

Men and Women in the Estonian Labour Market: An Assessment of the Gender Wage Gap

Tairi Rõõm and Epp Kallaste

Executive Summary

In a modern society, men and women should have equal opportunities to succeed. Any difference between the wages paid to men and women is considered an essential indicator of the non-existence of equal opportunities. On average, women earn less than men in all countries, and this by approximately one quarter less in Estonia.

This analysis seeks to ascertain the theoretical reasons for the gender wage gap, the historical development trend of the wage differential in Estonia, the degree to which differences in human capital and work explain that trend and the components of the gender wage gap that cannot be explained by the factors mentioned above. The wage gap is analysed using one of the most widespread methods – the Oaxaca-Blinder decomposition. The analysis is based on data from Estonian Labour Force Surveys for the years 1998-2000.

A gender wage gap arising from differences in the human capital and work of women and men is referred to as an explained wage gap, because these factors cause differences in the productivity of women and men. The portion of the wage gap that cannot be explained by observable factors is referred to as the unexplained wage gap. The unexplained wage gap results from the different personal characteristics and labour market behaviour of men and women, which cannot be identified on the basis of data, as well

as from possible discrimination. Although the explained wage gap arises from differences in productivity, discrimination may also play a role — for example, access to work-related training affects productivity.

The results of the analysis reveal that, on average, in 1998-2000, wages paid to women in Estonia amounted to 72.7% of the wages paid to men. The average gender wage gap has decreased since the time Estonia regained its independence, but nonetheless exceeds the wage gap in most other Central and Eastern Europe countries and EU member states. The decrease in the wage differential has arisen primarily from structural changes in the labour market, as a result of which industries employing more women than men, and in which education is appreciated more, have grown.

A greater than average gender wage gap existed among non-Estonians and employees who did not speak Estonian. In addition, the wage differential was greater among employees aged 30-40 years. One-third of the gender wage gap can be explained by differences in male and female human capital and occupational choices. Two-thirds of the gender wage gap cannot be explained by these factors. Hence, neither the reduction of segregation nor changes in other observable differences between men and women would contribute to a substantial reduction of the wage differential. Attention should be paid to the unexplained portion of the wage gap and its underlying causes.



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Introduction

The study aims at explaining the underlying reasons for the gender wage gap.

Estonian women are paid approximately three-quarters of the wages paid to men. The aim of this study is to analyse the reasons for that. First the theoretical reasons for the gender wage gap are explained. The authors then empirically analyse the degree to which the wage differential in Estonia is caused by differences in productivity (i.e. the fact that women's occupations differ from those of men and that women have different levels of education and work experience when compared to men), and the portion of the wage gap that cannot be explained using the observable differences between men and women.

An analysis of the gender wage gap is important for several reasons. First, similar pay for equivalent work is a generally recognised anti-discrimination principle, which Estonia also seeks to abide by. Second, ensuring equal opportunities and reducing the segregation of the labour market serve as a basis for the better realisation of women's potential, which is essential, among other things, from the point of view of the aging population and the diminishing numbers of people of working age. In the long run, all the available opportunities for increasing the share of the working age population should be utilised.

Besides the benefit of women realising their potential in the labour market, increasing the participation of women is important for securing adequate living standards. Given the recent trend of increasingly more families having just one parent (mostly the mother), it is important to ensure sufficient income for families, and this in turn is based on the opportunity to work and earn an adequate wage. Increasing the participation of women would also make it possible to improve their opportunities for self-fulfilment and increase their independence, thus taking a step closer to gender equality.

Wage is a vital issue when choosing between working and staying home.

Wage is a vital issue when choosing between working and staying home. The European Employment Strategy 2003,

which also serves as a basis for drawing up the Estonian National Action Plan for Employment, has set a substantial reduction of the gender wage gap in all the EU member states by the year 2010 as one of the goals. The reduction of the gender wage gap should be achieved by influencing the various underlying factors that cause the gap. Among other things, occupational and sectoral segregation must be reduced, access to education and training must be improved, remuneration systems must be made more transparent and awareness of the existence and causes of the wage differential must be raised (The Council of the European Union 2003).

Previously, Rein Vöörmann discussed the participation rate of women and men in the labour force as well as the wages paid to women and men in comparison to other Central and Eastern European countries (see, e.g. Vöörmann 2000; the Ministry of Social Affairs 1999). By analysing the average wages at the beginning and in the middle of the 1990s, Vöörmann points out that in Estonia women are paid less than men in all occupations and that wages paid to women fall short of the earnings of men by approximately one-quarter. Several other studies have been carried out in Estonia that were not targeted at an analysis of the wage differential, but which among other things recognised the existence of the gender wage gap. For example, Philips concluded that in 1989 men earned 30% more than women on average, while other socio-demographic and occupational characteristics were similar (Philips 2001). Kuddo et al. (2002) point out that while the characteristics of human capital and the labour market were similar, women were paid 934 kroons less than men (i.e. wages paid to women represented approximately 75% of the wages paid to men).

The current study advances analyses of the gender wage gap in Estonia by assessing factors that could potentially have a different impact on the wage formation of men and women (e.g. education level, length of employment, number of children, etc.). The gender wage gap is analysed on the basis of the Oaxaca-Blinder

decomposition method (Oaxaca 1973), using data from Estonian Labour Force Surveys from the years 1998-2000.¹

The first chapter of this study describes the reasons behind the gender wage gap. The second chapter provides an overview of how the ratio of male-female wages has changed in Estonia over the past decade. The third chapter examines in more detail the method of analysis, assesses the impact of various factors on the wage differential, and determines the proportion of the gender wage gap that can be explained by these factors.

1. Formation of wages and reasons for the gender wage gap

1.1. Explained and unexplained gender wage gap

As a rule, wages should be positively related to the productivity of workers. Irrespective of whether an employee is a woman or a man, blond or brunette, his or her pay should reflect the value-added generated by him or her. Yet it is common knowledge that women are paid less than men.

Several reasons may lie behind the gender wage gap. In economic literature, the gender wage gap is divided into explained and unexplained portions.

- The explained gender wage gap refers to the portion of the wage differential that can be explained by the observable characteristics of women and men (e.g. different working time, education level, length of employment, occupation, sector, etc.). The explained wage gap is explained from the point of view of the employer — that is, women are engaged in fields where their productivity is lower, or the human capital of women is such as to entail lower productivity, which, in turn, causes lower wages.

- The unexplained wage gap indicates the portion of the wage differential that cannot be explained using observable factors. The unexplained wage gap may refer to discrimination or to the fact that other variables, which are not observable for the researcher, have an impact on the wage differential.

Hence, the terms “explained wage gap” and “unexplained wage gap” signify the portions of the wage differential that can or cannot be explained by observable factors.

The unexplained wage gap is often interpreted as discrimination. Yet the unexplained portion of the wage gap may be caused by factors that cannot be measured, but which still render the productivity of women and men different (e.g. raising children makes women less flexible in respect to working time). On the other hand, the explained wage gap may also arise from discrimination, if the jobs and occupations chosen by women result from the norms established by society, not from the deliberate and voluntary choice of women.

The most commonly mentioned observable differences in the work and human capital of women and men are the following:

- Different working time
- Horizontal segregation of the labour market
- Vertical segregation of the labour market
- Differences in education
- Different length of employment

Working time is the principal factor affecting the explained portion of the wage gap. Women usually work less than men — that is, there are more part-timers among women than among men, and thus women’s wages are lower. When compared to working full-time, working part-time is more suitable for reconciling one’s professional life with raising children and, considering the traditional dis-

In the professional literature, the gender wage gap is divided into explained and unexplained portions.

Wages should correspond to the productivity of employees.

Survey was conducted among 810 enterprises.

1 – Since the Statistical Office altered their methodology for collecting data for the Labour Force Surveys in the middle of 2000, more recent databases cannot be linked to previous ones.

Women are predominantly represented in lower-paid fields of activity.

Women are more likely to become inactive than men.

There is no consensus as to whether differences in the length of employment and occupational choices result from discrimination or not.

tribution of gender roles, it is predominantly the women who choose a shorter working time.

However, when comparing men and women working full-time, it appears that, on average, women are still paid less than men. In such a case, the most widespread explanation for the differential is that women are predominantly involved in lower-paid fields of activity (the horizontal segregation) and that positions held by women are on the lower levels of the “career ladder” and hence have lower remuneration rates (vertical segregation). For example, women are seamstresses, while men are miners; women are secretaries, while men are senior executives. The question is: how does gender segregation arise between industries and occupations, and is it triggered by discriminatory behaviour on the part of employers and society? Segregation may arise from both people’s deliberate choices and the behaviour resulting from gender roles determined by society. The way women and men choose their qualification need not always be based on free choice, but rather on the potential of finding a job in the future. Women do not choose to study to become a car repair mechanic, as the potential of finding a job would be less than, for example, after studying to become a nurse. Vertical segregation may be caused by the limited existence of promotion opportunities for women or limited access to training. As far as employers are concerned, these factors may reflect a deliberate choice after considering the risk that women may choose to stay at home and raise children, as a result of which the expenses incurred by the employer in developing their human capital may be lost.

Productivity may also differ if people work in the same occupations and in the same sector. Empirical surveys based on regression analysis have revealed that a substantial part of the gender wage gap is caused by differences in human capital — that is, education level and length

of employment. The higher the employee’s human capital, the greater, on average, his or her productivity and hence also wage. Until recently, the education level of men has been higher than that of women in most countries (however, that trend has reversed now, i.e. more women than men are studying in universities in most developed countries).² Moreover, men have a longer length of employment, as women’s employment is interrupted by parental leave. Due to both of the reasons specified above, wages paid to women are smaller than the earnings of men on average.

