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**Luxembourg Income Study  
Working Paper No. 239**

**An Analysis of Gender Wage Differentials  
in Sweden and Finland  
in 1995**

**Ioanna Manafi**

**August 2000**

# **An analysis of gender wage differentials in Sweden and Finland in 1995.**

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## **Abstract**

This paper provides estimates for male-female earnings differentials in Sweden and Finland, incorporating the use of the Heckman (1979) two-step procedure for sample selection bias. Women who take part in the labour market may be a non-random sub-set of those being able to work. Therefore, the use of the Heckman two-step procedure for sample selection bias is essential. This technique enables the decision of females to participate in the labour market to be modelled and their earnings corrected for self-selection. The gender gap is subsequently calculated using Reimers (1983) method.

**Key words**: Sweden, Finland, earnings, discrimination.

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## **Introduction**

In spite of impressive reductions in the male-female pay gap in several cases since the 1950s, gender differentials continue to exist in all industrialised nations. Nevertheless, the size of the gender gap differs considerably across countries. According to published data, by the late 1980s, in France, Australia, New Zealand as well as in the Scandinavian countries, the female-male hourly pay ratios were as high as 80% - 90%, whereas in other countries in Western Europe and the United States the pay ratios were approximately 65% - 75% (Blau & Kahn, 1996). Indeed, the Nordic countries are widely known for their plans of action as well as their devotion to gender equity and the integration of women into almost every range of activities in public life. Thus, the fact that the United Nations Development Programmes (UNDP)

ranked these countries at the very top in its recent measure of women's status (Gender-related Development Index, GDI) should not be the cause of any surprise (Melkas & Anker, 1998). However, their valuation in terms of this index is not the sole evidence of relatively high gender equality in the Nordic countries. The majority in decision-making bodies is still composed of men; nevertheless women's participation rate in the Nordic parliaments is over 30 per cent. This rate is relatively high when compared with the one in other countries. Women's share in national government administrations is also high, despite the fact that 'women are still far less likely than men to become ministers in areas that are perceived as the most central, such as prime minister' (ibid.).

As far as the participation of women in the labour market is concerned, they have entered it vigorously in recent decades resulting in approximately equal numbers of males and females in the Nordic labour force. Nevertheless, in spite of women's dynamic presence in the labour market if one considers their high labour force participation rates, 'women are usually under-represented at higher levels, especially at managerial levels in the private sector' (ibid.). Moreover, females work part-time more often than males in both Sweden and Finland. This is due to some extent because women still perform roughly two-thirds of the total unpaid work at home.

In Nordic countries, the gap between men's and women's earnings is small when compared with the male-female earnings differential in other countries. Laws have been established on equal pay for equal work. The fact that earnings and wages of women are lower than that of men's is indisputable and Nordic countries are no exception to this 'rule'. Even in those, females' earnings are significantly lower than males' and even when they are in the same occupation, it is women who often occupy lower positions than men. Furthermore, females are more likely than males to occupy

positions in the public sector, where wages tend to be lower than in the private sector. 'Moreover, traditional misconceptions about women engaging in occupations requiring less responsibility usually lead to lower wages for Nordic women' (ibid.).

The purpose of this paper is to examine the extent of the differential in wages in the two Scandinavian countries using data for 1995 and decompose it into differences in characteristics between men and women, and the part often considered to be caused by discrimination.

The article is organised as follows: section 1 begins with the definition of discrimination and then proceeds to provide a brief overview of the solidarity wage policy in Sweden, since it was the cause of wage hikes for female workers and also of the abolition of special female wage scales. Section 1 also provides information about gender wage differentials from 1968 to 1981 and concludes with the Nordic policies to enhance equality. Section 2 provides economic explanation for differences in earnings and also a separate reference to the occupational segregation by sex in the Nordic countries. Section 3 discusses an estimated earnings function of male and female wages using the Heckman two-step procedure. Section 4 describes the data and the variables. Section 5 discusses the results and the final section concludes the analysis.

### **1.1. Definition of discrimination.**

Nowadays, discrimination takes many forms. Literally speaking, the word means "to distinguish between according to criteria that are appropriate to the choice" (Elliott, 1991, p34). Thus, it is something in which individuals should be engaged quit often. Nevertheless, the word has grown to have a different meaning. Specifically, it has come to signify 'distinguishing between individuals and acting to their detriment

according to criteria that are not relevant. Characteristics that should have no bearing on the issue at hand are used as criteria for distinguishing between people, with the result that people who are identical in the relevant characteristics are treated dissimilarly. Equals are treated unequally' (ibid.). Discrimination can be expressed within the labour market, but the latter is not the sole forum in which discrimination can be manifested. Concerning the labour market, discrimination manifests itself not only in differences in wages, but it 'may take the form of excluding certain groups from opportunities for advancement and promotion or of confining them to certain jobs. Outside the labour market it may occur by excluding certain groups from particular educational or housing opportunities, precluding them from membership of particular institutions, or forbidding access to certain facilities' (ibid.). In fact, discrimination is the expression of prejudice, therefore the latter is a precondition for the existence of discriminatory actions. People may be prejudiced against one or more races or they may be prejudiced against the opposite sex. However, not all prejudice causes discrimination. The prejudicial feelings and the desire to discriminate may exist, but the means for their expression may not be existent and therefore the desire to discriminate remains unsatisfied. Arrow (1973, cited in Elliott, 1991, p384) offered the most complete definition of labour market discrimination. According to him, it is 'the valuation in the market place of personal characteristics of the worker that are unrelated to productivity'. It is indeed the most thorough definition because it includes both demand and supply side considerations. Therefore, women are often discriminated against, since three characteristics that are most frequently chosen 'for differential treatment in modern labor markets' (ibid.) are race, sex and handicap.

