosina 1978 ja 1991. Tällöin on mahdollista arvioida muun muassa tarkasteluperiodilla tasa-arvo-lainsäädännössä tehtyjen muutosten vaikutusta naisten työmarkkina-asemaan. Naisten ja miesten välillä esiintyvistä palkkaeroista jää merkittävä osa selittämättä. Tärkeiksi syiksi tälle 'selittämättömälle' osuudelle nostetaan naisten ja miesten erilainen työmarkkina-asema ja ammatillinen jakautuminen. Lisäksi epätäydellinen informaatio työntekijöiden ominaisuuksista näyttää johtavan tilastolliseen diskriminointiin tiettyjä ryhmiä kohtaan. Miesten ja naisten tasa-arvoinen kohtelu brittiläisillä työmarkkinoilla on vielä saavuttamatta.

**AVAINSANAT:** diskriminointi, palkkaerot, sama palkka, sukupuoli

## 1. Introduction

Britain draws longitudinal evidence on the lives of its citizens for research purposes in several ways. One of these is the follow-up survey of birth cohorts. There are already three such studies under way, linking data collected on children with the adult sequelae. Among other subjects, they generate a longitudinal record from education into a person's experience in the labour market. It is from this point of view that two of the studies, of the 1946 and 1958 cohorts, have been used and compared in the analysis of the rates of pay received by male and female workers.

Information on the dates and type of data collection in these two studies is given in *Tables 1 and 2*. The sample sizes vary with sample attrition, and differ between the two studies, since NCDS attempts to follow up everyone born in the sample week, while the 1946 follow-up was confined to a stratified sample. The design of the studies provides a wealth of background information enabling one to control for human capital and other characteristics, to compare like with like in the assessment of whether unequal pay of men and women reflects unequal treatment or unequal endowment.

This study of the gender wage gap was occasioned by the release of data gathered in 1991 in the fifth sweep of the National Child Development Study, when they had reached age 33. We have been able to compare the latest findings with those emerging from the equivalent sweep of the MRC National Survey of Health and Development. This was carried out in 1977-78, when the cohort members were approaching 32. Having access to both cohorts has enabled us to situate each cohort's experience relative to each other, and to see how nationwide trends are manifested in two large longitudinal samples of adults at a similar age, thirteen years apart. The focus is on trends and determinants of wage differentials between men and women and, amongst the latter, between full-time and part-time workers and between mothers and non-mothers. The comparison of the pay gaps in 1978 and 1991 has enabled us to monitor the effectiveness of equal opportunities legislation, its progress and limitations.

**Table 1. The MRC National Survey of Health and Development: Dates and Types of Data Collection**

Year	Age in years	Data collector	Number contacted	Percentage contacted
1948	2	HV	4,689	94
1950	4	HV	4,700	96
1952	6	SD; SN or HV	4,603	95
1953	7	SN or HV; SD; T	4,480	93
1954	8	SN or HV; T	4,435	92
1955	9	SN or HV	4,181	87
1956	10	T	4,077	85
1957	11	SN or HV; SD; T	4,281	89
1959	13	T	4,127	86
1961	15	SN or HV; T; SD	4,274	89
1965	19	HV	3,561	75
1966	20	P	3,899	83
1968	22	P	3,885	84
1969	23	P	3,026	67
1971	25	P	3,307	74
1972	26	I	3,750	85
1978	32	P	3,340	78
1982	36	RN	3,322	86
1989	43	RN	3,262	85

HV = health visitor; SN = school nurse; SD = school doctor; T = teacher; P = postal contact; I = interviewer; RN = research nurse

Source: *Wadsworth (1991)*

By 1991, Equal Pay (as well as Equal Opportunities) should have been well established. The law on Equal Pay for Equal Work had been in force since 1975. Under pressure from the European Community, the law had been strengthened, in 1983, to allow women to claim Equal Pay for work of Equal Value. Many people thought that any remaining gap in men's and women's pay was justified by such features as women's broken employment records, and no longer represented discrimination of 'unequal treatment'. In 1978, Equal Pay and Sex Discrimination laws had only recently been implemented. For full-time employees of all ages, the lead of men's wages over women's had already come down to 37% (from 58% before the Equal Pay Act), assisted by national collective agreements complying with the new law. Men's and women's average hourly rates continued to converge, but more slowly over the 1980s. By the 1991 the ratio was 26%. The individual cohorts experienced very much the

same overall change, a 36% lead for the 32 year old men in 1978 gave way to a lead around 20% for the 33 year old men in our 1991 sample. Although the cohort studies have data on only a narrow age band, this does not appear to be unrepresentative of the overall experience of all ages taken together.

