

**IN FOCUS:**  
**WOMEN IN THE**  
**LABOUR MARKET**

Edited by  
**ÁGNES SZABÓ-MORVAI**



## INTRODUCTION

ÁGNES SZABÓ-MORVAI

This year, *In Focus* addresses the labour market situation of women, which has significance beyond the issue itself and affects at least three important socio-economic areas that present Hungarian policy formulation with challenges. The first is economic growth: if women's labour force participation rate reached that of men, Europe's GDP could be 12 per cent higher in the next 15 years (see Chapter 1). The second is low fertility, which is one of the most pressing problems of both Hungary and Europe: improvement in the labour market situation of women may also have a beneficial effect in this respect. Several papers (see Engelhardt *et al.* 2004, Brewster–Rindfuss, 2000, Rindfuss *et al.* 2003 and Castles 2003) report that fertility is higher in European countries where it is possible for women to reconcile work and family responsibilities and that policies supporting the reconciliation of the two clearly increased both fertility and the labour market participation of women (see for example Rønsen 2004, Boca, 1999, Fehr–Ujhelyiova, 2013). The third serious problem is the issue of pension insurance arising from low fertility: how a shrinking working age population is able to support the increasing number of pensioners. Since women constitute a potentially deployable, highly qualified working age population, increasing their labour market participation would also be beneficial in this respect.

*The labour market position of women according to international research (Chapter 1).* The labour market participation of women has increased throughout Europe, nearing but not reaching the male participation rate. Improving female labour market participation was underpinned by their increasing educational attainment and rising wages but several other factors contributed to it, for example the spread of household appliances and the contraceptive pill. The employment rate of women has also been approaching that of men; however, the typical forms of their employment are dissimilar: for example, part-time employment is in several countries mostly characteristic of women. Occupational segregation, that is the concentration of men and women in differing occupations, has been increasingly characteristic of the European labour market. The gender wage gap has significantly decreased in Europe over the past decades, which is due to the improving educational attainment and increasing work experience of women. Most of the gender wage gap is attributable to the segregation of genders according to occupations, industries and sectors, with the largest pay gap in the highest wage categories, which implies that a lower percentage of women than men become senior managers.

*Women in the Hungarian labour market (Chapter 2).* Changes in the labour market situation of women in recent years are presented herein. The Subchapters discuss changes in, and the main reasons for, the gender gap in labour market participation, unemployment and wages. The employment rates of both women and men have considerably increased over the last 17 years since the turn of the millennium. The increase in jobs, public works schemes and employment abroad as well as the shrinking working age population have equally contributed to this increase. The gender wage gap decreased from the late 80s to the millennium: the average wage of women increased from 75 per cent of the average wage of men to about 90 per cent. Since the 2000s, the average wage differences have remained stable; however, the breakdown into qualification levels shows that the wage gap has grown among those with a tertiary degree and declined among those with lower qualifications. In 2016, 41 per cent of management positions were held by women: this proportion was higher in the public sector, ranging between 50 and 70 per cent, and lower in the business sector, varying between 10 and 50 per cent.

*The situation of female workers in Europe and Hungary (Chapter 3).* Concerning the employment of women, the post-communist countries of Europe were significantly ahead of the EU15 in the early 2000s. Although the global crisis of 2008 had a larger impact on the employment of women in these countries, they regained some of the advantage during the subsequent recovery. Differences across countries in the employment of women in the period 2001–2016 were due to general influences but demographics and policy also played a role. National policies, such as parental leave, tax regimes, flexible employment and the development of the childcare system determine the employment rate of women to a great extent. Nevertheless, the income level of women is lower than that of men throughout Europe: a man has 50–70 per cent more work and personal income than a woman on average. Additionally, income disparities are much higher among women. Living in a relationship abates this income disparity but the proportion of those living in a relationship is decreasing in Europe.

*Human capital determining the labour market situation (Chapters 4–7).* The main reason for the emergence of gender inequalities at birth and early childhood is that less than ideal circumstances put boys at a bigger disadvantage in later life – this has also been confirmed by research into the Hungarian abortion ban of 1974. As for educational achievement, the situation of women is good and has been improving in Hungary. The share of women in higher education has been higher than that of men every year since 1990 and the share of girls among early school leavers has always been lower than that of boys.

In competence testing PISA scores, there are average differences between Hungarian boys and girls; boys perform somewhat better in mathematics, while the advantage of girls in reading comprehension is smaller than the global average. Analysis shows that traditional education systems with more frequent grade repetition, earlier tracking and less prevalence of modern pedagogical methods are more likely to be advantageous for boys.

There is also a considerable difference between girls and boys in terms of study choices. Women with a secondary vocational qualification are less likely to find employment than men with the same qualification level and nearly half of this disadvantage is attributable to vocational choices. If everyone were employed in the occupation relevant to their vocational qualification, this would result in 16.5 per cent higher expected wages for men with a vocational school qualification and 1.7 per cent higher expected wages for men with an upper-secondary vocational school qualification than for women.

In addition to educational achievement, non-cognitive factors (personality traits) also determine labour market performance. There are considerable differences between boys and girls already in early childhood – usually to the advantage of girls – in the majority of non-cognitive skills, and these skill differences have a significant impact on their school and labour market performance. In recent years, non-cognitive skills have taken on added importance in the labour market, since the spread of automated, computer-controlled and, more recently, AI-controlled production and service systems resulted in the increase in tasks requiring non-cognitive skills, which cannot be replaced by technology. Non-cognitive skills also include preferences, which are impossible to measure experimentally. Furthermore, labour market participation is strongly affected by the health of individuals and therefore an overview of the state of health of Hungarian women is also provided.

*Marriage, having children and work-life balance (Chapters 8–9).* Differences between the employment of men and women are largely due to events surrounding the birth of their children. The labour supply of mothers with young children is considerably affected by the supply of nursery places and the association between the two at age three of their children is much stronger in Eastern Europe than in Western or Southern Europe. The employment and wages of women start diverging from those of men sooner than the birth of their children, in fact during the years preceding the birth. Unlike mothers in Western Europe, future mothers in Southern and Eastern Europe experience a greater wage disadvantage than women who do not give birth in the following few years. If paid work and household tasks are possible to coordinate better, women do not have to give up as much of their labour market performance because of having children. Coordination is supported by the share of housework between partners. In Southern and Eastern European

countries, including Hungary, women work one to two hours a day more on average in paid work and housework together, while the difference is negligible in Northern and Western Europe.

*Discrimination and the institutional setting (Chapters 10–12).* Discrimination against women is difficult to prove and measure. When looking at wage data from 1995–2016, measurable discrimination has decreased from 18 to 9–13 per cent and it probably affects older women more. The institutional setting also significantly influences the labour market situation of Hungarian women: the most important measures of the past 10 years include increasing the flexibility of childcare services, introducing the system of family tax credit and investment in nurseries. It should be noted that some employers support the development of family-friendly forms of employment for their employees, while others hinder the utilisation of legally guaranteed benefits. A key element of the institutional setting is the system of public works. Since 2014, women have participated in public works schemes in increasingly larger proportions than men. Pension laws promote the early retirement of women, which reduces their employment rates.

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# 1 WOMEN IN THE LABOUR MARKET

## 1.1 THE PROBLEM AND ITS BACKGROUND AND LITERATURE REVIEW

JÚLIA VARGA

The most remarkable labour market development in the developed countries in recent decades has been the increasing convergence of the labour market roles of men and women. The gender gap in labour market participation, employment, number of hours of paid and unpaid work, wages and qualification levels has significantly decreased but there are still considerable differences in the situation of the genders. A lower proportion of women participate in the labour force, they are overrepresented in part-time and temporary employment, in low paid industries and occupations, are less likely to be self-employed and more likely to be employees, are less likely to run their own businesses or work in senior positions, and differences between the wages of men and women still pertain.

Investigating the reasons for the gender gap in the labour market and looking for policy options which support the reduction of the differences are not only relevant for gender equality but also because these differences may have an impact on the economic growth prospects of countries. *Christiansen et al.* (2016) argue that aging European societies, where fertility growth is slowing down, narrowing the gender gap in the labour market may influence growth in two ways: on the one hand, by increasing labour supply, on the other, by improving the financial performance of businesses. The second assertion is based on the findings of an increasing number of recent studies on the impact of the presence of women in the boards or senior management on companies' performance. Research, carried out predominantly in the United States, shows that companies with women in the management have better financial performance (*Adler* 2001, *Carter et al.* 2003, 2010, *Erhardt et al.* 2003).

Eliminating the gender gap in the labour force participation rates would increase the European pool of labour by 6 per cent, according to the findings of *Christiansen et al.* (2016), but if the gender gap in work hours also disappeared, this growth would reach 15 per cent. According to *OECD* (2012) calculations, closing the gap in participation would enable a 12 percent higher GDP in Europe over the next 15 years than the level achievable with the current participation rate. Other studies also reported a comparable impact on growth. *Cuberes-Teignier* (2014) and (2016) claim that as a result of a lower participation of women in the labour market and business, per capita income is 10 per cent lower than it would be in the case of equal participation. Increases in female participation and employment rates would not only bring

immediate economic benefits, but may also accelerate GDP growth in the medium and long term. According to findings of the OECD, a quarter of the economic growth achieved since 1995 has been due to reductions in the gender gap in employment rates (*OECD*, 2008, 2012).

In the majority of European countries the participation rate of women has been increasing since the 1970s, although at a different pace and starting from different levels. This continuous increase did not halt during the global economic crisis, which started in 2008–2009. As the average participation rate of men in the EU28 and EU15 did not change or only slightly changed during this period, the gender participation gap decreased.<sup>1</sup> In Hungary, similarly to other transitional countries, the female participation rate showed a different trajectory. In the communist era, female participation was higher than in more developed countries, then it suddenly plummeted at the beginning of the transition (from 76 per cent to 50 per cent between 1990 and 1995). After 2001 it started to grow again with some fluctuation but since the participation rate of men increased faster than that of women after 2012, the gender gap then started to widen after that date.<sup>2</sup>

At an individual level, age and educational attainment are the principal factors determining female labour market participation (see for example *Anderson–Levine*, 1999, *Attanasio et al.* 2008, *Thévenon*, 2009, *Jaumotte*, 2004, *Fortin*, 2005 and *Azmat et al.* 2006). Giving birth influences the labour market participation of women to different degrees over time and across countries and the differences are attributable to changes in family policy, attitudes and the labour market opportunities of women (*Del Boca et al.* 2009, *Connolly et al.* 2006 and *Vlasblom–Schippers*, 2006). Previously, marital status also used to have a major impact on the probability of employment of women but recent research shows that this effect has disappeared (*Cipollone et al.* 2013). However, the labour market status of partners does have an impact on female participation in most European countries: women with an unemployed partner are more likely to be active in the labour market (*Thévenon*, 2009), although the impact varies across countries and unemployment benefit systems (*Bredtmann et al.* 2014).

Family policy, subsidised child care and paid parental leave have a significant effect on the decisions of women with children concerning labour market participation (*Paull–Taylor*, 2002, *Jaumotte*, 2003, 2004, *Sánchez-Mangas–Sánchez-Marcos*, 2008, *Cipollone et al.* 2013 and *Del Boca et al.* 2009). Child care opportunities primarily influence the decisions of less qualified women, while part-time employment opportunities have more effect on the decisions of more qualified women.

There is extensive literature on the reasons for the increase in female participation. In addition to improving educational attainment and increasing wages, other factors also supported the labour market participation of women. Increasingly easy access to market substitutes for housework and the de-

1 The average participation rate of men aged 20–64 increased in the EU28 from 83.1 per cent to 83.5 per cent, and decreased in the EU15 from 84.2 per cent to 84 per cent between 2008 and 2017.

2 In 2017 the gender participation gap in the 20–64 age group was 15.3 percentage points in Hungary, while it was 11.5 percentage points in both the EU28 and the EU15 according to Eurostat data.



velopment and spread of household appliances (*Greenwood et al.* 2005) and contraceptive pills also contributed to the increase in the female labour supply (*Goldin–Katz*, 2002, *Bailey*, 2006, *Bailey et al.* 2012). Additionally, as a result of changes in the occupational composition of labour demand, the demand for office jobs, where women work in a higher proportion, has risen (*Goldin*, 1990, *Oppenheimer*, 1976). However, studies trying to explain the increase of female participation over time by changes in the usual variables (including wages, household incomes, educational attainment and other demographic variables) of traditional economic models, found that a large part of the change in participation cannot be explained in periods where the female participation rate grew more rapidly. This implies that changes in preferences and other unobserved factors may have an important role in the improving female participation (see *Blau–Kahn*, 2017).

Similarly to the narrowing gender gap in participation, the gap has also decreased between female and male employment rates over the past decades. Nevertheless, there are considerable differences in the forms of employment. In 2017, an average of 31.3 per cent of women and only 8.2 per cent of men aged 20–64 worked in part-time jobs in the EU-28.<sup>3</sup> In Hungary, part-time employment of both genders was negligible: 2.6 per cent of men and 6.3 per cent of women aged 20–64 had a part-time job in 2017.

Occupational segregation has remained significant. An average of 30 per cent of women in the EU28 worked in sectors with a majority of female workers (education, healthcare, welfare) in 2014. Occupational segregation has increased since 2008, which has increasingly contributed to the continuing gender pay gap.

The gender pay gap is a popular subject of studies investigating the labour market opportunities of men and women because pay rates often indicate how individuals are valued economically and socially. Pay is also a composite indicator for an individual's educational attainment, qualifications, work experience and expected future participation. Most studies differentiate between the explained and unexplained elements of the pay gap. The first is due to the differences between the measurable characteristics of the genders, while the second is usually identified as labour market discrimination. However, when measuring the gender wage gap and interpreting results, controlling for the selection effects is an important and complex consideration (see *Lovász–Tegledy*, 2010, in Hungarian). When wage differences cannot be explained by productivity differences, discrimination seems plausible as an explanation (*Becker*, 1971, *Phelps*, 1972). Becker and other authors (for example *Arrow*, 1973) hypothesized that competition would reduce employers' discrimination, as the least discriminating firms, employing more women, would have lower production costs and thus push more discriminating firms out of the market. Several studies examined what impact increased competition has on

<sup>3</sup> Eurostat.

the gender pay gap. *Black–Strahan* (2001) reported that following the deregulation of the financial sector (which they regarded as increased competition), the gender wage gap decreased in the banking sector. *Black–Brainerd* (2004) found that more exposure to international trade, that is increased competition, reduced the visible wage gap. *Lovász* (2010) relied on Hungarian data from the period between 1986 and 2003 to assess what proportion of the reduction in the wage gap is attributable to the impact of increased competition that diminishes discrimination. The results showed that increases in competition reduced employers' discrimination against women.

Studies on the gender wage gap applied various methods and diverse data sources, nevertheless some general trends are seen in their findings. One of the most important is that the gender wage gap has significantly narrowed in the developed countries over recent decades. A meta-analysis by *Weichselbaumer–Winter Ebmer* (2005) reviewed 263 studies on the gender wage gap from the period between the 1960s and the 1990s. The raw wage gap decreased from 65 per cent to 30 per cent between 1960 and 1990, primarily because female educational attainment and labour market experience improved. Although the studies applied varying methods and data, some of the findings were similar because the unexplained element of the wage gap did not decrease over time.

*Blau–Kahn* (2017) and *Goldin* (2014) presented similar results from the United States: in spite of a closing wage gap, the proportion of the unexplained element of the gap has not changed or even increased since the 1980s.

Reductions in the differences in educational attainment and the duration of work experience between the genders have contributed to the narrowing wage gap but the gender segregation according to occupations, industries and sectors has remained to be a determining factor. At present, occupational and sectoral segregation explains half of the wage gap in the United States (*Blau–Kahn*, 2017) and this is also the main reason for the gender wage gap in Europe (*Boll et al.* 2017). The importance of occupational – and in many cases sectoral – segregation was already researched by early studies on the gender wage gap (*Fuchs*, 1971, *Blinder*, 1973, *Oaxaca*, 1973, *Sawhill*, 1973, *Sorensen*, 1990, *Macpherson–Hirsch*, 1995). Women and men not only work in different occupations but at different levels of the hierarchy within an occupation.

In transitional countries, including Hungary, the gender wage gap significantly decreased after the political changeover (see for example *Kertesi–Köllő*, 1998, *Galasi*, 2000, *Brainerd*, 2000, *Newell–Reilly*, 2001). At that time it was primarily because low-qualified and less productive women were forced out of the labour market (*Hunt*, 2000) but also because competition curbed the discrimination of employers against women (*Lovász*, 2010). However, as for the start of the transitional period, *Csillag* (2007) reported that while in late communism gender segregation significantly contributed to the continuing pay gap, following the post-communist transition the line between female and

male occupations was more blurred and the overrepresentation of women in an occupation did not entail low wages.

In addition to studies on the average wages of men and women, more and more studies assessing the differences at the various points of wage distribution have been published in the past decade. *Blau–Kahn* (2017) presented that in the United States the wage gap is wider at the higher end of the wage distribution and decreases more slowly than at the lower end of the distribution. These findings are consistent with the results of other studies concerning the United States and other countries (*Kassenboehmer–Sinning*, 2014, *Arulampalam et al.* 2007). *Lovász* (2013), relying on Hungarian data, found that women lag behind more at the upper end of the wage distribution both in the public and the private sector, which supports the notion of the glass ceiling. Several studies report that women are less likely to be promoted than men of the same characteristics (*Blau–DeVaro*, 2007, *Cobb–Clark*, 2001, *McCue*, 1996, *Addison et al.* 2014). Whatever the reason for women to be less likely to work as senior managers, this fact also contributes to the continuing gender pay gap.

Some of the most recent studies have investigated the effects of gender differences in psychological characteristics and non-cognitive skills (*Heckman–Kautz*, 2012, *Nyhus–Pons*, 2011, *Cattan* 2014, *Fortin*, 2008, *Mueller–Plug*, 2006, *Semykina–Linz*, 2007). Findings showed that women are less likely than men to initiate wage bargaining or be willing to compete and they are more risk-averse, which may also contribute to the continuing gender wage gap or the choosing of a different discipline or occupation (for the summary of the relevant findings see for example *Bertrand*, 2011 and *Croson–Gneezy*, 2009). However, *Blau–Kahn* (2017) points out that, based on research results so far, psychological characteristics only explain a small proportion of the unexplained wage gap and that since these differences are based on experimental research, more evidence is needed to confirm that these differences also exist outside the research situation.

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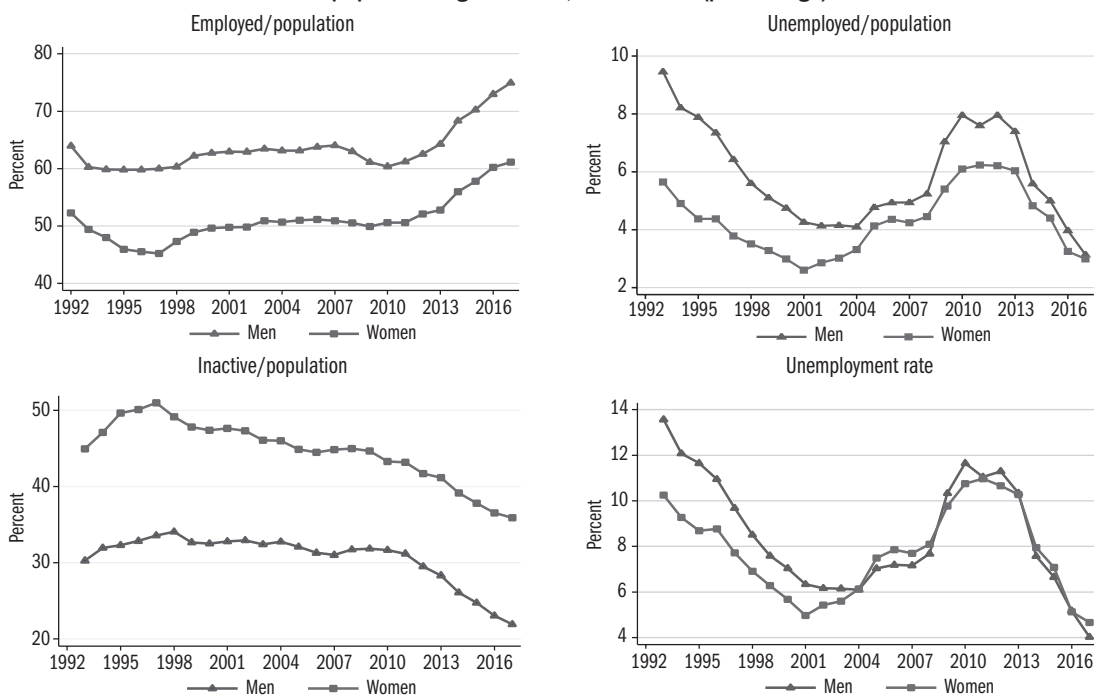
## 2 WOMEN IN THE HUNGARIAN LABOUR MARKET – TRENDS IN THE PAST TEN YEARS

### 2.1 LABOUR FORCE PARTICIPATION, EMPLOYMENT, UNEMPLOYMENT AND WAGES

JÁNOS KÖLLŐ

The key time series of male and female labour market participation are presented in *Figure 2.1.1*, using data and definitions from the Labour Force Survey (LFS) of the Hungarian Central Statistical Office (CSO). The two top panels and the bottom left panel of the Figure show the share of those in employment, unemployment and inactivity in the population aged 15–64, while the bottom right panel shows the evolution of the unemployment rate (i.e. the share of the unemployed in the labour force).