## **1.2. Solidarity wage policy and gender wage differentials in Sweden.**

Sweden is the only country with a higher unionisation rate than Finland, where the degree of unionisation is over 85 per cent (Tyrvaainen, 1992). Moreover, peaceful

labour relations are a field Sweden has a reputation for. Since World War II, labour disputes have been infrequent incidents. However, labour relations in previous decades were a lot less peaceful. 'The number of annual workdays lost owing to conflicts typically amounted to one or several millions during the inter-war period; the corresponding figures during the 1950s and the 1960s were typically fewer than 100,000 days' (Edin & Holmlund, 1995, p309). A decisive change took place in 1938 with the "Basic Agreement" between LO (the Swedish trade union confederation) and SAF (the Swedish employers' confederation). This agreement, which is often mentioned as Saltsjobadsavtalet, specified a set of rules for the solution of disputes. This set of rules 'together with previously introduced legislation formed a basis for more peaceful relations' (ibid.). The legislation incorporated a law on collective agreements from 1928 and this law rendered disputes illegal after a contract had been signed. Moreover, a labour court was introduced in 1928 in order to deal with disputes over contracts.

'The term solidarity wage policy was coined in the late 1930s, but egalitarian ideas have a long history in LO' (op.cit.). Demands for the equalisation of wage among different groups belonging to LO were frequently expressed during the LO Congresses, typically strongly connected with demands for a more centralised bargaining structure with LO. The idea that co-ordination was a necessary precondition for solidarity was developed and improved in many articles and LO reports during the 1940s. Two LO economists, Gosta Rehn and Rudolf Meidner argued that 'co-ordination should be seen not only as a device to achieve a wage policy of solidarity but also as a means to promote growth and structural change in the economy. The guiding principle should be "equal pay for equal work", irrespective of the ability to pay among particular firms or industries' (op.cit.). The principle could

be regarded as an attempt to make use of the ‘centralized union’s visible hand’ to accomplish a wage structure that would appear in a competitive labour market. The two economists’ program did not exclude differences in wages among workers who had different skills or working conditions. It only excluded differences based on firms’ profitability. Nonetheless, it indeed recognised that such a wage policy could put pressure on weak firms and finally result in unemployment in specific industries or regions. Thus, the solidarity wage policy ought to be combined with an active labour market policy in order to make the relocation of workers made redundant in less efficient firms less difficult. A solidarity wage policy and an active labour market policy constitute two main ingredients of the so-called “Swedish model”.

According to Holmlund, Edin (1991, 1992 respectively; cited in Edin and Holmlund, 1995, p311) and Zetterberg, ‘wage differentials in Sweden reflect industry rents to a much smaller extent than wages in the Unites States do’ and this finding is obviously in agreement with the aims of the solidarity wage policy. Nevertheless, equal pay for equal work is only one aspect of solidarity wage policy. Another, founded on strong ideological beliefs among the union leaders and the membership in general, is wage equalisation and there has always been a tension between these two aspects of the solidarity wage policy. To a certain degree pay compression could be justified as establishing equal pay for equal work. Wage hikes for female workers as well as the abolition of special female wage scales, mentioned in the introduction, constitute an example of this.

With regard to the gender wage differentials, Edin and Holmlund observed a noteworthy increase in the relative wage of females from 1968 to 1981. This occurred



simultaneously with a large rise in the labour supply of women. They also observed that after 1981 the gender wage gap has been almost stable at the same time as the growth of female relative supply has decreased. Measures such as the abrogation of separate wage scales for women by SAF and LO in the early 1960s, 'the introduction of separate taxation for spouses between 1965 and 1971, the changing rules and benefits for maternity leave, and the increasing supply of public day care' (op.cit.), constitute several factors that could help account for these movements in relative wages and relative supply. Measured relative demand for women rose rapidly between 1968 and 1981. In contrast, during the 1980s, they did not find any changes in relative demand. This increase was partly caused by the prompt growth of public-sector employment during the 1970s and the following slackening of public-sector expansion during the 1980s. The pattern of demand for females resembles very much their relative wage pattern. Obviously, shifts in relative demand for the labour of females constitutes a factor that cannot be ignored in a research into gender wage differentials in Sweden.

### **1.3. Policies to enhance equality in pay.**

Generally speaking, the Western and Southern European welfare state is based on males being breadwinners and females homemakers. By contrast with that, the welfare state in the Nordic countries is founded 'on the normalization of women's participation in gainful employment and a shared breadwinner role with men' (Melkas & Anker 1998, p9). In the so-called Nordic model, the intention of the welfare state has been a general redistribution of income and welfare. Natti (1994;cited in Melkas & Anker, 1998, p9) notes that 'employment policy has emphasized active rather than passive labour market policies – a goal of full employment for women and men, both sexes gainfully employed'.