In addition to the general length of employment, the duration and timing of periods of inactivity also have an impact on wages. Breaks in employment have a more adverse impact on a future rise in wages if a person has no previous work experience (e.g. immediately after graduation from a secondary school or a university). It has also been found that the longer the periods of absence from work, the lower the future increase in wages, irrespective of the length of previous employment (Neumark 1993). Due to gender roles, the probability of becoming inactive and the duration of periods of absence from work are greater for women than for men, in particular at the beginning of their professional life.

There is no consensus as to whether the gender wage gap arising from differences in the human capital and occupational choices (the explained wage gap) is caused by discrimination or not. Those who assert that the explained wage gap is not caused by discrimination assume that differences in education levels, length of employment and occupational choices result from the free choice of women: women prefer “easier” jobs and staying at home with children over the opportunity to earn higher wages. In other words, women deliberately prefer staying at home, and their welfare is greater when raising children than when working. However, opponents find that differences in the length of em-

2 – The former socialist republics (incl. Estonia) represent an exception as regards the education level – in these countries the education level of women has been higher than that of men for a long period.

ployment and occupational choices are also caused by discrimination: the choices that women make are imposed on them by society, and women work in lower-paid occupations not because of free choice, but because they find it difficult to find jobs in the so-called “male occupations” due to barriers caused by various norms and attitudes.

1.2. Gender wage gap and discrimination

Several empirical surveys have indicated that, at least until recently, the gender wage gap has resulted from discrimination. The basic concepts of discrimination theory were established by Gary Becker (1957). According to Becker, employers who discriminate while choosing employees (i.e. prefer men over women) are also willing to pay a higher price for their preferences. Employers prefer to hire men (as a result of the preferences and prejudices of their own, or of other employees or customers), even though gender is not an essential factor in determining productivity. While men’s wages are higher than those of women, hiring men is accompanied by higher expenses. Discriminating employers hire fewer women than would be optimal, and therefore earn lower profits than the employers who do not discriminate against women. Thus, while the employers of both types seek to maximise their welfare, non-discriminating employers have a competitive advantage over discriminating employers.

The main conclusion derived from Becker’s model is that, as a result of competition between companies, the companies that discriminate against women are eventually driven off the market. As a result, the relative demand for female labour increases, the wage gap between women and men with the same qualification becomes narrower and may disappear altogether. Several empirical studies have taken that conclusion as a basis and analysed whether increasing competition in an industry causes a reduction of the gender wage gap. There is a consensus that this is indeed the case. For example, Black and Brainerd (2002) analysed

whether globalisation has narrowed the gender wage gap in the United States of America. They compared the impact of an increase in trade on sectors that were open to competition, and on sectors which initially had little competition due to limited trade. The analysis carried out by Black and Brainerd yielded the conclusion that, as a result of an increase in trade, the gender wage gap narrowed more in the latter sectors. Their conclusion tallied with Becker’s theory: increasing competition in an industry (resulting from the deepening of trade relations in the given case) brings about a decrease of the gender wage gap. This implies that initially the gender wage gap was at least partly caused by discrimination.

Ashenfelter and Hannan (1986), who analysed the gender wage gap in the US banking sector, reached similar conclusions. They found that the greater the market power of the banks in a given region, the smaller the relative share of female employees in these banks. This result, too, is in line with Becker’s theory of discrimination. A study by Black and Strahan (2001), which discussed the same issue, was also based on the empirical analysis of the banking sector: the authors studied the effect of deregulation in the banking sector in the 1970s on the gender wage gap. They concluded that the increased competition resulting from deregulation has significantly reduced the gender wage gap. Hellerstein, Neumark and Troske (2002) found that the profitability of companies with substantial market power is positively linked to the relative share of women working in such companies. This result is also in line with Becker’s theoretical model that discusses discrimination.

The main conclusion based on the above studies is that a revival of competition in a product market most probably entails an improvement of the relative position of women in the labour market. Hence, enhancement of competition and facilitation of the efficient functioning of labour and product markets enable governments to, among other things, ensure equal treatment of men and women.

Discriminating employers earn smaller profits.

Competition advances equal treatment of men and women.

1.3. Additional reasons for a gender wage gap: differences in labour market behaviour and psychological factors

In Estonia, women settle for smaller wages and search for a new job less actively than men.

In addition to the previously mentioned reasons for differences in productivity, the gender wage gap is also caused by differences in labour market behaviour and the personal characteristics of men and women. Therefore, the unexplained portion of the gender wage gap consists of two components that cannot be differentiated in an empirical analysis:

- differences in wages that are caused by discrimination
- differences in wages that are caused by the different labour market behaviour and personal characteristics of men and women.

The higher the expected pay, the more intense the job search.

In the following, we will discuss the gender wage gap arising from labour market behaviour. Rõõm (2004) has concluded that women settle for lower wages and search for work less actively than men in Estonia. A comparison of reservation wages³ indicates that, on average, men demanded higher wages than women (see figure 1). While more than half of all women (56.5%) would agree to work for a wage of 2000 kroons, only approximately one-third (34.1%) of all men would accept a job for the same remuneration. The proportion of women whose reservation wage amounted to 3000 kroons or less was 82.6%, while the proportion of men

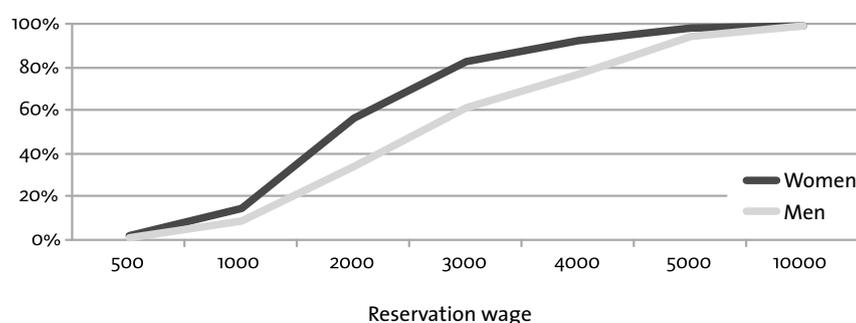
with the same remuneration requirement was 61.6%. Using a regression analysis, Hinnosaar (2003) found that *ceteris paribus* (i.e. when all variables included in the regression analysis were the same), the reservation wage for women was 29% smaller than that of men.

Besides the finding that women would agree to work for a lower wage than men, job search activity is lower among women than among men in Estonia. The probability that a man actively seeks work in case of unemployment is 17% higher than the same probability for a woman, *ceteris paribus* (Rõõm 2004).

The intensity of the job search and the reservation wage have an impact on both the probability of finding work and the future wage. The more actively an employee seeks work the larger the potential wage in his or her new job. Greater job search intensity increases the probability of finding a job that is the best match for the person's knowledge and skills. Thus, in the case of greater search intensity the potential productivity of an employee in their new job will be higher, and so will be the expected wage.

The positive relationship between the reservation wage and the potential future wage is the result of the fact that the higher the wage expectations of a person participating in the labour market, the more actively he or she seeks work,

Figure 1. Cumulative distributions of the reservation wages of women and men in Estonia (1998-2000)



Source: Estonian Labour Force Survey; calculations by authors

3 – The reservation wage is the lowest remuneration for which an unemployed person would agree to take up a job.

ceteris paribus. Furthermore, a high reservation wage may have a direct positive impact on the wage. In an imperfect information framework, asking for a high wage in job negotiations functions as a signal that implies high potential productivity. Therefore, if a person asks more, employers are in some cases also willing to pay more.

Men's reservation wages are higher than those of women because men are paid more than women on average and therefore their wage expectations are higher. This partly explains the greater activity of men in seeking work when compared to women. However, even if the wage expectations are the same, men are still more active in seeking work in Estonia than women (Rõõm 2004).

In addition to wage expectations, labour market behaviour can differ because a job search for women involves a higher opportunity cost. The traditional division of labour within families usually means that women have a larger share of household work, while men work more intensely outside the house. Also, if there is a need to take care of family members — children, ill or disabled relatives — then this duty usually falls to the woman. This implies that on average it is more costly for women to look for new jobs when unemployed.

Another explanation for why women are likely to search less intensely than men is their lower relative return on employment compared with unemployment income. Since women have lower expected wages, they are less motivated to look for a job. The existence of a gender wage gap means that unemployed wives whose husbands work have a higher alternative income than vice versa. This is an additional reason why women are less motivated to search for a job in general.

In addition to the above-mentioned factors, there are several psychological reasons why women's search intensity may

be lower. A number of studies in the area of psychology have shown that while both men and women exhibit overconfidence in certain situations, men are on the average more likely to overstate their characteristics relative to others.⁴ Men's relative overconfidence may contribute to the gender wage gap as a separate factor independent from search activity. Evidence from several studies has implied that people who work in masculine occupations (such as investment bankers, lawyers, managers and negotiators) tend to be overconfident (Barber and Odean (2001)). Since the salaries tend to be higher in masculine occupations, men may get selected for such jobs due to their overconfidence and that may partly explain their higher earnings. But men's relative overstatement of their abilities can also contribute to the differences in search behaviour, since search activity depends on how a person values his or her job finding prospects and the expected salary.