**Figure 2.1.1: Selected indicators of employment, unemployment and inactivity in the population aged 15–64, 1992–2016 (percentage)**



Note: The categories reflect the CSO classification.

*Employed:* a person who undertook at least an hour of gainful work during the week prior to the survey, or was temporarily away from their job.

*Unemployed:* a person who has no job but searched for a job actively during the month prior to the survey and would be able to start a job if he/she found one.

*Inactive:* neither employed, nor unemployed

*Unemployment rate:* unemployed/(employed + unemployed)

The points marked on the curves indicate the unweighted average of the four quarterly observations in the year concerned. The data on employed persons include public works participants and those working abroad.

Source: *LFS*.

After the transformational recession, the *employment to population ratio* followed an upward trend, which was interrupted by the global financial and economic crisis, especially in the case of men, who worked in the private sector in a higher proportion, including some industries highly affected by the crisis (for example the motor industry, construction, and transportation). By 2013 the employment rate of both genders had returned to the original trend, then started to grow rapidly, although this was largely due to the expansion of the public works scheme, increase in employment abroad and the shrinking working-age population of Hungary (i.e. the population in the denominator of the employment ratio). The long-term impact of these elements between 2000 and 2017 is presented in *Table 2.1.1*.

**Table 2.1.1: The contribution of public works, employment abroad and population decline to the increase in the employment rate between 2000 and the first quarter of 2017**

	Employment rate	Employment including public works and employment abroad	Employment without public works and employment abroad	Employees in domestic market jobs as a percentage of the total of those in employment	Population aged 15–64 living in Hungary
	(percentage)	(thousand persons)	(thousand persons)	(percentage)	(thousand persons)
<b>Men</b>					
2000	61.7	2057	2037	99.0	3334
2017	73.7	2352	2174	92.4	3188
Change (logarithmic difference)	0.178	0.134	0.065	-0.068	-0.045
<b>Women</b>					
2000	49.2	1722	1713	99.4	3500
2017	60.5	1970	1836	93.1	3253
Change (logarithmic difference)	0.207	0.134	0.069	-0.065	-0.073

Source: *LFS*, 2000 and 2017 Q1.

Employment rate ( $e$ ) is the ratio of employed persons ( $E$ ) to the working-age population ( $P$ ) ( $e = E/P$ ). Part  $(1 - a)$  of employment represents market jobs in Hungary, while part  $a$  represents public works and employment abroad. Hungarian, 'market-based' employment, excluding public works participation or working abroad is:  $E_k = (1 - a)E$ . Relying on the definitions above, the employment rate is expressed as formula (1) in a reference period (0 in superscript) and in the period considered (1 in superscript). In this calculation the reference period is the first quarter of 2000 (data on public works and employment abroad have been available since then), while the period considered

is the first quarter of 2017. Equation (2), based on the definitions, quantifies the contribution of the changes (measured on a logarithmic scale) that took place in Hungarian, market-based employment, the joint importance of public works and employment abroad as well as population size.

$$e^1 = \frac{E^1}{P^1} = \frac{E_k^1 / (1 - a^1)}{P^1} \quad \text{and} \quad e^0 = \frac{E^0}{P^0} = \frac{E_k^0 / (1 - a^0)}{P^0} \quad (1)$$

$$\Delta \ln e = \Delta \ln E_k - \Delta \ln(1 - a) - \Delta \ln P \quad (2)$$

It is apparent that the three components have been contributing roughly equally to the growing employment rate since the millennium. It is only the contribution of population decline (aging out of the working age population) which is different for men and women.

As for *Figure 2.1.1*, the top right panel reveals that at the low point of the transformational recession 8–10 per cent of working-age men were *unemployed*. This percentage was considerably lower, 4–6 per cent, in the case of women. The difference decreased steadily except for the years of the 2008–2010 crisis and has by now essentially disappeared: the unemployment to population ratio was 3 per cent in 2017 for both genders.

The share of *inactive* people grew in both genders until the late 90s: at that time one third of working-age men and one half of working-age women neither worked nor looked for a job. The gradual increase of the retirement age, regulations restricting disability retirement and those supporting employment during parental leave and motivating the registered unemployed to search for a job significantly reduced inactivity among men and women, although somewhat more in the case of men. In 2017, less than a quarter of working-age men and slightly more than a third of women was inactive according to CSO surveys (*Figure 2.1.1*, bottom left panel).

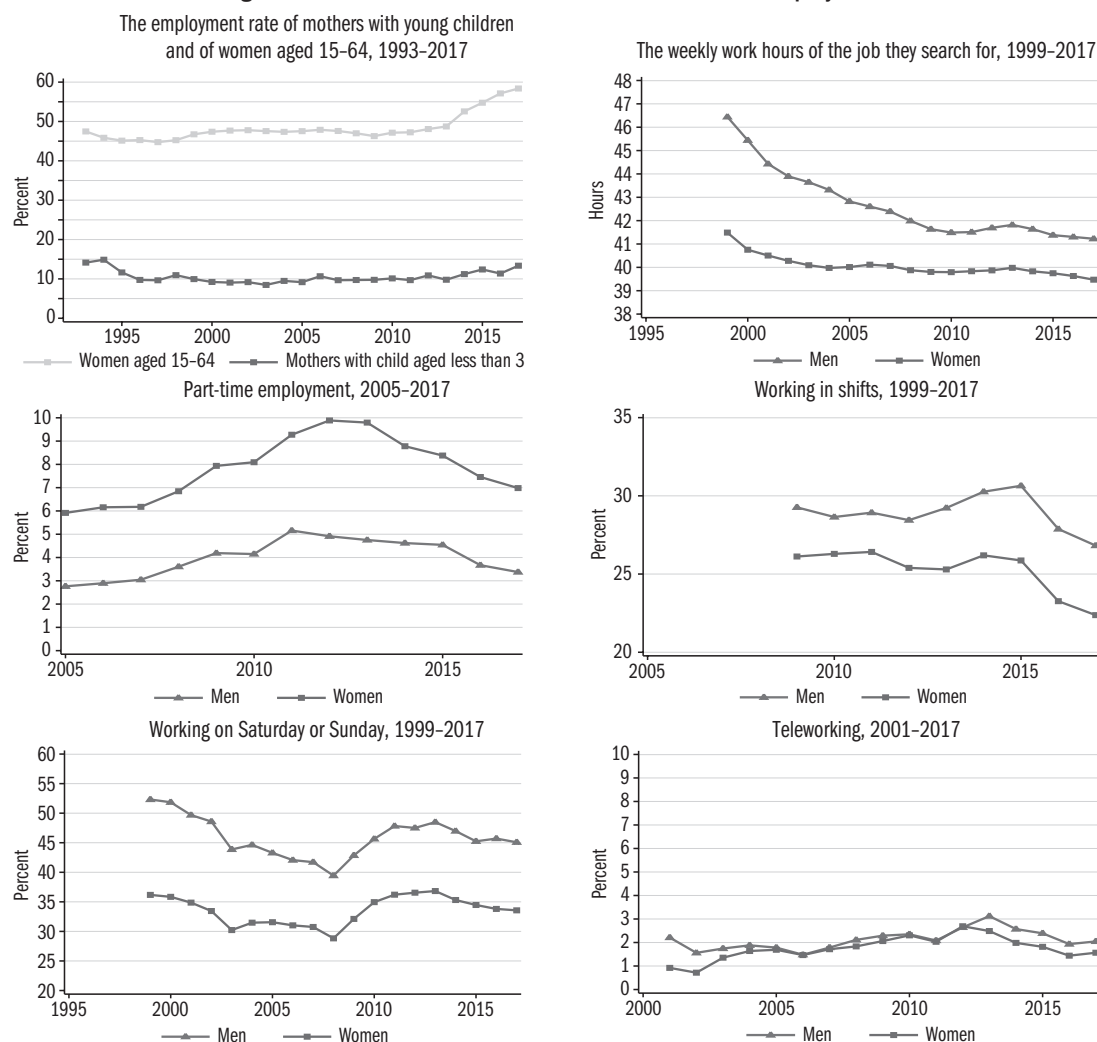
It must be noted that these surveys regard full time pupils and college or university students as inactive. In the first quarter of 2017, 46 per cent of inactive working-age men and 28 per cent of women were in fact in education. The percentage of men not in education, employment and not searching for a job was ‘only’ 14, while that of women was 28 percent (23 percent if women on parental leave are excluded).

The bottom right panel of *Figure 2.1.1* shows the evolution of the *unemployment rate*, the most often used labour market indicator. The rate ( $u$ ) shows the proportion of the unemployed as a percentage of the labour force, which consists of those in employment ( $E$ ) and the unemployed ( $U$ ), that is  $u = U / (E + U)$ . This indicator has shown no significant difference for men and women since 2004. Compared to the males, the female unemployment rate is reduced by the lower number of unemployed among women and it is increased by the lower number of women in work. The equality of the rates hides major inequalities between their components.



Figure 2.1.2 highlights some of the characteristics of female employment. It is well-known and also analysed in the later chapters of *In Focus* that an extremely low share of mothers with young children are in employment by international comparison. The employment rate of mothers with a child aged less than three years has been around 10 per cent since the mid-90s and has hardly increased as a result of regulations permitting employment when on parental leave.

**Figure 2.1.2: Some characteristics of male and female employment**



Note: A mother with a young child is someone who has at least one child aged less than three years. Working on Saturday or Sunday: at least occasionally. The periods considered are limited by the availability of data.

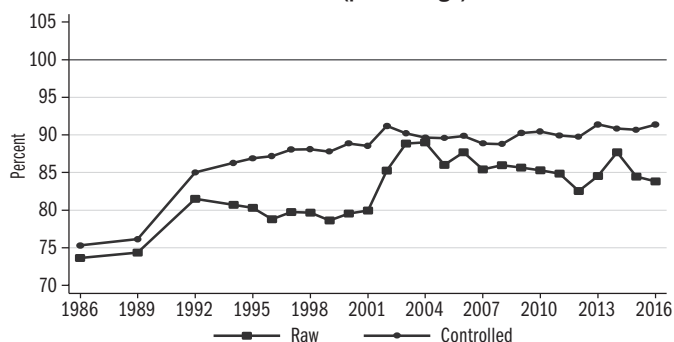
Source: LFS.

The large majority of women search for full-time jobs: they seek jobs with working hours of nearly 40 hours a week on average and this lags only one and a half hours behind the average time for men. In spite of this, the share of women employed part-time is double the share of men (7 and 3.2 per cent in 2017 respectively). It indicates the additional constraints on female employment that a much smaller proportion of women work shifts (26 versus 36 per cent in 2017 respectively) or at weekends (34 versus 45 per cent at least occasionally in 2017 respectively). Despite the difficulties of working long hours away from home, the share of those teleworking still does not exceed 2 per cent and it is slightly *lower* among women than among men.

Remarkably, in the 15–25-year periods concerned, differences between the genders or differences between women with and without young children changed very little. Only the number of work hours of jobs sought by men and women has converged – in other cases the curves are parallel.

Changes in the *gender wage gap* are presented in *Figure 2.1.3*, using Wage Survey data from the period between 1986 and 2016. In 1986, women earned less than 75 per cent of the average wages of men. The raw difference continuously decreased until 2001, and especially in the period 2002–2004. Then the disadvantage of women started to increase and stabilized at a level of about 15 per cent after 2007.

**Figure 2.1.3: The wages of women compared to those of men, 1986–2016 (percentage)**



*Wages*: gross monthly wages in May, plus 1/12 of the non-recurring income of the previous year, minus the non-recurring income received in May.

*Raw*: earnings of women, taking men's earnings as 100.

*Controlled*: Earnings of women compared to those of men, with identical labour market experience, educational attainment and sector.

The difference was calculated by a regression equation with the dependent variable being the logarithm of wages, while the independent variables are gender, labour market experience and its square, the estimated number of years spent in education and a binary variable representing the private sector. Instead of the parameter  $b$  for genders, figures are given in percentage term ( $e^b$ ). All parameters are significant at the 0.01 level, the confidence intervals are so narrow that they would not be visible in the graph.

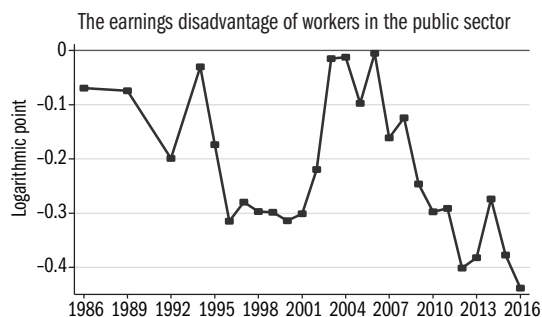
Source: Wage Surveys, 1986, 1989, 1992, 1994–2016.

The ‘controlled’ curve of the Figure presents the estimated earnings disadvantage of women when labour market experience, educational attainment and sector (private vs public) are controlled for. As for the method of calculation, see the Notes to Figure 2.1.3. The difference calculated in this way decreased until 2001 and then stabilised at 10 percentage points. To understand this unique dynamic and the difference between the raw values and those controlled for basic characteristics, one should consider the wage differences between the public and private sector and the gender gap within sectors. Changes in the gender wage gap are highly influenced by the facts that a) the public sector plays a more significant role in female than in male employment, b) the wage level of the public sector has fluctuated excessively in the past thirty years, c) the earnings disadvantage of women was different *within* the public and the private sectors after 1992 and changed differently over time. The temporal variations in these factors are presented in Figure 2.1.4.

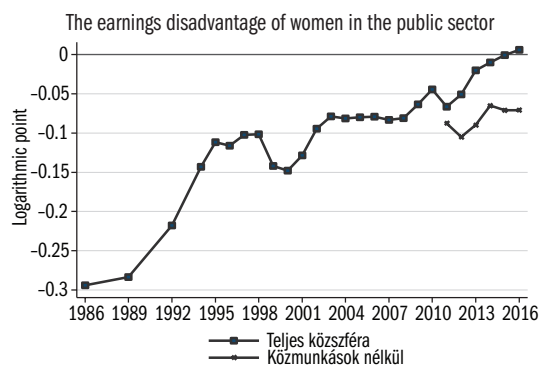
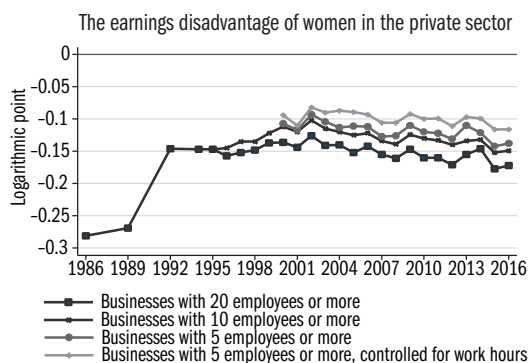
**Figure 2.1.4: The importance of the public sector in female employment and wages, 1986–2016**



The survey includes workers of state budgetary institutions prior to 1992 and public servants, civil servants, judges, prosecutors and public works participants after 1992 in the category of public sector employees.



Sample: public sector and enterprises with 20 employees or more. The curve shows the earnings disadvantage of workers in the public sector compared to the private sector, comparing employees of the same age and educational attainment, given in logarithmic scale.



Note: The curves show the earnings disadvantage of women, comparing employees of the same age and educational attainment, given in logarithmic scale, in the relevant populations.

Source: Wage Surveys, 1986, 1989, 1992, 1994–2016.

The top left panel of the Figure shows that the share of the public sector in female employment is much larger than in male employment and it increased over time almost continuously, from below 40 per cent to nearly 50 per cent. Its share in male employment fell from 30 per cent before the political change-over to below 12 per cent, and at present (in spite of a continuous increase after 1992) only slightly exceeds 20 per cent.

This disparity would not weigh much if the wage level of the public sector had not fluctuated so excessively compared to the private sector in the past thirty years. As shown in the top right panel, the earnings disadvantage of public sector workers, which was roughly 10 per cent before the fall of state socialism, increased to 30 per cent. As a result of increases in the minimum wage in 2001–2002 and increases in the salary of civil servants and public employees before and after the general elections in 2002, it fell to only 1–2 per cent; however, after continuous deterioration, it has now exceeded 40 per cent. This fluctuation, has necessarily affected the earnings position of an average woman compared to an average man.

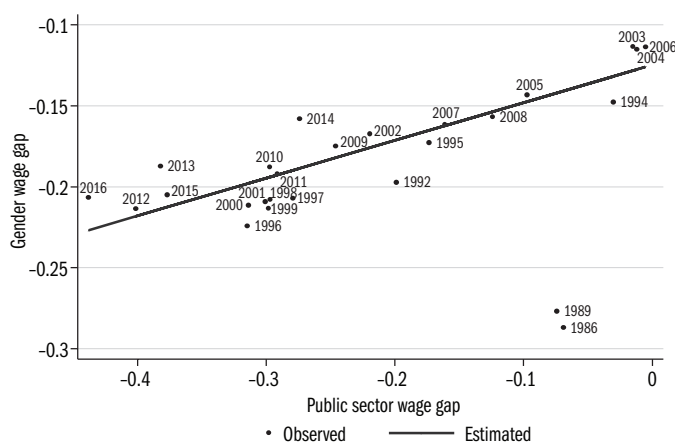
The situation is further complicated by the fact that the earnings disadvantage of women has always been different *within* the two main sectors of the economy. The graphs in the bottom left panel indicate that the earnings disadvantage of women in the private sector (controlled for age and educational attainment) fell from nearly 30 per cent to 15 per cent since the start of the transition; however, their situation did not improve afterwards and even worsened after the millennium.

The *extent* of the disadvantage depends on the types of businesses assessed. The Wage Survey only covered firms with 20 or more employees until 1995. The size limit was lowered to 10 persons in that year and to 5 employees in 2000. The gender gap in the hours worked also took on more importance after the millennium. Its impact has been measured since 1999. Apparently, the disadvantage of women is the greatest at medium-sized and large enterprises with at least 20 employees, currently about 17 per cent, while in the total population of businesses with more than 5 employees it is only 12 per cent even when controlled for work hours.

While in the private sector the wage gap between men and women of the same age and educational attainment was in the range of 10–15 per cent after the millennium, in the public sector it has continuously decreased since 1986 (with occasional slowdowns) and has by now completely disappeared – as long as employment in public works is considered part of the public sector (bottom right panel). Luckily, public works participants have been identified in the Wage Survey since 2011. If including market-based jobs only, the disadvantage of women still amounts to 6–7 per cent, which is substantially lower than the initial value and about half of that in the private sector, nevertheless not zero.

Figure 2.1.5 presents the impact of wage fluctuations in the public sector on the situation of women. The horizontal axis of the Figure shows by how much a public sector employee earned less than a private sector employee with equal gender, labour market experience and educational attainment. The vertical axis indicates the ‘general’ earnings disadvantage of women compared to men, irrespective of sector, holding labour market experience and educational attainment constant.

**Figure 2.1.5: The earnings disadvantage of women (both sectors) and of public sector employees (both genders), 1986–2016, logarithmic point**



*Sample:* public sector and enterprises with 20 employees or more. The curves show the earnings disadvantage of women and public sector employees, comparing employees of the same age and educational attainment, given in logarithmic scale.

*Explanatory variables of the equation for women are:* gender, labour market experience and its square, number of years spent in education.

*Explanatory variables of the equation for the public sector:* public sector, labour market experience and its square, number of years spent in education.

Regressing the earnings disadvantage of women ( $W$ ) to earnings disadvantage in the public sector ( $P$ ) (in 1992–2016) gives:  $W = 0.23P - 0.12$ ,  $r^2 = 0.77$ . The standard error of  $N$  is 0.03, the  $t$ -value is 8.9. The standard deviation of  $P$  is 0.131, that of  $W$  is 0.043.

Source: Wage Surveys.

If the size of the two sectors and the share and the earnings disadvantage of women within the sectors did not change, there would be a deterministic relationship between the relative wage level of the public sector and the general gender wage gap. Since both the share and earnings disadvantage of women changed over the years, the relationship is not function-like but the points are placed on a well-fitting curve after 1992: the situation of women as an employee group improved substantially if the wage level of the public sector increased and it deteriorated in the periods of budgetary cuts.

What is remarkable is not the *presence* of this trivial relationship but its *strength*. The slope of the line connecting the points in the period 1992–2016

is 0.23: a unit change in the relative wage level of the public sector results in an approximately one-fourth unit change in the relative wages of women. Taking into account the standard deviation of the two earnings disadvantage indicators (see the notes to the Figure), a one standard deviation difference in the earnings disadvantage of the public sector is associated with a 0.7 standard deviation difference in the earnings disadvantage of women.

The budget cuts in the public sector and the fact that the wages of public servants did not follow (sufficiently) the wage growth accelerating after 2013 in the private sector played a key role in the halt of an improvement in the earnings position of women. The earnings position of the average woman was worse in 2016 than in 1992.