**Table 2. The National Child Development Study: Dates and Types of Data Collection**

PMS (1958)	NCDS1 (1965)	NCDS2 (1969)	NCDS3 (1974)	EXAM (1978)	NCDS4 (1981)	CDS5 (1991)
Birth	7	11	16	20	23	33
17,733 <sup>a</sup>	16,883	16,835	16,915	16,906	16,457	15,600
Mother	Parents School Tests	Parents School Tests	Parents School Tests	School		
Medical	Medical Subject	Medical Subject	Medical Subject Census		Subject Census	Subject  Spouse/Partner Mother <sup>c</sup> Children
17,414 <sup>b</sup> 98% <sup>d</sup>	15,468 92%	15,503 92%	14,761 87%	14,370 85%	12,537 76%	11,407 73%

Notes:

a: Target Sample - immigrants with appropriate date of birth included for NCDS1-3

b: Achieved Sample - at least one survey instrument partially completed

c: This could be the Cohort Member, their Spouse or Partner

d: Response rate from Target Sample

Source: *Shepherd (1985)*

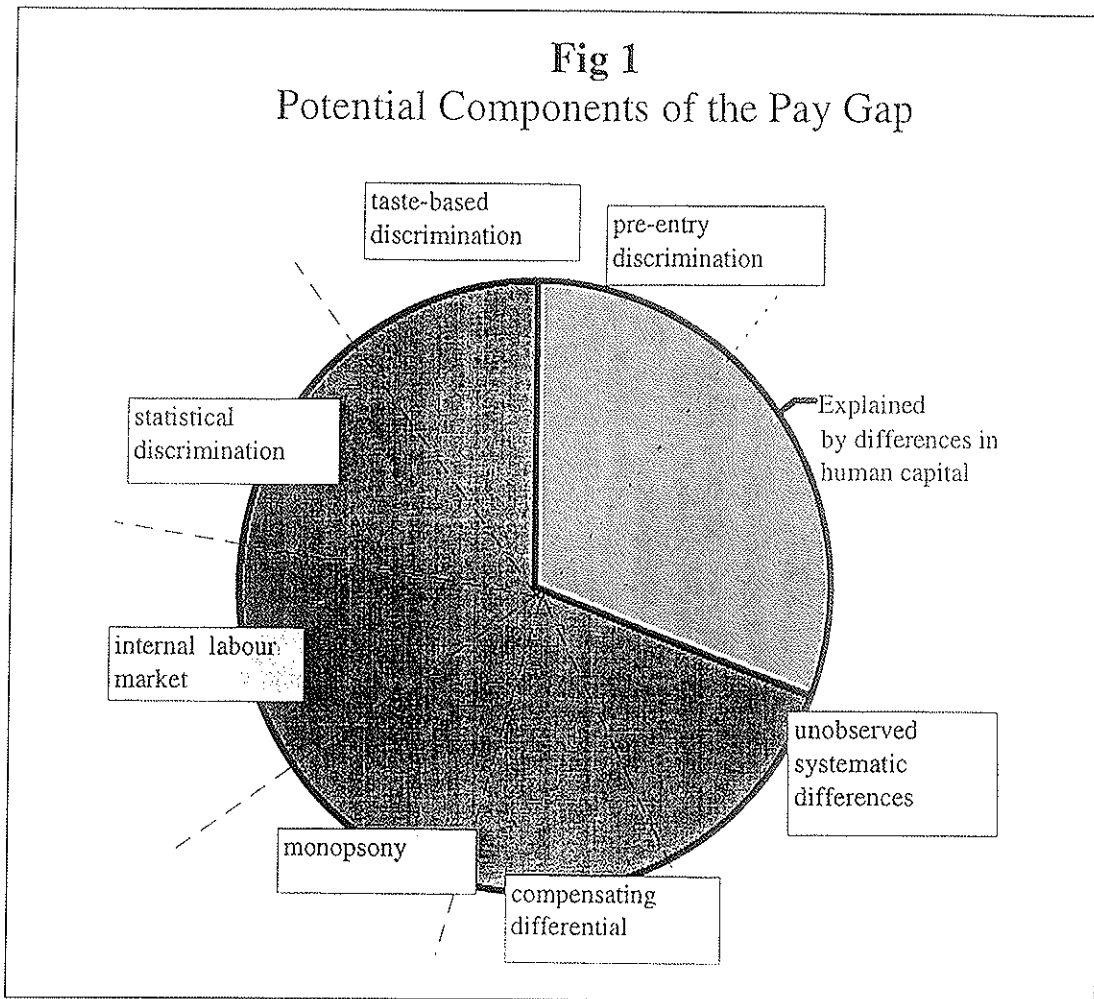
Over this period the cohorts (and everyone else) were also affected by a general widening of differentials in the labour market. This was associated with the deregulation programme of the Thatcher government, coming to power in 1979, with the decentralization and individualization of wage bargaining, and the casualization of employment contracts. Of particular interest in this context was a growing gap between the wages of women employed full-time and part-time. Part-time jobs are a large sector of the female labour market in Britain, employing around 40% of female workers (and in contrast to some other countries, very few men). They are particularly associated with