The Nordic model, by accomplishing a reduction in pay differentials between males and females, has to a great degree undermined the possibility of the former being the sole supporters of families. The rights of women do not depend upon their marital status, but upon their citizenship or employment. Natti (1994) points out that 'social security and the services of married women doing unpaid household work do not depend on their husbands' employment status; women are treated as individuals and not as spouses'.

Moreover, the Nordic societies have been relatively homogenous economically. Therefore, one may argue that differences between the status of males and females is more distinguishable than in other Western societies, which are characterised by the existence of distinct social classes, as well due to the fact that a society with 'sharp contrasts between social classes may to some extent hide differences in status based on sex' (Melkas & Anker, 1998, p10).

With regard to policies adopted by the Nordic countries in order to support gender equality, they include 1) acts on the national level on gender equality and 'national machinery for their execution, 2) different types of family support, namely parental leave programmes and day-care systems, both of them being very important in terms of equal opportunities of women and men in the labour market.

Nordic countries' present plan for 1995-2000 focuses on activities that promote, among other things, 'equal access for women and men to the political and economic decision-making processes; equality in economic status; possibilities for both women and men to combine the role of parent with that of worker' (op.cit.).

With regard to Finland, in the middle of the 1960s only one in every three Finnish workers belonged to a union. At the beginning of the 1990s, the degree of unionisation was over 85 per cent. There exists one large central confederation of

unions, which consists mainly of workers in the manufacturing industry. Tyrvainen (1992, p1275) reports that in addition, there exist three confederations of unions which represent primarily white-collar workers. Also, 'the wage settlement procedure is highly centralised and synchronized' (ibid.). Throughout the period from 1964 until 1990 there were only four years when no central agreement was reached and in those years settlements were reached at industry level. During the seventies, that is during the period of highly centralised wage bargaining and solidarity wage policy, there was a compression of earnings differentials. The rise 'in dispersion of earnings coincides with the abandonment of egalitarian wage policy and steps towards more decentralised wage setting' (Eriksson & Jantti, 1997, p1777).

Concerning the legal basis for equality of pay, it is clearly prohibited to pay different wages to female and male employees on the basis of sex. That is stated only in the Act on equality between men and women, which came into operation in 1987. The Employment Contracts Act of 1970 embodies only a general provision about employers treating their employees equitably and the Finnish Constitution embodies a provision according to which 'all citizens are equal before the law. But this rather general provision only seems to place an obligation on all public authorities in relation to citizens; and to prohibit the enactment of laws that will place them in unequal positions without justification ( Heikkero, Koskinen & Nikula, 1993, p63).

Separate wage brackets for women in the private sector were abrogated from collective agreements by the mid 1960s. One might regard the Equal Remuneration Convention, 1951 (No. 100) as the factor that contributed to a great extent to this development. 'On the other hand, the collective agreements do not include provisions positively obligating the promotion of equal pay' (ibid.). Before the abrogation of separate wage brackets in the public sector, different wages allowed by law were paid

for specific posts, depending on the sex of the office-holder. Primary school teachers provide a very good example. Not only were the wages of male teachers higher, but also the houses offered to them were larger than the ones provided for female teachers. Differences like these were annulled from employment relationships in the public sector by the end of the 1960s. Nowadays the wages paid to civil servants are primarily decided by the collective agreements, 'in certain cases as so-called contractual salaries, and office-holders are paid mainly on the basis of the post they hold, regardless of sex' (ibid.).

The Employment Contracts Act did not forbid discrimination related to sex in employment relationships in the private sector until 1970. 'The original form of section 17, paragraph 3, was the following: "The employer shall treat his workers impartially without making any unwarranted discrimination on the basis of origin, religion, sex, age, political or trade union activity or any other comparable circumstance... According to the Employment Contracts Act, discrimination in employment relationship is a punishable offence" (op.cit.). Nevertheless, this fact has not rendered the provision effective, not in practice at least. This statement is based on the fact that 'during a period of about ten years, only some ten cases in which this provision of the Act has been appealed to have been brought to the Supreme Court, and none of these has been concerned with discrimination based on sex' (op.cit.).

In 1987 there was a transfer of the prohibition of discrimination based on sex from the Employment Contracts to the Equality Act. The Finnish Equality Act embodies two kinds of provisions: 'target-oriented ones', which compelled, for example, public authorities as well as private employers to encourage equality, and 'concrete ones', which prohibit discrimination on the basis of sex, according to which: Discrimination on the basis of sex is prohibited. For the purposes of this Act

discrimination means the placing of women and men in different positions on the basis of sex. Discrimination also includes any procedure whereby women and men are de facto placed in clearly different positions in relation to each other’.

There is a section that is relevant to wage discrimination. According to this, ‘an employer’s procedure is to be considered discriminatory if the employer applies to an employee conditions of payment or employment less favourable than would be applied to an employee of the opposite sex employed in the same work or work of equal value’ (op.cit.). Nonetheless, the employer will not be considered to have practised wage discrimination provided that he is able to prove that ‘his procedure is based on an acceptable reason other than the employee’s sex’ (op.cit.). The Finnish Equality Act has an effect on all employment relationships, whether it is the private or public sector we are interested in, and there are no special provisions according to whether the work is full time or part time, temporary or permanent, done at home, etc. Both the Employment Contracts Act and the Equality Act have one important weakness: both of them are employer-orientated, which means that the prohibition on paying different wages to men and women working for the employer and performing the same work or work of equal value is applicable only to the employees of the same employer.