As pointed out in one of the studies (Köllő, 2014) of The Hungarian Labour Market 2014, the excessive fluctuation of the relative wage level of the public sector in Hungary, and the resulting volatility of the gender wage gap, is anything but natural. Such fluctuation of the wage difference between sectors was unprecedented in Europe prior to the financial and economic crisis starting in 2008. Even afterwards it was only in Romania that a comparable decrease in disadvantage took place (Vasile, 2012). The difference between the minimum and maximum values of the wage difference did not exceed 6.5 percentage points between 1993 and 2000 in Europe except Greece and France (Campos–Centeno 2012), while in Hungary it was 18.2 percentage points at that time and 29.5 percentage points in the next eight years. It must be also noted that the wage advantage in Greece increased monotonously in the 12.2 percentage point range, while in France the wage gap varied between –3 and +8 percentage points. Rises and falls comparable to the Hungarian ones – and the extreme earnings disadvantage at the low points – are uncommon in developed market economies.<sup>1</sup>

1 At the same time, Gimpelson–Lukiyanova (2009) reports a comparable earnings disadvantage (26–28 percentage points according to their regression estimation) in the Russian public sector in the early 2000s.

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## 2.2 IS THERE A GLASS CEILING IN HUNGARY?

### GENDER WAGE GAP BY EDUCATIONAL ATTAINMENT

ANNA ADAMECZ-VÖLGYI

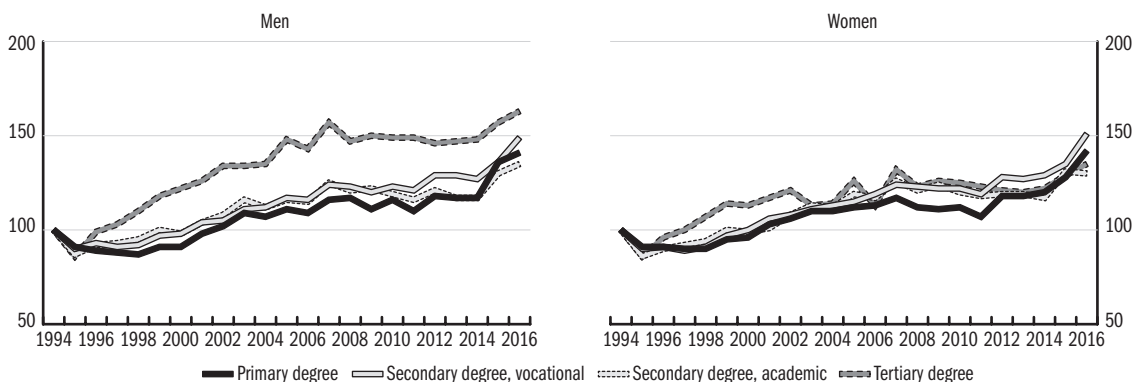
The average gender wage gap has been decreasing in Hungary since the beginning of the 1990's. Investigating the gender wage gap by educational attainment, however, reveals that it is decreasing only among those who have at most a secondary degree while it is still increasing among those having a tertiary degree. This phenomenon might be due to the *glass ceiling*: while the gender wage gap is decreasing in lower-level positions, above a certain level of labour market success the gender wage gap is widening. The *glass ceiling* metaphor refers to an invisible barrier in the corporate ladder that holds women (and other discriminated groups of employees) back from career advancement.

#### Research question

Earlier empirical research has focused on the average gender wage gap and aimed at identifying its causes. This chapter looks at the distribution of the gender wage gap by looking at whether its magnitude depends on educational attainment. We use the individual-level wage data of the Structure of Earnings (Bértarifa) survey from the private sector.

Figure 2.2.1 shows the evolution of average monthly wages of men and women in the last 20 years relative to 1994, net of consumer price inflation. Strikingly, the real wage growth of graduated men has been far above the real wage growth of both less-than-tertiary-educated men and women of all educational attainment levels, including graduated women as well.

Figure 2.2.1: The evolution of real wages in the private sector, 1994–2016 (1994 = 100)



*Sample:* full-time employees of firms with more than 20 workers in the private sector.

Vertical axis: real wage index relative to 1994. Real wages are constructed using the consumer price index of all years published by the Hungarian National Statistical Office.

Source: Own estimation using the Structure of Earnings (Bértarifa) survey.



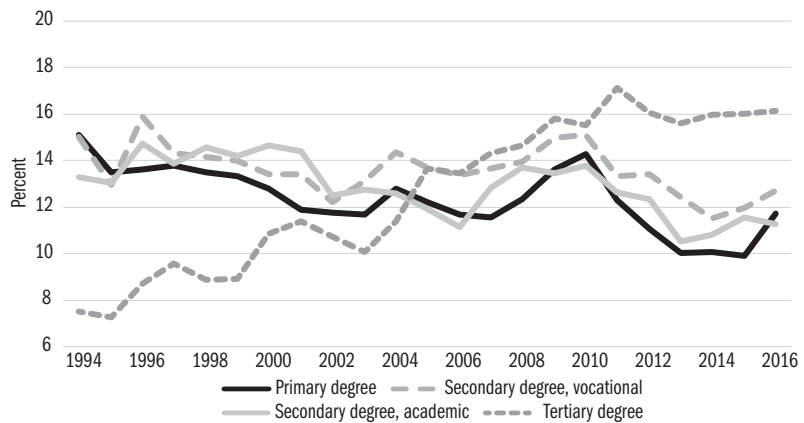
Wage differences among genders might occur as a result of women being more likely to work in occupations or at companies that offer lower wages on average to everybody. Thus, in the next section, we are looking at the evolution of the gender wage gap net of the effects of women and men working in positions and companies that are different in terms of their labour market returns. This *conditional gender wage gap* is considered as the upper limit of labour market discrimination.

### Conditional gender wage gap by educational attainment

We estimate the conditional gender wage gap using Mincerian wage models. Based on *Pendakur–Woodcock* (2010), we are investigating within-firm wage gaps that capture wage differences of men and women working at the same firms, in the same positions, who are of the same age and have the same level of educational attainment.<sup>1</sup> The effect of age is modelled using a second-degree polynomial while positions are coded using 4-digit occupation (FEOR) categories. We are also controlling for whether individuals are new entrants at the firm, and, for the difference between the share of graduated women and men within occupations and sectors as a proxy for the increasing relative supply of graduated women over time. We estimate separate equations in all years between 1994 and 2016, and, our dependent variable is the natural logarithm of gross nominal monthly wages.

Our results show that the conditional gender wage gap has decreased among those holding primary or secondary degrees, while it has been steadily increasing among college and university graduates (*Figure 2.2.2*). There is a particularly large improvement among those having at most a primary degree, mostly due to the fact that the minimum wage has been raised several time in this period.

Figure 2.2.2: Within-firm gender wage gap by educational attainment



<sup>1</sup> Estimating within-sector wage gaps instead of within-firm wage gaps gives very similar results and leads to the same conclusion.

*Sample:* full-time employees of firms with more than 20 workers in the private sector. The plotted coefficients are estimated in Mincerian wage models by linear regressions each year, and are derived using the interaction term of gender and



educational attainment. The vertical axis shows  $-1$ -times the gender wage gap, i.e. 16% should be interpreted as conditional on firm and occupation fixed effects, age and the relative share of graduated women vs. men in sectors and occupations as detailed in the text, women on average earn 16% less than men. The explanatory power ( $R^2$ ) of the yearly models is about 60%, sample size is between 90–130 thousand individuals.

Source: Own estimation using the Structure of Earnings (Bértarifa) survey.

Although a large higher education (HE) expansion took place in Hungary in the last 20 years, the share of those having a tertiary degree in the working age population is still around 75% of the comparable EU-average according to Eurostat data (28.5% vs. 21.4% in 2018, Eurostat Main Indicators Database). As our results suggest, the conditional wage returns of HE graduation are lower for women than for men. Theoretically, this could be the results of women being more likely to choose university courses that offer lower labour market returns; however, we measure the wage gap net of this effect as we control for firm and occupation fixed effects. Furthermore, we only use wage data from the private sector, thus, most low-paid, traditionally female occupations (teacher, nurse) are not included in our sample.

## Conclusions

We find that the conditional gender wage gap is 50% larger among those having a tertiary degree than among the non-graduated. The average graduated woman, working at the same firm, having the same occupation and being of the same age, earned 16% less in 2016 than the average graduated man, while this difference was 11% among women and men who did not have a HE degree. This is due to the phenomenon that while the average wages of graduated men increased enormously in the last 20 years, the wage growth of graduated women was much more contained.

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## 2.3 FEMALE AND MALE MANAGERS

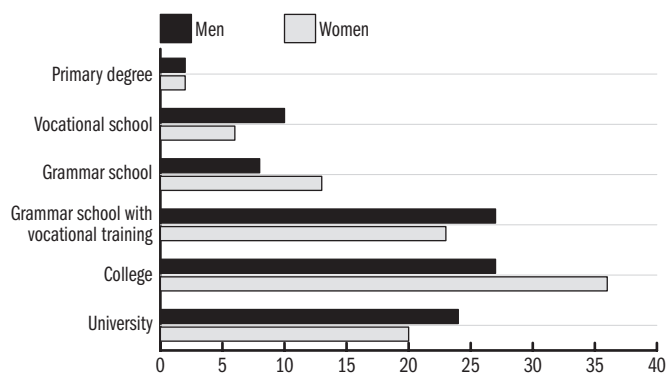
BEÁTA NAGY & ANNA SEBŐK

### Share of men and women in management positions

Data from the Labour Force Survey of the Central Statistical Office (CSO) indicate that the share of women in management positions is increasing. The gender ratio in the first main category of the Hungarian Standard Classification of Occupations (HSCO) (managers) is close to balanced: the share of women in the 2010s exceeds 41 per cent. One of the important reasons for this high proportion is the increasing female dominance in the younger generations in higher education, which increases the female management pool.

However, this 41 per cent share hides the excessive heterogeneity of the category, since it includes all management categories (ministers, heads of nurseries, business leaders or railway stationmasters). That is why the most frequent educational attainment level in the main category of management positions is college degree, followed by upper-secondary qualification, while university degree is only the third most frequent for women and men alike (*Figure 2.3.1*).

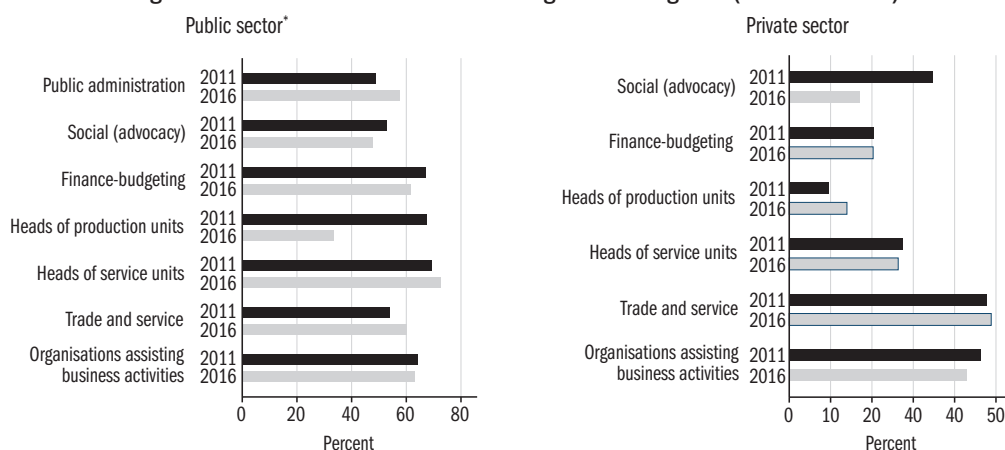
Figure 2.3.1: Educational attainment in management, 2015–2017



Source: Labour Force Survey of CSO.

### Where are women in managerial positions?

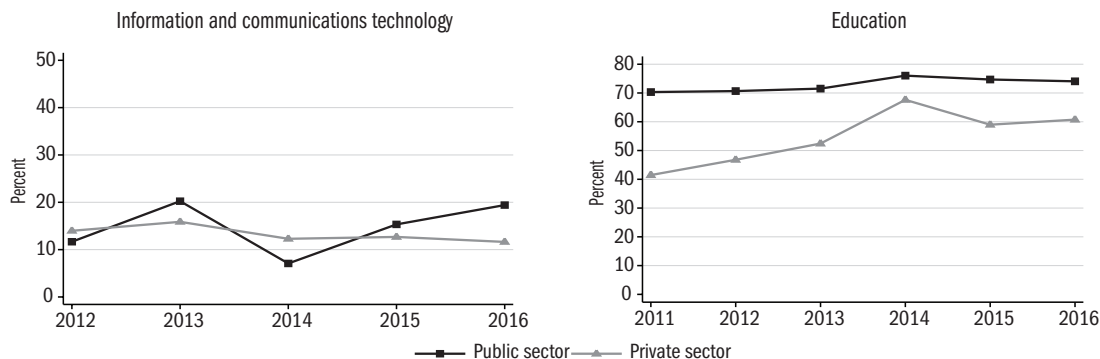
Women more frequently hold management positions in the public rather than in the private sector (see data in *Pocketbook*). When further analysing horizontal segregation, the gender gap is also striking across economic sectors: women primarily work as managers in finance and budgeting, followed by manufacturing, while the order is just the opposite for men. Apparently, women and men hold management positions in different sectors and, as will be seen later, in different occupational categories (*Figure 2.3.2*).

**Figure 2.3.2: The share of women in management categories (2011 and 2016)**

\* Because of the small number of cases, the Figure does not include the category of HSCO-111: legislator and senior officials.

Source: Wage Survey, *National Labour Office* (NLO).

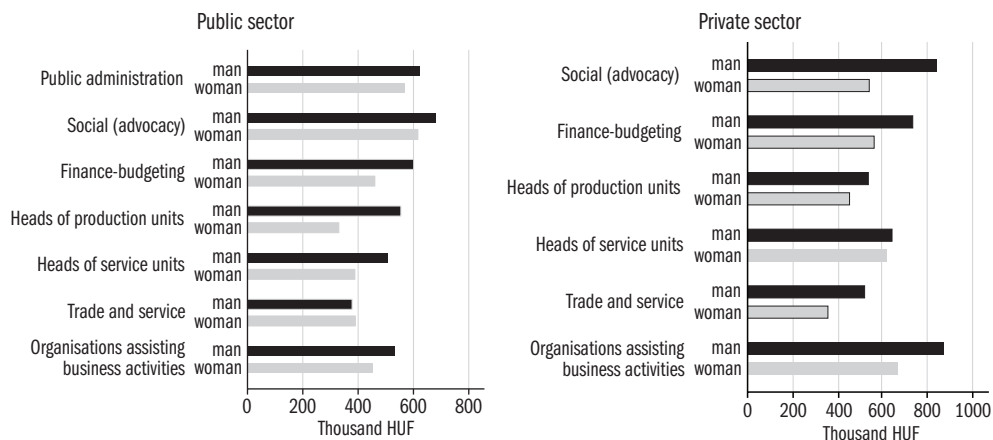
The narrower the categories, the more striking the segregation of female and male managers according to branches of industry: *Figure 2.3.3* illustrates this difference with the examples of managers in ICT and education.

**Figure 2.3.3: The share of female managers in information and communications technology and in education**

Source: Wage Survey, *National Labour Office* (NLO).

### How much do managers earn?

The aggregate difference between the wages of men and women, according to data from the Wage Survey, was 16 percentage points in 2016, the majority of which results from segregation, the fewer hours worked by women because of family obligations and less work experience. However, an analysis of managers compares more homogeneous female and male groups of leaders. *Figure 2.3.4* presents the wages of female and male managers in the public and private sectors.

**Figure 2.3.4: Average wages of men and women in management positions, 2016**

Source: Wage Survey, *National Labour Office* (NLO).

In the public sector, both male and female managers earned the highest wages in advocacy, administration and finance-budgeting in the period investigated (*Figure 2.3.4*). The wage advantage of male leaders is significant in all categories except for the management of service organisations. As for the managers of service organisations, male leaders typically had the highest wages at financial institutions, while women had the highest wages as managers of healthcare and educational institutions.

In the *private* sector, men had the highest wages at leading organisations assisting business activities, followed by managers at special interest organisations and business organisations. Similarly, the highest average wages for women leaders were seen at organisations assisting business activities, followed by leaders at service organisations and business organisations. The wages of women managers were lower than those of men in all categories, mostly quite massively.

### **Do women managers have a family life?**

There is a well-known correlation between holding a management position and the difficulties of balancing work and family life (the higher the position, the greater the difficulty). While men often may rely on their wives (partners) and children as resources, the 'second shift' drains resources in the case of women. Hungarian data also show that female managers are less often married or cohabit: in the 2010s, 70 per cent of male managers and 62 per cent of female managers lived in a relationship, according to the Labour Force Survey.

In families and households, the tasks of caring for dependents place more burden on women: caring for children and the elderly mainly falls to women. It is underpinned by the fact that more female than male managers receive social transfers related to child and elderly care. Data from the Labour Force Survey

indicate that 0 per cent of men as opposed to 6–7 per cent of women managers receive parental leave benefits or domiciliary care allowance in the 2010s.

Although data suggest a very high (41 per cent) proportion of women managers in Hungary, the patterns of occupational segregation are also seen. Social norms and roles keep women in feminized sectors and occupations, which are less-paid and in this way they account for some of the gender wage gap in management. Nevertheless the wage disadvantage of female managers, except for a single occupational category, is also conspicuous in a detailed category-by-category comparison. The disadvantage of female managers is reinforced and sustained by the fact that women more often than men are responsible for caring for dependents in the family.

### K2.1 Women in science – in Europe and Hungary

VERONIKA PAKSI & DÓRA GROÓ

In accordance with the strategy of the European Union, the share of women in research and development (R&D) has been growing since the millennium; however, the gender gap is only very slowly decreasing. Women accounted for only one-third of the European R&D sector in 2012, and the share of women was even lower in the field of engineering and technology (28 per cent) in spite of a substantial labour shortage. One of the main reasons for the low presence is the significant disadvantages that female researchers still face during their career. A lower proportion of them is able to obtain a job in research or in a field corresponding to their qualifications and a higher proportion of them work under precarious employment contracts, especially in higher education. Although the gender wage gap has decreased since the millennium in R&D, women still received 18 per cent lower wages for the same job in 2012 – which was larger than the wage gap seen in the economy overall. Vertical segregation (the so-called glass ceiling) remained strong, particularly in male dominated professions, despite the fact that the proportion of female heads

of higher education institutions and the share of women in decision making bodies significantly improved in that period. Nevertheless, the proportion of female professors in the field of technology did not exceed 13 per cent in 2012 (*EC*, 2013, 2015).

The situation of Hungarian female researchers is less favourable than that of their European colleagues or their male counterparts. Their headcount has increased more slowly than that of men in R&D since the millennium, thus their proportion has been continuously decreasing – currently it does not even reach one-third. Horizontal segregation across sectors (the so-called glass wall) forces women into the low-paid public sector and only one-fifth of them holds a job in the better paid private sector. Although the largest increase in the headcounts of women was seen in technology, their proportion is the lowest in this field (22 per cent) and there is intense movement between the sectors: women typically move from the private to the public sector (*EC*, 2012, 2015). Qualitative research has highlighted that this trend is partly due to striving for a better work-life balance, meanwhile, knowl-

edge-intensive professions also have started to increasingly attract women to the private sector by often offering – beyond higher salaries – more family friendly conditions than the public sector. However, researchers' investments do not necessarily pay off in the other sectors, moreover, work-life balance is still considered as a responsibility of the individual in Hungary, but which women are unable to tackle alone. The career of female researchers with young children thus slows down in both sectors because they have difficulties in accomplishing the crucial elements of a successful career (e.g. international mobility, networking or undertaking decision-making roles) (*Paksi et al.* 2016, 2018).

Despite the two-decades-long strategy of the European Union, the above inequalities still designate a less advantageous career in science for women. In order to reduce gender inequalities, an integrated approach to the problem, as well as a targeted policy and social support are needed (*Pető, 2018, Nagy-Paksi, 2014*). Some good practices for such an outcome are found in Hungary. The Association of Women in Science has been working in the civil sector for ten years in cooperation with research and development institutions and experts, and supports the scientific career of young girls through several projects (Girls' Day, Women in Science Excellence Award). Another initiative is the Women in Science Presidential Committee established by the President of the Hungarian Academy of Sciences, which aims to increase the number of female

academics, support female researchers at all levels of their academic career and make a research career more attractive. Finally, although it is not obligatory, an increasing number of institutions in the private R&D sector develop and use practice-oriented workplace gender equality and diversity plans (*Paksi et al.* 2018).

