

# Gender segregation in the labour market placed in the context of educational segregation: cross-national comparison<sup>1</sup>

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## **Gender Segregation in the Labour Market Placed in the Context of Educational Segregation: Cross-National Comparison.**

The position of women in the labour market may be analysed in many possible ways. In general, we can distinguish between two main approaches. The first one brings into focus the access to the labour market and works with indicators such as labour market participation, employment rates, unemployment rates, inactivity rates, duration of employment etc. The second approach deals with the issue of quality of labour market participation, which includes problems like occupational gender segregation, gender gap and labour market discrimination. This article focuses on the latter approach, in particular on the occupational gender segregation in relation to the gender segregation in education.

The theory of human capital suggests that the increasing level of qualification, talents and productive skills of women acquired in the educational system, training and experience at work, should have a positive impact on quality of women's position in the labour market and enhance gender equality. Given the increasing educational attainment of women over the past decades, one would assume that their position in the labour market, including the gender segregation in occupational categories, has improved as well. However, the results of current research prove that despite all the changes and progress made with respect to the level of education of women, the level of occupational segregation tends to remain relatively stable over time. Thus, the increasing level of education does not seem to have a very strong impact on the overall level of gender segregation in occupations. One of the possible explanations may be the fact that women and men tend to choose different fields of study which predetermine their participation in particular categories of occupational structure to a larger extent than their level of education. Men are still over-represented in different fields of education than women and this tendency seems to persist even in the countries where a campaign has been led for the promotion of democratic and non-discriminatory practices in the system of education.

The main aims of this article are: 1) to conduct a cross-national comparison of levels of occupational gender segregation and 2) to examine the relation between the level of occupational gender segregation and gender segregation in education (both vertical and horizontal). The analyses include 18 European countries covered by the European Social Survey (ESS) conducted in 2004. The comparison pays a special attention to differences and similarities between the EU-15 countries and the new EU member states, i.e. post-socialist countries.

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## **1. Introduction**

In the course of the recent decades, the participation of women in the labour market has grown continuously; the forecasts indicate that this trend will continue. This means that the number of women involved in paid forms of employment is gradually approaching the number of men. However, it is crucial to ask which areas of the labour market women have been entering, to what extent the participation of women and men in particular occupations is evenly distributed, whether there exist typically female and typically male areas of labour market, and whether women and men are equally distributed at all degree levels of occupational hierarchy.

Indicators as rate of employment or rate of participation in the labour market provide information on the citizens' chances of entering the labour market, but do not give evidence of the structure and quality of their participation. In order to analyse the structure and quality of men's and women's position in the labour market, it is necessary to employ other indicators: for example the level of gender segregation in the labour market. The understanding of whether and how a particular gender-based structuring of the labour market occurs, and of how this process of segregation relates to the educational segregation, can help to minimize the possible undesirable impacts of gender disadvantage. The key problem is breaking the vicious circle characterised for instance by Reskin (1993). She argues that the more typically female occupation is held by women, the lower income they have in comparison with men, having simultaneously lower opportunities of career growth, lower social status and fewer opportunities to acquire supervisory positions or to make decisions etc.

There are a few ways to conceptualise gender segregation in the labour market. Literature mentions two basic kinds of gender segregation in the labour market: horizontal and vertical. Horizontal segregation may

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be defined as high concentration of men or women in a particular sector of the labour market or in particular occupations. A labour market showing a strong horizontal segregation harbours a lot of clearly separated typically male or typically female occupations or sectors. (Reskin 1993) Vertical segregation may be characterized as a disproportional participation of women or men at different degree levels of occupational hierarchy, for instance in supervisory positions, middle management, in positions requiring a certain degree of responsibility and made distinct by a possibility of defining the work of subordinates, etc. In the majority of European countries, women are found at lower degree levels of the job ladder, holding supervisory positions less often than men. (Coré 1999)

Working with the concept of occupational gender segregation, which is the major topic of this study, we must be aware of the fact that all categorizations of occupations in the labour market, applied empirically and existing so far, do not strictly pursue only the horizontal layer of segregation. Simultaneously, they carry an implicit reference to the vertical segregation in the labour market. Considering, for example, the following three categories of employment – manager/ress, teacher, and labourer – it becomes evident that these categories do not only represent three distinguishable sorts of employment by their type, they concurrently involve a notion of hierarchy. The significance of these three types is not merely horizontal (“nominal”), but also vertical (“ordinal”). This is why theoretical positioning of occupational gender segregation as the horizontal type of segregation remains inaccurate to a significant extent.

Literature mentions a range of factors participating in the emergence and perpetuation of gender segregation in the labour market: labour market supply and demand, welfare state system, the level of economic development, the development of the tertiary sector, etc. This study focuses on exploration of the influence of human capital, or, in more concrete terms, of the level and field of education on occupational gender segregation. The theory of human capital indicates that the more skills and experience an individual obtains thanks to the system of education or to her or his participation in the labour market, the more successful her or his participation in the labour market is, including the rate of pay. (Chiplin – Sloane 1976) The increasing qualification of women (in comparison to men) should therefore contribute to the gender equality in the labour market. Consequently, it is possible to assume that the increasing level of education will be accompanied by the decreasing level of occupational gender segregation. However, the existing empirical studies do not confirm this kind of direct relation. Although the level of education of women has risen dramatically over the last decades, the occupational gender segregation does not show any substantial changes. A possible explanation is that women and men choose, or, as a matter of fact, are directed towards a choice of different fields of education, and thus contribute to the gender segregation in the sphere of education<sup>6</sup>. Men are over-represented in the fields of study which are different from those of dominated by women. Research confirms that this tendency does not change significantly over time, not even in those countries, where women participate sufficiently in the labour market, or where a campaign has been led for the promotion of democratic and non-discriminatory practices in the system of education Bradley (2000). As long as most of women acquire education in traditionally “feminine” fields of study from childhood, which prepare them for a participation in the labour market in occupations, which do not enable a quick and easy promotion, but are characteristic with lower reward, it is then not surprising that women, on average, earn less than men, their advancement on the career ladder is slower, and thus achieve the supervisory positions less often.

It is, therefore, the objective of this article: 1) to conduct a cross-national comparison of occupational gender segregation and 2) to explore the relation between the occupational gender segregation and the horizontal and vertical gender segregation in education. The comparison will involve 18 European countries, for which there were available data in the European Social Survey (ESS) from 2004. This comparison will pay a particular attention to the situation in the new EU member states including thus the Czech Republic. This article will then attempt at interpretation of the level of gender segregation in these countries placed in a wider European context.

The article has got the following structure: the first chapter on conceptualisation defines the problematics of occupational gender segregation. The consecutive part introduces the basic categories of factors influencing the level of occupational gender segregation, while focusing on the influence of the level of educational attainment and its field. The second chapter specifies and operationalises the main research questions, as well as defines the main research hypotheses and describes the ESS data, methods and techniques. The third chapter presents the output of our analyses, which is the cross-national comparison of the level of occupational gender segregation contextualised and related to the educational gender

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<sup>6</sup> We elaborate more on the issue of why women and men are prone to choose different educational paths (e.g. gender stereotypes, different expectations of men and women, etc.) in part 2.2. of this text.

segregation. The fourth and last chapter summarizes briefly the main results of our analyses and relates them to their theoretical starting points.

## **2. Theory and Existing Research into Gender Segregation in the Labour Market**

Studying the labour force participation rate from the gender perspective, we notice a trend lasting for several decades. Next to the traditionally high and for decades unchanging active male participation in the formal labour market in all European countries (70-85%), the rate of female participation in paid forms of employment rises continuously. The female inactivity rate in the labour market<sup>7</sup> in the EU-15 dropped from 48% in 1980 to 27% in 2001. Not only is there a growing number of single women entering the labour market, but also the employment of mothers of young children increases continuously. (Cook 2001; ILO 2003) The Scandinavian countries, the Netherlands and Great Britain may boast of the highest rates of female employment (more than 65%). On the contrary, the lowest rate of employment which does not surpass 55% may be found in Italy, Greece, Spain, Poland, Hungary, Slovakia and Luxembourg. In Germany, France, Ireland, the Czech Republic, Cyprus, Latvia, Slovenia and Estonia the rate of employment fluctuates between 55 and 60%<sup>8</sup>.