Finally, the Equality Act is supervised by the Equality Ombudsman and his Office as well as the Equality Board, ‘on which there are more detailed provisions in a separate Act. This supervision is administrative rather than judicial in nature’ (op.cit.). Law has not prescribed any special consequences in cases of lack of obedience regarding the target-oriented provisions of the ACT. For example, it is not possible to demand that employers fulfil their obligation to encourage and support equality, by taking them to court. However, in cases of non fulfilment of the employers’

obligations prescribed by the Equality Act, or in cases of violations of the Act's provisions, the Equality Ombudsman has an obligation to make efforts, by using counselling and advice, 'to prevent the continuation or recurrence of the illegal procedure' (op.cit.).

In Sweden, the Equal Opportunity Act of 1992 states that 'employers must promote a well-balanced sex distribution in various types of jobs, and make special efforts to attract applicants from the under-represented sex' (Melkas & Anker, 1998, p.31). Additionally, employers ought to facilitate the combination of parenthood and work for males and females and reduce differences in pay and other conditions among women and men who perform equal work or work of equal value. Discrimination based on sex is officially forbidden in hiring, terms of employment, choice of assignment, pay and also sexual harassment ought to be combated.

As far as social support for families with children is concerned, it constitutes an essential part of the welfare state and the relevant measures facilitate to a large extent the entry of mothers and also their stay in paid employment. The family support policies consist of 'parental leave programmes, day-care systems, public allowances for children and housing, free or subsidized medical and dental care for children and support for single parents (e.g. a child maintenance support is paid in Finland to single mothers if the father neglects maintenance payments for the care of the child)' (op.cit.).

With regard to facilities for working couples' children, day-care centres and family day-care are well developed in the Nordic countries. They started expanding dynamically around 1970. They are provided by the municipalities and they are supported by large government subsidies (Ronsen & Sundstrom, 1996, p271).

Concerning the parental leave programmes available, they include wage compensation after the birth of a child and the length of time is extensive, particularly in Sweden and it is not only the mother that is entitled to time out. The time can be used by either parent. Ronsen and Sundstrom (1996, p270) point out that ‘a right to a job-protected leave at childbirth makes it possible for women to retain ties with the workforce while caring for their baby at home’. Moreover, women who are entitled to maternity leave have the opportunity to return to work when they decide, whereas women who do not have such privileges end up spending time in search of a job.

Sweden particularly, has established several policies in an attempt to promote gender equality and render fathers more actively involved in the care of children. As of 1984, such policies entailed a) a cash benefit for a year with reference to childbirth which could be used by either the mother or the father or shared between them, b) leave of ten days for the father when the child is born; c) up to three months annually to take care of a sick child up the age of 12 for either parent; and two more days off per child (aged 4-12) per year for ‘parent education or to visit the child’s preschool or school (Sundstrom, 1994; cited in Carlin & Flood, 1996, p168).

## **2. Economic explanations for differences in earnings.**

As mentioned in the introduction, the fact that the earnings and wages of females are lower than those of males is indisputable. In an attempt to account for the difference in earnings or wage rates, it is essential that the determinants, which are regarded to influence them, be discussed. The fundamental tool employed in this kind of analysis is the “earnings function”, ‘which is a regression of individual earnings or wage rates on a vector of characteristics, which may be personal, environmental or characteristic of the market’ (Arabsheibani & Lau, 2000, p7). The human capital

theory constitutes ‘the major school of thought on the existence of earnings differentials’ (ibid.). Human capital theory gives emphasis to the importance of education and also on-the-job-training. These two types of investment in human capital are able to raise a person’s productivity and thus they have an effect on their earnings. Apart from the actual cost of additional years of education, they also entail an opportunity cost namely the foregone earnings. Therefore, the expectation of higher lifetime earnings is very likely to lead a worker to invest in further education, since he expects to be adequately compensated for their expenditure on more years of schooling and also for the foregone earnings during those years. Moreover, the more educated worker must be more productive than other workers who have received less education in order to demand higher earnings (Willis, 1986; cited in Arabsheibani & Lau , 2000, p7).

Generally speaking, women tend to receive an ‘all-round, general, liberal education’ (Heikkero, Koskinen & Nikula, 1993, p77), which is not highly appreciated in the labour market, or they tend to obtain vocational training that leads to a field dominated by women. On the other hand, men mostly seek “hard” vocational training. Specifically, Nordic women and men have a high level of education. Furthermore, male-female differences with respect to the number of years of school completed are small. Anker (1998; cited in Melkas & Anker, 1998, p28) reports that the mean years of schooling for women and men aged 25 or over in 1990 were 10.5 and 10.7 respectively in Finland, that is the female-male ratio was 0.98 and 11.1 years for both men and women in Sweden, yielding a ratio equal to 1. Naturally, the high level of education of females has contributed to the increase in their labour force participation. ‘On the other hand, men and women pursue different fields of study in secondary school and subsequently’ (Melkas & Anker, 1998, p23). Typical



women-dominated fields 'are medical and health-related sciences, educational science, teacher training and humanities' (ibid.). On the other hand, computer sciences, engineering, mathematics and agriculture are fields typically male-dominated. The persistent differences in education partly cause sex segregation to continue existing in the labour market, 'as they reinforce and preserve gender-stereotyping' (op.cit.).