domestic responsibilities and particularly badly paid. They are mostly confined to low skilled and low responsibility activities, often in small non-unionized establishments, and they are low paid even after allowing for their incumbents' human capital (Ermisch and Wright, 1992). In the British context, the pay penalties of being female are compounded if being female means the relative good pay of the full-time sector is unattainable. Thus, though comparisons among full-time workers may be of more interest for international comparisons, no survey of gender and remuneration in Britain would be complete without allowing for the part-time sector, and its differential rates of pay.

The existence of two cohort studies with data on wages and work experience as they enter their thirties provides a unique opportunity to go behind the superficial indicators of change and to look at what is bringing men's and women's wages together - and what still keeps them apart.

We use the detailed evidence collected in the two cohorts to examine how far the convergence of men's and women's wages over time may be attributed to a reduction of unequal treatment of the sexes in rates of pay, rather than a convergence of their productive endowment. Less unequal treatment could be the result of equal opportunities policy, particularly the 1983 Equal Pay Amendment Act, although other trends and transformations in the labour market could also have contributed to the trend.

One cannot immediately conclude that the reduction in the pay gap is the outcome of less unequal treatment, without investigating the earning potential, or human capital endowments, that the two cohorts brought to the labour market at the two dates. It could simply be the result of changed gender differentials in endowments. Just as the later cohort were more likely to have the physical asset of home ownership, they were also better endowed with educational qualifications and employment experience, particularly if they were women in full-time jobs. Women's participation in employment, especially in full-time jobs, had gone up at age 32-33, and so had their employment experience.



Our analyses adopt the standard Oaxaca procedure, fitting separate earning equations for each group workers, and attributing log wage differences to differences in regressors ('explained') and differences in parameters ('unexplained'), or in other words, differential treatment (Oaxaca 1973). This partitioning of the wage gap does not necessarily distinguish between the non-discriminatory and discrimination, for as illustrated in *Figure 1*, an 'explained' gap may have arisen, in part at least, from discriminatory processes. Parameters may differ because of measurement error. Though 'unexplained residual' gaps are customarily labelled as 'discrimination' in the technical literature, they may arise in a number of ways. It is not necessarily all (or even at all) overt, law-breaking discrimination with conscious malicious intent, or 'taste' for discrimination on the part of employers, employees or customers. Workers on low pay may, in theory, be content to accept 'compensating differentials' to offset other features of the job. Apart from this, imperfections in the labour market and in employers' knowledge, a-symmetry of information and bargaining power, and segregation of oc-

cupations can all prevent markets operating to eliminate any differential which was not rewarding variations in personal productivity.