It is also shown that women perform worse when they have to compete with others, while the performance of males improves in a competitive environment. Gneezy, Niederle and Rustichini (2002) conducted a laboratory experiment where they showed that as the competitiveness of an environment increases, there is a significant improvement in performance for men, but not for women. (Their conclusions, however, were based on a small sample and therefore not statistically robust.) The inference from this behavioural difference for the current study is straightforward. A job search is a competitive process and if women's performance worsens in competitive environments, they might get more easily discouraged and to search less in general compared with men.

Finally, evidence from behavioural economics and finance literature implies that women are in general more risk-averse than men (See for example, Sunden and Surette (1998), Lehmann and Warning (2001)). This may also contribute to differences in search intensity. If women are

4 – An overview of the relevant literature is provided e.g. in the article written by Barber and Odean (2001).

more risk averse, they are more likely to accept a job offering a lower wage (i.e. their reservation wages may be lower on average) and search intensity is positively related to the reservation wage. On the other hand, a more risk-averse person may be more inclined to an intensive search — that is, s/he might aim to lessen the risk of remaining jobless by trying to get as many job offers as possible. Due to these opposite incentives, the overall effect of risk-averseness on search intensity is ambiguous.

2. Development of the gender wage gap in Estonia in comparison to other countries

The gender wage gap was larger at the end of the 1980s than at the end of the 1990s in Central and Eastern European countries.

In most of the Central and Eastern European countries, gender wage gaps were larger during the last years of the Soviet era than at the end of the 1990s. (Rõõm (2004), see also Figure 3). The decrease in the wage gap during the previous decade may seem surprising at first sight, as general income inequality increased during the transition process. Furthermore, equal rights were guaranteed for men and women in the labour market at least in the rhetoric in socialist countries. Wages were determined centrally across the occupations and industries chosen, and thus the so-called subjective factor inherent in the capitalist system was ruled out in the formation of wages, at least theoretically. Nonetheless, the remuneration paid to men and women differed substantially. In Estonia, the average monthly salary of women represented 66% of the monthly salary of men in 1989 (Noorkõiv et al. 1997).

In 2001, the hourly rate paid to women amounted to 75.7% of the hourly rate paid to men, while in 1994 this ratio had been 71%. This implies that the gender wage differential decreased in the previous decade (see also Figure 2).

Compared with other transition economies, Estonia was no exception regarding the gender pay difference; the average gender pay ratio in Central and Eastern European economies was 72% at the end of 1980s. In Western Europe, these ratios were on average 5 percentage points higher than in the Central and Eastern European countries (see Figure 3).

Segregation has been mentioned as the main reason for the wage gap in the socialist system. The Soviet-era centralised allocation of jobs caused extensive gender segregation across occupations and professions. While women were traditionally engaged in the service sector (education, trade, etc.), heavy industry, transport sector and agriculture predominantly represented the so-called male occupations that were better paid in comparison with the service sector. Primarily as a result of the segregation, but also due to the reason that men were more likely to be promoted than women irrespective of their occupations, wage gaps were wider in Central and Eastern European countries than in Western Europe during the last decade of the socialist era (see Figure 3).

The gender wage gap depends, among other things, on the overall wage structure of a particular country. The general inequality of wages and the position of women in the distribution of wages are

Figure 2. Gross average hourly pay for women and men (kroons), and the ratio of women's wages to men's wages (%)



Source: Statistical Office of Estonia

essential factors. More equal wage distribution implies a smaller gender wage gap. However, a wide-ranging distribution of wages need not entail a wide gender wage gap. If, for example, wage differences are substantial across education levels and women are on average more educated than men, then the gender wage gap is small (Blau and Kahn 1992, 2000). Hence, in international comparisons of wage differences as well as in analysing the development of the gender wage gap in a particular country, attention should be paid to the general wage structure for men and women.

In almost all CEE countries, gender pay gaps declined during the 1990s. This implies that economic reforms brought about a relative improvement in the position of women on the labour market. Economic transition was characterized by a rapid increase in wage differentiation and a simultaneous decline in labour force participation rates from the artificially high levels of the Soviet era. Both of these factors contributed to the reduction of the gender pay gap, as:

- An increase in pay inequality coincided with and was to some extent the consequence of an increasing demand for better-educated labourers. The relative returns to education and employ-

ment opportunities for more educated workers rose rapidly during transition. In comparison with men, women benefited more from this development, since in most former Soviet countries females were and are more educated on average.⁵

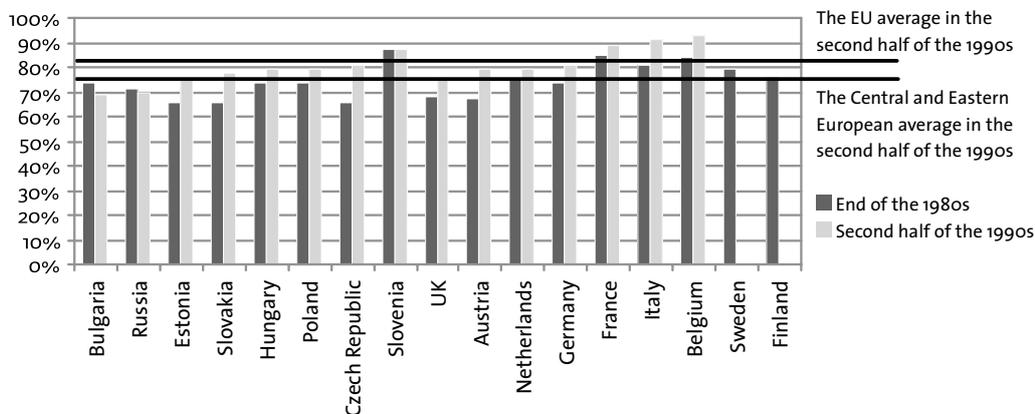
- The relative position of women in the labour market improved, since women worked disproportionately more in sectors that gained from the transition. Orazem and Vodopivec (2000) show that in Estonia and Slovenia, labour demand fell most in predominantly male sectors, while predominantly female sectors either declined little or expanded. This was likely the case in many other transition economies as well, since the employment loss was the largest in heavy industry sectors and agriculture where the workforce was male-dominated. On the other hand, female-dominated sectors, such as trade and services, were underdeveloped under the socialist system and labour demand increased in these sectors during the transition.

An additional factor causing a decline in the gender wage gap during the transition in Estonia and in some (but not all) other CEE countries was structural change in the labour force composition. Simi-

Demand for labour increased in sectors where women dominate.

Demand for highly educated employees increased.

Figure 3. Proportion of women's wages to men's wages (%)



Sources: Central and Eastern European countries – Newell and Reilly 2000, EU member states at the end of the 1980s – Blau and Kahn 2000, EU member states at the end of the 1990s – European Commission 2002

5 – In Estonia 23% of working age women have a university degree, compared with 15% of working age men.

larly to other post-socialist economies, economic transition in Estonia brought about a decline in the overall employment rate, but the drop in employment was more pronounced for women than for men. Since individuals with the lowest earning potential (i.e. low-skilled workers) were the most likely to drop out of the labour force during the period of employment contraction, the gender difference in relative reductions in the employment rates changed the composition of the labour force. As a result, the skill pool of women who remained in the labour force improved relative to men. There is evidence in Estonia that during the first years of transition (between 1989 and 1995) the employment shares for the least-educated groups fell relatively less (from 37 to 18 percent) for men and relatively more (from 35 to 12 percent) for women (Orazem and Vodopivec (2000)). The idea that the change in the composition of the labour force was a source of the reduction in the gender wage gap was first pointed out by Hunt (2002). She showed that in Eastern Germany this decline was in part caused by low-earning and low-skilled women selectively dropping out of the labour force.

Raising awareness of and changes in gender roles contribute to the reduction of wage differences.

The gender wage gap has narrowed in Western European countries, the United States of America and other developed industrial countries in the last decades. In addition to greater awareness of the gender inequality issue in these countries, two other trends have contributed to the reduction of the wage gap. First, the relative education level of women has improved in comparison with men and, second, the average length of employment of women has increased as a result of a decline of birth rates and an increase of the average childbearing age. In Estonia, an improvement of education levels among women may entail a reduction of the wage gap in the near future. However, the length of employment is unlikely to increase.

The average education level of women during the transition process in Estonia has improved when compared to men, and this should narrow the wage gap.

Even though the relative share of men with higher education has increased as a result of the increase of the relative demand for highly educated labour, the percentage of highly educated women has grown even more quickly. In Estonia, the share of male students aged 19-22 years increased from 23% to 43% in 1993-2003. The percentage of female students of the same age has grown more – from 28% to 59% (Statistical Office of Estonia).

It is quite unlikely that an increase of the average length of employment of women will reduce the gender wage gap in Central and Eastern European countries (incl. Estonia) in the near future. While the socialist regime was characterised by a high employment rate for women, the transition process has entailed a decrease rather than an increase of both the women's participation rate and work experience along with an increase of female unemployment in the majority of transition countries.

To sum up, the decrease in the gender wage gap has hitherto first of all been fostered by structural changes of the labour market in Estonia. That trend will probably continue in the future, though as a result of other factors. The gender wage gap could be reduced on account of an increase in awareness of gender equality issues resulting from more extensive public discussion in that regard, and as a result of changes in the traditional gender roles across generations. The adoption of the Gender Equality Act (RT I, 21.04.2004) will definitely have a positive impact in that context, too, as it specifies the various forms of discrimination.