The human capital theory accounts for the fact that females tend to be segregated into predominantly 'female' occupations, including those at low levels, as regards the fact that women take career breaks or work in part time jobs in order to be able to take care of the family. Therefore, they choose careers where interruptions have a smaller effect on earnings. The underlying logic for this is that being absent from the labour force results in a depreciation of skills, while continuing to work results in an appreciation of human capital because of the 'accumulation of experience, which in turn is rewarded because of greater productivity' (Arabsheibani & Lau, 2000, p9). Albrecht, Edin, Sundstrom and Vroman (1999, p294) recognise the fact that women are more likely than men to interrupt their work careers for family reasons (childbearing, child rearing and so on) to be an important factor behind the gender gap in wages. Interruptions in their career are considered to decrease females' wages relative to males' for at least three reasons. The first reason is that wages tend to increase with work experience. Time spent away from work is in fact experience foregone. In other words, females tend to earn less than men because on average they have accumulated less work experience. The second reason is that women, in anticipation of future work interruptions, they choose or are assigned to jobs with less potential for training and therefore they have 'flatter earnings-experience profiles; that is women tend to realise a lower rate of return per unit of realised work experience

(op.cit.).The third reason is that time out of the labour force seems to result in a loss in subsequent earnings which is greater than can be explained solely by foregone experience. Several studies, with the one Mincer and Polachek (1974) being the pioneer, 'have used U.S. data to investigate the effect of career interruptions on women's subsequent wages by estimating earnings functions, augmented by the inclusion of variables representing time out of work' (op.cit.). The majority of these studies conclude that time out of work has a negative effect on wages. Therefore, women who take time out seem to 'suffer an additional negative effect above and beyond the wages lost due to foregone experience' and this has been attributed to *skill atrophy* and *human capital depreciation*. As far as the segregation between male and female jobs is concerned, Eyraud (1993, pp2-3) points out that it is likely to result in de facto discrimination in wages, 'since the greater value attributed to strictly male qualities of predominantly male occupations is likely to result in higher pay for men than for women'.

As mentioned in the introduction a reference will be made on the occupational segregation by sex in Sweden and Finland, which is also persistent in Norway, as well. Occupational segregation, in general, based on gender is one of the most important factors that contribute to women's inequality within the labour market. It is about 'the tendency for men and women to be employed in different occupations across the entire occupational structure (horizontal segregation) and the tendency for women and men to be employed in different positions within the same occupation or occupational group (vertical integration)' (op.cit.).

Occupational segregation by sex exerts a negative effect on the efficiency of the labour market as a whole. The typical attitudes of employers showing a preference for men or women is likely to prevent them from choosing the person that is most

suitable for a specific post. Moreover, segregation brings about inflexibility due to the fact that ‘it restrains mobility between “male” and “female” occupations’ (op.cit.). At the individual level, occupational segregation, which is founded on the worker’s gender, exerts a highly negative effect on females, on their career opportunities and their wage and also on the ‘quality of work-life and the valuation of women’s work’ (Anttalainen, 1986; Gunderson, 1994; cited in Melkas & Anker, 1998, p5). The gender wage differential is the result of both horizontal and vertical segregation. Therefore, even in cases where females have gained admission to traditional male occupations, they are likely to be found in lower status and lower paid positions than men. ‘The polarization of the labour market by gender’ also results in qualitative differences between females’ and males’ work. According to the research carried out by Kauppinen, Haavio, Mannila and Kandolin (1989) ‘typical women’s work generally involves less decision-making and independent planning than typical men’s work, is more restricted in space and time, as well as more monotonous’.

With regard to the explanation of the gender wage differential, an alternative one is the fact that observable differences in incomes, earnings and wages of males and females, can be caused by discrimination. ‘The theory of economic discrimination in the labour market considers labour services as the good, and the wage rate as the price’ (Arabsheibani & Lau, 2000, p10). We assume that labour services are basically identical goods if productivity is the same and this suggests that if males and females have the same productivity, in that case there should not be unequal prices between them (Cain, 1983; cited in Arabsheibani & Lau, 2000, p10).

Market-based indicators like wages and not segregation indices are employed for the measurement of discrimination. This method emphasises wage rather than employment discrimination. In addition to the fact that it is possible to measure

wages, this can be justified by the fact that in cases where discrimination manifests itself 'in widespread refusals to hire or promote minority workers, this should lower their relative wages' (ibid.). This group of workers ought to search for jobs offered by firms and industries that are less preferred and this phenomenon is called "crowding hypothesis"

Moreover, wage discrimination may be in existence regardless of the degree of integration or segregation that characterises the labour market. Consequently, differentials in wages constitute a more fundamental measure of the discrimination in the labour market, when compared with employment differentials between majority and minority groups.

As mentioned in the introduction, this paper employs the Heckman two-step procedure. Heckman (1979) lays emphasis on the significance of sample selection, which is attributed to the fact that a specification error occurs if a non-random sample is employed. This bias appears in the earnings equation for females, due to the fact that wages are observed only for the women who are in fact working and earning a wage. There is a problem involved in this specification, namely the observed wages that working women receive do not constitute a dependable estimate of wages that non-working women would receive if they decided to take part in the labour force. Thus, the earnings functions which are estimated on the chosen sample 'do not accurately reflect the wages of a worker if one were randomly selected from the population' (op.cit.). The remaining part of this analysis attempts to estimate women's earnings function after having corrected for sample selection and also estimate gender wage differentials in Sweden and Finland.