There are a few factors beyond this general trend of the increasing number of women entering the labour market: an increasing demand for the female labour force caused by the development of the service sector and administrative occupations (Esping-Andersen 2002; Castels 1997; Hakim 2000), rising flexibility of the labour market, mainly the possibility of working part-time (Hakim 2000), an economic situation effecting a drop in real income and a consecutive change in the standard of living of single-income families (Cook 2001), the growing education and employment qualification of women, demographic developments including lower fertility and undermining the traditional family. (Pfau-Effinger 2004)

### **2.1. Occupational Gender Segregation**

Occupational gender segregation is characterized by the fact that women or men are strongly over-represented in certain categories of employment which in turn create relatively separated female or male segments of the labour market. Empirical studies confirm that women are over-represented in the service sector – mainly its public section – as far as the sectors are concerned. (Charles 1992; Coré 1999; Bettio 2002; Esping-Andersen 2002) Coré (1999) states that more than half of observed occupational categories in the OECD countries are (fe)male dominated (the [fe]male share being 80%). A closer examination of particular occupations reveals that women are mainly concentrated in administrative occupations, service sector and trade. Alternatively, men are over-represented in managerial and technical occupations. (Charles 1992) Analyses of time series and trends have proven that gender segregation within occupational categories remains relatively stable in the course of time and does not decline in the majority of countries. (Bettio 2002) This is true even about countries which have endeavoured to intervene in the form affirmative action in order to lower gender segregation.

### **2.2. Factors Influencing Occupational Gender Segregation**

The following text will pay attention to selected factors which determine or influence occupational gender segregation. Although the text will unveil merely the influence of factors tied with the human capital (education) of workers, it is necessary to highlight the influence of state intervention briefly (equal opportunities policies, anti-discriminatory policies, policies to enable balancing career and family life), and the factors of labour force demand (female labour demand, employers' preferences) and other factors of labour force supply (workers' preferences and their human capital).

#### **2.2.1. Institutional Interventions Implemented by the State**

An individual's position in the labour market is, to a great extent, influenced by the structure and scope of provisions of welfare state. These provisions regulate or to a certain extent modify, at least, functions and structure of the labour market. It follows that some kinds of provisions may stimulate or, contrarily, inhibit the gender segregation in the labour market. Presumably, women living in a country with an extensive range of state-guaranteed provisions compensating the costs and disadvantage effected by family responsibilities (i.e. long-term maternity or parental leave, a possibility of working part-time) will benefit from these; this

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<sup>7</sup> An individual is recognized as inactive in the labour market as long as she or he is not officially employed or does not belong to the category of unemployed.

<sup>8</sup> Source: [http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=0,1136184,0\\_45572595&\\_dad=portal&\\_schema=PORTAL](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL)

will induce higher gender segregation in the private sector. Mothers-oriented state interventions may, in turn, model the women and mothers into a “special” category of female workers. The welfare state may become, through its effort at recompense of disadvantage, a stimulator of the processes of segregation.

Chang (2000) distinguishes among four basic types of segregation regimes: formal-egalitarian, traditional family-centred, substantive-egalitarian and economy-centred<sup>9</sup>.

- The formal egalitarian type with an extensive system of interventions is centred on the support of equality of access to all occupations; its characteristic feature is ungenerous provisions in the form of benefits and services (the USA and Great Britain);

- The traditional family-centred type limits its interventions to equality of access to all occupations, anti-discrimination laws, and severely limited benefits that support combining career with family life (Japan, Germany, Austria, Portugal);

- The substantive-egalitarian type directs its interventions to equality of access to all occupations and extensive benefits and services supporting working mothers (the Scandinavian countries);

- The economy-centred type is characterized by high cash benefits and extensive range of state-provided services on the one hand, and insufficient intervention regarding the equal opportunities of accession to the labour market (socialist Hungary in the past and former Czechoslovakia).

The countries modelled on the egalitarian type are very successful in the integration of women into the labour market, nevertheless, the labour market thus produced perpetuates gender segregation and women are concentrated in the service sector – mainly its public section. In turn, men dominate the private sector.

The formal egalitarian type is relatively successful in both areas. A large number of women access the labour market, which is not, concurrently, accompanied by gender segregation. On the other hand, this system generates a great deal of social inequalities. There is an evident disparity between the primary and secondary labour market; a large number of working population find themselves near the poverty line.

The traditional family-centred type is characterized by a relatively low female labour participation in the work market and average values of gender segregation. The traditional male role of breadwinner is deeply rooted in the countries coming under this type. It is not an individual, who is entitled to the social benefits from the state, but the family, which is judged as a whole. Consequently, the social rights of married mothers and women are frequently derived from the situation of their partner.

Drawing on Sirovátka (2004), the consequences of the economy-centred segregation regime in the post-socialist countries may be summed up as follows: An aftermath of the past regime, horizontal segregation is still a wide-spread phenomenon. “In the course of socialist regime, women were gradually pulled into the labour market in massive numbers. Its sex segregation, as far as the categories of employment, professions, and pays are concerned, was nevertheless significant and women held mostly subordinate and undemanding employment positions, in order to manage time-consuming household work, (the services did not work, goods were difficult to get) and child care”. (Sirovátka 2004: 3-5) Moreover, the economic transformation after 1989 segmented the labour market by the criterion of employment stability<sup>10</sup>. Occupational segregation remains a pronounced feature. For instance, women are underrepresented in legislation or in the managerial positions (approximately a quarter of employees). Contrariwise, there is a lack of male labour force in the public sector (health service, education [lower-end positions] and social service.

### 2.2.2. Labour force demand

Another group of factors influencing segregation consists of those related to the theory of supply and demand. This theory is based on a presupposition that the number of workers in the formal labour market and the quality of their participation in the sphere of the paid forms of employment depends on how their labour force is demanded in economics and to what extent these workers are able and willing to meet this demand. Let us then explore what the impact of the labour demand on the gender segregation in the labour market is. A particular attention will be paid to the evidence based on the historical development of the demand for labour, employers’ preferences and their personnel practices.

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<sup>9</sup> Chang structured this categorization after surveying of social provisions in different countries. He examined whether the provisions promoting equality of opportunities i.e. various legal regulations against discrimination in the labour market and securing the same starting line for all citizens) prevail over those supporting employees’ balance between career and family life and state-guaranteed provisions compensating the costs and disadvantage effected by family responsibilities and parental care (state-guaranteed maternity leave, a possibility of working part-time, cash benefits during maternity leave, accessible state-subsidized child care, delegated social rights in the form reception of husband’s pension, social and health insurance paid by state, etc.).

<sup>10</sup> This text does not explore the situation of the Czech Republic labour market before 1989, though. The comparison of the regimes, e.g. before, in and after the transformation, despite relevant, would distract our primary focus. Nevertheless, it is important to remind the readers, that the situation before 1989 could be described by full (compulsory) employment of both men and women and central planning, and by a recent comparative decline of women’s participation in the labour market in the Czech Republic (and other post-Communist EU member states).

The boost in the service sector and of the rise in the number of administrative positions has fuelled the growing demand for a certain type of labour force in economics. The usual household work such as food preparation, cleaning, care for the underage children, the old or the ill members of the household became a part of the formal economics. As a consequence, the labour demand for workers who would be qualified and able to do these jobs, increased. It is, therefore, not surprising that women entered those occupations (especially the occupations in the service sector) that had been created by the shift of some unpaid forms of work into the formal labour market. The trend, which was formed after World War II in Western Europe and escalated in the 1950s and 1960s, has lasted, to a certain degree, until today. Charles (1992)

Authors, as for example Charles (1992) and Bettio (2002), mention an existing and statistically significant relation between the female employment rate and occupational gender segregation. There is a higher level of gender segregation in the countries with a higher rate of female participation in the labour market. The Scandinavian countries are the European leaders in the female employment rate; however, looking at women's and men's shares in particular occupations, the Scandinavian labour market comes out as sustaining gender-segregation. Hakim (1992) evidences this situation and states that gender segregation is a real problem in the countries which ideologically promote, or did so in the past, equality of social opportunities for women and men. The countries he uses as examples include not only Sweden, but also the former Soviet Union or Israel. Assuming direct proportionality between the rate of female participation in the labour market and the level of horizontal segregation enables us to expect that the countries with a low rate of female participation in the labour market (i.e. Italy, Greece and Spain) have got labour markets with the least developed gender segregation. (Bettio 2002)

Gender segregation in the labour market is also related to part-time women workers' participation in the labour market. Bettio (2002) states that the more women work part-time in a given country, the higher is the level of horizontal segregation for the country. Part-time work is the most wide-spread in the private sector which is what may shed light on this fact; this is also why it is much attractive for women who desire to combine career and family life. Another possible way to explain this might be the fact that employers tend to appoint men into full-time positions as they are less likely to go part-time for family reasons.