The parental benefit established in Estonia in 2003 may also, due to various reasons, have an effect on the average work experience and wages of women. The parental benefit enables a person to receive an income equal to his or her salary for up to twelve months after the birth of a child⁶. First of all, the establishment of the parental benefit may affect the average length of parental leave. Yet it is questionable as to whether breaks in

employment will increase or decrease for women as a result. On the one hand, as a result of the establishment of the parental benefit, women who otherwise would have returned to work within a couple of months after the birth of a child, may decide to stay at home until the end of the period during which the benefit is paid – that is, for one year. On the other hand, those who before the adoption of that Act would have stayed at home for three years might now decide to return to work after one year has passed since the birth of a child.

In addition to the length of parental leave, it should be considered whether and how the establishment of the parental benefit would impact the birth rate. Various developments are possible. On the one hand, parental benefits should increase the birth rate, as it makes it easier for women to stay at home with children. On the other hand, it is possible that the average childbearing age will increase, as women will postpone childbearing in the hope of earning higher wages (and thus also higher benefits) in the future. An increase in the average childbearing age will probably reduce the birth rate. For a longer discussion of the possible effects of the parental benefit on women's labour market behaviour, please refer to Leetmaa and Võrk (2003). The impact of the parental benefit on women's participation in the labour market and, accordingly, on the wages of women is an important issue that should be investigated in more detail.

3. Analysis of the explained and unexplained gender wage gap in Estonia

3.1. Data

To assess the difference between wages paid to women and men, we used the data from Estonian Labour Force Surveys for the years 1998-2000. The sample includes both full-time and part-time workers. The wages of part-timers have been recalculated into wages corresponding to full-time work. Thus we eliminated the possibility of wage differences arising from the fact that there are more part-timers among women.

As asserted in Chapter 1, there are more part-time workers among women than among men. For example, in 2003, 11.5% of women and 5% of men were employed part-time (Statistical Office). This percentage is smaller than that in the old member states of the European Union, where one-third of all working women and 6% of men are part-timers on average (European Commission 2002).

Wages are defined as net salaries paid for the month that preceded the survey. We use real net wages (the base year is 1996). In the labour market as a whole, women's wages amounted to 72.7% of the wage level of men on average. The wage differential was smaller in companies owned by foreign persons and in large companies (with more than 200 employees) (see Figure 4). By age group, the wage differential was the greatest among employees aged 30-40 years: the level of women's wages represented 68.3% of the level of men's wages in that segment. The gender wage gap among non-Estonians was greater by 5.4 percentage points than the gender wage gap among Estonians. Regarding only non-Estonians, the wage gap was 5.5 percentage points lower among employees who speak Estonian. As, on average, non-Estonians are paid less than Estonians, these ratios imply that non-Estonian women are the least favoured in the Estonian labour market.

In 1998-2000, women's wages amounted to 72.7% of men's wages on average.

6 – For the maximum and minimum amounts of the parental benefit and bases for calculation thereof, please refer to the Parental Benefit Act (RT I, 22.12.2003).

Analysing employment in Estonia by sectors and occupations, both vertical and horizontal segregation can be observed. In comparison with women, more men work as skilled workers and craftsmen and as plant and machine operators. On the whole, approximately one-half of all men (48.7%) and only 13% of women work in these occupations. There are more men in managerial jobs (working as legislators, senior officials, or managers). On the other hand, a relatively larger proportion of women are engaged as top and medium level specialists. In comparison with men, a greater percentage of women are also employed as clerks and as service and sales workers. By industries, agriculture, construction and logistics are male-dominated, while education, health care and trade are female-dominated (see also Appendix 1).

Wages paid to men exceed wages paid to women by 23%, with jobs and personal characteristics being similar.

Wages are lower than average in the spheres where women dominate the workforce. Correlation coefficients between the relative share of women and the average wages are -0.33 by industry and -0.25 by occupation. The relative share of women exceeds that of men by more than twice among top and medium level specialists and clerks, and by three to four times among service and sales workers. The relative share of men exceeds that of women by approximately two times in

managerial jobs and by three to four times among skilled workers and plant and machine operators (see Figure 5).

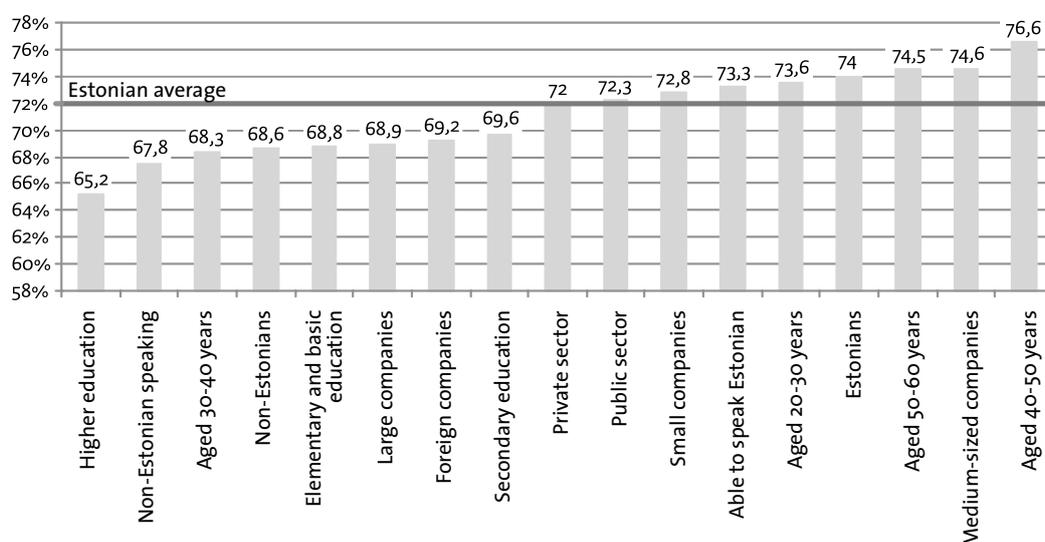
The segregation is more expansive across industries than by occupations. Men dominate sectors like fisheries, mining and construction; the proportion of women in these industries is less than 15%. On the other hand, women dominate in hotels and restaurants and in education, health care and social sectors; the relative share of men in these sectors is 10-20%.

3.2. An assessment of the wage gap in Estonia

The wage gap is assessed using the Oaxaca-Blinder decomposition (see Box 1).

With other factors not taken into account, on average women earned 72.7% of the wages paid to men in Estonia in the years 1998-2000. As described above, a part of the wage differential arises from different occupations, working time and other observable factors, while a part of the wage differential cannot be explained by these factors. To explain the components of the wage gap, we first estimated the Mincer-type wage regression on the basis of a sample that included both men and women (the estimates are presented in Appen-

Figure 4. *The average ratio of women's real net monthly wages, converted to full-time units, to men's wages in 1998-2000 (%) (1996 is the base year)*



Source: ETU 1998-2000, calculations by authors

Oaxaca-Blinder decomposition

The Oaxaca-Blinder decomposition (OBD), first introduced by Oaxaca (1973), is the most widespread method of assessing the gender wage gap. The method allows us to differentiate the wage gap that arises from personal characteristics and occupational choices from the wage gap that cannot be explained by these factors, i.e. differentiate between the explained and unexplained portions of the gender wage gap. The wage gap is divided into two components on the basis of each explanatory variable (education, length of employment, occupation, etc.):

- differences between men and women in the values of explanatory variables — that is, the explained wage gap (e.g. women's length of employment is shorter on average),
- differences in the remuneration based on these variables — that is, the unexplained wage gap (e.g. for an additional year of schooling, women are paid less than men).

In the case of the OBD, first Mincer-type wage regressions⁷ are estimated separately for men and women, using the least squares method. Thereafter wage differences between men and women are separated into components, based on the underlying reasons for these differences. The wage regression estimates can be decomposed in various ways. We applied the two most widespread methods in this study:

$$\bar{w}_m - \bar{w}_n = (\bar{X}_m - \bar{X}_n)' \hat{\beta}_n + \bar{X}_m' (\hat{\beta}_m - \hat{\beta}_n) \quad (1)$$

and

$$\bar{w}_m - \bar{w}_n = (\bar{X}_m - \bar{X}_n)' \hat{\beta}_m + \bar{X}_n' (\hat{\beta}_m - \hat{\beta}_n) \quad (2)$$

\bar{w}_m – the mean value of male earnings,

\bar{w}_n – the mean value of female earnings,

X_m – the vector of the mean values of explanatory variables for men,

X_n – the vector of the mean values of explanatory variables for women,

$\hat{\beta}_m$ – the vector of coefficients of the explanatory variables for men (from the male earnings equation),

$\hat{\beta}_n$ – the vector of coefficients of the explanatory variables for women (from the female earnings equation).

The first element of the right-hand side of the equation indicates the wage differential that arises from the different values of the observable factors for men and women. Hence, $(\bar{X}_m - \bar{X}_n)' \hat{\beta}_j$ ($j = m, n$) indicates the portion of the wage gap that can be explained by gender-based differences in the length of employment, occupations, etc. If the first equation is used, this indicates the explained portion of the wage gap, provided that both women and men are paid in the labour market on the basis of the coefficients of the female earnings equation. In the case of the second equation, both women and men would be paid on the basis of the coefficients of the male earnings equation.

The second half of the equation, $\bar{X}_j' (\hat{\beta}_m - \hat{\beta}_n)$, indicates the portion of the wage gap that arises from remuneration that differs for the same factor. In the case of the first equation, this indicates the unexplained portion of the wage gap if the labour force had the same mean values of variables as men. In the second equation the unexplained portion of the wage gap is indicated in the case where the labour force had the same mean values of variables as women.