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## 3 WOMEN'S LABOUR MARKET PERFORMANCE IN THE EU AND IN HUNGARY

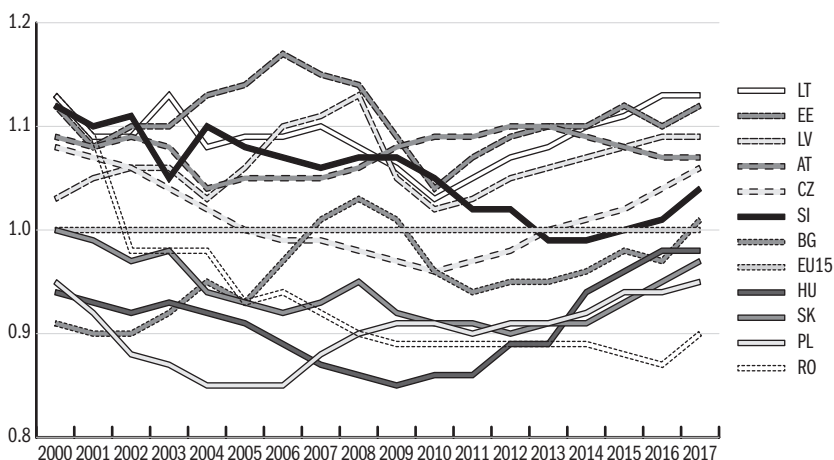
### 3.1 FEMALE EMPLOYMENT IN POST-SOCIALIST EU MEMBER STATES<sup>1</sup>

FLÓRA SAMU, ÁGOTA SCHARLE & MÁRTON CSILLAG

In the early 2000s, the post-socialist EU Member States still had a distinct advantage in female employment compared to the old Member States. They had lost this advantage before the outbreak of the global financial crisis but regained it to some extent during and after the recession (*Csillag et al.* 2013). This chapter examines the role of demographic and policy factors driving these changes.

Before the transition in 1989, Central and Eastern European countries were characterised by high overall employment and a small gender employment gap. Cross country dispersion in the Soviet bloc was also smaller than within the EU15, where female employment varied considerably between high levels in the Nordic countries and low levels in the South. Female employment dropped as a result of the transitional shock in most CEE countries, and the recovery proved to be slow. Despite the steady rise of female employment in the New Member States (NMS) since 2000, the employment rates have come close to the EU15 average only recently (*Figure 3.1.1*).<sup>2</sup>

Figure 3.1.1: Relative female employment rate in post socialist EU countries, EU15 = 1



Note: Share of 20–59 years old population. The Hungarian data include the participants of public works as well (which significantly raises the employment rate after 2009).

Country abbreviations: AT: Austria, BG: Bulgaria, CZ: Czech Republic, EE: Estonia, HU: Hungary, LT: Lithuania, LV: Latvia, PL: Poland, RO: Romania, SI: Slovenia, SK: Slovakia.

Source: Eurostat (lfsa\_ergan).

1 The research leading to the results reported in this paper has received funding from the European Union's Seventh Framework Programme (FP7/2007–2013) under grant agreement 'Growth-Innovation-Competitiveness: Fostering Cohesion in Central and Eastern Europe' (GRINCOH).

2 Bulgaria is an exception as female employment increased compared to the EU15 until 2008 (most likely due to the high emigration rate, which reduced labour supply). Romania stands out at the other extreme, where the female employment rate declined in absolute terms as well.



Female unemployment was above the EU15 average in several NMS in the 2000's but it has steadily declined since the financial crisis, falling below the EU15 average throughout the region. In some countries, this reflects genuine improvement in labour market opportunities, while for example in Romania and Poland it was coupled with a rise in inactivity (compared to the EU15).

The cross-country variation in female employment in the CEE region has received little attention so far. Earlier studies focused only on Western Europe (e.g. *Cipollone et al.* 2014) or tended to focus on explaining differences in the overall decline in employment (e.g. *Munich and Svejnar*, 2009). Research on the impact of attitudes or policies on female employment in the CEE (e.g. *Fodor*, 2005) usually ignores variations *within* the female labour force.

This chapter presents the evolution of female employment in selected CEE countries and describes the role of 1) demographic trends (such as ageing, increasing educational attainment or declining fertility that affect the composition of the female labour force), 2) differential increases in employment across subgroups that may be related to policy changes, and 3) general labour market processes that affect employment equally in all subgroups.

We use a *Smith and Welch* (1989) type dynamic decomposition. We compare selected CEE countries to Austria as a benchmark country, where female employment is somewhat higher, but the main trends are very similar to the EU15 average.<sup>3</sup>

### The decomposition method

The procedure is to first estimate a regression model of the determinants of employment separately for two regions in both the beginning and the end of the period under consideration, and then to use the estimated coefficients and the distribution of explanatory variables to account for the changes in the difference between the employment rates across the countries. We estimated the impact of major demographic variables on employment in linear probability models using individual-level data of the EU-LFS for the period 2001–2016 (women aged 20–64). *Csillag et al.* (2013) provides a more detailed description of the method, while *Samu et al.* (2017) presents the results in more detail.

### Factors influencing female employment

Female employment is influenced by long term demographic processes, slowly changing attitudes, societal expectations, also by regulations and incentives that can be influenced by government policies in the short term. In this paper we examine only the factors that have a differential impact on the employment of particular subgroups of women (or mothers) clustered by age and education.

An increase in fertility rates lowers female employment unless it is accompanied by a strong improvement of day-care provision. We measure the role of fertility trends in the decomposition by the decline of female employment

<sup>3</sup> We use a single country as a benchmark as the average of the EU15 covers widely differing countries. We chose Austria in particular as its Continental welfare system is similar to the system of most CEE countries.



attributed to the growing share of mothers in the female population. Population ageing also reduces female employment rates because in older generations less people work due to declining health, increasing leisure time and the disincentive effect of the pension system. We capture the role of ageing by the growing share of older generations. The increase in levels of education tends to raise female employment: we capture this by the changing share of those with a high level of education and those with a low level – within the population.<sup>4</sup>

The expansion of day-care services and their free or subsidized provision may raise female employment rates. The contribution of day-care services can be measured by the changing employment rate of mothers with small children. The role of pension regulations is reflected in the changing employment rate of older women. Raising the statutory retirement age may increase the female employment rate, while relaxing the rules of minimum service years may decrease employment. Raising the guaranteed minimum wage may reduce the employment rate of less educated women.<sup>5</sup> The contribution of demand stimulating wage subsidies can be captured only if they targeted certain age or education groups (by examining the changes in the employment of these subgroups).

There are other factors such as economic development that normally increase overall labour demand, or a decline in gender discrimination which improves chances for all women to access the labour market. The contribution of these factors cannot be separated in the decomposition.

### **What factors have influenced the rate of female employment in Hungary?**

In Austria female employment rose steadily from 65% to 74% between 2001 and 2016, while the other countries showed larger fluctuations especially during the financial crisis. The growth of female employment was rapid before the crisis in Bulgaria and in Estonia, while in Poland the growth rate was high after the crisis as well. In Hungary the female employment rate was 61% in 2001, and it increased rather slowly afterwards until the end of the crisis when it grew at a higher pace to reach 70% by 2016.

The age distribution of the labour force was rather similar in the selected countries, and ageing affected all the countries though at a different pace. In Poland and in Estonia the pace of ageing was higher (share of age group of 55–59 years grew from 9–11% to 15%) than in Austria (from 12% to 14%), while in Bulgaria and in Hungary a slower increase was observed (from 13–14 to 14–15%).

The educational composition of the female labour force varied widely between the selected countries. At the start of the period in 2001, in Austria, Bulgaria and Hungary a quarter of the female labour force had low levels of education, while in Poland and Estonia the share of those with low levels of education reached 20 and 10% respectively. By the end of the period the coun-

<sup>4</sup> Effective policy measures may change the educational attainment level of particular social groups such as unemployed youth, that can generate an increase of employment in the short term.

<sup>5</sup> The large-scale extension of public works would cause a significant rise of employment in this group, but we control for this in the Hungarian data. (See methodology and rationale in Scharle, 2016.)

tries which lagged behind at the start improved their relative position. The share of the highly educated labour force was the largest in Bulgaria and in Estonia at the start of the period. Although the share of the highly educated increased in all selected countries, the improvement was much more rapid in Austria and in Poland. At the end of the period this indicator was the lowest in Hungary among all selected countries (in Austria it grew from 12.5% to 32.2% within 16 years, while in Hungary it increased from 15.1% to 28.8%).

Overall, Hungary was not significantly disadvantaged in 2001 compared to Austria regarding the composition of the female labour force. Yet before the crisis the pace of employment growth was slower in Hungary. Decomposing the total change in employment, we find that the slower pace was mainly due to general factors and the contribution of some specific factors was in fact positive in Hungary. The share of the labour force with low levels of education dropped significantly, which lifted the female employment rate by 1.6 percentage points (pp). Employment opportunities for women with small children did not worsen as much as in Austria, which contributed to a further 1.5 pp of relative improvement. However, these positive effects were offset by the large negative contribution of general (−4.5 pp) and demographic factors (−1.5 pp).

During the crisis the improvement of female employment continued in Austria, while it stalled in Hungary. The difference between the two countries can be explained mainly by general factors (6.5 pp). Demographic factors widened the gap between the two countries: Hungary was characterized by a more rapidly accelerating ageing process (−0.6 pp), a slower reduction in that part of the labour force with low levels of education (−0.5 pp) and improving fertility (−0.6 pp). The implemented policy measures were mainly on the positive side in Hungary: restriction of retirement regulations (0.8 pp) and promoting labour market inclusion of mothers (0.6 pp) supported female employment but could not fully compensate for the significant negative contribution of general factors.

After the crisis the improvement of female employment slowed down in Austria but commenced a more rapid growth in Hungary, mainly due to general factors (6.3 pp), since the contribution of demographic trends and policy changes was small. The share of 55–59 years olds grew faster in Austria and more gradually in Hungary (0.8 pp). However, the share of the high-educated in the labour force rose also more rapidly in Austria (−1.6 pp). Policy measures tended to widen the gap between Austria and Hungary. The employment rate of 55–59 years old (−0.8 pp), high-educated (−0.9 pp) and mothers with small children (−0.6 pp) increased faster in Austria than in Hungary.

The general factors were dominant in the rapidly growing Eastern-European countries as well. Female employment grew faster in Estonia and in Bulgaria than in Hungary mainly because of general economic factors (5.6 pp and 7.7 pp).<sup>6</sup> The widening performance gap of Poland can be explained mainly by

6 In Bulgaria the rapid employment growth of population aged 55–59 was likely driven also by the ambitious pension reform (1.4 pp), in Estonia the improving employment rates of mothers with small children (1.2 pp) and highly educated women (0.9 pp) were added to the general economic driving factors.

the accelerating ageing process in the period before the financial crisis. The share of the older (55–59 years old) age group grew faster in the Polish working age population than in Hungary (or in Austria) and the employment rate of women in this age group decreased. During the crisis the negative demographic factors were no longer present, while general factors were more favourable (the Polish economy weathered the crisis much more robustly than the Hungarian economy). This was the main reason why Poland was able to catch up by the end of the period.<sup>7</sup>

It appears therefore, that the changes in female employment were driven mainly by general economic factors between 2001 and 2016 in the countries examined, but the contribution of demographic and policy related factors was not negligible. By the end of the period Hungary caught up to the European average but barely narrowed the employment gap with Austria: the improving trend after the crisis was restrained by unfavourable policy measures implemented.

7 After the crisis a smaller increase of female employment was recorded again in Poland than in Hungary, mainly due to general economic factors.

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## 3.2 INEQUALITY IN EUROPE – WOMEN, MEN AND COUPLES

ZSOMBOR CSERES-GERGELY

1 *Ortiz-Ospina and Rosner* (2018) provides a noteworthy global overview.

2 *Filauro* (2018) and *Vacas-Soriano and Fernández-Macías* (2017) uses a similar approach. Graphs used here are from a recent revision of *Benczúr et al.* (2017).

3 We have created the database by pooling per country micro-data from the European Union Statistics on Income and Living Conditions (EU-SILC) survey. North-West Europe (NW) is comprised of Austria, Belgium, Denmark, United Kingdom, Finland, France, Netherlands, Ireland, Luxembourg, Germany and Sweden. Southern Europe (SO) is comprised of Cyprus, Greece, Italy, Malta, Portugal and Spain. Central and Eastern Europe (CEE) is comprised of Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. Personal income is defined as the sum of personal labour income and transfers attached to persons. All income sources are yearly totals. Labour income is a result of worked months, hours and wage rates, thus cannot be directly compared to the ILO employment rate.

4 Here and in what follows, I use the word ‘partners’ as a catch-all phrase for spouses and those cohabiting.

5 Due to the procedure used for data cleaning, shared income does not precisely match on average in the case of men and women; therefore I present average values here. Sharing half of the personal income is assumed as there is no information on actual sharing in an EU-wide database. Data on personal consumption, such as the one *Bargain et al.* (2018) uses, could be used for this purpose.

Although we know a fair amount about processes shaping income inequality of men and women on the labour market and within households, this is not true about such inequalities themselves.<sup>1</sup> In what follows, I would like to show for the whole of Europe that income inequality *between* as well as *within* the two genders, that is among women and men, together with patterns of cohabitation and employment are important drivers of overall income inequality. We shall see that these drivers show remarkable differences across geographic areas in Europe and have changed considerably during the 2009–2012 crisis.

The basis of this section is *Benczúr et al.* (2017),<sup>2</sup> which uses an EU-wide individual database, considers different income sources and computes different inequality measures to look at income inequality in the EU as a whole. Because there are significant differences among them, I use the geographic areas as defined there: North-west- (NW), Southern- (SO) and Central and Eastern Europe (CEE).<sup>3</sup> The following calculations use data from the years 2006–2014 for the 25–60 years old population with personal income.

One can characterise the income inequality *between* men and women with differences in the share of those with non-zero income and that in average income levels among them. After the 2009 crisis, an increasingly larger percentage of women earned labour income, both in the whole of the EU and in each area considered. At the same time, the share of working men has decreased, especially in Southern Europe. Differences in income levels are substantial: in Europe, a man commands 50–70 per cent more labour- and personal income on average than a woman – see the first half of *Table 3.2.1*. If, instead of relying solely on personal income, cohabiting partners<sup>4</sup> share half of that with each other, the disposable income of women increases by 15–30 per cent, and that of men decreases by 18–30 per cent in the EU as a whole (see the second half of *Table 3.2.1*).<sup>5</sup> The same is true in all geographic areas, but the gain of women and the loss of men is much lower in Central and Eastern Europe than elsewhere. Inequality between the average woman and man is thus similar in the case of personal- and labour income but is likely to decrease notably if partners pool income.

The level of average income is always lower in the case of women than in the case of men, but inequality (measured by the log-variance of income) is higher for women – see *Figure 3.2.1*. The difference is relatively small in Central and Eastern Europe (inequality is larger only by 15 per cent among women than among men), while much larger elsewhere (the difference is be-

tween 30–60 per cent). These differences are due to the components of annual labour income, mostly months and hours worked [Benczúr *et al.* (2017) discusses the details]. Participation patterns of women and men in Southern Europe changed considerably during the crisis years, and this also affected inequality, decreasing differences among women and men. Indeed: inequality among men rose dramatically, from a level typical of North-west Europe to that characteristic of Central and Eastern Europe. A change towards a similar direction, but of smaller magnitude took place in North-west Europe too. Inequality levels of income shared among partners are smaller in all years and areas than the already low levels of men (measured in log variance, assuming equal sharing).

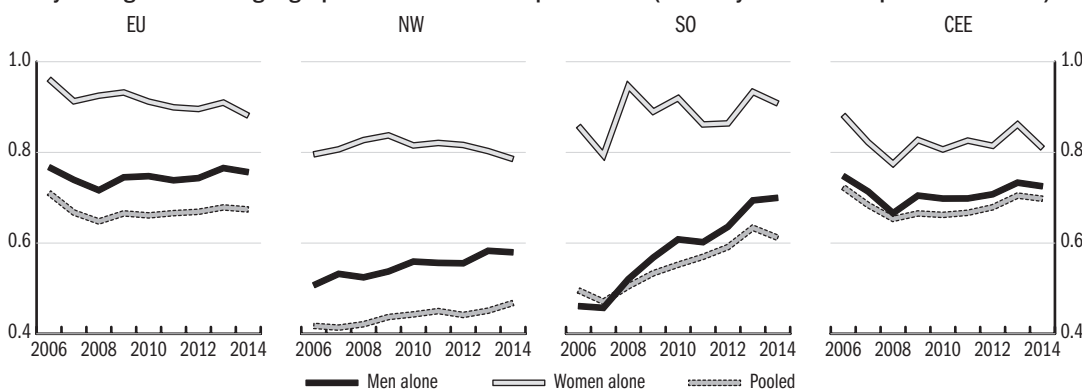
**Table 3.2.1: Average annual income levels for women and men in geographic areas of the European Union (in thousands of Euros at 2015 prices, adjusted for purchasing power parity; 25–60-year-olds commanding personal income)**

	Labour income				Personal income				Shared		Shared/personal			
	Women		Men		Women		Men		Together		Women		Men	
	thousand euros								per cent					
	2006	2014	2006	2014	2006	2014	2006	2014	2006	2014	2006	2014	2006	2014
EU	14	15	27	25	16	16	29	27	21	21	131	128	72	76
NW	18	19	34	32	20	20	36	34	26	26	130	130	72	76
SO	14	13	26	21	15	14	28	23	20	18	130	125	70	76
CEE	7	9	11	14	8	10	12	14	10	12	119	115	79	82

*Remark:* The modified OECD scale was used to calculate per capita household income and the PPI indicator of Eurostat to adjust for differences in purchasing power.

Source: Own calculations based on *EU-SILC* microdata.

**Figure 3.2.1: Inequality of personal income among women and men as measured by the log variance in geographic areas of the European Union (25–60-year-olds with personal income)**

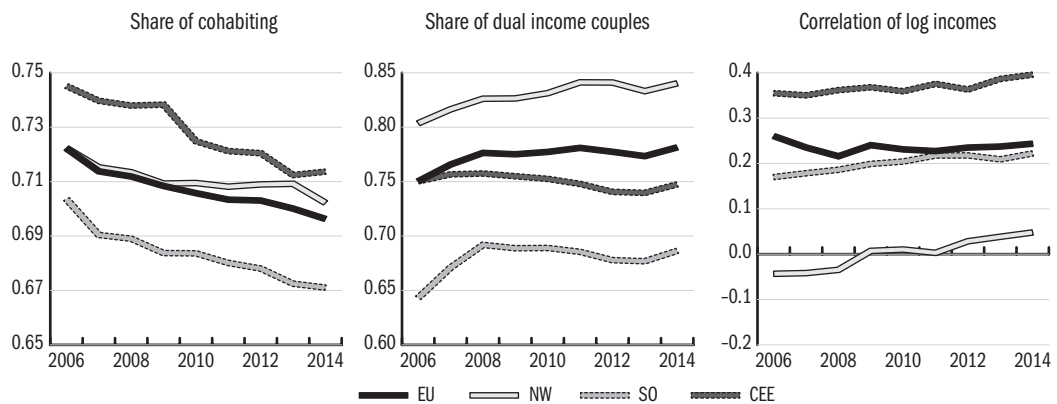


Source: Calculations based on *EU-SILC* microdata.

The overall gain coming from income pooling among partners depends on the prevalence of cohabitation and labour market activity of partners as well

as the correlation between incomes. About two-thirds of the Europeans in the sample cohabits in partnership – see the first panel of *Figure 3.2.2*. The same proportion is somewhat above the EU-average in Central and Eastern Europe and below that in Southern Europe but exhibits a decreasing trend over time almost everywhere (the North-west after the Crisis being an exception). An increasing number of partners work in all geographic areas. Both the share of dual-earner couples and its increase is the largest in North-west Europe, followed by that in Central and Eastern Europe, while Southern Europe comes last with a rather low level. The rightmost panel of *Figure 3.2.2* shows that there are considerable differences across areas also in terms of the correlation of partners' incomes. The correlation is positive and relatively strong in the CEE, not significantly different from zero in the North-west, while in Southern Europe it is measured in-between, around the EU average.

**Figure 3.2.2: Household characteristics and their effect on pooled income**



Source: Own calculations based on *EU-SILC* microdata.

Based on the differences among and the trends of the components of inequality, we see that it is their interaction that shapes inequality among men and women living in partnership. Couples residing in North-west Europe experience a drop in income inequality not only because of the above-average demographic potential of cohabitation but also because of the small correlation between the income of the partners. Quite the opposite happens in Central and Eastern Europe, where the large positive correlation between income sources cancels the more modest, but still favourable demographic and labour market potential. This cancellation is the reason why income inequality across women does not change significantly when passing to pooled income. The same underlying mechanisms and the dramatic changes in labour market participation of women and men explain why the gain from pooled income decreases over time in the case of women in Southern Europe.

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### 3.3 WORK-FAMILY POLICIES AFFECTING FEMALE EMPLOYMENT IN EUROPE

JUDIT KÁLMÁN

Female labour force participation has improved remarkably in Europe over recent decades but there are still a few EU member states where it is below 60 per cent (Greece, Spain, Italy, Malta, Croatia)<sup>1</sup> and in several Eastern European countries, including Hungary, it fails to reach 66.5 per cent of the EU average, although increasing since the 2000s and getting close to it.<sup>2</sup> Female labour market participation is lower than male participation in each European country, with great variance across member states. There are countries (for example Malta, Italy, Greece, Romania, the Czech Republic, Slovakia, Poland and Hungary) where the difference is striking, even though the average educational attainment of women has by now exceeded that of men.<sup>3</sup> Furthermore, female employees usually work fewer hours,<sup>4</sup> in lower-status positions, in lower paid service sectors, which collectively result in significant gender gaps in wages and incomes. Factors affecting female employment at an individual level and wage differences between genders –described in detail in *Chapter 4* – are influenced by demographic and structural effects alike, furthermore several differences stem from incentives determined by institutions, welfare systems, policies and tax regimes. The latter are described briefly in this subchapter.