As research reveals, employers, when filling particular positions, calculate with the presumption that women are more likely to be family-oriented and spend more of their time uninvolved in career development (maternity or parental leave); employers also anticipate that women will demand a reduction in working hours more frequently than men. At least, these facts result in employers' need to boost organisational and administrative costs. According to Ruhm (1998) employees in the competitive environment of open labour market who are more probable to take parental leave are penalized by being accepted into positions where more frequent absences from work and interrupting career are less costly steps for the employer. As Bernhardt (2000) asserts, private companies are aware that female employees are more likely than their male counterparts to go on maternity leave and that they may demand part-time work on their return. It follows that the strategy of these companies is to appoint men to all important positions where the continuous efficiency is necessary. Consequently, women are appointed to positions in which they function as expendable sources of labour. Such provisions as maternity leave and carer's leave might create an atmosphere of caution in the labour market: companies endeavour to forestall problems that might occur in case of employing people inclined to interrupt their careers or to go part-time. They simply choose not to admit them to the aforementioned positions which require continuous efficiency. (Valentová 2004)

By inference, women with children or women planning to have them in the future will opt for work in the public sector where the legislation on equal opportunities for women and men is easier to apply and monitor than it is in the private sector. At this point the discussion intersects with the previous consideration of the institutional interventions of the state. The labour market is structured to a significant extent by the system and orientation of the social welfare provisions. As Bettio argues, the public sector undergoes a process of feminisation by organizing and financing a shift of unpaid work into the formal labour market and by providing working conditions which facilitate it for women to combine career and family life. (Bettio – Villa 1998, cf. Esping-Andersen 1997) Gornick and Jacobs (1998) equally assert that the growth of the public sector has stimulated – and the tendency proves to remain – women's participation and integration into the labour market as well as their access to quality employment. The work in the public sector opens new possibilities for securing an employment with a stable social status. The public sector is much less exposed to the market pressures; it is burdened by a lot of working conditions regulations, which carries along much advantage and disadvantage on both sides. The stability of a state-provided employment and its accessibility to women are clearly positive qualities. The stability and feminisation of this sector are often expiated by financial “penalization” which takes the form of lower salaries; they equally depend on the state solvency.

### 2.2.3. Labour force supply

The following paragraphs will explore labour force supply, which is defined as individuals' ability and motivation to participate in the labour market. (Cotter et al 1998) The research focuses on workers' preferences, volitional strategies and the influence of the human capital on gender segregation.

An important role in female and male participation in the labour market is played by harmonization of paid employment and household work. In general, women intending to have children concentrate in occupations where interrupting career is not problematic, nor is motherhood considered a disadvantage by the employer who therefore does not discriminate it. Selecting careers, men follow different strategies in which making career and family life compatible does not play such a significant role, especially when their position is that of the breadwinner. According to Becker's economic theory (1985) the majority of married women voluntarily opt for less demanding employments in the labour market, men seek to provide financial support to the family by increased participation in the labour market. An example from Great Britain demonstrated by Hakim (1992) proves that this trend is diminishing, nevertheless it does not repudiate Becker's assertion. However, there is plentiful research which tackles the women's expectations from the labour market and the workplace. It appears that increasing numbers of women desire a successful career, striving, equally as men, to achieve the greatest possible financial profit from their participation in the labour market. Furthermore, women value positive atmosphere in the working group, supportive family policies and flexibility. (Marini et al 1996; Elgquist – Salzman 1988)

In the countries where cultural and financial expectations motivate women to enter the labour market (i.e. the Scandinavian countries); even women whose career ambitions are not too high (family-centred type, adaptable type) enter the labour market; they are, accordingly, inclined to accept an employment that does not fully satisfy them. On the other hand, this kind of employment facilitates looking after the family. They choose the kind of employment which sustains their family-oriented preferences.

Human capital theory represents another influential argument related to labour supply and the position of women in the labour market. Its basic thesis assumes that the improving level of women's education and of qualification (skills and experience acquired through the system of education or through work experience) pushes up the rate of female participation in the labour market as well as its quality and women's rate of pay. (Chiplin – Sloane 1976) As far as the educational attainment is concerned, young women have caught up with men or even surpassed them in some countries; this development, though, has not significantly affected the level of gender segregation in the labour market. Understandably, the growing level of education does not guarantee, as a simple indicator, equal participation of men and women in all occupational categories. It is equally necessary to take into account the field of education that men and women select. The choice of the field of study may predetermine the whole of the subsequent career. As Charles (1992) highlights, within the modern, bureaucratised, output- and efficiency-oriented societies, the qualification and the type of skills are decisive for the subsequent integration into the labour market. Provided that differences between women's and men's skills and qualifications exist, they will re-emerge in the form of their positioning in the labour market. The reproduced gender-based division of skills results in the segregation in the labour market. As the relation between the occupational gender segregation and educational gender segregation forms the key question of this study, this problematics will be scrutinized in the following subchapter.

### 2.3. Education and Gender Segregation in the Labour Market

It is the main goal of this study to compare the level of occupational gender segregation across different countries in the context of gender-based segregation by the level and field of education. The previous chapter has briefly outlined that the theory of human capital presupposes the growing level of educational attainment and improvement of skills applicable in the labour market to bring about gender desegregation of the labour market. (Chiplin – Sloane 1976; Charles 1992; Hakim 1992) Coré (1999) holds that despite the fact that the education gap has been closing over the past decades, occupational gender segregation has not changed significantly since the 1970s. Nowadays young women spend more years in the educational process than men, and the numbers of women attaining tertiary education equate or even surpass those of men.<sup>11</sup> The aforementioned facts about the level of educational attainment raise a question of whether it is not rather the field of education than its level, what determines the later career of an individual. A closer examination of academic programs shows that boys' and girls' choices differ substantially. According to Esping-Andersen (2002) programs as health care and social care are dominated by women (84%) as well as humanities (69%),

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<sup>11</sup> Source: [http://www.oecd.org/document/31/0,2340,en\\_2649\\_37455\\_33710751\\_1\\_1\\_1\\_37455,00.htm](http://www.oecd.org/document/31/0,2340,en_2649_37455_33710751_1_1_1_37455,00.htm)

whereas the female share at technical colleges is mere 15%. On the contrary, men dominate sciences and technical fields as information technologies and engineering programs.

Especially inspiring work to this study is by Bradley, Charles and Hakim. Bradley (2000) compares tertiary gender segregation in different countries and concludes that horizontal gender segregation in education does not show significant changes over decades, not even in those countries, where a campaign has been led for the promotion of democratic and non-discriminatory practices in the system of education (i.e. Sweden). She further argues that the highest level of gender segregation remains in the Scandinavian countries which promote equality of opportunities. Bradley states that unequal shares in (fe)male representation in academic programs exist where the female enrolment at academic programs is higher than male and maintains that horizontal gender segregation in education tends to persist and outlast the vertical gender segregation.

There are clear consequences affecting women's participation in the labour market. Charles (2002) names as the main causes culturally embedded gender patterns and structural barriers. These cause women to anticipate a more difficult access to certain positions and certain environments during the process of selecting the future field of study, therefore they select fields which will transform into an easier and more acceptable career. Hakim's arguments (2002) relate to this fact when she maintains that women emphasize atmosphere and relationships in the working environment far more than men. They select such fields of study that will later enable them to find a job corresponding with their expectations and preferences

Although many authors recognize a close implication of horizontal segregation in education with the horizontal segregation in the labour market, none of them investigates the given topic systematically nor evidences it by empirical data covering a whole of adult population active in the labour market.