The second half of the equation is often interpreted as discrimination. In such a case, the presupposition is that all the variables that have an impact on the wage differential have been taken into account and that the explained wage gap does not arise from discrimination. As was described above, such a simplified interpretation in the decomposition of the wage differential may be erroneous. On the one hand, the explained portion of the gender wage gap may also result from discrimination. On the other hand, it is possible that some of the factors that cause systematic differences in male and female productivity have not been taken into account in the analysis. In the former case the actual wage differential caused by discrimination is underestimated; in the second case that differential is overestimated.

7 – Mincer-type wage regressions represent the most widespread method for explaining wages. In the equation, the dependent variable is a natural logarithm of earnings, and various personal characteristics and occupational features are used as explanatory variables.

dix 2). The following were used as explanatory variables in the equation: sex; age; squared age; nationality; knowledge of the Estonian language; knowledge of the Estonian language multiplied by nationality; marital status; number of children; head of household; education; working time; length of employment; employer's form of ownership (public or private); size of employer (number of employees); occupation; sector; region; and the concentration of women in that occupation and industry. The latter variable was found by calculating the proportion of women in the relevant industry and occupation for each employee. The real wage was used as the dependent variable.

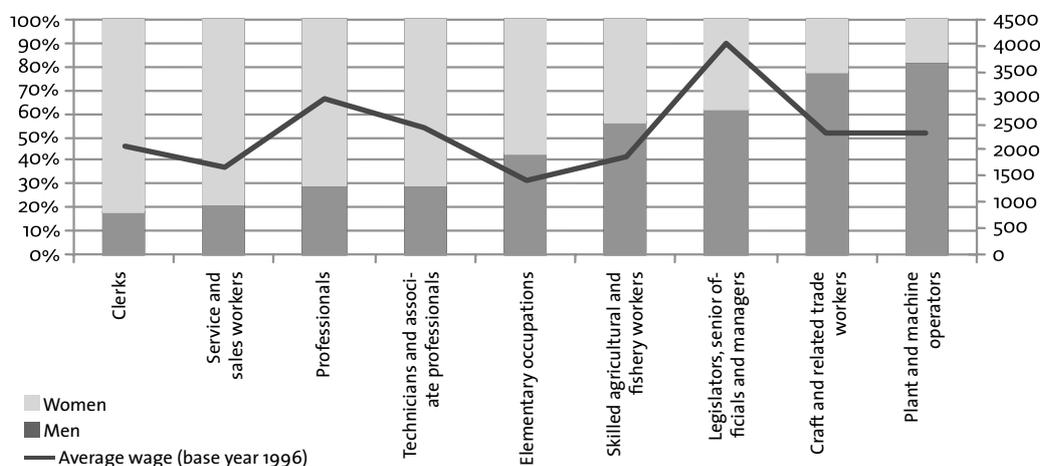
It appears from the wage equation estimated for both men and women that, considering the differences in personal characteristics and occupational choices, men are paid 23% more than women on average. Hence, of the initial 27.3%, 4.3 percentage points can be explained by differences in female and male human capital and in other observable factors.

The majority of the coefficients that explain the impact of demographic variables and the variables that indicate personal characteristics and the nature of the work are statistically relevant.

- As age increases, wages first grow and thereafter decline gradually.

- The higher the education level of an employee, the greater, as a rule, is his or her wage. On average, wages paid to employees with basic education are 12.3% lower than those paid to employees with higher education and wages paid to employees with secondary education are 4.9% lower than those paid to employees with higher education.
- On average, non-Estonians who are not able to speak Estonian earn 21.8% less than Estonians, while non-Estonians who are able to speak Estonian earn 15.2% less than Estonians.
- Those employees who are the primary earners in the family are paid 14.6% more on average.
- The more children in the family, the lower the average wages; yet the wages of married (cohabiting) people are higher than the wages paid to single people.
- The number of working hours per week has a positive impact on wages, but this impact is small: each extra hour yields a 0.3% salary increase on average.
- Tenure in the company where the employee currently works has a positive impact on wages, but this impact is not large: each extra year yields a 0.4% salary increase on average.

Figure 5. Proportion of women and men (%), and the average real net monthly salary (kroons) in different occupations



Source: ETU 1998-2000, calculations by authors

- Wages are lower in the private sector by 4.9% when compared to the public sector.
- The greater the number of employees in a company, the higher the average wage in that company. In comparison with large companies (with more than 200 employees), wages are lower in small companies (with up to 20 employees) by 19.1% and in medium-sized companies by 8.2% on average.
- In companies controlled by foreign owners wages exceed the remuneration paid in companies owned by local owners by 24.4% on average.
- Finally, wages are lower in the industries and/or occupations where women dominate the labour force when compared to the industries and/or occupations where men dominate the labour force.

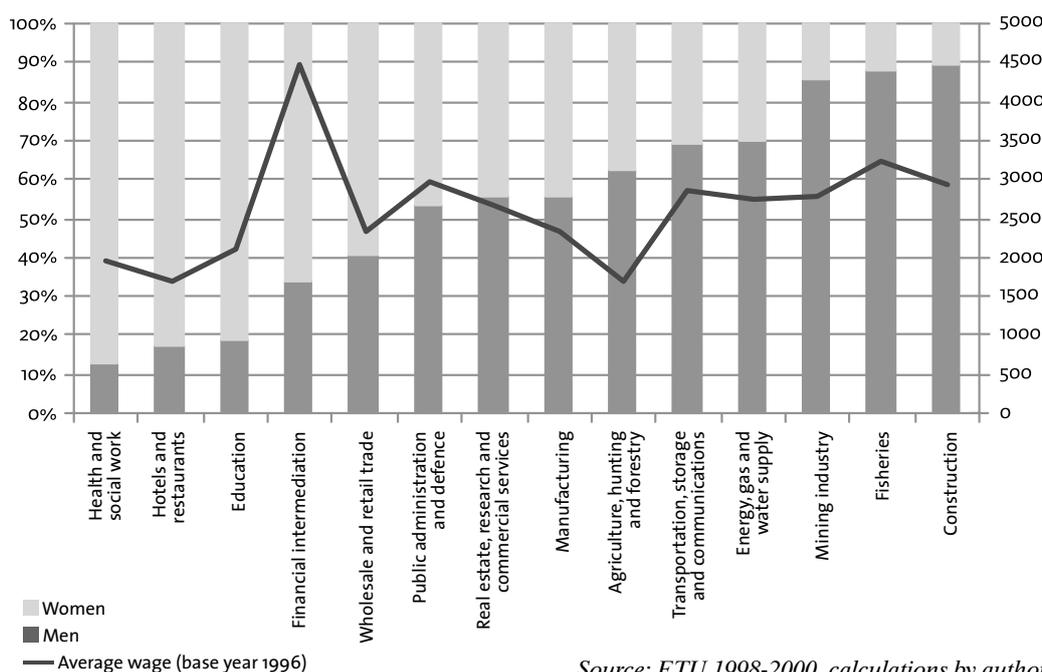
In addition to the aforementioned explanatory factors, the wage equation also contains indicator variables that signify the industry, the occupation, the region where the employee lives, and the year during which the study was carried out.

Wages paid to unskilled labour are lower than wages paid in other occupations. In Tallinn wages are higher than in any other region in Estonia. Only some industries (mining, education, financial intermediation, forestry, and health care) have a significant impact on wages. All other factors considered, real wages were higher in the year 1999 than in the year 2000.

In addition to the regression that was based on the entire sample, we also estimated the wage regressions of men and women separately (the estimations can be found in Appendix 2). In general, the estimates of parameters for separate male and female samples are close to the regression estimated on the basis of the entire sample. However, some important differences exist which influence the gender wage gap:

- Education has a greater impact on the wages of men: while the wages of women with a basic education are 8.9% lower than the wages for women with higher education on average, in the case of men the difference is as much as 15.4%. Hence, men benefit more from additional years of schooling than women.

Figure 6. Proportion of women and men (% , the left axis) in different sectors, and the average real net monthly salary in the particular sector (kroons, the right axis)



Source: ETU 1998-2000, calculations by authors

In Estonia, 1/3 of the gender wage gap is explained and 2/3 is unexplained.

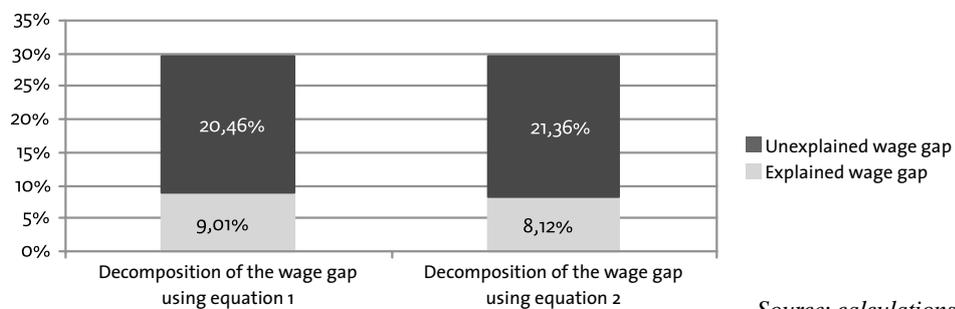
- Knowledge of the Estonian language has a significant positive impact on the wages for non-Estonian men only; for women knowledge of languages is not a decisive factor.
- The number of children in the family does not have an effect on the earnings of men, but it has an adverse impact on women's wages: for each child a woman's earnings are lower by 3.6% on average.
- With all the other factors equal, the difference between wages paid to married and single people is greater in case of men than in case of women (9.3% in case of men, 4% in case of women).
- The number of worked hours has a positive impact on the wages paid to men, while it has no impact on women's wages. Each extra hour of labour yields a 0.23% salary increase for men on average.
- The earnings of men in the private sector exceed the earnings of men in the public sector by 9%; for women, there is no difference.
- Segregation has a different impact on the earnings of men and women. Segregation does not influence the wages paid to men – men's wages are generally the same, no matter whether they work in an industry/occupation dominated by men or in an industry/occupation

dominated by women. On the other hand, wages earned by women who work in an industry/occupation dominated by women are remarkably lower than the wages earned by women working in the so-called male occupations, *ceteris paribus*.