The access of women to employment and job opportunities is not only important for their individual financial independence, activity, parenthood, participation in public affairs and through these in a better quality of life and greater gender equality<sup>5</sup> but it also has a considerable impact on better allocation of skills and thereby on economic growth (*IMF*, 2016, *OECD*, 2018), population growth, alleviation of several public finance and social problems of aging societies and sustainability of fiscal policy. Acknowledging this, the EU has several directives, objectives and policies in place to encourage member states to strive to enhance the labour market situation of women (Directive 2006/54/EC<sup>6</sup> and Article 153 TFEU<sup>7</sup>), involving those who are inactive or excluded from the labour market (Article 151), implementing the principle ‘equal pay for equal work’ (Article 157) and a better work-life balance for carers. Increasing the current labour market participation of women is strongly related to the employment target of the Europe 2020 Strategy (employment rate must be increased to 75 per cent by 2020 in the EU) and to reducing poverty in several member states (see for example single mothers). There has been some ongoing horizontal coordination in social and employment policies; nevertheless, the policies of individual member states are significantly different.

1 Eurostat data from 2017.

2 For more details on female employment in the post-communist EU member states see Sub-chapter 3.1.

3 An average of 44 per cent of women and 34 per cent of men had a tertiary qualification in the EU28 in 2016.

4 An average of one-third (31.4 per cent) of working women aged 20–64 were employed part time, while the figure is only 8.2 per cent for men in the EU28 in 2017. It is 38.9 per cent among mothers with young children and 5.8 among fathers with young children. The rate of women in part-time employment is especially high in Netherlands (75 per cent), Belgium, Denmark, the United Kingdom, Ireland, Germany and Austria (see Eurostat).

5 All EU member states have ratified the Convention on the Elimination of All Forms of Discrimination Against Women adopted by the UN in 1979.

6 Directive 2006/54/EC.

7 Article 153 TFEU.

## Policies and their impact on female employment

Policies in EU member states – similarly to other developed countries<sup>8</sup> – assist with reducing the cost of bringing up children (family allowances, tax allowances), balancing work and family life<sup>9</sup> (maternity leave, parental leave – for mothers and more recently also for fathers), flexible work arrangement possibilities, childcare system (nursery, kindergarten) but the way, extent and design of support are rather different. The abundant international literature increasingly labels these policies work-family policy rather than family policy or employment policy, referring to the paradigm shift with a focus on the balance of work and parenting and to the fact that it is not the effects of individual policy packages but of the policy mix that should be evaluated (*Hegewisch–Gornick*, 2011, *Thévenon–Luci*, 2012, *Szikra*, 2010).

## Parental leave policies – reinforce attachment to the labour market but their length and income replacement effect also matter

Evidence indicates that the existence and duration<sup>10</sup> of paid maternity and parental leave aiming at job retention are crucial (*Cascio et al.* 2015, *Ruhm*, 1998, *Hegewisch–Gornick*, 2011, *Nieuwenhuis et al.* 2012). Paid maternal and parental leave reduces the risk of mothers giving up their existing jobs around the time of giving birth to their children. These parental leave allowances are tied to past employment in all member states, thus they do not protect unemployed women who give birth. The beneficiaries usually make full use of them, whether they are a few months' long (Cyprus, Portugal) or last several years (Germany, Norway, Eastern European countries) – see for example the tables in the OECD Family Policy database. Obviously, mothers tend to stay in the labour market more often in countries where employers do not dismiss them during or directly after parental leave and the childcare system is well-developed and accessible for the majority (*Del Boca et al.* 2008, *EC*, 2015, *Lambert*, 2008).

In several countries (Finland, Norway and the post-communist countries) it is possible to stay at home for three or four years on parental leave; however, these allowances are not necessarily linked to job protection and only involve a smaller amount of monetary benefit.<sup>11</sup> Monetary benefit linked to parental leave varies to a great extent (*Figure 3.3.1*): there are countries where it equals 100 per cent of the wage earned previously (Baltic countries, Portugal and Germany), while in others it is reduced or does not have a specified obligatory value.

Where none or only a small percentage of wages are compensated for, considerably fewer mothers or fathers stay on parental leave, although it differs across qualification levels, social and labour market positions, because of different opportunity costs of staying at home. Empirical results (*Akgunduz–Plantenga*, 2018, *Rønsen–Sundström*, 2002, *Evertsson–Duvander* 2011) show that too

*8 Cipollone et al.* (2014) estimates that 25 per cent of the increase in the employment of young women has been due to these policies in the past 20 years. The figure is 30 per cent in the case of highly qualified women but the policies have a less significant effect on the labour supply of low-qualified women.

*9* The impact of becoming a parent on employment is obvious when comparison is made with childless women: the employment rate of women with a child younger than six years is on average 8 percentage points lower compared to childless women in the EU; however, this difference is over 30 (or even 40) in Hungary, Slovakia and the Czech Republic and more than 15 per cent in Estonia, Finland and Germany. While in several countries, becoming a mother has an insignificant effect (see for example Belgium or Holland, where the proportion of part-time employment is high) or even a positive effect on the labour market status of women (Sweden, Slovenia and Portugal), in the case of men, becoming a father always has a positive effect (see *Sub-Chapter 8.4* and *EC*, 2015).

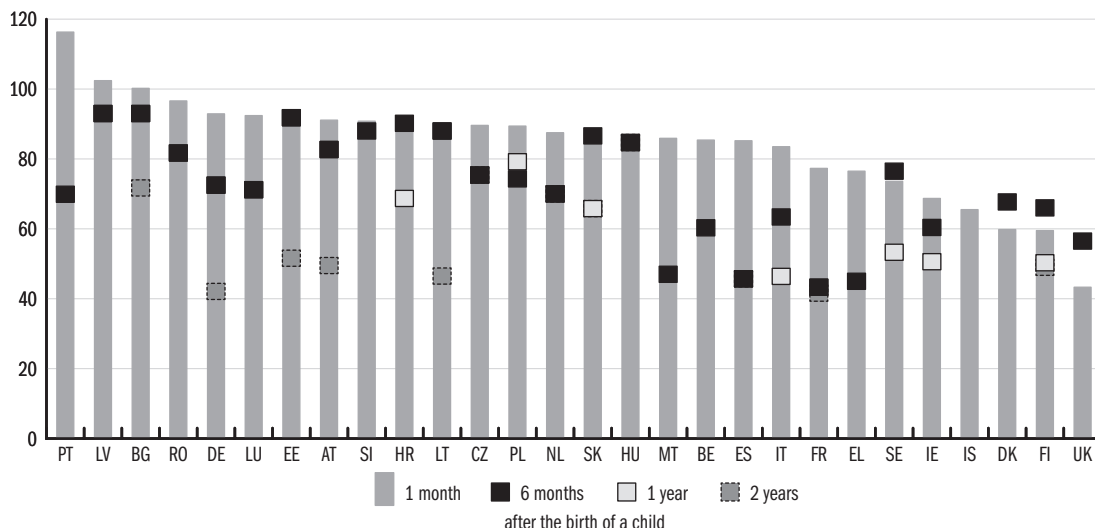
*10* Tables F2.1–2.5 of the OECD Family Database provide data on the duration and the income replacement rate.

*11* Except for Germany, where parental leave with job protection is three years long but without monetary benefits. In the post-communist countries there is a small amount unrelated to past wages. In Norway and Finland this was introduced specifically to reduce the burden on the childcare system and it demonstrably contributed to the reductions in mothers' employment rates but not equally in the various groups of society: it was mainly used by poor, migrant families with several children and therefore not only were these mothers increasingly excluded from the labour market but their children benefited less from early childhood development provision (*Fagnani*, 2009, *Moss–Korintus*, 2008).

12 There is no consensus in the literature about what constitutes a ‘too long’ parental leave but an OECD study (*Thévenon–Solaz, 2014*) suggested that a period of parental leave longer than two years tend to cut parents off from, and hinder them from, re-entering the labour market; they have a negative impact on their future wages and career and reinforce occupational segregation.

extensive<sup>12</sup> periods of parental leave have a negative impact on mothers’ return to the labour market (an excessively long gap in work experience results in skill deterioration), on the wage level achievable (*wage penalty*) and the share of housework in the family (*Ronsen, 2001*) as well as on macro-level employment rates (*Jaumotte 2003, OECD, 2017, Albrecht et al. 2003, Hegewisch–Gornick, 2011*).

Figure 3.3.1: The equivalised net household income one month, six months and two years after the birth of a child, as a percentage of their prior net income



Country codes: AT: Austria, BE: Belgium, BG: Bulgaria, CZ: the Czech Republic, DE: Germany, DK: Denmark, EE: Estonia, EL: Greece, ES: Spain, FI: Finland, FR: France, HR: Croatia, HU: Hungary, IE: Ireland, IT: Italy, IS: Iceland, LT: Lithuania, LU: Luxembourg, LV: Latvia, MT: Malta, NL: Netherlands, PL: Poland, PT: Portugal, RO: Romania, SE: Sweden, SI: Slovenia, SK: Slovakia, UK: the United Kingdom.

Note: OECD simulation calculations, for a sample family of two parents and two children, assuming that all paid periods of parental leave are taken without interruption and the first child is two years old when the second is born.

Source: *OECD Family Policy Database*, FP 2.4.

13 In most countries it is still only women who are likely to use parental leave, except for Norway, Sweden, Iceland, Portugal and Germany, where the father’s quota is not transferable, that is families either lose it, or get less money if the mother alone stays at home. In these countries the share of fathers staying at home on parental leave is increasing (*Björnberg 2002, Kluge–Tamm, 2009*).

14 At the same time, it is also seen that the father’s quota contributes to the slow changes in stereotypes and a more fairly distributed housework, which lifts the burden on women.

As a result of European guidelines, nearly all countries have a father’s quota, whereby a certain part of the parental leave may (only) be used by fathers, though there are large differences in the duration and extent of allowances (in Hungary it is five days, in most countries it is two weeks, while in the Nordic countries it is six months), as well as in its transferability to the mother.<sup>13</sup> Findings show that men use the opportunities offered by policies different than woman: they reduce their labour supply to a smaller extent, or use the leave in several shorter periods, especially if it involves loss of income (*Hegewisch–Gornick, 2011*).<sup>14</sup>

### The disincentive effect of monetary family benefits and the tax system

Generous monetary family benefits and family tax credits have a negative impact on female labour force participation through the income effect (*Nieuwenhuis et al.* 2012, *Thévenon*, 2012, *IMF*, 2016). In several countries (for example Luxembourg, the Czech Republic, Ireland and Greece) the tax system does not encourage the taking up of employment by the second wage earner in the family (higher marginal tax rates),<sup>15</sup> which significantly influences the labour supply of women (*Keane*, 2011, *Prescott*, 2004). Transferable family tax allowance is usually claimed by better paid men, which may also reduce female employment or reduces the income of divorced women (*Szikra*, 2010). Rather than a joint taxation of married couples (for example France, Germany, Ireland and Portugal), a more neutral tax system, leaning towards individual taxation curbs these disincentives and contributes to increasing female employment (*Jaumotte*, 2003, *IMF*, 2016).

According to *Korpi* (2000) and *Korpi et al.* (2013), support measures in line with the so called ‘earner-carer’ model promote a more equal gender division of paid and unpaid work and contribute to higher employment rates and higher fertility. These include maternity leave, shared parental leave and benefits subject to prior employment. By contrast, policies of countries where the ‘traditional-family model’ applies tend to sustain gender disparities: they include monetary benefits<sup>16</sup> that are most often not linked to previous employment and are lump-sum or flat rate. The actual policies used in most welfare states combine these dimensions; however, there are clusters of countries where one of these models dominates<sup>17</sup> and others where both are present – Hungary belonging to the latter (see *Wesolowski – Ferrarini*, 2017, p. 13). It remains to be seen, whether in such situations the diverging policies reinforce or cancel each other out.

### Part-time/flexible employment opportunities

Part-time employment opportunities facilitate the labour market integration of women, support work-family reconciliation in certain life stages and undoubtedly play an important role in increasing female employment. In several, but not all, OECD countries it is easy to shift back and forth between full-time and part-time employment (*OECD*, 2007) and there are countries with typically high part-time female employment (Netherlands, the United Kingdom, Austria and Germany – see *Figure 3.3.2*).

At the same time, some countries promoting full-time employment are also able to achieve high female employment (France, the Nordic countries and Slovenia). It should be noted that *part-time employment is very often not voluntary and results from other policies* (e.g. taxation or inadequate, inaccessible or too expensive kindergarten care), and it also has *controversial effects because*

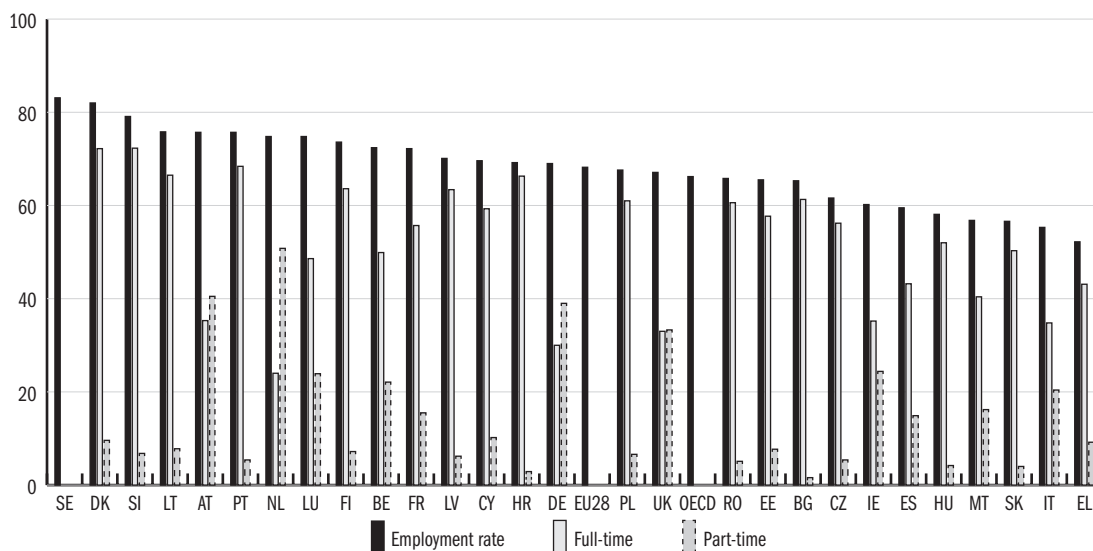
15 The inactivity trap is a situation when an implicit tax increase hinders the re-entry of inactive persons to the labour market – this is currently the highest in Belgium, Germany and Denmark. The low wage trap also plays a role: it emerges when the extent of higher tax rates and lower benefits resulting from higher labour supply is such that it averts labour supply. The tax burden on the second wage earner is considered high if any or both of these effects are significant.

16 Dependent child allowances, maternity benefit, extended parental leave benefit following a paid leave, family tax credits and disincentives in the tax system discouraging the activity of the second wage earner etc.

17 The earner-carer model is characteristic of the Nordic and Baltic countries and Slovenia, while several elements of the benefit system reinforcing the traditional family model and roles are in place in Germany, Austria, the Czech Republic and Belgium.

it may create lock-in situations and disincentives. Women in part-time employment are often found in low-status jobs, having lower hourly rates, switching jobs frequently, less eligible for unemployment benefits, thus they are in a worse and more vulnerable employment situation, not to mention their lower future old-age pension.<sup>18</sup>

Figure 3.3.2: The employment rate of mothers aged 15–64, with at least one child, working full-time or part-time, 2014



See country codes below Figure 3.3.1 (CY: Cyprus).

Source: Author's calculation based on Tables LMF1.2 of the *OECD Family Database*.

### Development of childcare provision

A comprehensive and accessible system of childcare institutions is a crucial element for the employment of mothers (*Blau–Currie, 2003, Del Boca, 2015, Anderson–Levine, 2000, OECD, 2007, EC, 2015*); countries with a high employment rate of mothers invested substantially in developing child day care provision. Nevertheless, in her comparative study *Jaumotte (2003)*, found that tax systems and parental leave schemes have a stronger impact on female labour supply and that the better development of childcare institutions is more important in countries where full-time female employment is dominant because it is easier for women working part time to find informal childcare solutions. Although attitudes of parents towards childcare institutions vary across countries, as does utilisation and the number of hours spent in childcare (*Andringa et al. 2015*), some patterns emerge:

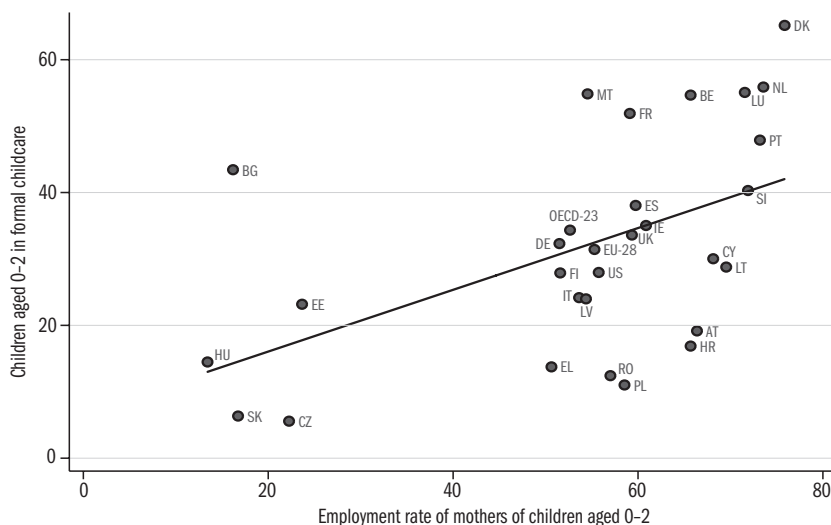
- 1) universal and strongly subsidised provision in the Nordic countries;
- 2) in the more traditional Southern European countries there are very few places for children under the age of three and not accessible everywhere;

18 The case of Sweden, Denmark and to some extent Norway suggests that part-time employment opportunities can only provide transitional solutions to the higher employment rate of mothers (it was typical of these countries in the 1980s and 1990s), and a more comprehensive, well thought-out policy mix – including the combination of tax and social security policy, exclusive father's quotas and the expansion of nursery and kindergarten provision – drastically reduces part-time employment and increases full-time employment among women.

- 3) the extensive use of expensive private settings in the English-speaking countries, with subsidised provision available only for single mothers;
- 4) the free-of-charge childcare system in the post-communist countries used to be extensive but has shrunk since transition and is now characterised by serious regional disparities.

High costs of using childcare institutions limit female labour supply and the labour market reintegration of mothers (for example in Ireland, Netherlands or Poland, where even families with a median income spend cc. 20 percent of their income on childcare). These institutions are used more extensively (especially by single parents) in countries where they are free of charge or are highly subsidised and therefore affordable for the majority<sup>19</sup> and are, at the same time, of good quality (*Han et al.* 2009), which results in higher female employment in all groups by education level (*Cascio et al.* 2015). However, the authors point out that the accessibility of the childcare system alone does not increase the total labour supply of women if it only replaces other, informal solutions (babysitters, family day care, grandmothers etc.). Furthermore, their usage is not only influenced by cost and access but also significantly and to a varying extent across countries by preferences and social norms, which change rather slowly over decades.

**Figure 3.3.3: Employment rate of mothers (full or part time) and the participation of children aged 0–2 in formal childcare, 2014**



See country codes below *Figure 3.3.1* (CY: Cyprus).

Source: Author's calculation based on the *OECD Family Database*, participation of children aged 0–2 in centre based (ISCED 0) or other *early childhood education and care (ECEC)*, the employment rate of mothers aged 15–64 (working full or part time) having one child aged below three.

19 Cf. reducing child poverty is also an important objective of the EU2020.



Figure 3.3.3 shows clearly what was already seen previously, that Hungary, the Czech Republic and Slovakia form a separate group: they sadly have the worst mother employment rates within the EU. These countries have a high family benefits expenditure to GDP ratio and a weak childcare system with large regional disparities, coupled with excessively long parental leave schemes.<sup>20</sup> These policies together hinder, rather than encourage the return of women to employment.

\* \* \*

In conclusion, apparently those countries have the best results in female employment where it is easy to reconcile work and family: a large proportion of young children spend a high number of hours in centre based day-care, part-time female employment is high, monetary and in-kind family benefits are generous but the duration of parental leave is below average and maternity leave is less generous (EC, 2015, *Blau–Kahn*, 2013, IMF, 2016). While relatively a lot is known about the impact of these policies on female labour market participation, less is known about how they influence the number of hours worked. It is also evident that the impact of the entire mix of these policies must be evaluated as a whole because the same policy might have a different effect in a different context.<sup>21</sup> For a long time it seemed that the trend of declining fertility cannot be avoided and female employment can only be improved at the expense of that. However, since the 2000s there have been several examples in developed countries of policies supporting work-family reconciliation resulting in both high female employment and high fertility (Sweden, France, the United Kingdom etc.), while in another group of countries (Italy, Spain and Greece) low female employment is coupled with low fertility rates. Experience has shown that policies supporting the labour market reintegration of mothers and work-family reconciliation also have a positive impact on fertility rates and child development (*Thévenon–Luci*, 2012, *OECD*, 2012). i. e. they help resolving the often mentioned potential conflict of working mothers *versus* balanced child development. Several lessons can be drawn from the diverse practices of the various countries with different development levels, dissimilar institutional and political settings and cultures; however, the cross-country transferability of these policy options is limited. Certainly, in order to increase female employment rates the above policies have to be fine-tuned and better coordinated, the disincentives of the tax and benefit system be cut and the cultural stereotypes and social norms concerning the role of women in society, public and private sectors and politics must be challenged. Diversity is essential both for better targeting of such policies exerting different effects on various sub-groups of women as well as to ensure individual choice.