## 2. Results

The first analyses in our study (Paci and Joshi 1996, Chapter 2) used regression to control for differences in human capital characteristics when assessing the extent and determinants of wage differentials for both the cohorts in their early thirties. Our measure of human capital includes ability as tested at school, educational qualifications and the record of employment experience up to age 32-33. An alternative estimate of the human capital model for NCDS (including training) is presented in our Chapter 3, which also reports various extensions of the explanatory variables into type of job: employer characteristics, contract characteristics, industry and occupation. Responsibility for children is included as another potential influence on wage levels, in a further chapter. *Tables 3 and 4* bring some of the salient findings from these analyses together. *Table 3* represents the differences in wages in terms of logarithms and *Table 4* as percentages of the lower wage being compared.

The first column of *Tables 3 and 4* offers estimates for the overall wage gap between men and all women, full and part-time, which in the case of estimates derived from this report is a weighted combination of the differentials shown in the next two columns. The rows in each panel decompose the crude log pay gap into unexplained and explained components. These panels also draw on a previous study of the 1946 cohort (Joshi and Newell 1989). The last column reports the sample size used in each estimate, for men, women employed full-time and women employed part-time separately. These numbers vary within cohort because of the way we have handled missing data.

Regression analysis permits a partitioning of observed gender gaps into a part which is accounted for by explanatory variables and one which remains explained by no included characteristics other than gender itself - a 'gender premium'. In the early years of implementation of the Equal Pay Act, the cohort then in their early thirties displayed a gender premium in pay between men and women taken together around one third of women's pay (32% after adjusting for human capital). Comparable estimates



for the NCDS in 1991 (panels 3 and 4) are around one quarter (24% or 28% according to the exact sample used). A gender premium around one quarter is still no lower than the estimates for married persons of all ages in 1980 by Wright and Ermisch (1991) who were not out of line with other findings from that time (see Paci and Joshi 1996, Chapter 1). Despite the superficial similarity of the cohort's wage differentials with those of workers of all ages noted in Chapter 1, the adjusted gender premia for all ages may not be as comparable with the NCDS as are the two cohorts with each other. Among workers of all ages in 1991 we might expect to find a bigger portion of the observed gap explained by differences in endowment. The evidence on the 1946 cohort, among other sources, would lead us to expect women older than 33 to have relatively lower education and experience, and perhaps there was not much scope for closing attribute gaps within more recent cohorts.

If this otherwise unexplained term represents unequal treatment in the labour market, differential treatment of the sexes does not yet seem to have been eliminated by the Equal Pay regime. But, comparing cohorts, there does seem to be some improvement over time. Note that the evidence for improvement affects 'full-timers' only.

What seems to have changed in the opposite direction is the pay gap between women in full- and part-time jobs, both before and after adjustment for human capital. These endowments do differ markedly between full-time and part-time female employees in each cohort. The unadjusted pay gaps were 40% in 1978 and somewhere around 50% in 1991. After adjustment the part-time premium was 11% in 1978 and 15 - 23% in 1991. This would appear to be part and parcel of a more general tendency for differentials to open up in the labour market, despite the narrowing gap between men and women employed full-time. The deteriorating full-/part-time pay gap could also account - at least partially - for the higher propensity to participate in full-time employment by the more recent cohort.

Before controlling for industry, occupation and other job characteristics, the unexplained part-time penalty among women in 1991 is now of the same order of magnitude as the unexplained gender premium among full-timers. Because of the opposite