### **3. The Model**

The earnings of men is assumed to follow the standard Mincerian form, as follows:

$$\ln Y_{mi} = X_{mi} \beta_m + u_{mi} \quad (1)$$

where  $\ln Y_{mi}$  is the log of earnings of men, and  $X$  is a vector of characteristics,  $\beta$  is its corresponding vector of coefficient and  $u_{mi}$  constitutes the error term.

The decision of a female to take part in the labour force is taken to be endogenous. The probability of participation is a non-random choice. Assume that the decision to take part in the labour force can be expressed as

$$I_{fi}^* = Z_{fi} \beta_f - e_{fi}$$

$I_{fi}^*$  is the endogenous selection process upon which the decision of females to participate or not depends,  $Z$  is a vector of characteristic variables specifying the choice of participation,  $\beta$  is its corresponding vector of coefficients and  $e$  is a stochastic disturbance term.

$I_{fi}^*$  is not observed, instead the individual female is noticed in two states of the world.  $I_{fi} = 1$  if they take part and  $I_{fi} = 0$  if they do not, where

$$I_{fi} = 1 \text{ if } I_{fi}^* > 0 \text{ ie. } Z_{fi} \beta_f - e_{fi} > 0 \text{ and } I_{fi} = 0 \text{ if } I_{fi}^* \leq 0 \text{ ie. } Z_{fi} \beta_f - e_{fi} \leq 0$$

Assuming that  $e_i$  is normally distributed

$$P_r (I_f = 1) = P_r (I_{fi}^* > 0) = p_r (Z_{fi} \beta_f - e_{fi} > 0)$$

$$= F(Z_{fi} \beta_f)$$

where  $F(.)$  is the normal distribution function.

The earnings of females can be seen as  $\ln Y_{fi} = X_{fi} \beta_f + u_f$  where

$$E (\ln Y_{fi} | Z_{fi} \beta_f - e_{fi} > 0) = X_{fi} \beta_f + E (u_f | Z_{fi} \beta_f - e_{fi} > 0)$$

If there is any correlation between unobserved determinants of participation and unobserved determinants of earnings then  $\text{cov} (e_{fi}, u_f) \neq 0$  and  $E (u_f | e_{fi}) \neq 0$ .

Heckman (1979) has shown that if  $e_{fi}$  and  $u_f$  are jointly distributed as bivariate normal with zero mean where  $s_e^2$ ,  $s_u^2$  are variances and  $s_{ue}$  is the covariance, then

$E(u_f | e_{fi} > -Z_{fi}) = -\{s_u(s_{ue}) / s_u s_e\} / \{f(Z_{fi}) / F(Z_{fi})\}$  where  $f(\cdot)$  is the normal density function and  $f(Z_{fi}) / F(Z_{fi})$  is the inverse of the Mill's ratio. The estimated earnings of females is therefore  $\ln Y_{fi} = X_{fi}\beta_f + \alpha_1 + v_i$  where  $v_i$  is the new error term, uncorrelated with  $X$  and  $E(v_i | Z_{fi} - e_{fi} > 0) = 0$ .

Following on from this, a decomposition of the earnings differential is made, following Oaxaca and Ransom (1994). By using this decomposition technique, one can measure the extent to which the difference in earnings between men and women due to a difference in characteristics or endowments, and the extent to which it expresses different rewards to the same work. Formally, separate earnings functions are estimated for men (m) and women (f),

$$\ln Y_m = \beta_m \bar{X}_m + u \quad (5)$$

$$\ln Y_f = \beta_f \bar{X}_f + u \quad (6)$$

where  $Y_m$  and  $Y_f$  are the monthly earnings for men and women respectively,  $X_m$  and  $X_f$  are the vector of means of the independent variables for men and women,  $\beta_m$  and  $\beta_f$  are the corresponding vectors of rewards or prices to these characteristics.

The difference between (5) and (6) gives the gender earnings differential:

$$\ln Y_m - \ln Y_f = \beta_m \bar{X}_m - \beta_f \bar{X}_f$$

This difference can be decomposed into differences in characteristics and differences in coefficients, by adding and subtracting a term  $\beta_m \bar{X}_f$  to obtain:

$$\begin{aligned}
&= [\beta_m X_m - \beta_m X_f] + [\beta_m X_f - \beta_f X_f] \\
&= \beta_m [X_m - X_f] + X_f [\beta_m - \beta_f] \quad (7)
\end{aligned}$$

$$\begin{aligned}
&= [\beta_m X_m - \beta_f X_m] + [\beta_f X_m + \beta_f X_f] \\
&= X_m [\beta_m - \beta_f] + \beta_f [X_m + X_f]
\end{aligned}$$

The first term measures how much of the differential in earnings between men and women can be attributed to differences in endowments or characteristics. The second term reflects how much the differential in gender earnings can be attributable to the underpayment of women. This part is the one regarded to be ‘unexplainable’ often mentioned as the “discrimination term”

#### **4. Data and variables.**

The data used in this analysis is held at a database in Luxembourg. The organisation is called Luxembourg Income Study (LIS). The LIS database is a collection of household income surveys. It is not possible to download the datasets held at the database. They may only be accessed by incorporating either SAS, SPSS, or STATA programs in the body of an e-mail message. The programme used in this paper is STATA.