20 Even though nearly 90 per cent of children over three attend kindergarten in Hungary (the so-called Barcelona objectives), as for younger children, the country lags behind. Only the past few years brought about a shift in the family policy of these countries, which may slowly lead to changes in the unfavourable indicators.

21 For example introducing universal obligatory kindergarten attendance should not be expected to increase female labour supply where childcare has already been generously subsidised or where mothers have significant unearned income (from their partners or from family benefits etc.). Additionally, where there is not sufficient demand in the regional labour market, labour supply will be less flexible and thus the same universal kindergarten scheme will have less impact on female employment.



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## 4 HUMAN CAPITAL, PART I

### BIRTH AND EARLY CHILDHOOD

#### 4.1 INTRODUCTION

ÁGNES SZABÓ-MORVAI

Educational attainment, labour market status, choice of profession and wages all strongly depend on individual human capital, which is a set of personal characteristics that enable someone to produce economic value (see for example *Mincer*, 1958). The most important elements, and the ones examined most often by economists, are cognitive skills, non-cognitive characteristics and health – this volume covers these in detail; however, due to lack of space, some important topics, such as network capital, will not be analysed.

Cognitive skills mainly include attention and the ability of processing information, measured by intelligence and performance tests developed for this purpose (see *Bilker et al.* 2012), which effectively predict labour market success (*Heckman et al.* 2006).

Non-cognitive characteristics include several personality traits and abilities, such as the Big Five personality traits (extraversion, agreeableness, conscientiousness, neuroticism and openness) often used by psychologists and the preference parameters used and measured by economists (social, risk, competitive and time preferences) (*Borghans et al.* 2008a).

According to Heckman's model of human capital formation, the various components of human capital are fundamentally related. Components of human capital created in one period increase the return on investments made in the next period. Additionally, cross effects are also seen, for example because of a higher level of non-cognitive skills in the first period, the level of cognitive skills grows faster in the second period (*Heckman*, 2007).

Chapters 4–7 give an overview of the major components of human capital as well as the gender differences in these components. Chapter 4 presents the formation of human capital in early childhood and the impact of shocks on children. Chapter 5 discusses school performance, which strongly relates to cognitive skills; however, non-cognitive skills (for example perseverance and tolerance for failure) also have a significant impact on it (*Borghans et al.* 2008b). Chapter 6 covers the differences in, and the effects of, non-cognitive factors, while Chapter 7 details what is currently known about the health of Hungarian women.

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## 4.2 THE ROLE OF EARLY CHILDHOOD SHOCKS IN THE EMERGENCE OF GENDER INEQUALITIES

ÁGNES SZABÓ-MORVAI

Research on the reasons for the gender gap in employment often focuses on factors affecting individuals in late childhood (education, career choice) and adulthood (having children, career paths). However, labour market performance is strongly influenced by the components of human capital such as mental capacity (cognitive skills), personality traits and health. The components of human capital are actively shaped by the environment from the moment of conception. In the months prior to birth, intrauterine effects and stimuli provide the environment for foetal development. The inherited set of genes, the number of prior abortions of the mother, her way of life before and during pregnancy, addictions, nutrition, stress level as well as air and water quality are all found to have an impact on the foetus. The circumstances of birth, preterm delivery, complications during delivery and the quality of subsequent medical care are decisive for later life. Following birth, children's primary environment is within their families, where most effects come from. The amount and quality of food intake is important, just as how much family members talk and read to the child, if there is violence, substance abuse or financial insecurity in the family – and a divorce or adoption may also be decisive events. Additionally, the wider environment, including air and drinking water pollution, local medical care and health visiting service and the access to and quality of nurseries, kindergartens and primary schools also influence human capital (*Szabó-Morvai, 2016*).

By the time children are ten years old, they are affected by plenty of impacts largely defining their labour market success. Some of these influences have been proven to affect girls and boys differently. In order to understand the reasons for the gender employment gap, it is useful to consider which circumstances result in what kind of differences in human capital between genders. Research findings show that psychological harm such as violence or neglect negatively affect both boys and girls. However, physiological impacts such as starvation, harmful environmental factors and poverty affect boys more. This may be due to the profound difference in the neurobiological development of boys and girls between conception and the age of two (*Schore, 1994, 2017*).

According to *Schore (2017)*, the right hemisphere of boys develops more slowly than that of girls and thus boys are more susceptible to negative environmental impacts than girls of the same age. *Kunzler et al. (2015)* reported that infant boys react differently to separation anxiety (separation from the mother): their cortisol levels soar significantly and repeated separation leads

to the divergent development of some of the neural pathways in the brain, which will be responsible for future behavioural disorders, while emotional responsiveness and stress tolerance will also change.

This may be the reason why grade repetition at school, behavioural problems, substance abuse, juvenile delinquency, suicide or psychological disorders such as attention deficit hyperactivity disorder (ADHD) or autism spectrum disorder are seen in a higher proportion of boys. For example *Chetty et al.* (2016) used administrative data to prove that boys brought up in single-parent families in poor financial circumstances are less likely to find employment in their twenties than girls brought up in similar circumstances.

Many children are exposed to these risks: in Hungary the share of children living in poor households<sup>1</sup> is 18 per cent, the share of children living in single-parent families<sup>2</sup> is 12.5 per cent, while the share of vulnerable children in basic school<sup>3</sup> is 5.1 per cent. *Table 4.2.1* indicates data on Hungarian men in some important dimensions. For example the share of suicide is 3.5 times and the share of prisoners are 19.9 times higher among men than among women.

**Table 4.2.1: Dimensions of vulnerability among men and women**

	Men	Women	Difference (percentage point)
Share of SEN pupils (per cent, 2009–2015) <sup>a</sup>	5.98	3.29	1.8
Suicide (hundred-thousands, 2010) <sup>b</sup>	35	10	3.5
Number of prisoners (2016) <sup>c</sup>	16,361	822	19.9
Drug users attending treatment (2016) <sup>d</sup>	9,357	4,235	2.2
Number of registered alcoholics	12,952	5,033	2.6

<sup>a</sup> Based on data from the National Assessment of Basic Competences organised by the Educational Authority.

<sup>b</sup> Central Statistical Office (CSO).

<sup>c</sup> Eurostat.

<sup>d</sup> CSO.

1 Age group: 0–5 years, 2016. Source: *Varga et al.* (2018).

2 Data from 2001, age group: below six. CSO.

3 2016, pupils in basic (primary and lower secondary) school. The share of pupils vulnerable because of family circumstances (malnourished, exposed to domestic violence, neglected or showing symptoms of drug addiction) as reported by school-teachers. Source: Institute of Economics, HAS.

4 The postpartum depression of mothers is a typical form of neglectful parenting: in this case the mother does not or insufficiently responds to the needs, signals and communication of the baby. Neglectful parenting causes as much harm in the future development of children as physical abuse.

5 Several studies reported that childhood abuse and neglect result in structural changes in the corpus callosum, thus the part of the brain providing one of the most important links between the two hemispheres will be smaller. This may lead to a deterioration of the efficiency of cognitive functions (*Petersen et al.* 2014).

Hereafter research with non-exhaustive examples for the association between early childhood shocks and later consequences are described.

### Emotional shocks

Research findings concerning later impacts of early childhood shocks are mixed. *Petersen et al.* (2014) found that boys neglected<sup>4</sup> or abused in childhood were more likely than girls to have behavioural disorders.<sup>5</sup> This is contradicted by *Currie–Widom* (2010), which compared victims of childhood violence or neglect with a group of individuals not experiencing these. The members of the group exposed to violence were 14 per cent less likely to be employed and if employed, they were less likely to have a job requiring a qualification. They were also more likely to earn lower wages and have fewer assets (a car, house etc.). The impacts were stronger in the case of women than in the case of men. *Norman et al.* (2012), in their meta-analysis, did not find a sig-

nificant gender difference in the negative consequences of childhood abuse and neglect. *Phelps* (1998) found that the divorce of parents did not affect boys significantly, while the earnings of women clearly decreased. However, *Lizardi et al.* (2009) reported that while parental divorce did not increase the risk of suicide for girls, it did increase it for boys.

### Physiological impacts

As for physiological environmental shocks, research results are more consistent: consequences are clearly more severe for boys. *Catalano* (2011) and *Catalano et al.* (2013) and (2006) provide circumstantial evidence for the vulnerability of boys in the womb by reporting that at times of natural or social disasters and economic crises the share of boys in live births decreases.<sup>6</sup> Additionally, negative intrauterine impacts not only affect foetal loss, but also influence the future health and cognitive characteristics of surviving infants.

Analysing children born after the terrorist attacks of 11 September 2001 in New York, *Currie–Schwandt* (2015) found that air pollution with dust has a negative impact on the birth weight of infants, with a clearly stronger effect on boys: their birth height is significantly smaller, and they may develop cardiovascular problems, such as high blood pressure in later life.

The employability of boys brought up in poverty, single-parent families and a disadvantaged neighbourhood is substantially lower than that of girls brought up in similar circumstances (*Chetty et al.* 2016). *Autor et al.* (2015), relying on administrative data of boy-girl siblings, showed that the sons of low-qualified single mothers, who attend low-quality primary school, will be more likely to play truant or have behavioural problems than their sisters. These boys also achieve lower scores on competence tests, are less likely to complete upper-secondary school and more likely to be juvenile offenders.

<sup>6</sup> *Eriksson et al.* (2010) suggest that the placenta of boys transports nutrients more efficiently (therefore they tend to grow bigger during pregnancy); however, it is less capable of storing them. This is why the growth of boys requires more nutrients and a less favourable environment (for example the starvation of their mothers) causes more harm in foetal development.

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## 4.3 THE IMPACTS OF ABORTION RESTRICTIONS ON BIRTH OUTCOMES

ANNA ADAMECZ-VÖLGYI, ANNA BÁRDITS, GÁBOR KERTESI  
& ÁGNES SZABÓ-MORVAI

In-utero shocks have a long-term impact on human capital, which determines future labour market performance. This study investigates the effects of the abortion ban introduced in Hungary in 1974, relying on the birth database of the Central Statistical Office (CSO), with preliminary findings presented below.

In countries where there is a strict abortion ban, the number of unsafe abortions is much higher (*Ganatra et al.* 2017). As a result of unsafe abortions, 13 per cent of mothers die globally and a quarter of the women undergoing such a procedure suffer permanent damage to their health (*Haddad-Nour*, 2009). This obviously has a negative impact on their future pregnancies.

After some of the unsafe abortion attempts children are nevertheless born. We exploit a natural experiment to investigate the impact of abortion restrictions on the health of the newborn children: on 1 January 1974 in Hungary, the previous relatively permissive abortion regulation was tightened, abortion committees were established and abortion was only allowed in specific cases. Restricting access to abortion may have a negative effect on the health of new-born children. On the one hand, in the early stage of pregnancy, when mothers are not aware of being pregnant and the foetus is the most vulnerable, mothers' behaviour during unplanned pregnancies may be different from how they would behave in a planned pregnancy. On the other hand, restricting access to abortion may lead to choosing alternative ways of terminating the pregnancy, which in many cases do not succeed but are however harmful to both the foetus and the mother.

Such effects of the restrictions introduced in 1974 in Hungary have already been studied by medical research. It is well-documented that, after the restrictions, in cases when an abortion was not permitted by the abortion committee, doctors tried to induce miscarriages with high-dose oestrogen injections if requested by women (*Czeizel et al.* 2014). This practice continued until 1978, when it became apparent that as a result of unsuccessful attempts, there was a dramatic upsurge in the number of children born with limb reduction defects. This was only one of the methods; other detrimental practices might also have existed.

This study explores whether the restrictions had an impact on the health of children at birth, and if this impact differed for girls and boys. The causal impact of the restrictions is challenging to measure because of several other

changes that happened in this period: contraceptive pills became cheaper and more accessible, while family allowance, parental leave benefits and other benefits related to child rearing increased. We identify the impact of the restrictions making use of the fact that until the end of 1978 the restrictions did not apply to women aged 35 and above; they had the same access to abortion as earlier. Our empirical strategy consists of comparing the children of mothers aged 34 and 36.<sup>1</sup> Even before the restriction, women aged 34 gave birth to more children than women aged 36. In 1974, the number of births increased further among women aged 34 but not among women aged 36, and we assume that this difference is the result of the restrictions as women aged 34 became less likely to have an opportunity for an abortion. Since the two age groups are very close to one another, it is reasonable to think that the growing gap in births in 1974 was not caused by any other changes (for example the increase in the family allowance) because those were not linked to age.

We evaluate whether the share of children with birth defects also increased as a result of the restrictions using a ‘difference in differences’ approach. This assumes that in the absence of restrictions on abortion, the difference in the share of children with birth defects between the two maternal age groups would have remained the same. If the share of children with birth defects increased among mothers aged 34 but not among mothers aged 36, the difference would be interpreted as the impact of the restrictions. Our findings are shown in the third row of *Table 4.3.1*. The restrictions increased the share of children with birth defects in 1974 by 1 percentage point (Column 1), due to a decrease in the group aged 36 and an increase in the group aged 34. This impact is robust to the inclusion of several control variables (Column 2) and is statistically significant in both models.<sup>2</sup> This 1-percentage-point impact means that the share of children born with birth defects increased nearly fourfold due to the restrictions.

If we are looking at the data of more years before and after the restrictions, trade-offs emerge. On the one hand, this allows us to control for the variability of the share of children with birth defects within a year. On the other hand, the distance from the cut-off year, 1974, when the restrictions were introduced, increases. The larger the distance from the cut-off, the more opportunities women had for adapting to the new regulation. The impact we have found in 1974 is still robust looking at 1973–1975 but becomes small and insignificant looking at 1972–1976; thus, further investigations are needed in this respect.<sup>3</sup>

We have also looked at whether the effects differ between boys and girls; these findings are not presented here in details. We find suggestive evidence that the negative impacts might have been larger for boys, which is consistent with the relevant literature indicating that boys are more sensitive to in-utero negative shocks (see for example *Catalano et al.* 2013, *Eriksson et al.* 2010).

1 It is not known how permissive abortion committees were with mothers aged 35, therefore the age group of 34 was chosen as the treatment group and the age group of 36 as the control group. If in actual practice there were mothers aged 36, whose abortion was not permitted for reasons unknown to us, in spite of their age but mothers aged 34 were more likely to be denied, it does not create a problem for the identification strategy adopted.

2 It has a probability of less than 5 per cent that such or a larger impact would be seen due to random fluctuation, if in fact there were no impacts

3 Limitations of the study include the very small number of children with birth defects in the sample: in the longest period examined, fewer than 20 children per year on average were born with birth defects altogether in the two age groups, thus a few children born with a birth defect may substantially affect our estimates.

**Table 4.3.1: The impact of restrictions on access to abortion in 1974  
on the share of children born with birth defects**

	(1)	(2)	(3)	(4)	(5)	(6)
	1974	1974	1973-1975	1973-1975	1972-1976	1972-1976
Born to a mother aged 34	-0.006* (0.004)	-0.007* (0.004)	-0.006*** (0.002)	-0.006*** (0.002)	-0.003* (0.001)	-0.002* (0.001)
Born after June 1974	-0.004 (0.004)	-0.005 (0.005)	-0.002 (0.002)	-0.005 (0.005)	-0.0003 (0.002)	-0.0007 (0.004)
The effect of restrictions	0.009** (0.005)	0.011** (0.005)	0.007** (0.003)	0.007** (0.003)	0.003 (0.002)	0.003 (0.002)
Constant	0.009*** (0.003)	0.012* (0.006)	0.008*** (0.002)	0.012*** (0.004)	0.005*** (0.001)	0.005 (0.003)
Controls	no	yes	no	yes	no	yes
N	4,512	4,358	12,651	12,196	20,359	19,607
R <sup>2</sup>	0.001	0.006	0.001	0.003	0.000	0.003

Notes: Sample of live births of women aged 34 and 36. Linear probability models.

The coefficients of all columns were estimated by separate regressions. Robust standard errors in brackets. Control variables: educational attainment, proxy for income, county of residence, type of settlement, quarter of year fixed effects.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

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## 5 HUMAN CAPITAL, PART II

### TEST SCORES AND SCHOOL PERFORMANCE

#### 5.1 CHANGES IN THE GENDER GAP IN EDUCATIONAL ATTAINMENT

JÚLIA VARGA

By the end of the 1990s, in most developed countries the gender gap in educational attainment had reversed (see for example *Schofer–Meyer*, 2005, *Goldin et al.* 2006, *Vincent-Lancrin*, 2008, *Parro*, 2012). While men used to have a higher educational attainment than women, in recent decades women have obtained tertiary or higher qualifications in greater proportions than men and have been low-qualified in lesser proportions. Research has revealed several reasons for such an increase in female educational attainment. For example, because labour market participation of women has become widely accepted, this encouraged women to invest in human capital (*Goldin et al.* 2006). The increase in the labour demand for higher education graduates and the additional wage return to higher education also supported the participation of women in higher education (see for example *Charles–Luoh*, 2003, *DiPrete–Buchmann*, 2006). *Becker et al.* (2010) conclude that the costs of higher education are lower for women because of the gender differences in non-cognitive skills and explain the higher participation of women by the lower costs. Women have not only overtaken men in higher education participation rates but female higher education students also graduate in a higher proportion (*DiPrete–Buchmann*, 2006, *OECD*, 2016), which further increases their advantage in the share of higher education graduates.

In 2017 the share of those with a lower-secondary qualification at most (ISCED 0–2) in young people in the EU28 was nearly 5 percentage points higher among men than among women, while the share of those with a higher education (tertiary) qualification was 17.5 percentage points higher among women than among men. In the age group 30–34, the share of those with a higher education qualification was 10 percentage points higher among women (*Table 5.1.1*). This gender gap was smaller in Hungary than the EU28 average but there is a similar tendency.

In 1990, at the start of the economic changeover, the educational attainment of women in the population over 15 was lower than that of men in Hungary – except for those with an upper-secondary qualification. Compared to men, women had a smaller share of those with a lower-secondary qualification or less, a substantially smaller share of those with a secondary vocational qualification without an upper-secondary school leaving certificate (Matura) and a somewhat smaller share of those with a higher education qualification.

However, they had a larger share of those with an upper-secondary qualification with Matura (*Figure 5.1.1*).

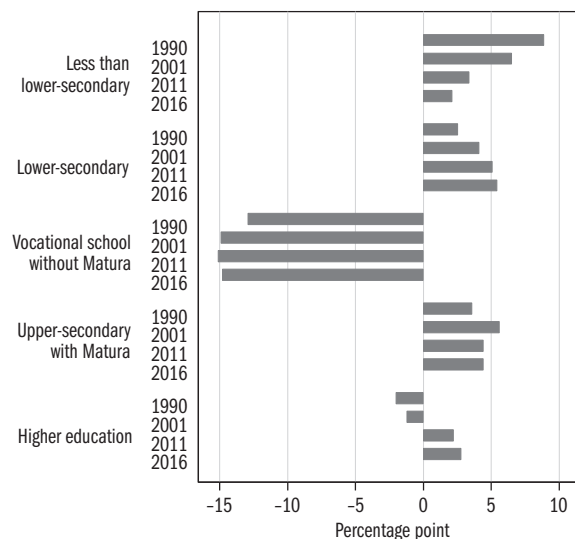
**Table 5.1.1: Difference in the share of educational attainment between women and men in younger age groups, 2017**

	EU28 average			Hungary		
	women	men	difference	women	men	difference
	percentage					
<b>Aged 20–24</b>						
Lower-secondary at most (ISCED 0–2)	14.2	19.1	–4.9	15.5	15.8	–0.3
Upper-secondary (ISCED 3)	64.4	65.8	–1.4	73.1	78.5	–5.5
Tertiary (ISCED 5–8)	32.4	14.9	17.5	11.4	5.7	5.7
<b>Aged 30–34</b>						
Tertiary (ISCED 5–8)	44.2	33.9	10.3	35.8	24.7	11.1

Note: The percentage of women with a certain educational attainment level aged 20–24 (and aged 30–34) within the female population aged 20–24 (and aged 30–34 respectively) minus the percentage of men with the same educational attainment level aged 20–24 (and aged 30–34) within the male population aged 20–24 (and aged 30–34 respectively).

Source: Eurostat.

**Figure 5.1.1: The difference in the share of educational attainment levels among men and women aged over 15 in Hungary, 1990, 2001, 2011 and 2016 (percentage point)**



Note: The percentage of women with a certain educational attainment level minus the percentage of men with the same educational attainment level.