Depending on the method used, the wage differential arising from the composition and structure of the labour force is 8.1-9% and the wage differential that cannot be explained by observable factors is 20.5-21.4% in Estonia (see Figure 7). The explained portion of the wage gap indicates the part of the wage differential that would exist even if women and men with similar observable personal and occupational characteristics were paid equally. The proportion of the unexplained wage gap exceeds the proportion of the explained wage gap by more than twice. Minor differences in the average wages and the wage gaps found on the basis of the joint sample of men and women result from the differences in the sizes of samples. The average wage was calculated on the basis of a larger sample than the sample used in the regressions.

In the estimations concerning Estonia, the explained portion of the wage gap is relatively large when compared to most other European countries (see Figures 8 and 9), which can partly be explained by the fact that we used more control variables in our regressions for Estonia than was the case for other countries.⁸

Figure 7. Gender wage gap in Estonia (1999-2000): Oaxaca-Blinder decomposition



Source: calculations by authors

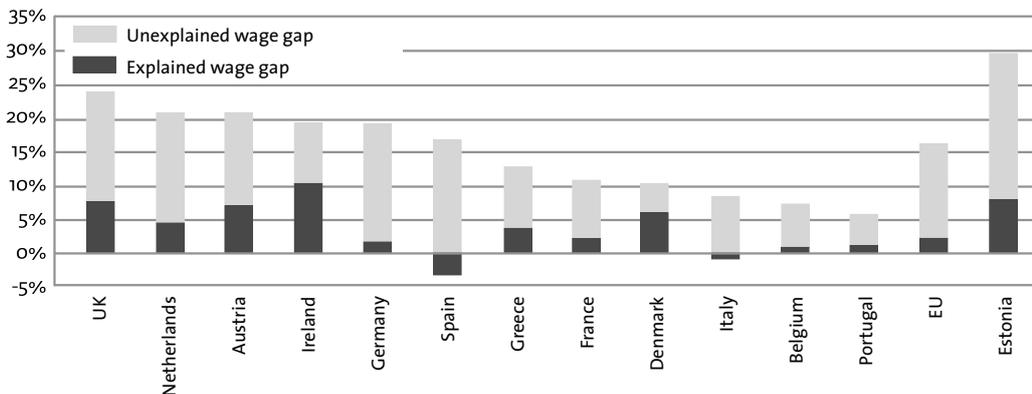
8 – It should be noted with regard to the data set out in Figures 8 and 9 that the explained portion of the gender wage gap depends on the number of control variables used. The explanatory variables used in regressions are different across surveys concerning both the EU member states and Central and Eastern European countries (both in relation to each other and in comparison with this study). Therefore, the results of OBD are not one-to-one comparable.

The average gender wage gap is smaller in EU member states than in Central and Eastern European countries and the relative share of the wage gap arising from the structure of the labour force is somewhat higher in the former group. The proportion of the wage differential that arises from the structure of the labour force is the greatest (representing approximately 50% of the wage gap) in the UK and Ireland. In several countries, the explained portion of the gender wage gap is negative, which indicates that in these countries the productivity (and thus also wages) of participating women should be higher when compared to men on the basis of the observed characteristics that measure human capital. In West-

ern Europe such countries represent the minority (among 12 states, the explained portion of the gender wage gap is negative in Spain and Italy only), but in Central and Eastern European countries the explained portion of the gender wage gap is negative in more than a half of the countries.

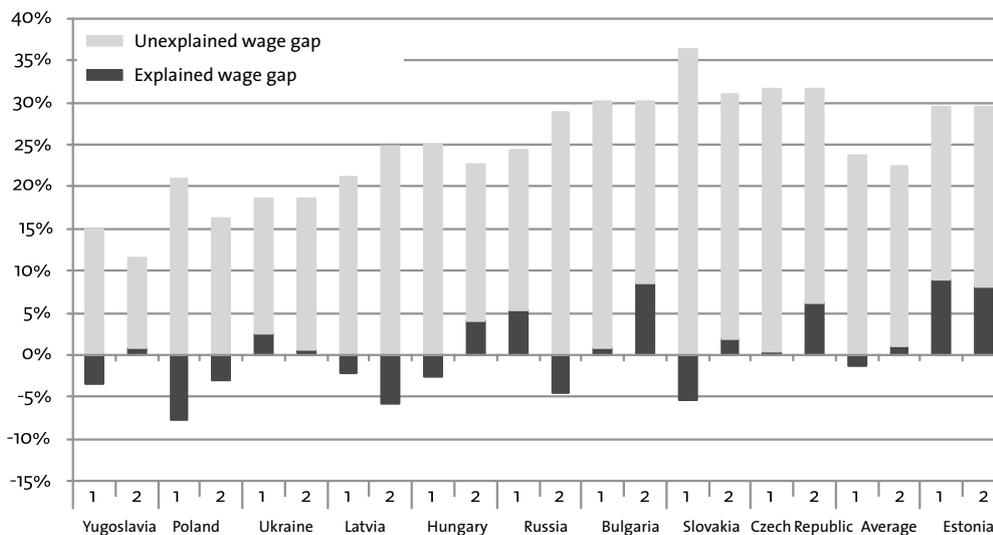
Regarding Central and Eastern European countries, the proportions of explained and unexplained wage gaps were to a great extent dependent on whether equation (1) or equation (2) was used in the OBD estimation. The volatility of the results of the OBD performed by Newell and Reilly (2000) is most likely due to the small number of control variables.

Figure 8. Oaxaca-Blinder decomposition in the EU member states, 1998, equation (2)



Source: European Commission (2002)

Figure 9. Oaxaca-Blinder decomposition in Central and Eastern European countries (1 – the first equation; 2 – the second equation)



* The Czech Republic, Slovakia, Hungary – the year 1992; Bulgaria – the year 1995; Latvia, Poland, Russia, Ukraine and Yugoslavia – the year 1996.

Source: Newell and Reilly (2000), calculations by authors

On average, the explained wage gap was close to zero — it was negative (-1.3%) when equation (1) was used, and positive (1.0%) when equation (2) was used. While in Estonia the general gender wage gap was higher than the average gender wage gap among Central and Eastern European countries (29.5% vs. 22.4%), the unexplained portion of the wage gap was lower in Estonia than in other Central and Eastern European countries.

In conclusion, women's earnings represented 72.7% of men's earnings in 1998-2000, without taking into account other variables. Approximately 8-9 percentage points — that is, one-third of this wage differential can be explained using observable differences in male and female labour force structure, and 20-21 percentage points — that is, two-thirds of the wage differential — cannot be explained by the set of variables that were used.

Considering that a rather small portion of the gender wage gap can be explained by the variables included in our study, neither the reallocation of labour between industries or occupations nor the equalisation of human capital between genders would contribute much to the reduction of the differential. In order to reduce the gender wage gap, attention must be paid to the portion that cannot be explained by the factors observed in this study. For example, the unexplained portion of the wage gap may result from lower activity in seeking work or lower reservation wages among women. In such a case, better-organized labour intermediation would make it possible to narrow the gap. The unexplained component of the wage gap may also be due to different personal characteristics of men and women, such as their tolerance of risk or self-confidence. It is probable that some of the unexplained wage gap results from discrimination, as well.

Based on the study carried out by Pettai and Proos (2003) it can be asserted that although women at present find it more difficult to make a career in Estonia, women's and men's attitudes toward labour supply and career-orientation

change as they become older. While, on average, women are less career-oriented than men, among young people (aged 21-30) an equal number of men and women consider career important. In addition, fathers equally appreciate the career of their daughters and sons. Hence, it is possible to observe that attitudes toward the work of men and women are changing across generations.

Conclusions

The gender wage gap may be caused by the fact that women's work differs from that of men — women either work less or their human capital (their level of education and/or work experience) is smaller. That portion of the wage difference is known as the explained portion of the gender wage gap, as it can be explained by the lower productivity of women. On the other hand, the gender wage gap may also be caused by the fact that women are paid less than men even if their productivity and occupation are the same. The part of the wage differential that cannot be explained by observable differences in the factors that affect male and female earnings is called the unexplained portion of the gender wage gap.

The unexplained wage gap is generally interpreted as discrimination. Yet it is probable that not all essential factors causing the wage differential can be taken into account in an empirical analysis. In such a case, the unexplained component of the wage gap overestimates the wage differential caused by discrimination. On the other hand, it is possible that the explained portion of the gender wage gap also partially results from discrimination. If the choices that women make are imposed on them by society, and women work in lower-paid occupations not because of their free choice, but because they find it difficult to find jobs in so-called "male occupations" due to barriers caused by various norms and attitudes, the unexplained component of the wage gap underestimates the role of discrimination.