The LIS dataset for Finland for 1995 was derived from the Income Distribution Survey and the same holds for Sweden, as well. In this paper variables from the person file were used. Household and Children files are also available. The total number of people in the sample for Finland is 19621, of which 9807 are males and 9814 are females. Some categories of people were excluded from the analysis for Finland, namely farmers, both employers and own-account ones, small employers, other employers, own-account workers, self-employed, students, retired workers and

pensioners, persons doing household work, long –term unemployed and others who are not classified were excluded. There was also a restriction imposed on age. People aged 16 to 65 are included in the analysis. The remainder comprised of 3996 men and 3771 women. With regard to Sweden the sample consists of 26947, of which 13107 are males and 13840 are females. As for Finland, some categories of people were excluded, namely the self-employed, the not employed, with the latter category including pensioners, students and other. Also the unclassified workers were excluded from the analysis. The restriction imposed on age is the same as for Finland. The remainder comprised of 5681 men and 5718 women.

The dependent variable for Sweden was the hourly wage rate, since this variable was available in the dataset, and its the natural logarithm was taken. Moreover, the log earnings equations were estimated for both males and females separately. In the sample, men earn an average of 126.0107 crowns and women receive an average of 92.9987 crowns.

Concerning Finland, since the hourly wage rate was not available, a new variable was created which is a rough estimate of the weekly wage rate, since the annual gross wage/salary was divided by the number of weeks worked full time per year. This is a rough estimate, since the weeks worked part time were not taken into consideration so that was used as the dependent variable and the natural logarithm was taken. Here again the log earnings were estimated for both men and women separately. In the sample, men earn an average of 150251.6 finnish marks and women earn 108581.9 marks.

For Sweden, dummy variables were created for the different categories of occupations, as defined by the International Standard Classification of Occupations (ISCO). Seven types of occupations were specified. Dummy variables were also



created for the region where the correspondent lives in. This category includes seven regions<sup>1</sup>. The geographic location was a variable available only for the household file, thus there had to be a merge of the two files, in order to incorporate this variable into the person file.

For Finland, dummy variables were created for the different categories, like for Sweden. Seven types of occupations were specified. Moreover, there was another variable used, namely the industry of the worker, for which 9 different types were specified. Apart from the variable indicating the region where the correspondent lives, there is another variable indicating whether it is urban or other. Here again the geographic location variables had to be incorporated from the household file.

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### **5.1. Female labour participation.**

The only independent variable used in the probit function for Sweden was the number of children under 18. The effect of the presence of children under 18 is positive and significant. This might cause surprise, because in general we expect that the presence of dependent children would have a negative effect on the decision of women to participate, since it is relatively difficult to work and take care of young children especially. Nevertheless, as discussed above, the policies carried out by the Nordic countries facilitate the combination of parenthood and employment and specifically the combination of motherhood and employment, since the greatest part of the household work is performed by women. So, the logical argument that motherhood is likely to prevent women from working is reversed. The presence of depended children encourages mothers to work in order to supplement the family income.

For Finland, the effect of age is positive and highly significant, which suggests that as women become older the probability to participate in the labour force increases, though at a decreasing rate. The effect of education at all levels is also positive and significant. The results show that women who have received 16 years of education or they have completed their postgraduate studies are more likely to participate. With regard to the effect of marital status, one would expect that being separated or divorced would have a negative effect on a woman's decision to work. In the case of Sweden, being both single or separated or divorced has a significant

positive effect on their decision to work. The first is not at all surprising since single women are not supported financially by a husband, but the fact that being separated or divorced has a positive effect on women's decision to work means that Finnish women feel quite independent and they have a dynamic presence in the labour force. Finally, we observe that the region where a woman lives can have a negative effect on their decision to work. Living in Hame, Kimi, Mikkeli, North Karelia, Central Finland and Oulu Province all have a negative effect on women's decision to work. Finally, we observe that living in areas other than rural has a positive effect.

The results of the probit for Sweden and Finland are presented in Table 1 and 2 respectively.

### **Results of probit analysis of female participation for Sweden and Finland**

**Table 1**

<b>Variables</b>	<b>Coefficient</b>	<b>'t'</b>
_cons	1.290044	13.128
occfarm	.0917185	0.708
occprof	.0832735	2.107
occmadm	.1689686	3.861
occtesc	.1042299	2.684
occtrco	.1218644	2.407
occoth	-.0198589	-0.519
secedu	.0033865	0.163
univedu	.1265891	5.176
Biggerc	-.0927428	-5.284
South	-.0482342	-2.014
North	-.0976974	-3.195
Northsp	-.0833765	-2.569
Gothenb	-.0684287	-3.269
Malmo	-.0125879	-0.348
Scandin	-.0924983	-2.171
otherna	-.0452363	-0.753
notmar	.0525223	2.793
page	.0566042	12.625
agesq	-.0005896	-10.998