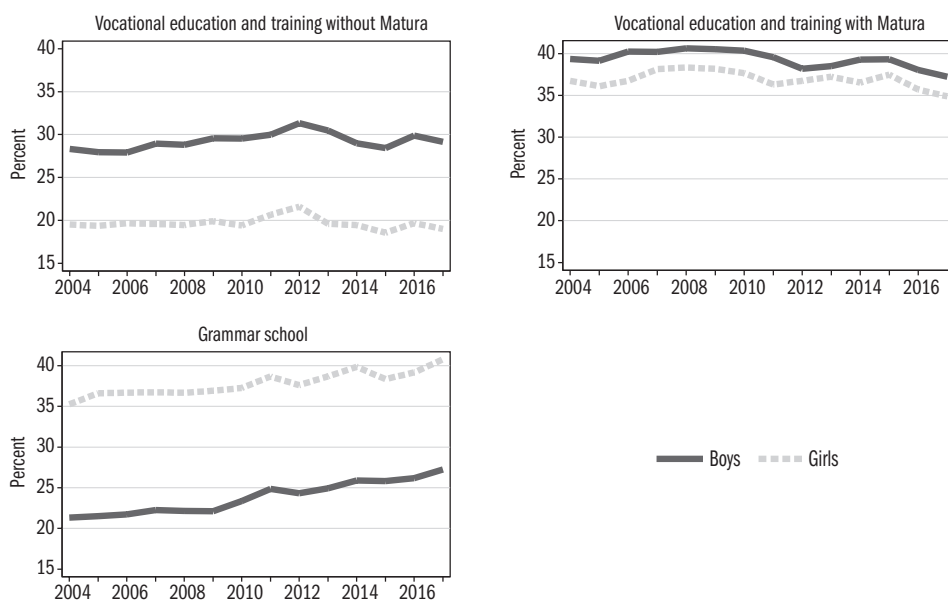
Source: Calculated from data from the 1990, 2001 and 2011 census and the 2016 micro-census (CSO). The positive section of the graph indicates the predominance of women, while the negative section indicates the predominance of men.

However, in younger age groups women were already more qualified in 1990 than men. There was no difference in the share of those with a lower-second-

ary educational attainment level at most between the genders but women had a greater share of higher education graduates (*Table 5.1.1*) since in Hungary (similarly to the Scandinavian countries and the other post-communist countries) the share of women in higher education had already reached 50 per cent by 1981, then exceeded it (*Bavel, 2012*). As a result of the expansion of education after the political changeover, by 2011 the share of women in higher education graduates had already exceeded that of men in the entire population over 15, and this advantage further increased up until 2016.

In the coming years the gender gap is likely to increase further. On the one hand, when continuing their studies in upper secondary education, the share of boys in vocational education and training, which does not lead to an upper-secondary school leaving exam (*Matura*) and in this way does not enable pupils to enter higher education, is 10 percentage points higher. By contrast, the share of girls in general upper-secondary education (gymnasiums) is 10 percentage points higher (*Figure 5.1.2*). Boys have only a 2–3 percentage points higher share in upper-secondary vocational education than girls, therefore girls are, on the whole, in a higher proportion in education leading to a *Matura*.

**Figure 5.1.2: The share of the genders within the pupils of the different types of upper-secondary schools in Hungary, 2004–2017 (percentage)**



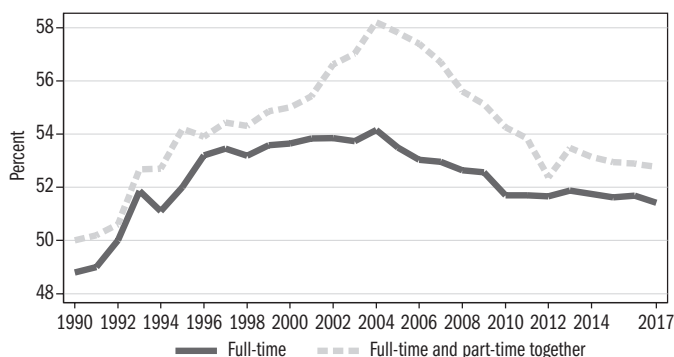
Source: *Varga et al. (2018)*, Indicator C.2.4.

The share of women in higher education decreased after 2004 but it still exceeds 50 per cent in both full-time and part-time programmes (*Figure 5.1.3*). Furthermore, since women also complete their studies in higher proportions than men in Hungary, there is an even greater difference between the share



of women and men among higher education graduates – to the advantage of women (see *Hermann–Varga, 2012*).

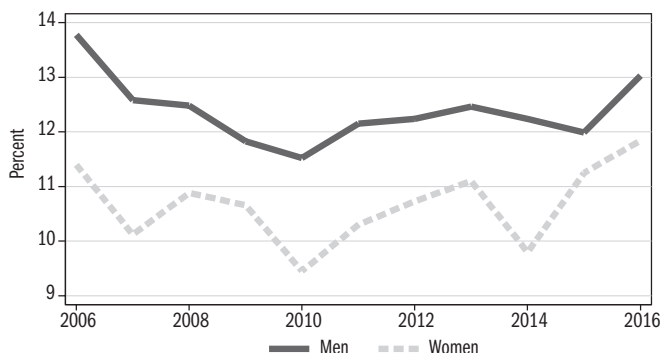
**Figure 5.1.3: The share of women in higher education in Hungary, 1990–2017 (percentage)**



Source: Data from the yearbooks of education published by the Ministry for Education in the period 1990–2000 and data from the Educational Authority since 2000.

The proportion of the low-qualified is also likely to decrease more (or increase less) among women, because there is a lower share of early school leavers among women than among men, although after 2010, along with the increasing proportion of early school leavers in general, the share of early school leavers among women started to approach that of men (*Figure 5.1.4*).

**Figure 5.1.4: The proportion of early school leavers in Hungary broken down by gender, 2006–2016 (percentage)**

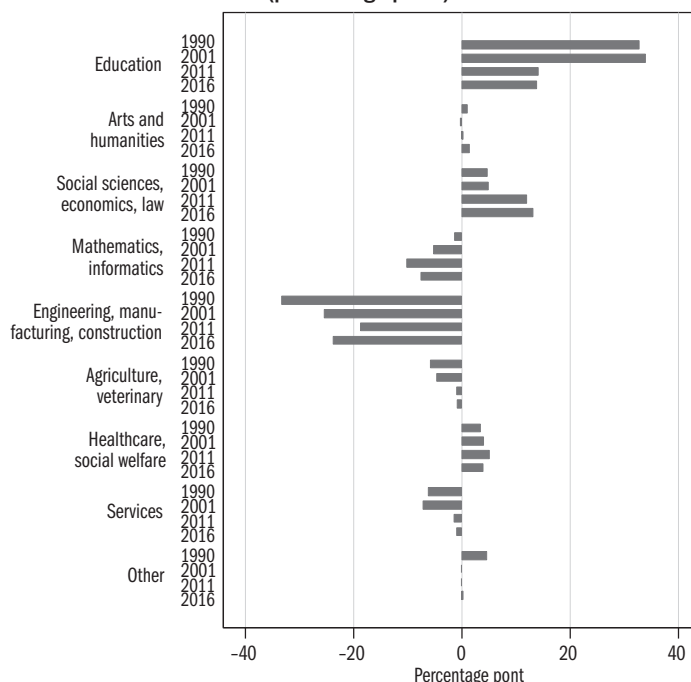


Source: *Varga et al. (2018)*.

Although women at present obtain a higher education qualification in a greater proportion than men, they do not form a majority in all fields of science. There is significant gender segregation in terms of fields of study in most countries but there are considerable differences across countries. Women are underrepresented in Science, Technology, Engineering and Maths (the STEM subjects) and overrepresented in the fields of teacher education, humanities,

social sciences, law and healthcare (*Charles–Bradley*, 2002, *Vincent-Lancrin*, 2008 and *Zafar*, 2013). These differences have important consequences for the earning potential of men and women (*Brown–Corcoran*, 1997, *Jurajda*, 2003 and *Machin–Puhani*, 2003).

**Figure 5.1.5: Differences in the proportions of fields of studies of degrees obtained by women and men aged 30–34 in Hungary 1990, 2001, 2011 and 2016 (percentage point)**



Source: Calculated from data from the 1990, 2001 and 2011 census and the 2016 micro-census (CSO).

In 1990, nearly half of women with a higher education qualification, aged 30–34, had a degree in teaching in Hungary. Even though women remained overrepresented in this area over the next decade, the gender gap in the share of teaching degrees decreased (from 33 percentage points to 14 percentage points). By contrast, the difference in the share of social sciences, economics and law degrees has increased, to the advantage of women. While in 1990 women only had a 5 percentage points higher share of degrees obtained in such disciplines than men, in 2016 they already had a 13 percentage higher share. As for the share in degrees in engineering, industry and construction, women started to close the gap in the period 1990–2011. In 1990, men had an advantage of 33 percentage points, which decreased to 18 percentage points by 2011. However, the advantage of men in Mathematics, Informatics and Science grew from less than 1.5 percentage points in 1990 to more than

10 percentage points in 2011. Between 1990 and 2016 the very small gender gap in human sciences, arts, healthcare and social welfare did not change and it disappeared in agriculture and veterinary studies.

In spite of the significant changes in the proportions across disciplines, considerable differences remained in Hungary between the two genders in the shares of degrees in different disciplines, which profoundly affects the labour market opportunities of the genders and also has an impact on the proportions of disciplines in higher education degrees in general. In Hungary it seems unlikely to increase the proportion of STEM graduates substantially without the increase in the share of women in these disciplines.

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## 5.2 GENDER GAPS IN TEST SCORES IN INTERNATIONAL COMPARISON

ZOLTÁN HERMANN

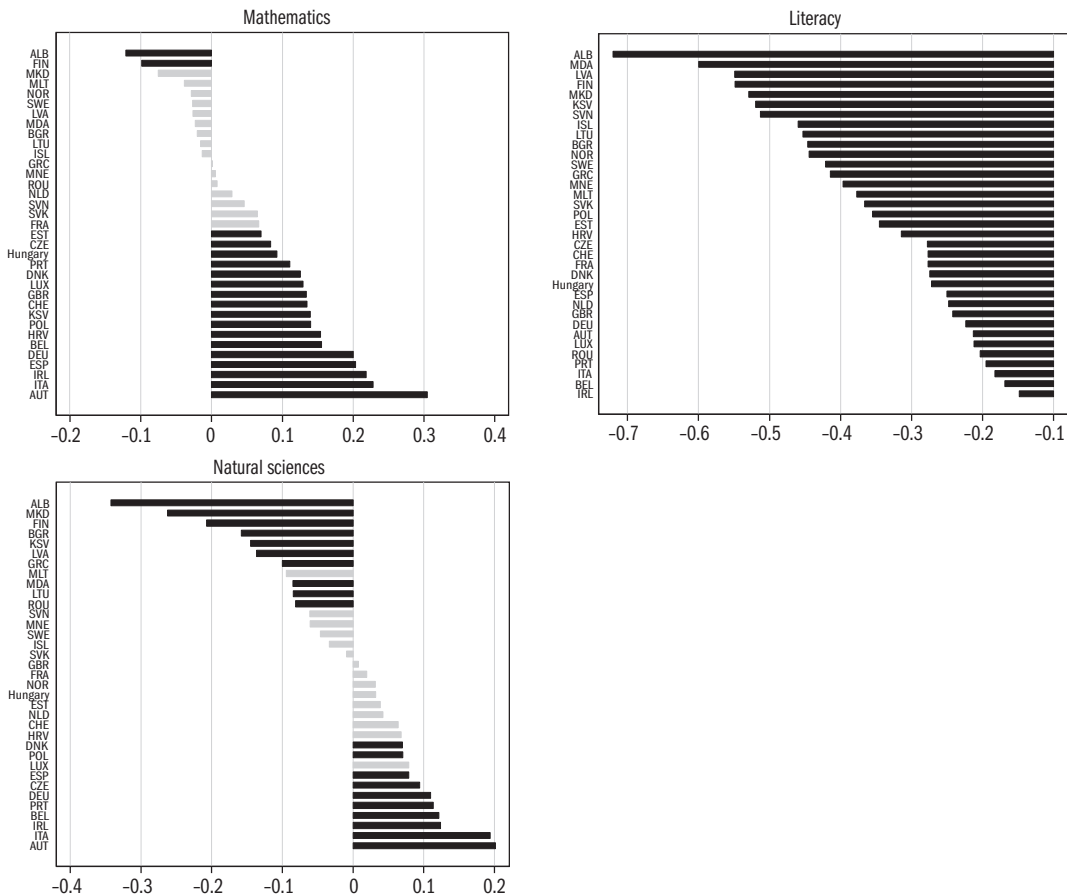
It is a well-known fact, that there are significant differences among countries regarding the gender gap in test scores (*Marks*, 2008). Gender gaps in test scores (hereafter GGTS) based on the data of the latest PISA programme of 2015 are presented below. The PISA Programme measures students' skills in mathematics, natural sciences and literacy with standardized tests to assess how well students can apply what they learnt in school to real-life situations out of the context of school exercises. The programme measures the skills of students at the age of 15.

There are significant differences among countries in the average performance level of students. In order to precede its influence on the measured GGTS, test scores were standardised by country thus the unit of the GGTS is the standard deviation (SD). Raw scores were divided by the standard deviation excluding gender differences, calculated from the average of boys' variance and girls' variance (*Baye-Monseur*, 2016). This way the variance component generated by the gender gap itself is eliminated from the standard deviation. The GGTS was measured from the boys' aspect; positive values indicate the better performance of boys.

*Figure 5.2.1* presents the average values of the GGTS in European countries. Gender gaps are the largest in the field of literacy. The performance of girls exceeds that of boys in every European country, by a country average of 0.35 standard deviation, which denotes a significant difference. In mathematics, it is rather boys who perform better on average but this is not the case in every country. In some countries, the difference is not significant while in Finland and Albania girls perform better than boys. In the average of countries, the advantage of boys is 0.07 standard deviation. As regards natural sciences the picture is rather mixed. In one-third of the countries boys achieve better scores, in one-third girls while there is no significant difference in the remaining countries.

However, differences among countries are significant in all the three fields. Although the standard deviation of the GGTS among countries is the largest in literacy (0.14 SD) its value is quite similar in mathematics and natural history (0.10 and 0.12 SD). In the case of Hungary the GGTS is around the medium level. There is no significant difference in the field of natural sciences. The performance of boys is somewhat better (0.09 SD) in mathematics. The advantage of girls in literacy (0.27 SD) is somewhat below the European average.

Figure 5.2.1: Gender gaps in test scores (boys-girls) in European countries, 2015



Dark grey: significant GGTS at a level of 5 percent

Light grey: not significant GGTS at a level of 5 percent

Abbreviations: ALB: Albania, AUT: Austria, BEL: Belgium, BGR: Bulgaria, CHE: Switzerland, CZE: Czech Republic, DEU: Germany, DNK: Denmark, ESP: Spain, EST: Estonia, FIN: Finland, FRA: France, GBR: United Kingdom, GRC: Greece, HRV: Croatia, HUN: Hungary, IRL: Ireland, ISL: Iceland, ITA: Italy, KSV: Kosovo, LTU: Lithuania, LUX: Luxembourg, LVA: Latvia, MDA: Moldova, MKD: Macedonia, MLT: Malta, MNE: Montenegro, NLD: Germany, NOR: Norway, POL: Poland, PRT: Portugal, ROU: Romania, SVK: Slovak Republic, SVN: Slovenia, SWE: Sweden.

Source: Own calculation based on the PISA database of 2015.

It is important to mention that there is a strong positive correlation at the country-level among test score differences measured in the three fields of studies. (Guiso *et al.* 2008, Marks, 2008). Regarding the European data of 2015 this correlation is around 0.8. This means that the more advantage boys for example have in mathematics in a country typically the less they lag behind in literacy. This, however does not mean that gender differences *in total* are high in certain countries while lower in others. The difference rather is that girls in

certain education systems perform relatively better in all the three fields (as in Finland or Latvia) while in other countries boys learn relatively more effectively (as in Austria or Italy).

This correspondence leads to two important conclusions. First, it is not likely that different degree of specialization of gender roles is the main driver of the country differences. If this were to be the case, in countries where the education system transmits strongly specialized expectations after gender roles the advantage of boys would be similarly significant in mathematics than the advantage of girls in literacy, i.e. negative correlation could be observed. Second, cross-country differences could hardly be explained by subject-specific education policies (e.g. teaching methods and curricula in mathematics). It is more likely, that these originate in the more general characteristics of the education systems (Marks, 2008).

### **Possible reasons for gender gaps in test scores among countries**

Literature on cross-country differences traditionally explains this variation by social and cultural factors, results are however mixed. A part of the analyses demonstrates a positive association (Guiso *et al.* 2008, Else-Quest *et al.* 2010), while others did not find a link at all (Fryer–Lewitt, 2010, Stoet–Geary, 2015). Another part of the literature links the differences of GGTS among countries with the characteristics of the education system. Van Langen *et al.* (2006) examined the integration of the education systems (school types, segregation, differences among schools) and found, that girls perform relatively better in a more unified school system. Ayalon–Livneh (2013). Van Hek (2017) arrived at a similar consequence regarding the standardisation of education systems, which was measured by the variation in pedagogic methods among teachers. Hermann–Kopasz (2018) studied three further characteristics of the school system: early selection among school types, frequency of grade repetition and deployment of the so called, student-oriented teaching practices. The latter is measured by the composite index developed by the OECD (2013). The composite index is based on the frequency of classroom practices e.g. when individual students are allocated different exercises, students work on longer projects or engage in group work. The results of this study regarding European countries are summarized below.

Table 5.2.1 demonstrates the correspondence based on single cross-sectional regression estimates on the European sample. In countries where grade repetition is more frequent boys perform relatively better than girls (their advantage is larger in mathematics and their disadvantage is smaller in literacy). On the contrary, student-oriented teaching practices are more favourable for girls. Early selection (at the age of 14 or earlier) is not closely related to test score differences.

**Table 5.2.1: Gender gaps in test scores (boys-girls) and the characteristics of the education system in European countries, 2015**

	Mathematics	Literacy	Natural sciences
	(1)	(2)	(3)
Early selection	0.0286 (0.0298)	0.0324 (0.0367)	0.0269 (0.0340)
Frequency of grade repetition	0.0278* (0.0143)	0.0531*** (0.0176)	0.0266 (0.0163)
Student-oriented teaching practice	-0.133** (0.0518)	-0.0729 (0.0639)	-0.116* (0.0591)

Note: Cross-sectional regression estimates.  $N = 30$ . Due to its outlier values Albania was excluded. Standard errors in square brackets.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Source: Own calculation based on the PISA database of 2015.

These correlations themselves, however do not answer the question of whether the characteristics of the education system do have an effect on gender gaps. To explore causal effects we employ indirect methods.

We can assume that grade repetition has primarily an impact on low achiever students by directly affecting or threatening them. Therefore, correlation between test score differences and grade repetition is expected to be the strongest in their case. This hypothesis though cannot be proved which implies that the frequency of grade repetition is unlikely to have a direct effect on test score gaps (*Hermann-Kopasz, 2018*). The correlation with grade repetition is more likely to represent the impact of some other characteristic of the educational system.

The link between student-oriented teaching practices and the gender gap could be examined also within countries, as teaching practices could differ among schools as well as within schools. The results of student level estimates containing country- or school fixed effects confirm that student-oriented teaching practices could have a positive impact on the relative performance of girls. (*Hermann-Kopasz, 2018*).

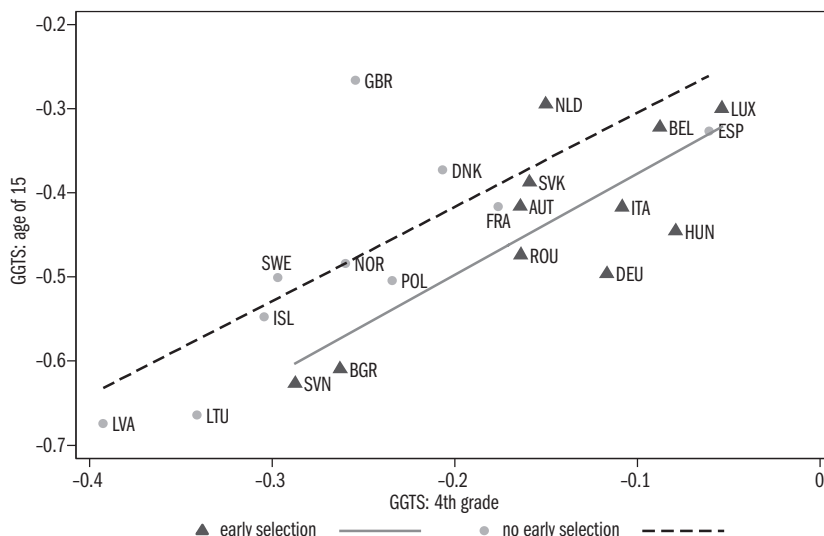
The direct impact of early selection could be examined by the difference-in-differences method, complementing PISA data with the data of the TIMSS and PIRLS data on fourth grade pupils by IEA.<sup>1</sup> As no different school types exist in primary education anywhere, the direct impact of early selection could be estimated by comparing the change in GGTS between the fourth grade and the age of 15 in early tracking and late- or non-tracking countries. The impact is shown by the fact that the change is greater in selective school systems than in countries with a unified school system. *Figure 5.2.2* presents this effect in the field of literacy based on PISA data of 2012. It is clearly visible, that the disadvantage of boys in literacy increases between the fourth grade and the age of 15 in all countries (except the United Kingdom where it remains at the same level). This growth, however is stronger in school systems

<sup>1</sup> IEA: International Association for the Evaluation of Educational Achievement. TIMSS: Trends in International Mathematics and Science Study. PIRLS: Progress in International Reading Literacy Study.



with early selection. The average effect is indicated by the difference between the levels of the lines representing the two groups of countries.