To reduce the wage differential, attention must also be paid to the proportion that cannot be explained by observable factors.

In addition to the factors that have a direct impact on productivity, the gender wage gap may also result from differences in male and female labour market behaviour, as well as from a wide range of psychological factors. It has been found that women settle for lower wages and search for a job less actively than men. These differences are partly explainable by men's higher wage expectations. However, women's reservation wages and job search intensity are lower even if other conditions remain the same. Among the psychological factors that affect wages, differences in risk tolerance, self-confidence, and so on among men and women, could also be mentioned.

In Estonia, the male-female wage ratio has decreased since Estonia regained its independence. Structural changes in the labour market worked in favour of the reduction of the wage differential. On the one hand, the wages of high-skilled employees increased comparatively faster, and the average education level of women was higher than that of men. On the other hand, the industries where women dominate (mainly various fields of services) developed more rapidly. The gender wage gap is wider in Estonia than the average in Central and Eastern European countries and EU member states, which may partly have been caused by the greater-than-average general wage inequality in Estonia.

While in the last decade the structural changes in the labour market fostered the narrowing of the gender wage gap, in the future the most influential factors will probably be similar to these in Western countries. In developed economies the reduction of the wage differential has primarily resulted from an increase in awareness of gender issues, as well as from an increase in women's relative education level and work experience. Similarly to other post-socialist countries, in Estonia the average education level of women exceeds that of men. That difference has grown over the past ten years and should thus contribute to the reduction of the wage differential. Yet it is quite unlikely that any increase in women's work ex-

perience would narrow the gender wage gap in Estonia in the near future. While the socialist regime was characterised by a high employment rate for women, the transition process has entailed a decrease, rather than an increase, of both participation rates and average work experience among women along with an increase of unemployment in the most transition countries. The relative decline of women's work experience will presumably continue in the near future, as well.

In 1998-2000, women's wages represented 72.7% of men's wages on average. The wage differential was larger than the average between men and women with higher education and men and women not able to speak Estonian. Of the wage differential, 8-9 percentage points (approximately one-third) can be explained by differences in male and female characteristics (different jobs, sectors, human capital, etc.). The rest of the wage differential (20-21 percentage points, i.e. approximately two-thirds) cannot be explained by observable factors. Based on this study, the explained portion of the gender wage gap is larger in Estonia than in other Central and Eastern European countries, which may imply that our labour market is more efficient. However, estimates rendered with regard to Estonia and other Central and Eastern European countries on the basis of OBD cannot be compared one-to-one, as different variables were used in the regressions.

Reducing labour market segregation as well as increasing the relative education level and work experience of women would contribute little to the narrowing of the gender wage gap. The greater part of the gender wage gap is caused by factors that cannot be observed in the regression analysis. To reduce that portion of the wage differential, the reasons behind it should be explored in more detail. In Estonia, women's lower activity in seeking work and settling for lower wages have been pointed out in that context. The unexplained portion of the gender wage gap is partly due to the different personalities of men and women and different evaluations of personal characteristics on

Of the gender wage gap, 8-9 percentage points can be explained by differences in male and female characteristics (different jobs, sectors, human capital, etc.). The rest of the gender wage gap (20-21 percentage points) cannot be explained by observable factors.

the part of employers. Some of the unexplained wage gap probably results from discrimination.

While a substantial part of the wage differential is likely to have resulted from people's attitudes, which are expressed in the labour market behaviour of employees or in employers' choices of employees, it is difficult to directly influence the unexplained portion of the wage gap. Efficient labour market intermediation and a higher awareness of the reasons of the wage gap might help to reduce the portion of the gender wage gap that is related to job search activity. Higher awareness also contributes to changes in attitudes. To some extent, changes in attitudes and awareness can be directed with the help of legislation. In Estonia, two important acts of law were adopted recently that might play a role in this regard. Efficient implementation of the Gender Equality Act will facilitate the processing of discrimination cases and increase awareness in gender equality matters, while probably also influencing attitudes in hiring and remunerating men and women in the long run. The Parental Benefit Act may have an impact on the birth rate, women's work experience, and employers' expectations concerning the labour market behaviour of women. It will be possible to assess the impact of these acts in a couple of years, when they will have been in force for a longer period.

Enforcing competition would also contribute to the reduction of discrimination. Surveys based on Gary Becker's economic models describing discrimination have shown that the more competitive an industry is, the less discrimination there is against women. Since discrimination is costly for companies, only those employers who hire cheaper labour (that is, women) with the same qualifications, are able to survive in competition. Hence, enhancement of competition and facilitation of the efficient functioning of labour and product markets enable governments, among other aims, to ensure equal treatment of men and women.

References

- Ashenfelter, O., T. Hannan** (1986). Sex Discrimination and Product Market Competition: The Case of the Banking Industry. *Quarterly Journal of Economics*, Vol. 101, No. 1 (February) pp. 149-173.
- Atonji, J. G., R. M. Blank** (1999). Race and Gender in the Labour Market. *Handbook of Labour Economics*, Volume 3C, Chapter 48.
- Barber, B. M., T. Odean** (2001). Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly Journal of Economics*, February 2001, pp. 261-292.
- Becker, G. S.** (1957). *The Economics of Discrimination*. University of Chicago Press, Chicago.
- Black, D. A.** (1995). Discrimination in an Equilibrium Search Model. *Journal of Labour Economics*, 13(2) pp. 309-324.
- Black, S. E., E. Brainerd** (2002). Importing Equality? The Impact of Globalization on Gender Discrimination. NBER working paper No. 9110.
- Black, S. E., P. E. Strahan** (2001). The Division of Spoils: Rent-Sharing and Discrimination in a Regulated Industry. *American Economic Review*, Vol. 91, No. 4 (September) pp. 814-831.
- Blau, F. D., L. M. Kahn** (1992). The Gender Earnings Gap: Learning from International Comparisons. *American Economic Review* Vol. 82, No. 2, pp. 533-538.
- Blau, F. D., L. M. Kahn** (2000) Gender Differences in Pay. *Journal of Economic Perspectives*, Vol. 14, No. 4 (Autumn 2000) pp. 75-99.
- Council of the European Union** (2003). Council Decision of 22 July 2003 on guidelines for the employment policies of the Member States (2003/578/EC).
- European Commission** (2002) *Employment in Europe 2002, Recent trends and prospects*, Luxembourg: Office for Official Publications of the European Union.
- Gneezy, U., M. Niederle, A. Rustichini** (2002). Performance in Competitive Environments: Gender Differences. *Quarterly Journal of Economics*, forthcoming.
- Hellerstein, J. K., D. Neumark, K. R. Troske** (2002). Market Forces and

- Sex Discrimination. *Journal of Human Resources*, Vol. 37, No. 2 (Spring), pp. 353-380. Hinnosaar, M. (2003). Reservation Wages in Estonia. *Bank of Estonia Working Papers* 2003, No. 1.
- Hinnosaar, M., T. Rõõm** (2003). The Impact of Minimum Wage on The Labour Market in Estonia: An Empirical Analysis. *Bank of Estonia Working Papers* 2003, No. 8. Hunt, J. (1998) The Transition in East Germany: When is a Ten Percent Fail in the Gender Pay Gap Bad News. *CEPR Discussion Paper Series in Transition Economics*, No. 1, 805.
- Jolliffe, D.** (2001). The Gender Wage Gap in Bulgaria: A Semiparametric Estimation of Discrimination. *William Davidson Working Paper* No. 401.
- Jurajda, S.** (2000). Gender Wage Gap and Segregation in Late Transition. *William Davidson Institute Working Paper* No. 306.
- Jurajda, S., H. Harmgart** (2002). Sex Segregation and Wage Gaps in East and West Germany. *Working Paper*.
- Kroncke, C., K. Smith** (1999). The Wage Effects of Ethnicity in Estonia. *Economics of Transition*, Vol. 7, pp. 179-199.
- Kuddo, A., R. Leetmaa, L. Leppik, M. Luuk, A. Võrk** (2002). Sotsiaaltoetuste efektiivsus ja mõju tööjõupakkumisele (The Efficiency and Impact on Labour Supply of Social Benefits), *PRAXIS Center for Policy Studies*, Tallinn.
- Leetmaa, R. and A. Võrk** (2003). Pere-toetuste mõju pereplaneerimisele ja riigieelarvele (The Impact of Family Benefits on Family Planning and State Budget), *PRAXIS Center for Policy Studies*, Policy Study No. 5/2003.
- Lehmann, E., S. Warning** (2001). Decision Making and Gender Differences: A 15 Million DM Game. *Behavioral and Experimental Economic Abstracts*, Working Paper Series, Vol. 2 (19).
- Moffitt, R. A.** (1999). New Developments in Econometric Methods for Labour Market Analysis. *Handbook of Labour Economics*, Vol. 3A, Chapter 24, pp. 1367-1398. Mortensen, D. T. (1986). Job Search and Labour Market Analysis. *Handbook of Labour Economics*, Vol. 2.
- Mortensen, D. T., C. A. Pissarides** (1999). New Developments on Models of Search in the Labour Market. *Handbook of Labor Economics*, Part 3B, Chapter 39.
- Neumark, D.** (1993). Sex Discrimination and Women's Labor Market Interruptions. *NBER Working Paper* No. 4260.
- Newell, A., B. Reilly** (2000). The Gender Pay Gap in the Transition from Communism: Some Empirical Evidence. *William Davidson Institute Working Paper* No. 305.
- Noorkõiv, R., P. F. Orazem, A. Puur, M. Vodopivec** (1997). How Estonia's Economic Transition Affected Employment and Wages (1989-1995). *World Bank Policy Research Working Paper* 1837.
- Oaxaca, R. L.** (1973). Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review*, Vol. 14, pp. 693-709.
- Orazem, P. E., M. Vodopivec** (2000). Male-Female Differences in Labor Market Outcomes during the Early Transition to Market: The Case of Estonia and Slovenia. *The World Bank Working Paper*.
- Pettai, L., Proos, I.** (2003) Naiste ja meeste positsioon ühiskonnas. Barjäärid ja eelarvamused (The Position of Men and Women in Society. Barriers and Prejudices) *The Estonian Institute for Open Society, Gender Equality Monitoring Results* <http://www.sm.ee/gopro30/Web/pages/sotskalvaldkond0060> [3.09.2004]
- Philips, K.** (2001). The Changes in Valuation of Human Capital During the Transition Process in Estonia, *Dissertationes Rerum Oeconomicarum Universitas Tartuensis* No. 6, Tartu 2001.
- Pissarides, C. A.** (2000). *Equilibrium Unemployment Theory*. The MIT Press, Second Edition. Rõõm, T. (2004). Search Intensity and Wage Differences. *Bank of Estonia Working Papers* 2004 No. 1.
- The Gender Equality Act**, RTI 21.04.2004, 27,181.
- Ministry of Social Affairs** (1999). Jagatud õigused ja vastutus. Sooline võrdõiguslikkus Eestis (toim. M. Järve) (Shared Rights and Responsibility. Gender Equality in Estonia (ed. M. Järve)).
- Sunden, A., and B. J. Surette** (1998). Gender Differences in the Allocation of Assets in Retirement Saving Plans. *American Economic Review*, Vol. 63 (3).