**Table 2**

<b>Variables</b>	<b>Coefficient</b>	<b>'t'</b>
_cons	6.724225	72.364
occfarm	-.0253722	-0.612
occprof	.059711	3.471
occtesc	.1694708	9.918
occtrco	.0892463	3.391
occmadm	.1332588	9.036
occoth	-.0148749	-0.942
indfafi	-.1175106	-2.954
indmien	-.0372646	-0.581

indpuse	-.1166118	-9.084
indcons	-.1899631	-4.676
indret	-.0206725	-1.414
indtrco	.0091256	0.478
indfin	.0230588	1.440
indprse	-.0871048	-6.292
msunkno	-.0404172	-0.769
single	.0080456	0.466
sepdivo	.0329098	1.889
widowed	.0292588	0.830
educ10	.0280788	1.749
educ12	.1295201	7.324
educ13	.2718431	12.989
educ15	.36678	14.550
educ16	.5733892	26.282
postgra	.8319831	14.667
Turku	-.0908515	-5.897
Hame	-.1178964	-7.852
Kymi	-.0896428	-4.481
Mikkeli	-.0979497	-3.596
Northk	-.0912733	-3.248
Kuopio	-.0711365	-2.997
Centrafi	-.1141266	-4.948
Vaasa	-.1367852	-4.397
Oulu	-.1108079	-5.819
Lapland	-.0228811	-0.853
Aland	-.0738057	-1.188
other	.003137	0.283
page	.0357965	7.921

## 5.2. The earnings function for men and women

## SWEDEN

To begin with, for women in the sample before the correction bias, working in the managerial and administrative sector they earn 15% more than those working in manufacturing. Also working in technical or scientific sector or the transport and communication one yields 9% and 10% higher earnings in comparison with the manufacturing sector. The returns to human capital characteristics are high for women having received university education with the earnings for them being nearly 13% higher compared to those with primary education. As far as the region is concerned, women living in Bigger cities, in the South, in the North, and in the North sparsely built areas earn 9%, 5%, 9% and 8% less respectively compared to those living in Stockholm. Being non-Swedish has a negative effect on earnings but not significant. Being unmarried has a positive effect on wages, since unmarried women earn 9% more compared to married ones. As expected, age has a significant positive effect on earnings, but at a decreasing rate. For women in the corrected sample, working as a professional has a significant positive effect on earnings, since these women earn 8% more than those in manufacturing. Also in the corrected sample, working as a professional or administrative or managerial posts earn higher wages than those in manufacturing and the positive effect is a little greater in the corrected sample. Being Scandinavian (non-Swedish) has significant negative effect on earnings, since Scandinavian earn 9% less compared to Swedish. For men, working as a farmer has a significant negative effect on earnings since farmers earn 8% less compared to men working in manufacture. Working as a professional, in a technical or scientific job or in a managerial or administrative post results in earning 18%, 14% and 26% more, respectively. By contrast with women in both the corrected and the uncorrected sample, secondary education results in men earning 8% more compared to those with primary education and the effect of university education is highly significant resulting in them earning 24% more. Living in Bigger Cities, South, North and North sparsely built areas has a highly negative effect on earnings. Not being either Swedish or Scandinavian has a significant negative effect on wages resulting in those men earning 16% less than Swedish men. The results are presented in the end of the paper.

## FINLAND

For women in the non-correlated sample, being employed in a post as a professional has a significant positive effect on wages resulting in those women earning 6% more than the ones in manufacture. Being employed in a technical or scientific job has a highly positive effect on earnings, since women in these jobs earn 17% more. Moreover, working for the transport and communication field or being a manager yields earnings 9% and 13% higher respectively. The farming and fishing industry has a significant negative effect on earnings, since women working in that industry earn 12% less than those working for the manufacture industry. Also, the public sector industry has a negative significant effect on earnings. Moreover, the construction industry and the private sector industry have significant negative effects. The variables related to marital status are not significant apart from the one of unknown marital status. The variables related to education are highly significant apart from education of ten years and we observe that the returns to education from 12 to 16 years are hierarchical. Living in Turku, Hame, Kymi, Mikkeli, North Karelia, Central Finland, Vaasa, Oulu have a significant negative effect on earnings. Age has a positive significant effect on earnings, but at a decreasing rate. In the corrected sample, being separated and divorced has a significant positive effect on earnings.

Education of 10 years is also significant and here again the returns are hierarchical from the education of 10 years up to the education of 16 years. Also age is significant, at a decreasing rate.

For men, the farmer occupation has a significant negative effect on earnings as it did for Sweden. Working in the transport and communication field has a significant negative effect on earnings. Also, the retail industry has a significant negative effect on earnings. Being single has a significant negative effect on earnings. All education variables are significant. Living in Kymi and does not have a significant negative effect on earnings, but living in Lapland does. Age is highly significant. The results are presented in the end of the paper.

### Decomposing the gender wage gap for Finland

The results of the decomposition method of Oaxaca and Reimers are given below:

	Corrected for sample selection bias: Oaxaca method	Corrected for sample selection bias: Reimers method	Without correction Oaxaca	Without correction Reimers
Endowment differences	0.1426	0.17	0.1426	0.22
Wage discrimination	0.1674	0.22	0.30	0.44
Total estimated differential	0.31	0.39	0.4426	0.66
% due to endowments	54	49	41	43
% due to discrimination	46	51	59	57

### For Sweden

Endowment differences	0.16	0.18	0.16	0.18
Wage discrimination	0.13	0.23	0.32	0.39
Total estimated differential	0.29	0.41	0.48	0.57
% due to endowments	58	53	46	49
% due to discrimination	42	47	54	51

**Conclusions** : As stated over and over throughout this paper, Nordic countries have been concentrating on promoting the equality between the two sexes and in general, but they are not identical. In Finland, greater part of the differential is due to discrimination than in Swede. That means that even though the government in both countries is aims at combating inequality Sweden seems to have managed to do that with better results.

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