The accessible studies investigating the problematics of horizontal segregation in education limit their analyses to the subpopulation of tertiary students and ignore gender segmentation in lower study programs. This article gives the first evidence of the horizontal segregation in education at all its levels. This allows us to link the facts about gender segregation in education to those about occupational gender segregation.

The field of education substantially influences the position in the labour market. If the majority of women and men acquire education in gender-typical fields, they will probably end up in typically female or male employments, the female one being characteristic by lower rewards. The gender segregation has come full circle (segregation in education, segregation in the labour market, gender pay gap), while the choice of the study program stands at its very beginning. It is the objective of the following chapter of this study to fill in the blank spaces on the map of empirical analyses that deal with the linkage between gender segregation in education and in the labour market.

### **3. Empirical Part**

#### **3.1. Main Research Questions, Indicators, Hypotheses, Data**

The subject of this analysis is a comparison of several European countries from the perspective of occupational gender segregation and of vertical and horizontal segregation in education. The analysis is mainly descriptive, indicating relevant themes and directions for potential future empirical enquiry. Nevertheless, empirical studies connecting educational and labour market segregation from a gender perspective are still very limited or almost non-existent in the Czech context and thus this text opens the field for Czech sociological inquiry setting the international context as a relevant background<sup>12</sup>.

To identify the occupational position, we applied a complete Goldthorpe scheme of 11 classes. Based on an individual's classification in the labour market – whether he or she participates on the demand side or the supply side or neither – three basic class positions may be recognized in the Goldthorpe class scheme: employers, employees and self-employed. Employers are further divided into large and small. Hotel owners, shop owners, restaurant owners or owners of smaller companies are marked as large employers and they make up class I. Smaller employers differ from the large owners as to the number of employees: they most probably employ dozens of workers than hundreds (class IVa and IVc), or do not employ any (class IVb and class IVc). Furthermore, smaller employers differ from the larger ones in their share in the company management.

The class position of employees is differentiated by the type of working agreement or the employer-employee relation. One side is taken by those who have entered an employment contract. The employer-

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<sup>12</sup> The team of this grant project works further on providing a more complex analysis of the relation of occupational and educational segregation from a gender perspective. These analyses will be a result of a combination of existing secondary quantitative data analysis (such as this one) and a qualitative empirical inquiry in the Czech context.

employee relation is therefore a service relation. The other side is taken by workers who have entered a labour contract. The employer-employee relation is defined by the means of job performance.

The employment contract establishing a service relation typifies all professionals, managers, higher-grade technicians and higher-grade administrators and officials. Depending on the level of education, decision-making responsibility and the rate of pay, we may distinguish between higher class (class I) and lower class (class II). All labourers are typified by the labour contract. They may be distinguished into industrial and agricultural labourers. Skilled workers in industry make up a separate class (class VI). They differ from the remaining classes (unskilled workers class VIIa and farm labours VIIb) in the rate of pay, stability of employment and the extent of autonomy.

There are positions in between these classes which are formed by contract of employment, but this contract combines two types: service relation and labour contract. Their income consists of two parts: contractual pay and performance-based wage. This category consists of routine non manual employees (sales, administration and services). Depending on the level of income and expertise, the category is divided into a higher-grade rank (class IIIa), where the positions are mostly occupied by men, and a lower-grade rank(class IIIb), mostly occupied by women (working conditions do not differentiate this class substantially from unskilled manual workers). Furthermore, lower-grade technicians and supervisors also range among these positions (class V). It is especially difficult to specify whether the reward within this group depends on the service relation or whether it is performance-based. In most cases their employment may be qualified as the “service relation,” which distinguishes them from workers (class VI a VII).

Those who do not employ anybody and those not employed range into the category of self-employed. The type of their entrepreneurial activities fits them either into the industrial sector (class IVb) or agriculture (class IVc). The difference between the self-employed farmers (class IVc) and farm labours (class VIIb) is that the former are holders, the latter employees. Regarding the land tenure, the family-oriented organisation of agricultural production, and the source of income, it is necessary, according to Goldthorpe and his colleagues, to distinguish them into two classes.

To identify the level of education (vertical dimension of educational attainment) we applied the ISCED97 system of seven levels<sup>13</sup>. We modified this system into a system of four levels by merging categories 0) and 1), categories 3) and 4), and categories 5) and 6). The following analysis therefore works with these levels of education: *basic education*; *vocational or technical education*; *secondary education* and *tertiary education*.

**Table 1: Economically Active Population by Sex across All the Sample European Countries**

EGP class scheme		Men	Women	Total
I	Higher-grade professionals, administrators, and officials; managers in large industrial establishments; large proprietors.	14.61	7.28	10.77
II	Lower-grade professionals, administrators, and officials; higher grade technicians; managers in small industrial establishments; supervisors of non-manual employees.	18.69	19.56	19.14
IIIa	Routine non-manual employees, higher grade – administration and commerce.	5.56	19.14	12.67
IIIb	Routine non manual employees, lower grade (sales and services).	5.57	19.53	12.87
IVa	Small proprietors, artisans, etc, with employees.	2.05	1.11	1.56
IVb	Small proprietors, artisans, etc, with no employees.	1.54	2.11	1.84
V	Lower grade technicians; supervisors of manual workers.	6.23	1.17	3.58
VI	Skilled workers.	20	8.27	13.86
VIIa	Unskilled workers outside the primary sector.	19.06	15.86	17.39
VIIb	Farm labours (agricultural and other workers in primary production)	3.85	4.16	4.01
IVc	Farmers, etc. (farmers and small holders; other self-employed workers in primary production).	2.85	1.8	2.3

Source: ESS 2004

<sup>13</sup> ISCED 1997 (International Standard Classification of Education) comprises the following levels of education: 0) Pre-primary education; 1) Primary education or first stage of basic education; 2) Lower secondary or second stage of basic education; 3) (Upper) secondary education; 4) Post-secondary and non-tertiary education; 5) First stage of tertiary education; 6) Second stage of tertiary education (cf. International Standard Classification of Education, 1997)



**Table 2: Educational Structure by Sex in 18 European Countries**

Education	Men	Women	Total
Basic	16.6	19.36	18.09
Vocational	21.78	20.6	21.14
Secondary	41.41	42.23	41.85
Tertiary	20.21	17.81	18.92

Source: ESS 2004

As an indicator of the type of education, we used the ESS question of what field or program the respondents' highest qualification is in<sup>14</sup>. Respondents could select one of fourteen categories, by which the whole of the scope of possible study programs was represented: general (not specific) field, humanities, technical and engineering programs, agriculture and forestry, teacher training education, science and mathematics, medical studies and health service, economics and commerce, social studies, law and legal service, personal care service, public order and safety, transport and communication.

**Table 3: Fields of Study Outline by Sex in All the Sample European Countries**

Type of Education	Men	Women	Total
General or not specific	25.24	30.54	28.06
Art – fine or applied	1.77	1.99	1.89
Humanities	3.29	4.93	4.16
Technical and engineering	32.09	5.55	17.97
Agriculture and forestry	5.12	4.17	4.61
Teacher training education	2.51	6.73	4.76
Science and mathematics	6.12	3.23	4.58
Medical and health service	2.3	10.7	6.77
Economics and commerce	8.99	15.04	12.21
Social studies and public administration	2.61	4.35	3.53
Law and legal service	1.12	0.99	1.05
Personal care services	3.68	10.89	7.52
Public order and safety	1.91	0.31	1.06
Transport and communication	3.24	0.58	1.83

Source: ESS 2004

The main hypotheses tested in this study are as follows: Based on the above mentioned theoretical and empirical evidence, the countries with a high level of horizontal gender segregation in education will presumably show a high level of horizontal occupational gender segregation in the labour market. Supposedly, segregation of women and men across varied fields of study will be reflected in the gender segregation in the labour market. The Czech Republic, as well as other post-socialist countries, is expected to demonstrate a relatively high level of occupational gender segregation. This inference is drawn from the evidence of the historical development in the labour market of traditional economies and from the situation in the labour market during the era of socialism. Based on the evidence presented in the 2.3 subchapter, the level of vertical gender segregation in education across the sample countries is not expected to reproduce the level of occupational gender segregation.