Table 3. Summary of gender wage gaps in the 1958 and 1946 cohorts

Model and year of data	logarithms			Sample numbers	
	Men: All women	Men: Women Full-time	Women Full-time Part-time	Men FT PT	M F P weighted
<i>Human Capital</i>					
<i>1977-8, Age 31-2</i>					
Total differential	0.456	-	-	918	928
Unexplained by model	0.281	-	-	227	225
Explained	0.177	-	-	245	
(Joshi and Newell, Table 3.2)					
Total differential	0.495	0.307	0.338	925	925
Unexplained by model	0.275	0.218	0.102	226	206
Explained	0.220	0.089	0.235	247	258
(Paci and Joshi, Chapter 2)					
<i>1991, Age 33</i>					
Total differential	0.281	0.174	0.368	2 681	
Unexplained by model	0.211	0.170	0.142	1 237	
Explained	0.070	0.004	0.226	509	
(P & J, Table 2.5)					
Total differential	0.337	0.183	0.419	1 797	
Unexplained by model	0.244	0.166	0.211	866	
Explained	0.093	0.017	0.208	504	
(P & J, Table 3.1)					
<i>Human Capital plus Job Characteristics</i>					
<i>1977-8, Age 31-2</i>					
Total differential	0.456	-	-	918	928
Unexplained by model	0.243	-	-	227	225
Explained	0.214	-	-	245	281
(J & N, Table 3.2)					
<i>1991, Age 33</i>					
Total differential	0.337	0.183	0.419	1 797	
Unexplained by model	0.136	0.108	0.062	866	
Explained	0.201	0.075	0.357	504	
(P & J, Table 3.4)					
<i>Human Capital plus Job Characteristics plus Parenthood</i>					
<i>1991, Age 33</i>					
Total differential	0.337	0.183	0.419	1 797	
Unexplained by model	0.123	0.108	0.041	866	
Explained	0.214	0.075	0.378	504	
(P & J, Table 4.1)					

Note: The men in these samples virtually all have full-time jobs; 99.9% of the 1946 cohort and 100% in NCDS by sample definition.

Table 4. Wage gaps in terms of percentages of the lower rate: 1958 and 1946 cohorts at ages 33 and 32

Model and year of data	Men: All Women	Men: Women Full-time	Women Full- time: Part-time	Sample numbers	
				Men FT Women PT Women weighted	M F P
<i>Human Capital</i>					
<i>1977-8, Age 31-2</i>					
Total differential	57.8%	-	-	918	928
Unexplained by model	32.4%	-	-	227	225
Explained (Joshi and Newell, Table 3.2)	19.4%	-	-	245	281
Total differential	64.0%	35.9%	40.2%	925	925
Unexplained by model	31.6%	24.4%	10.7%	226	206
Explained (Paci and Joshi, Chapter 2)	24.6%	9.3%	26.5%	247	258
<i>1991, Age 33</i>					
Total differential	32.5%	19.0%	44.5%	2 681	
Unexplained by model	23.5%	18.5%	15.3%	1 237	
Explained (P & J, Table 2.5)	7.2%	0.4%	25.4%	509	
Total differential	40.1%	20.1%	52.0%	1 797	
Unexplained by model	27.6%	18.1%	23.5%	866	
Explained (P & J, Table 3.1)	9.7%	1.7%	23.1%	504	
<i>Human Capital plus Job Characteristics</i>					
<i>1977-8, Age 31-2</i>					
Total differential	57.8%	-	-	918	928
Unexplained by model	27.5%	-	-	227	225
Explained (J & N, Table 3.2)	23.9%	-	-	245	281
<i>1991, Age 33</i>					
Total differential	40.1%	20.1%	52.0%	1 797	
Unexplained by model	14.6%	12.1%	6.4%	866	
Explained (P & J, Table 3.4)	22.3%	7.1%	42.9%	504	
<i>Human Capital plus Job Characteristics plus Parenthood</i>					
<i>1991, Age 33</i>					
Total differential	40.1%	20.1%	52.0%	2 497	
Unexplained by model	13.1%	11.4%	4.2%	1 219	
Explained (P & J, Table 4.1)	23.9%	7.8%	45.9%	664	

trends within women's wages, the picture of progress on the gender differential looks better if one confines attention to full-timers. The unadjusted differential dropped from 36% to around 20%, and the unexplained component from 24% to 18%.

What is more noteworthy is that the part of the wage gap explained by human capital endowment had almost disappeared. This means that among men and women born in 1958 who were in full-time jobs, men's hitherto traditional advantage in educational attainments and experience were minimal. It should not be assumed that men in this generation (and presumably those following) will tend to be better qualified than their female colleagues. This feature should increase employers' interest in conserving the human capital of their employees with practices which help the combination of employment with family responsibilities. If this convergence of human capital is not generally perceived, this could be a source of the statistical discrimination which is probably perpetuating unequal treatment.

Another surprise, when we added different information to the human capital model, was that job characteristics, apart from the full-time-part-time distinction itself, account for surprisingly little of the gaps between men and women (full-time); though more than that between women part-timers and the rest. Our fullest model of hourly pay for full-timers leaves a smaller gender differential unexplained (12%). The fact that men and women tend to do different types of jobs confirms the 'crowding' hypothesis, and limits the writ of Equal Pay for Equal Work. Allowing for characteristics of the firm, job, industry and occupation leaves an unexplained differential of 12% of full-time women's pay.