Appendix 1. The relative share of employees in an occupation and industry in the years 1998-2000

L1.1. The share of employees in the occupation (relative to the aggregate number of employees)

	Entire sample	Men	Women
Legislators, senior officials and managers	12.37%	15.19%	9.48%
Professionals	10.91%	6.24%	15.71%
Technicians and associate professionals	12.61%	7.26%	18.10%
Clerks	4.44%	1.62%	7.33%
Service and sales workers	11.18%	4.64%	17.89%
Skilled agricultural and fishery workers	6.49%	7.14%	5.82%
Craft and related trade workers	16.73%	25.56%	7.68%
Plant and machine operators	14.30%	23.09%	5.27%
Elementary occupations	10.97%	9.26%	12.73%

Source: calculations by authors

L1.2. The share of employees in the industry (relative to the aggregate number of employees)

	Entire sample	Men	Women
Agriculture, hunting and forestry	12.21%	14.78%	9.46%
Fisheries	0.76%	1.30%	0.19%
Mining industry	1.23%	2.03%	0.37%
Manufacturing	23.24%	25.06%	21.30%
Energy, gas and water supply	2.91%	3.93%	1.82%
Construction	6.81%	11.77%	1.53%
Wholesale and retail trade	13.71%	10.86%	16.74%
Hotels and restaurants	2.69%	0.88%	4.61%
Transportation, logistics and communications	8.80%	11.82%	5.58%
Financial intermediation	1.18%	0.78%	1.61%
Real estate, research and commercial services	5.20%	5.59%	4.78%
Public administration and defence	6.14%	6.34%	5.93%
Education	9.62%	3.54%	16.10%
Health and social work	5.52%	1.33%	9.98%

Source: calculations by authors

Appendix 2. Assessments of Mincer-type wage regressions

Dependent variable: Ln (wage)

	Entire sample	Men	Women
Reference group: woman			
man	0.2297***		
Age	0.0207***	0.0168***	0.0236***
Age square/1000	-0.3392***	-0.2967***	-0.3672***
Reference group: higher education			
primary education or less	-0.1230***	-0.1537***	-0.0893***
secondary education	-0.0492***	-0.0634***	-0.0428***
Reference group: Estonian			
non-Estonian	-0.2182***	-0.2650***	-0.1808***
Reference group: cannot speak Estonian			
can speak Estonian	-0.0267	-0.0731**	0.0130
Reference group: cannot speak Estonian and is a non-Estonian			
can speak Estonian and is a non-Estonian	0.0660**	0.1090**	0.0335
Reference group: is not the head of household			
head of household	0.1459***	0.1713***	0.1094***
Number of children aged less than 16 years	-0.0159***	0.0004	-0.0362***
Reference group: is not married or cohabiting			
is married or cohabiting	0.0669***	0.0932***	0.0400***

Work hours per week	0.0029**	0.0023**	0.0041
Tenure in the company where the employee is currently working	0.0039***	0.0025***	0.0044***
Reference group: public company			
private company	-0.0492***	-0.0899***	-0.0144
Reference group: domestic company			
foreign-owned company	0.2435***	0.2606***	0.2201***
Reference group: a company with more than 2000 employees			
a company with up to 20 employees	-0.1913***	-0.2106***	-0.1702***
a company with 20-200 employees	-0.0821***	-0.1033***	-0.0652***
The relative share of women in the industry and occupation where the employee is engaged	-0.0805**	0.0630	-0.2973***
Reference group: fisheries			
agriculture, hunting and forestry	-0.3180***	-0.3675***	-0.1645
mining industry	0.2004**	0.1708*	0.1081
manufacturing	-0.0275	-0.1035	0.1031
energy, gas and water supply	0.0891	0.0318	0.1920*
construction	0.0745	0.0404	0.1416
wholesale and retail trade	-0.0348	-0.0659	0.0690
hotels and restaurants	-0.1029	-0.1418	0.0477
transportation, logistics and communications	0.0678	0.0429	0.1128
financial intermediation	0.2514***	0.2782**	0.3511***
real estate, research and commercial services	-0.1102	-0.1585	-0.0022
public administration and defence	-0.0212	-0.1352	0.1693
education	-0.2138***	-0.4453***	0.0085
health and social work	-0.1885**	-0.3246***	0.0090
Reference group: elementary occupations			
legislators, senior officials and managers	0.7312***	0.7014***	0.7318***
professionals	0.6892***	0.5594***	0.7484***
technicians and associate professionals	0.4478***	0.3622***	0.4972***
clerks	0.2568***	0.2641***	0.3370***
service and sales workers	0.1788***	0.1749***	0.2337***
skilled agricultural and fishery workers	0.3949***	0.3536***	0.3554***
craft and related trade workers	0.2350***	0.2508***	0.1765***
plant and machine operators	0.1929***	0.2072***	0.1726***
Reference group: Tallinn			
Harju County, except Tallinn	-0.0379**	-0.0391	-0.0523**
Hiiu County	-0.0796**	-0.0163	-0.1475***
Ida-Viru County	-0.2749***	-0.3086***	-0.2487***
Jõgeva County	-0.3678***	-0.4216***	-0.3111***
Järva County	-0.2062***	-0.2426***	-0.1737***
Lääne County	-0.1984***	-0.2520***	-0.1538***
Lääne-Viru County	-0.1796***	-0.1934***	-0.1750***
Põlva County	-0.3239***	-0.3401***	-0.3083***
Pärnu County	-0.2097***	-0.2422***	-0.1830***
Rapla County	-0.1535***	-0.1663***	-0.1359***
Saare County	-0.2650***	-0.2939***	-0.2331***
Tartu County	-0.2036***	-0.2345***	-0.1721***
Valga County	-0.2609***	-0.3095***	-0.2156***
Viljandi County	-0.2476***	-0.2725***	-0.2245***
Võru County	-0.3226***	-0.3711***	-0.2797***
Year 1998	-0.0238*	0.0029	-0.0609***
Year 1999	0.0392***	0.0433**	0.0244
Constant	7.1614***	7.6028***	6.9852***
Sample size	13386	6560	6826
R-squared	0.4165	0.3791	0.4155

Notes: *** indicates that the estimate is significant at the 1% level,
** indicates significance at the 5% level, and
* indicates significance at the 10% level

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9/2005 Business Support Measures in the State Budget Strategy for 2007-2013

Authors: Anne Jürgenson, Tarmo Kalvet, Rainer Kattel

The objective of the study is to develop proposals for priorities and measures for the support of business, and their hierarchy, in the single programming document for 2007-2013. The recommendations are based on a survey conducted among 810 companies. The results of the survey indicate lack of cooperation, limited development activities that are not related to subcontracting activities as well as lack of skilled workers as main inhibitors of development. The authors make recommendations for supporting businesses in a way that enables them to move into activities and fields that allow rapid increases in productivity and inter-company cooperation as a result of which positive feedback mechanisms are created. In conclusion, Estonia must essentially create an industrial policy that has been lacking to date.

4/2002 Digital Divide in Estonia and How to Bridge It. Executive Summary

Authors: Mari Kalkun (Emor), Tarmo Kalvet (PRAXIS)

The study focuses on social aspects of information and communication technology use in Estonia. The issue of digital divide has not enjoyed much attention, although several empirical surveys indicate that the problem does exist in the country. There exist certain groups of the population who do not use the Internet at all. At the same time, it is obvious that information technology can help raise productivity. Hence, it will be paramount to tackle the problem of digital divide more than has been until now. The authors make policy recommendations for popularising information and communication technology in order to encourage computer and Internet use among Estonian population.

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