To analyse occupational and educational gender segregation we use data from the *European Social Survey (ESS)*<sup>15</sup>. There are two facts recommending the ESS data. First, the survey covers both old and new EU member states. This facilitates hypotheses testing of differences between post-socialist countries and old

<sup>14</sup> The original wording of the question about the field of study, as it is recorded in the international ESS questionnaire. F6a – In which of these fields is your highest qualification? 1) general or not specific field, 2) art – fine or applied, 3) humanities – languages, classics, history, theology, etc., 4) Technical and engineering, 5) agriculture and forestry, 6) teacher training education, 7) science, mathematics, computing, 8) medical, health service, nursing, 9) economics, commerce, business administration, accountancy, 10) social and behavioural studies, public administration, media, culture, sport and leisure studies, 11) law and legal service, 12) personal care services, 13) public order and safety, 14) transport and communication. Owing to a lot of researchers' critical view of this question because of its low variance of answers from respondents with lower educational attainment, we applied descriptive techniques to examine whether or not their answers are concentrated in two or three categories. Our analyses did not prove the variance of respondents' answers to be limited in a significant manner.

<sup>15</sup> Specifically, the ESS (2004) data from the Round 2 file are included: the *Integrated File – Edition 2.0*. This round covered 26 countries and was fielded in the years 2004 and 2005. To achieve comparability and a sufficient number of respondents in respective social classes, we had to exclude eight countries from the analysis. The data file uses the following country codes: AT–Austria; BE–Belgium; CZ–Czech Republic; DE–Germany; DK–Denmark; ES–Spain; FI–Finland; GR–Greece; IE–Ireland; NL–Netherlands; NO–Norway; PL–Poland; PT–Portugal; SE–Sweden; SI–Slovenia; SK–Slovakia; UA–Ukraine. The analysis combines design weight (dweight) and probability weight (pweight).

EU member states. Second, the data contain information on the type of education. This is an important fact, as a lot of cross-national research focuses merely on the indicator of the highest level of educational attainment, but the information on its type is missing. In order to compare occupational gender segregation across various countries in the context of horizontal segregation in education, the ESS appears to be an ideal data source.

### 3.1.2. Index of Gender Segregation

As the participation rate of economically active population by class and gender is marked by the type of occupational structure, and, simultaneously, the female and male shares in particular levels of education are affected by the educational structure, the data will be analysed with the help of the index of gender segregation designed by Maria Charles and David Grusky (1995). This index enables us to identify a “net” sex ratio in particular occupational categories, levels of education or fields of education.

The index of gender segregation is based on classification of both the general (for a state) and the specific (for every occupational category or educational category separately in a particular country) gender segregation score. This score shows the rate of relative segregation by sex and is represented by the *ratio index* ( $R$ ). Contrary to the (fe)male participation rate in occupational or educational categories, this index is not influenced by multinational difference in occupational and educational structures across particular countries. The index is computed in the following way:

$$R = 1/I \sum_{i=1}^I \{ \ln(F_i / M_i) - [1/I \sum_{i=1}^I \ln(F_i / M_i)] \},$$

where  $F_i$  is the number of women in a given employment or educational level,  $i$ ,  $M_i$  is the number of men in a given class position, level of education or field of education,  $i$ , and  $I$  is the number of occupational or educational categories.

Values of  $R$  give the sum for individual class-specific or education-specific deviations from proportional representation of the sexes in a class average or educational category. The factor indicative of to what extent women in a given country are disproportionately represented in the labour market or in the educational structure is indicated by  $\exp(R)$ . A situation in the labour market or within educational structure which does not show any gender segregation,  $R = 0$  and  $\exp(R) = 1$ . With ultimate gender segregation,  $R$  cannot be identified as  $M_i = 0$  in every typically female occupation, at every level of education or field of education. (Charles – Grusky 1995; Charles 1992)

Working with the index described above, it is necessary to take into account the fact that index is sensitive to the number of categories which enter the analysis. Too large categories, associating too many occupations or types of education make the index into a very rough tool for exposing gender segregation. A general rule is that the rougher is the categorization, the less accurate data about gender segregation you achieve.

## 3.2. Results of Analyses

### 3.2.1. Level of Gender Segregation in the Labour Market and in Education

The first column of table 4 shows the ratio index of segregation ( $R$ ) in the labour markets of the sample of 18 European countries. The second column indicated as  $\exp(R)$  is more interesting to look at for the sake of interpretation. It measures the overrepresentation of women or men in average occupation (if the sample of occupational categories is complete). For instance in Ireland, men or women are over-represented by the factor of 2.72 in the average Irish occupation. Slovenia shows the factor of 1.40. We may then conclude that the level of gender segregation in the labour market is higher by 94 % (or by the factor of 1.94) than in Slovenia (computed as  $2.72/1.40=1.94$ ). The Czech Republic is located among countries with a lower level of occupational gender segregation (the Czech Republic is evidently at the beginning of the last third of the ladder of countries ordered according to the ratio index of gender segregation).

Another 11 columns of table 3 show the ratio index score of gender segregation in particular class positions (we mean the specific  $R_i$ ). This value is computed by deviating the ratio of females to males in the  $i^{\text{th}}$  class category and the corresponding ratios averaged from all class positions. The ratio index score is computed as follows:

$$R_i = \ln(F_i / M_i) - [1/I \sum_{i=1}^I \ln(F_i / M_i)],$$

where the terms are defined as in the previous case. The parameter for each class position may be interpreted as a deviation of the given class position from equal representation of women and men in this class position.

Looking at average scores for all analysed countries (the bottom-line in the table) we can conclude that gender segregation in the European labour market exists. Women are over-represented in class II (*lower-grade administrators, and officials; higher grade technicians, managers in small industrial establishments; supervisors of non-manual employees*), IIIa (*routine non-manual employees, higher grade – administration and commerce, salespeople, service sector employees*), IIIb (*Routine non manual employees, lower grade (sales and services)*), IVb (*small proprietors, artisans with no employees*) and slightly in class VIIa (*Unskilled workers outside the primary production*). Men dominate class I (*higher-grade administrators, and officials; managers in large industrial establishments; large proprietors*), IVa (*small proprietors, artisans with employees*), IVc (*farmers and small holders; other self-employed workers in primary production*), V (*lower grade technicians; supervisors of manual workers*), VI (*Skilled workers*) and VIIb (*agricultural and other workers in primary production*). The Czech Republic has got a similar pattern as there is in Europe.

The Czech Republic differs significantly from the European mean values especially in categories IVb and IVc – women are represented above the European average among small proprietors, artisans, with no employees (difference = 0,5) men are often farmers, small holders and self-employed in primary production (difference R= 1,4). Furthermore, in comparison to the European average, women are more often represented in class IIIa (*routine non-manual employees*) and VIIa (*unskilled workers outside the primary production*), on the contrary, men prevail in class I (*professionals, managers, high-grade salariat*) a V (*supervisors of manual workers*).

Table 5 shows the level of vertical gender segregation in education, which is the level of segregation regarding the level of education in the select sample countries. The computation is, as well as with occupational gender segregation, based on the ratio index. Four levels of education entered the analysis: basic, vocational, secondary and tertiary. The data document that the highest segregation by the level of education among men and women exists in Germany, Ukraine, Poland, Switzerland and the Netherlands. Contrarily, the most equal distribution of men and women across all levels of education exists in Estonia, Belgium, Denmark Finland, and the Czech Republic. The Czech Republic shows the most disproportionate representation by gender in the category of vocational education, where women are over-represented. The remaining categories show an altogether balanced ratio.