The gulf between rates of pay for full-time and part-time employment among women is worthy of attention. The full-timers in the NCDS 'full model' sample average 52% more than part-timers. Adjusted for details about jobs as well as their less productive personal characteristics the unexplained gap is cut to 6%. The job characteristics accounting for low pay of part-timers include low status occupations, small firms in the private sector and a shorter journey to work. In the combined full-time and part-time labour market the unexplained pay gap had been 28% in 1978. In 1991, it was down

to 15%, due to falls within each sector, and would have been even lower if part-time employment had retained its share.

Family responsibilities do not appear to be the missing link accounting for the low pay of part-timers. For the 1946 cohort, differences in pay between mothers and other women in 1978 were completely accounted for by human capital and whether the job was part-time. There was no direct pay penalty attached to employment of mothers beyond the consequences of lost experience and part-time employment which are allowed for. For NCDS in 1991, allowing for the presence of children in the home did make a difference. As the bottom panel of *Tables 3 and 4* show, introducing parental status into the full model modestly increased the still small fraction of the man/woman pay gap for full-timers which is explained (from 7.1% to 7.8%). Between the two groups of women it increased the explained component from 43% to 46%. For both NCDS and MRC part-time employment accounts for a good deal of the low pay of mothers but motherhood does little to explain the low pay of part-timers.

The emergence of a negative premium for mothers in NCDS suggests that, despite the arrival of family friendly employment practices on the agenda between 1978 and 1991, the economic opportunities for women with children had actually deteriorated, at least in some parts of the labour market. This pay penalty of motherhood in NCDS has been narrowed down to those in full-time employment who did not take maternity leave at the time of their first birth. Part-timers seem to be more or less uniformly low paid whether or not they have children. Full-timers who had taken maternity leave were remunerated at the same rate as childless women. This is perhaps witness to the uneven spread of practices facilitating mothers' employment rather than evidence of their ineffectiveness. For those who did take up the maternity leave more often available to this cohort, earning power seems to have been preserved. Neither maternity leave nor remaining childless permit women to escape the financial penalty of being female.

To recap: there is still a gender penalty for 33 year old women in 1991, whatever their position in the labour market. It is more severe for mothers who have full-time jobs

but did not take maternity leave from their job at the time of their first birth than those who did. It is even more severe for women employed part-time, if their pay may be compared with men employed full-time.

### 3. Discussion

The analyses in this report have uncovered unexplained components of two separate wage gaps: between men and women employed full-time and between women working full- and part-time. These have been the main focus of the commentary, though parts of them still remain unexplained. As noted in *Figure 1*, there are a number of possible explanations for the 'unexplained' component. These explanations could all apply to each of the two gaps studied. Each may have arisen from a variety of causes, and we have not been able rigorously to reject any one explanation. Among those we think are important, on the basis of the evidence presented, are occupational segregation and labour market segmentation. These affect women part-timers particularly, who may also be at a disadvantage, working in local labour markets, from facing monopsonistic employers. We also suspect that imperfect information is generating statistical discrimination against classes of workers. Perhaps the longitudinal information brought out in this report can help to improve the perception of a generation's human resources.

Our impression is that the fully equal treatment of men and women, in these cohorts, and by extension their British compatriots, has yet to be achieved. Equal Pay legislation, with its limited resources and cumbersome machinery of adjudication has made only slow progress after its opening years. The benefits of Equal Pay seem especially remote for women in part-time jobs. The deregulation of the labour market is likely to be working against the full success of Equal Pay legislation, by fostering the sort of market structure in which such law is hard to enforce, and in which collective bargaining has less influence. The low pay of Britain's part-time women workers may seem irrelevant to those in other countries, but they should provide lessons of the circumstances in which Equal Pay law is not enough.

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ELINKEINOELÄMÄN TUTKIMUSLAITOS (ETLA)  
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY  
LÖNNROTINKATU 4 B, FIN-00120 HELSINKI

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Puh./Tel. (09) 609 900  
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