Table 4: **Ratio Index of Occupational Gender Segregation across Different European Countries**

Country	Ratio Index		Ratio Index for Particular Class Categories										
	R	exp R	I	II	IIIa	IIIb	IVa	IVb	V	VI	VIIa	VIIb	IVc
Ireland	1,00	2,72	-0,68	0	1,64	0,87	-0,75	1,49	-0,89	-0,56	0,15	-0,98	-0,4
Netherlands	0,96	2,61	-0,53	0,45	1,1	1,51	-0,18	0,38	-1,65	-0,44	0,23	-0,17	-0,91
Norway	0,94	2,55	-0,88	-0,11	1,36	1,95	0,17	0,13	-1,76	-0,73	0,49	-0,03	-0,56
Ukraine	0,93	2,53	-0,77	0,23	0,85	1,31	0,62	0,25	-1,45	-0,79	0,06	0,6	-0,78
Sweden	0,91	2,48	-0,98	0,32	1,56	1,34	-0,35	0,77	-1,83	-1,01	0,12	0,01	0,08
Finland	0,87	2,39	-0,65	0,28	1,69	1,81	-0,81	0,84	-0,84	-0,79	-0,06	-0,94	-0,67
Denmark	0,85	2,35	0,07	0,39	0,9	1,22	-0,14	0,57	-1,31	-0,52	0,21	-0,36	-1,43
Britain	0,83	2,29	-0,75	0,56	1,83	2,22	-1,29	-0,32	-1,44	-1,03	0,07	0,07	0,02
Poland	0,80	2,22	-0,29	0,33	1,66	1,63	-0,24	0,83	-0,73	-0,42	-0,23	-2,06	-0,75
Austria	0,77	2,15	-0,59	-0,12	1,22	0,88	-0,53	0,17	-1,86	-0,32	0,17	0,77	0,09
Germany	0,76	2,14	-0,25	0,93	1,96	1,88	0,06	0,61	-0,96	-0,86	-0,02	-1,15	-2,36
Switzerland	0,74	2,10	-0,45	0,94	1,29	1,6	-0,5	0,6	-1,15	-0,3	0,71	-1,4	-1,62
<b>Czech Republic</b>	<b>0,70</b>	<b>2,02</b>	<b>-0,19</b>	<b>0,21</b>	<b>1,64</b>	<b>1,71</b>	<b>-0,46</b>	<b>0,96</b>	<b>-1,59</b>	<b>-0,77</b>	<b>0,41</b>	<b>-0,12</b>	<b>-2,26</b>
Belgium	0,69	1,99	-0,47	0,37	1,54	1,68	-0,58	0,6	-2,06	-0,9	-0,33	0,1	0,14
Estonia	0,65	1,91	-0,23	0,11	0,56	0,91	-0,85	0,74	-1,31	-0,1	0,23	0,83	-0,9
Portugal	0,62	1,85	-0,31	0,26	1,5	2,15	0,25	0,58	-1,56	-1,1	0,07	-0,64	-1,54
Greece	0,61	1,84	0,18	0,18	0,09	0,3	-0,78	-0,55	-0,5	0,41	0,58	0,09	-0,02
Slovakia	0,60	1,82	-0,31	0	1,47	1,43	-0,6	0,1	-1,35	-0,39	-0,31	0,26	-0,37
Slovenia	0,33	1,40	-0,19	0,5	2,17	1,95	-0,46	-0,1	-1,51	-0,4	-0,26	0,62	-2,07
<b>Average</b>	<b>0,77</b>	<b>2,18</b>	<b>-0,44</b>	<b>0,31</b>	<b>1,37</b>	<b>1,49</b>	<b>-0,39</b>	<b>0,46</b>	<b>-1,36</b>	<b>-0,58</b>	<b>0,12</b>	<b>-0,24</b>	<b>-0,86</b>

Source: ESS 2004

The countries reported in the table are ordered by the values of the average index, from its highest rate, i.e. from the highest level of gender segregation in the labour market to its lowest rate.

The higher the value of the average index, the higher is the level of gender segregation. Negative values stand for male overrepresentation.

**I** Higher-grade professionals, officials and administrators; managers in large industrial establishments; large proprietors.; **II** lower-grade professionals, administrators, and officials; higher grade technicians; managers in small industrial establishments; supervisors of non-manual employees; **IIIa** Routine non manual employees, higher grade (sales and services); **IIIb** Routine non manual employees, lower grade (sales and services); **IVa** Small proprietors, artisans, etc., with employees; **IVb** small proprietors, artisans, etc., with no employees; **V** Lower grade technicians; supervisors of manual workers; **VI** Skilled workers; **VIIa** Unskilled workers outside the primary sector; **VIIb** Farm labours (agricultural and other workers in primary production); **IVc** Farmers and small holders; other self-employed workers in primary production.

Table 5: Ratio Index for Vertical Gender Segregation across Different European Countries

Country		Ratio index		Ratio index for particular educational categories			
		R	exp R	basic	vocational	secondary	tertiary
Germany	DE	0.45	1.58	0.60	0.47	0.08	-0.66
Ukraine	UA	0.31	1.37	0.42	0.35	0.17	0.31
Poland	PL	0.30	1.35	0.07	-0.48	0.27	0.38
Switzerland	CH	0.29	1.34	0.16	0.52	0.06	-0.43
Netherlands	NL	0.28	1.33	0.34	0.42	0.12	-0.24
Slovenia	SI	0.27	1.31	0.44	-0.43	0.19	0.02
Greece	GR	0.22	1.25	0.40	-0.09	0.16	-0.23
Ireland	IE	0.22	1.24	-0.18	0.14	0.34	0.22
Slovakia	SK	0.21	1.24	0.23	0.33	-0.15	-0.16
Portugal	PT	0.17	1.19	-0.01	0.16	0.21	0.31
Austria	AT	0.16	1.18	0.15	0.19	0.04	-0.28
Sweden	SE	0.16	1.17	0.01	-0.10	-0.25	0.27
Norway	NO	0.15	1.16	0.35	-0.01	-0.13	-0.10
Czech Republic	CZ	<b>0.15</b>	<b>1.16</b>	<b>0.03</b>	<b>0.45</b>	<b>-0.03</b>	<b>-0.08</b>
Denmark	DK	0.14	1.15	-0.13	0.23	-0.09	0.11
Finland	FI	0.12	1.13	-0.04	0.01	-0.08	0.35
Belgium	BE	0.10	1.11	0.22	-0.03	-0.10	0.06
Estonia	ES	0.09	1.10	0.10	0.01	-0.25	0.01
Average		0.21	1.24	0.17	0.12	0.03	-0.01

Source: ESS 2004

The countries reported in the table are ordered by the values of the average index, from its highest rate, i.e. from the highest level of vertical gender segregation in education to its lowest level.

The higher the value of the average index, the higher is the level of gender segregation.

The Czech Republic appears as a country with a larger share of women with vocational training as compared to the European average. Other categories reproduce the European average. The third type of segregation that we will scrutinize in this study is the horizontal segregation in education. As stated above, this type of segregation examines the disproportional representation of men and women in different fields of the educational attainment. Table 6 shows that the highest level of gender segregation in the system of education exists in Finland, Sweden, Slovakia, Belgium, Ukraine and Ireland. The most even distribution of men and women across different fields of study is in Estonia, Austria, Germany and the Czech Republic. The Czech Republic ranges among the five countries which may boast of the lowest level of average segregation of men and women in different fields of study.

**Table 6: Ratio Index for Gender Segregation by the Field of Study across Different European Countries**

Country	Ratio Index															
	R	exp R	General or not specific field	Arts	Humanities	Technical and engineering,	Agriculture and forestry	teacher training education	Science, Mathematics and computing	Medical, health service, nursing	Economics, commerce, business administration	Social studies, public administration	Law and legal services	Personal care services	Public order and safety	Transport and communication
Finland	1.10	3.02	0.1	1.22	0.67	-1.73	-0.68	0.67	0.17	1.8	0.67	1.73	0.34	1.34	-3.39	-2.91
Sweden	1.10	2.99	-0.21	0.59	0.22	-0.17	0.75	1.72	-2.11	-0.4	0.28	0.93	1.36	-1.99	-1.23	1.17
Slovakia	1.09	2.96	-0.31	1.14	1.01	0.5	-0.41	0.86	-2.37	-1.8	0.64	-1.13	0.64	-2	-2.51	2.12
Belgium	1.04	2.84	0.74	0.66	0.64	-1.68	-0.97	1.47	-1.17	2.02	0.64	0.86	-0.45	1.3	-0.54	-3.51
Ukraine	1.02	2.78	-0.74	-0.1	1.56	1.72	-1.13	2.12	-1.13	-0.09	-0.23	-0.74	1.47	-1.27	-0.12	1.01
Ireland	0.99	2.69	0.29	0.6	-1.85	-1.13	1.24	-0.97	1.87	0.23	0.87	0	1.08	-1.71	-1.27	0.59
Netherlands	0.97	2.64	0.03	-2.3	-1.57	1.21	-0.19	1.71	0.42	1.13	0.19	1.84	-1.78	-1.53	-0.03	0
Denmark	0.97	2.63	0.65	0.48	0.51	-2.08	-2	1.34	-0.46	2.15	0.24	0.22	0.55	1.45	-1.1	-1.94
Poland	0.94	2.56	-0.87	1.31	-0.54	2.58	0.7	0.39	0.04	0.67	-1.11	-2.9	1.27	0.63	-2.12	-0.72
Norway	0.93	2.53	-2.27	-1.6	0.76	-0.95	2.48	0.15	0.84	0	2.01	-1.19	-1.39	0.19	0.71	-1.87
Slovenia	0.89	2.44	-0.1	2.36	0.61	0.66	-0.05	1.58	-3.93	-1.65	0.21	1.29	0.12	-2.08	-0.06	1.91
Greece	0.88	2.41	0.73	0.36	0.83	-2.41	-0.45	1.53	-0.19	1.44	0.45	1.05	0.19	2.53	-4.81	-1.25
Switzerland	0.87	2.40	0.68	-0.1	1.97	-0.91	0.47	0.97	0.11	1.44	0.67	0.88	0.05	0.3	-4.07	-2.47
Portugal	0.83	2.29	0.87	-0.1	2.05	1.35	0.59	0.13	0.71	-2.49	-2.04	1.9	0.67	-1.14	-3.18	1.09
Czech Republic	0.77	2.16	0.08	-0.1	0.78	-1.3	-0.49	1.17	-0.44	1.67	0.82	0.33	-0.6	1.03	-1.61	-1.33
Austria	0.75	2.12	0.57	0.24	0.63	-2.18	-0.32	0.73	-0.06	1.47	0.65	0.77	-0.61	0.93	-0.69	-2.13
Germany	0.74	2.09	0.43	0.48	-0.03	-1.77	-0.09	1.06	-1.03	1.49	0.55	0.54	-0.3	1.07	-1.25	-1.14
Estonia	0.59	1.80	0.17	0.99	0.2	-2.14	-0.66	0.6	-0.48	1.33	0.4	0.5	0.3	0.33	-0.19	-1.33
Average	0.91	2.52	0.05	0.34	0.47	-0.58	-0.07	0.96	-0.51	0.58	0.33	0.38	0.16	-0.03	-1.53	-0.71

Source: ESS 2004

The countries reported in the table are ordered by the values of the average index, from its highest rate, i.e. from the highest level of horizontal gender segregation in education to its lowest rate.

The higher the value of the average index, the higher is the level of gender segregation.

Focus on the Czech Republic brings to light that women are significantly over-represented in the fields of study as medicine and health service, personal care service, teacher training education, economics, commerce and business administration, and humanities. Contrarily, male dominated fields are public order and safety, transport and communication, technical and engineering programs, agriculture and forestry, science and mathematics. This is also a composition corresponding to the European average, showed in the bottom line of the table.

Comparing the differences between the countries within the vertical and horizontal gender segregation in education, it becomes clear that there is a distinct separation of men from women in the sphere of fields of education. By implication, the difference between the country with the highest index score of segregation by the level of education and its lowest score accounts to 44%. Consequently, German score of vertical gender segregation in education is by 44% higher than Estonian. The countries show a much more significant difference in horizontal gender segregation in education. The difference between the lowest index score and its highest level amounts to 68%; this means that the Finnish level of gender segregation by the field of study is higher by 68% than the Estonian.

When focusing on the comparison of partial categories in the Czech Republic with the European average, men are over-represented in technical and engineering programs (difference  $R = 1.88$ ), women in medicine and health care services (1.09), and personal care services (1.06). Contrasted with the European average,

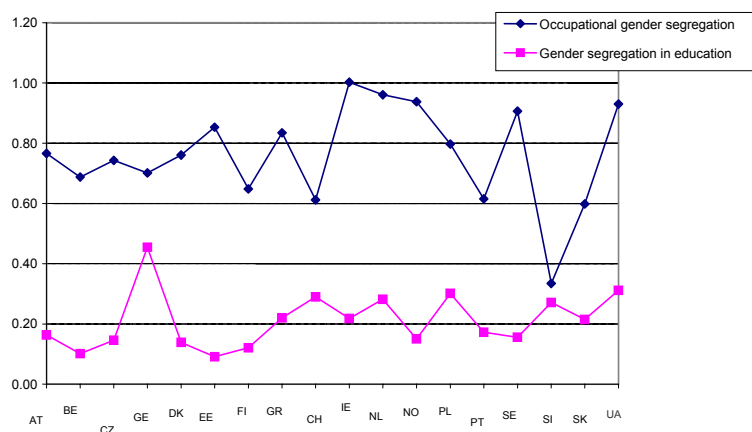
Czech women acquire education less often in the fields as transport and communication, Czech men study law and legal services programs less often than it appears to be current in Europe.

### 3.2.2. Relation between Gender Segregation in the Labour Market and Educational Gender Segregation

The text which is to follow will concentrate on the occupational gender segregation and educational gender segregation. We will employ a descriptive comparison of the ratio index score (R) in the sample countries.

Figure 1 compares occupational and vertical gender segregation in education in the analysed sample of countries. All countries show higher values for occupational gender segregation than gender segregation within the levels of educational attainment. The values representing the Czech Republic are located very close to Finland, Belgium, Austria and Denmark, which are all countries characterised by a low level of segregation in educational attainment and by an average level of occupational segregation. The remaining new EU member states, i.e. post-socialist countries (apart from Poland), sustain relatively good values when compared to other European countries. Slovakia and Slovenia demonstrate a very low level of occupational segregation while the level of vertical segregation in education fluctuates slightly above the European average.

Figure 1. Comparison of occupational gender segregation and of gender segregation in education across different EU countries



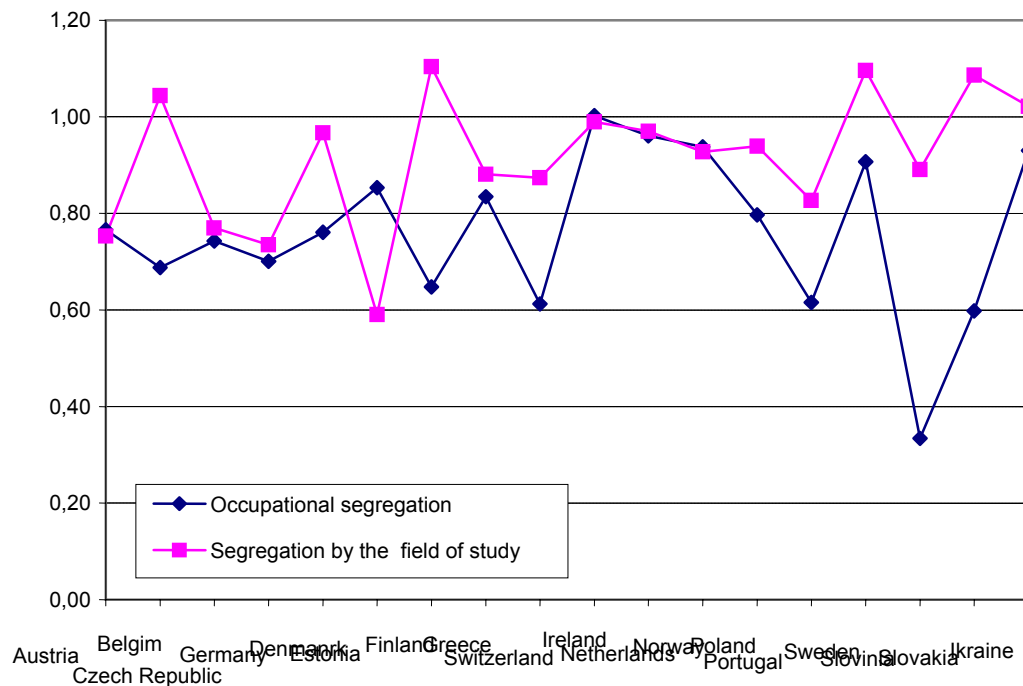
Source: ESS 2004

The figure represents the values of the average index R from tables 4 and 5

Figure 2 relates the level of occupational gender segregation to the level of segregation within the educational attainment in the analysed sample of 18 European countries. Comparing figures 1 and 2, the difference between the level of horizontal gender segregation in education and occupational gender segregation becomes quickly evident: it is not significant. Belonging to countries with exceptional scores are: Finland (with a relatively high level of segregation within the field of study whereas the level of occupational gender segregation belongs to the lowest in Europe), Estonia (where exists extremely low level of segregation within the field of study, whereas the level of occupational gender segregation remains comparable to the European average) and Slovenia (where the level of segregation within the field of study is average when placed into the European context but the level of occupational gender segregation is the lowest in Europe). The Czech Republic belongs in the group of countries, where the levels of both types of segregation are almost identical. Compared to other countries involved in the sample, it demonstrates relatively low values.

As far as the relation between the gender segregation in the labour market and horizontal segregation in education, the Czech Republic is located near the countries with a lower level of gender segregation in education and of the segregation in the labour market, which is near the countries as Austria, Germany, and, to certain extent, Portugal. The remaining new member states, apart from Slovakia, sustain relatively good values as well.

Figure 2. Comparison of occupational and of segregation by the field of study across different EU states



Source: ESS 2004

The figure represents the values of the ratio index R from tables 4 and 6..

The subsequent paragraphs will provide an answer to the question of whether it is possible to examine the relation between the level of occupational gender segregation and the level of vertical and horizontal segregation in education with the help of statistics, and to thus find out whether it is the level of horizontal segregation in education that has got a more significant influence on the occupational gender segregation, according to statistics, or the level of vertical gender segregation. In terms of statistics, we seek to explain what levels of variance in occupational gender segregation is explained by horizontal and vertical gender segregation in education.

To answer this question we will fit a simple linear regression model<sup>16</sup>. The level of occupational gender segregation will be the dependent variable and the first independent variable will be the level of horizontal segregation in education. If all the sample countries are included in the model, it shows that the horizontal segregation in education accounts for 10% of occupational segregation. In order to find out how the relation between these two variables modifies if tested for the vertical segregation in education – in other words, if we supply the regression model with another variable representing the level of vertical segregation in education – it proves that the level of explained variance does not increase significantly. By implication, the level of vertical segregation in education does not enhance the level of explained variance of the independent variable. It follows that the level of vertical gender segregation in education does not have the same influence on the level of occupational segregation as the horizontal segregation in education. It must be taken into account that the influence of independent variables has not been proved at a statistically significant level. This implies that the result cannot be generalised. Despite this fact, this analysis, surpassing the descriptive analyses, shows the direction for the future research into the relation between gender segregation in the labour market and gender segregation in education.

#### 4. Conclusions

The most important contribution of this article is its attempt at relating information on occupational gender segregation to the data on educational gender segregation, investigating both its vertical form (segregation by the level of education) and its horizontal form (field of education). In the existing accessible data sources,

<sup>16</sup> Bettio (2002) applied the same test to explain the relation between the rate of employment and the level of segregation measured by the ratio index for selected EU countries.

allowing cross-national comparison, there were completely missing data specifying the field of respondents' educational attainment, the information which would enable the analysis of horizontal segregation in education. For that reason, the empirical analyses scrutinizing the relation between educational segregation and segregation in the labour market are only possible now. The ESS (2004) survey provided indispensable data to test hypotheses on the interconnection between occupational gender segregation and the horizontal and vertical educational segregation.

While the previous research into horizontal educational segregation was limited mainly to the subpopulation with tertiary education, this text focuses on the respondents across all levels of education.

Furthermore, the article contributes to the academic debate on the process of gender segregation by including new EU member states. Literature touches on the segregation effects of socialist regimes and their impact on the women's position in the labour market in the present time (Hakim 1992; Chang 2000; Sirovátka 2004), however, a systematic comparison including both old and new EU countries has not yet come into existence.

An important finding implicated in the analyses which have been undertaken reveals that the sample countries differ as to the occupational gender segregation. The difference amounts to as much as 94%, meaning that the country with the highest level of segregation (Ireland) proves to have a double level of occupational gender segregation when compared to the one of the lowest segregation levels (Slovenia). The sample countries vary much less when compared by the criterion of horizontal educational segregation. The countries' values show a difference of 68%. We detected values indicating an ideal distribution of men and women in the area of level of educational attainment: the values do not exceed 44%.

Our analyses have documented that the highest level of occupational gender segregation, as defined in this research, exists in Ireland, the Netherlands, Norway, Ukraine and the Scandinavian countries. The Czech Republic has got the seventh lowest ratio index of occupational segregation. There is only lower level of segregation in Belgium, Estonia, Portugal, Greece, Slovenia and Slovakia. We may infer that the lower level of occupational segregation is characteristic of the new member states, being lower than in the most of old member states. In other words, the labour market in the new member states (i.e. in the post-socialist countries) does not show a propensity towards segregating into typically (fe)male categories. Female dominated types of employment in the Czech Republic are mainly routine non-manual employment in administration and higher-grade positions in commerce, routine non-manual lower-grade positions in commerce and service sector, sales assistant positions and service sector employees, small proprietors and artisans with no employees. Men are over-represented in professional and managerial occupations, in positions of supervisors of manual workers, small proprietors with employees, and among workers and farm labour.

Comparing European countries through the prism of gender segregation by the field of study, the evidently highest level of gender segregation in the system of education exists in Finland, Sweden, Slovakia, Belgium, Ukraine and Ireland. Most of these countries also demonstrate significantly high rates of gender segregation in the labour market. On the other hand, women and men are relatively least isolated in individual fields of study of educational systems in Estonia, Germany, Austria, the Czech Republic, Portugal, Switzerland and Greece. As far as the horizontal educational structure is concerned, the Czech Republic is located on the fourth degree level out of eighteen. Further focus on the Czech Republic reveals that women are over-represented in the study programs such as medicine and health services, personal care, teacher training education, economics and commerce, and humanities. Contrarily, male dominated fields are public order and safety, transport and communication, technical and engineering programs, agriculture and forestry, science and mathematics.

Completing this information with the vertical segregation data, and hence of difference in (fe)male share in different positions across levels of educational attainment, it shows that the Czech Republic retains a good position even in this area. It occupies the fifth place. Less significant differences between women and men regarding the level of educational attainment exist only in Denmark, Finland, Belgium and Estonia. This, in turn, implies that despite the relatively small differences between women and men in the Scandinavian countries as far as education is concerned, the male-female ratio in different fields of study demonstrates that women prefer to a large extent only a few specific study programs. Germany reveals the largest difference in the level of educational attainment; however, the horizontal segregation in education is not extensive. The category with the least balanced male-female ratio in the Czech Republic is that of vocational education: here women are over-represented. On the whole, the remaining categories show a balanced ratio.

The data analysis has not confirmed our hypothesis that the new EU member states, i.e. post-socialist countries, will sustain a high level of gender segregation and will converge with the Scandinavian countries.



Quite the contrary, most of the post-socialist countries proved to sustain a relatively low level of gender segregation both in the labour market and in education.

The data presented support the inference that the level of occupational gender segregation is more closely intertwined with the horizontal segregation in education than with the vertical segregation in education. The figures included in our study show that the differences among different countries as to the level of vertical segregation in education are so small that it is a complicated process to identify any kind of relation between vertical segregation in education and the segregation in the labour market. This is different, though, in case of horizontal segregation in education. Most of the sample countries – with the only exceptions of Estonia, Finland and Belgium – demonstrate that the higher the level of gender disparity across different occupational categories, the higher the level of gender disparity across different fields of study. The Czech Republic, Austria, and Germany thus range among the countries with relatively low levels of occupational gender segregation and of gender segregation in education. On the other hand, the highest level of segregation may be found in Sweden, Ireland, and Holland. Our hypothesis that the countries with higher horizontal segregation of women and men into typically feminine and masculine fields of study simultaneously reveal also a higher level of occupational gender segregation has been supported in our descriptive study by a recorded tendency, which, nevertheless, was not confirmed as statistically significant.

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