**Figure 5.2.2: The impact of early selection on the gender gaps in literacy test scores (boys-girls) in European countries, 2015**



Note: Abbreviations see under *Figure 5.2.1*.

Source: Own calculation based on the data of PISA of 2015 (age 15) and PIRLS of 2006 (4th grade).

Regression estimates on whole sample of countries confirm the effect shown by *Figure 5.2.2* in all the three fields of knowledge (*Hermann–Kopasz, 2018*). In the case of literacy the effect is statistically significant on the European subsample, as well. The direct impact of early selection therefore is advantageous for girls. The reason for this is that the share of girls in vocational-type schools providing a lower level of general education is lower in general.

On the whole, it seems that gender gaps in test scores cohere with the characteristics of the education system. More traditional education systems – where grade repetition is more frequent, selection is early, and the use of modern pedagogic methods is less widespread – favour boys. The *direct* impact of early selection however improves the performance of girls.

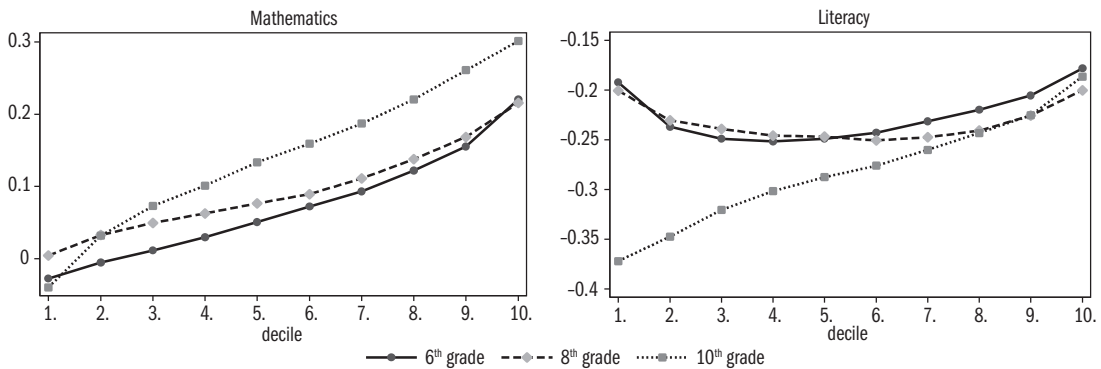
### Gender gaps in test scores and the distribution of student achievement

Beyond differences in average test scores it is worthwhile to examine gender gaps both among exceptionally weak and well-performing students. The lower proportion of girls in tertiary education in STEM (natural science, IT, technology and mathematics) programmes is well-known; from this respect GGTS measured among well-performers is more relevant than the average

GGTS (*Baye–Monseur, 2016*). The analysis of the other tail of the distribution shows the extent of gender-specificity of low achievement.

Figure 5.2.3 presents GGTS in Hungary in deciles by test scores, in three grades based on the standardized data of the National Assessment of Basic Competencies.

Figure 5.2.3: Gender gaps in test scores (boys-girls) by students' performance in Hungary, 2013–2017



Source: Own calculation based on the data of the National Assessment of Basic Competencies.

Gender gaps show remarkably different patterns on the two tails of the distribution. In mathematics boys have a larger advantage in the top of the distribution and there is no difference among low achievers. GGTS in primary schools is even smaller, the advantage of boys increase after the 8th grade except in the group of the weakest performers.

As regards to literacy the difference at the 10th grade is the largest – in favour of girls – among the weak performers. Gender gaps at the 6th and 8th grade however show a balanced picture. Differences at the 10th grade are in line with the PISA data as well as with the general findings of the literature. In international comparison, however in Hungary girls perform exceptionally well relative to boys in the lower part of the distribution in all the three fields measured by PISA, while gender gaps in other parts of the distribution are of average size. This is probably related to the differences among school tracks.

It is worth mentioning here, that test scores of high achiever boys in European countries typically exceed or at least reach the test scores of the best performer girls in the field of natural sciences while among low achievers it is rather girls who have the advantage. This pattern is consistent with the lower participation rate of girls in STEM education (*Baye–Monseur, 2016*).

Finally, a further commonly-known characteristic of the gender gap in test scores is that the test score distribution among boys is less equal, the variance is higher than among girls (*Baye–Monseur, 2016*). In the average of European countries, the variance measured among boys is about 15 percent higher in

all the three fields. This difference in Hungary, however is among the smallest ones.

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## 5.3 GIRLS IN HUNGARIAN VOCATIONAL EDUCATION\*

MÁRTON CSILLAG, BORI GRESKOVICS & TAMÁS MOLNÁR

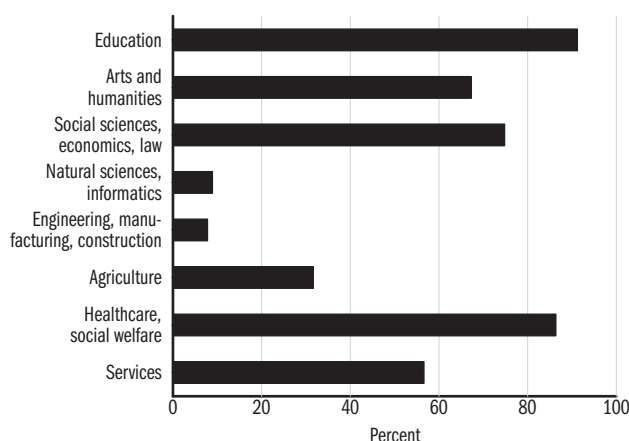
The most striking example of labour market differences between men and women is occupational gender segregation, i.e. men and women work in different fields and occupations. Vertical segregation covers gender differences in occupational hierarchies, while horizontal segregation reflects gender differences between occupations that can lead to exclusively male and female professions. In many cases ‘male professions’ result in higher prestige and higher wages. In this analysis we focus on the latter, the horizontal segregation.

Because occupational choice is strongly determined by educational attainment, we look first at gender differences in vocational education between different fields, then we examine their impact on later employment and wages.

### Gender segregation in vocational secondary education

In this analysis we use data from the Hungarian Educational Authority, and we assess gender ratio by different vocational programmes in basic vocational schools (lasting 3 years, with typically no baccalaureate), and in vocational secondary schools (lasting 4–5 years, with a baccalaureate) among students passing the final exam in 2014.<sup>1</sup> Breaking down the data by a broader field of studies results in significant gender differences. Girls represent the overwhelming majority, more than 86% and 91% of students in the field of Health Care and Education, while less than 10% of students graduating from the fields of Mathematics, IT and Natural Sciences, as well as Technical Studies and Construction were girls (*Figure 5.3.1*).<sup>2</sup>

Figure 5.3.1: Share of girls in different vocational programmes (%)



Source: Authors' calculation, based on data from Educational Authority, *OH KIRSTAT*, 2014.

\* The analysis was produced under the project 'Girls can do it. Supporting non-traditional career choices of women with a vocational education.' We are thankful for the support of the Visegrád Fund.

1 In the academic year 2016/2017 a limited transformation of vocational education was conducted. Since then it has been possible to obtain a baccalaureate degree in both kinds of vocational schools. Although we use data from 2014, therefore, the transformation made no impact on our results.

2 If we focus on different vocational programmes (thus on narrowly defined fields of study) gender segregation becomes more pronounced. In our calculations we used the first two digits of the three digit official National Qualifications Register (OKJ) code to distinguish between different vocational programmes.

## Consequences on the labour market

### *Employment rate*

We analysed the impact of gender and vocational qualifications on labour market status using the data of the annual Labour Force Survey conducted by the Hungarian Central Statistical Office in 2014. We assessed 10,575 young Hungarian individuals aged 20 to 29, who had a vocational qualification with or without a baccalaureate.

We examined the explanatory power of gender and the field of vocational qualification for employment chances, while controlling for other demographic attributes (e.g. region, age).<sup>3</sup> We assessed separately the group of young persons who have a basic vocational education and the ones who have a vocational secondary education.<sup>4</sup> We found a significant gender gap in the group who have attained a basic vocational education: only 61.7% of young women were employed, while 76.4% of men had a job. In the group with a vocational secondary education gender differences were negligible: 83.3% of women and 86.5% of men were employed.

Using multiple regression analysis, we see that the effect of gender on employment probability is largely reduced if we included the field of vocational qualification in the model among those with a basic vocational education.<sup>5</sup> By contrast, among young people with a vocational secondary education no such result can be observed. More specifically women without a baccalaureate had by 11 percentage points a lower chance to be employed than men with the same education, but the difference becomes significantly smaller (5.74 pp) if we include the effect of field of vocational qualification in the model. There was no significant gender gap in the group of people with a baccalaureate, although women were slightly less likely to be employed than men (*Table 5.3.1*). The results suggest that half of the gender gap among young people with a basic vocational education can be explained by the unfavourable field of study choice of young women, which is most likely due to the fact that girls tend to choose occupations with less favourable labour market outcomes.

**Table 5.3.1: Employment chances of women compared to men**

	Basic vocational education		Vocational secondary education	
	gender only	whole model	gender only	whole model
Marginal effect	-0.11	-0.06	-0.03	-0.03
Confidence interval	[-0.17, 0.06]	[-0.12, 0.01]	[-0.07, 0.00]	[-0.07, 0.02]
p-value	0.000	0.087	0.064	0.230

Source: Authors' calculation based on data from the national *Labour Force Survey* in 2014.

We also found that employment correlates strongly with occupational choice among young adults with a basic vocational education. Several fields (e.g. textile industry, trade) chosen by mainly women offer worse labour market out-

3 In our calculations we used a logit model. In our final model the following variables were involved: gender, the dummy variable of different occupations (with data from about at least 50 people). We controlled the model for age, the region of residence and the wave of the survey.

4 In our analysis participants of public work schemes and people on maternity or parental leave were not included.

5 Age has a significant impact on employment both among people with a basic vocational education and vocational secondary education. The level of employment increases with age. The region of residence also correlates with the employment, the correlation is especially strong among people with a basic vocational education. People living in the central and western parts of Hungary have significantly greater chances to be employed than people living in Eastern-Hungary. This correlation is likely to be true for groups with a different level of education as well.

comes than others (e.g. electrical industry) chosen predominantly by men. Conversely, the impact of occupational choice was smaller among young people with a vocational secondary education.

### *Gender pay gap*

The gender differences in field of study choices have a strong impact on the future wages as well. The share of women is systematically higher in fields which lead to occupations where the relative average wages are lower.

If everyone worked in the same occupation or field in which they graduated, men would earn 18% more than women among young adults with a basic vocational education (using data from 2014 on graduations and wages).<sup>6</sup> After controlling for other factors determining wages young men still earn more by 16.5% than women due to their more favourable occupational choices. Among young people with a vocational secondary education the gender pay gap caused by the gender differences in the field of vocational education is negligible, reaching only 1.9% in the case of average wages, and amounting to 1.7% if we control for the other factors.

We found five programmes in basic vocational education that are mainly responsible for the significant expected early career gender pay gap. These five programmes in total widened the gender gap by 15.4% in favour of men. Three of these were primarily chosen by men and led to relatively high earnings (machinery, energetics and construction programmes). The other two programmes were in the fields of trade and tourism and attracted mainly women; and given that these two programmes led to lower (relative) wages they decreased the average expected wages of women.

### **Summary**

We found on the basis of the 2014 data that girls and boys were characterized by a different pattern of fields of study choices in secondary vocational education. This fact strongly affects the futures chances of men and women on the labour market, especially among those with no baccalaureate. Women with a basic vocational education have a significantly less chance to be employed than men with the same education and half of the gender gap can be explained by gender differences in field of study choices. The different occupational choices can also lead to a future gender pay gap: if everyone worked in the same occupation or field from which they graduated, men with a basic vocational education would earn more by 16.5% than women with the same level of education, while the gender pay gap is only 1.7% among young persons with a vocational secondary education.

<sup>6</sup> We used individual wage data (Bértarifa) for 2014 and estimated the relative wages and wage premiums of different occupations (3 digits code of Hungarian Standard Classification of Occupation [FEOR]). The wage premiums were calculated by controlling for age and region of workplace. We must add that only declared wages are in the data, which can bias the calculation of relative wage premiums. We connected the wage premiums to data received from the Hungarian Educational Authority for 2014 and we assumed that every young person takes a job related to her/his field of education.

## 5.4 HORIZONTAL GENDER SEGREGATION IN HIGHER EDUCATION – STEM APPLICATIONS

KOEN DECLERCQ & JÚLIA VARGA

Despite the significant increase in the participation of women in higher education as presented in chapter 5.1, horizontal gender segregation is still considerable. STEM (Science, Technology, Engineering and Mathematics) study fields are chosen by a much smaller proportion of women than men. This not only negatively influences labour market opportunities of women, but also the labour supply of STEM graduates.

The reasons for horizontal gender segregation have been broadly studied in the literature. One strand of the literature tried to explain this phenomenon by the gender skill gaps in test scores in mathematics (*Ceci et al.* 2009, *Ceci-Williams*, 2010, *Halpern et al.* 2007, *Hyde et al.* 2008, *Turner-Bowen*, 1999, *Wai et al.* 2010). However, most of this research concluded that the gender gap in test scores in mathematics has significantly decreased over recent decades and therefore, nowadays gender performance gaps explain the horizontal gender segregation only to a smaller extent (*Hyde et al.* 2008, *Spelke*, 2005, *Goldin et al.* 2006).

Other research found that labour market expectations of men and women differ from each other and can partly explain the different decisions in higher education (see for example *Montmarquette et al.* 2002, *Varga*, 2006, *Boudarbat*, 2008, *Arcidiacono et al.* 2012). These studies found that women are less responsive to expected earnings when making their choices in higher education. This is another reason why women are less likely to choose the STEM-fields than men. According to *Zafar* (2013), future wage expectations explain only a small part of the gender gap in STEM fields. Gender differences in preferences are the most important explanation. Other studies arrived at the same conclusion (*Turner-Bowen*, 1999, *Kahn-Ginter*, 2017). More recent studies show that horizontal segregation in higher education – in addition to the differences in preferences – also has its roots in gender differences in risk aversion (*Bertrand*, 2011, *Croson-Gneezy*, 2009, *Eckel-Grossman*, 2008, *Gneezy et al.* 2003) and in the propensity to participate in competitions as well as in self-confidence (*Reuben et al.* 2014). These studies found that women are more risk-averse and are less self-confident. This could also explain the choices of different fields of study as women are less likely to apply to highly competitive fields.

In connection with the explanations based on the differences in preferences, the question occurs whether preferences are constant or if they change over



time. This chapter studies whether a change in admission chances influences application decisions to STEM programmes and whether the effects differ by gender. The analysis is based on the impact evaluation of the education reform of 2012.<sup>1</sup> In 2012 a sudden and considerable reduction took place both in the number of public-financed university places and in university places in general. The study fields were not equally affected by this decrease. The reform implied a proportionally larger decrease in the number of non-STEM places, which led to an increase in the relative admission chances to the public-financed STEM programmes. The impact of this modification is analysed below.

The analysis is based on two administrative databases which are linked at individual level, namely the 2011 and 2012 waves of the whole sample of the Secondary School Graduation Database of the Educational Agency and the whole sample of the Higher Education Application Database of the Higher Education Application Agency. The linked data observe which secondary school graduates applied for higher education studies in the given year. The data also observe the graduation results of all graduates, the type of their secondary school, the type of the settlement where it is located and the date of birth of the graduate. The data was only used for the students who graduated in the year of the higher education application i.e. in 2011 or in 2012. The analysis does not consider individuals who applied to state-accredited higher vocational education. The sample was limited to students who applied for an initial (BA) or a so-called an undivided program. The higher education application database contains information on all applications including the applicant's number, institution, programme, the type of the financing, the level of the training type and, if the applicant was admitted to the given training programme. Furthermore, the data also include detailed information on the applicant's 'test scores' (achievements in the secondary school and the results of the secondary school graduation exam), additional scores for disadvantaged applicants or applicants who had taken a language exam before.

*Table 5.4.1* presents the applications of 2011 and 2012, before and after the policy reform. According to the descriptive statistics, it seems that women reacted more strongly to the changes. The share of higher education applicants decreased for both men and women, but the decrease was more outspoken for women. In 2011, one-fourth of the male graduates applied to a STEM programme as the first selected option while this proportion was only 7.1 percent among women. STEM applicants of both genders chose almost exclusively public-financed training programmes. In 2012 the proportion of men applying to STEM training programmes as a first option did not change while the proportion of women increased by 1 percent. The share of men who applied for STEM training programmes as a final option decreased by 0.6 percent while the proportion of women increased by 0.5 percent.

<sup>1</sup> Detailed analysis see at [CERS HAS](#).

**Table 5.4.1: Application decision in higher education ranking. The share of higher education applicants compared to the total number of secondary school graduates in the given year by gender, 2011–2012**

	Men			Women		
	Public-financed	Self-financed	Total	Public-financed	Self-financed	Total
<b>A) First ranked option, 2011</b>						
STEM	25.1	0.1	25.2	7.1	0.0	7.1
Non-STEM	27.6	1.6	29.2	52.8	1.9	54.7
Total	52.7	1.7	54.4	60.0	1.9	61.8
<b>B) Last ranked option, 2012</b>						
STEM	24.8	0.4	25.2	8.1	0.1	8.2
Non-STEM	18.3	6.3	24.6	36.5	10.1	46.6
Total	43.1	6.7	49.8	44.6	10.2	54.8
<b>C) First ranked option, 2011</b>						
STEM	23.9	2.8	26.8	8.6	0.7	9.2
Non-STEM	19.3	8.4	27.7	40.3	12.3	52.6
Total	43.2	11.2	54.4	48.9	13.0	61.8
<b>D) Last ranked option, 2012</b>						
STEM	19.1	7.2	26.2	7.7	2.0	9.7
Non-STEM	11.0	12.5	23.6	24.2	20.9	45.1
Total	30.1	19.7	49.8	31.9	22.9	54.8

Table 5.4.2 presents the results of the simple models that evaluate how the reform affected application decisions: (1) the decision to apply to higher education, (2) the number of applications, (3) the decision to rank a STEM programme first, (4) the decision to rank a STEM programme last, (5) the decision to rank at least one STEM programme, (6) the total number of STEM programs, (7) the decision to rank a self-financed programme first, (8) the decision to rank a self-funded program last, (9) the decision to rank at least one self-financed study programme and (10) the total number of self-financed options ranked. Models (2) and (6) are simple OLS regressions and the further ones are logit models.<sup>2</sup>

The results of model (1) show that women are more likely to apply to higher education. The reforms of 2012 caused a decrease in the number of students applying to higher education and especially discouraged participation of women.

The following regressions show that after the reform, more men applied to STEM programmes both as their first and final selections and that men submitted a higher number of such applications than women. However, there was no significant difference between men and women regarding the change in the probability of applying to at least one STEM programme. Men responded to the modifications of 2012 rather by increasing their STEM applications while women were more likely to apply to self-financed programmes after 2012 which – as the admission chances to the self-financed programmes are higher – seems to be a less risky strategy.<sup>3</sup>

<sup>2</sup> The table only contains estimation results of the *gender* variable, the dummy variable of *the year of the reform* (i.e. 2012) and the *interaction* of these the two variables.

<sup>3</sup> The student considers if it is reasonable to invest time in the preparation for the admission exam. An important element of this consideration is the probability of admission. The lower the probability for the admission the riskier is the time invested into the preparation.

Table 5.4.2: Higher education applications – the impact of the reform

	(1) Applies	(2) Number of total applications	(3) STEM ranked first	(4) STEM ranked last
Women	0.080* (0.004)	0.096* (0.014)	-0.299* (0.005)	-0.305* (0.005)
D <sub>2012</sub>	-0.047* (0.004)	0.272* (0.015)	0.018* (0.004)	0.016* (0.004)
Women × D <sub>2012</sub>	-0.049* (0.006)	-0.111* (0.020)	-0.005 (0.006)	-0.005 (0.006)
	(5) At least one STEM application	(6) STEM applications in total	(7) Application to self-financed programme as first selection	(8) Application to self-financed programme as final selection
Women	-0.339* (0.005)	-0.912* (0.013)	0.003 (0.003)	0.012* (0.005)
D <sub>2012</sub>	0.014* (0.005)	0.302* (0.017)	0.105* (0.003)	0.200* (0.005)
Women × D <sub>2012</sub>	0.004 (0.007)	-0.239* (0.020)	0.026* (0.004)	0.017* (0.006)
	(9) Applies for at least one self-financed programme	(10) Number of applications for self-financed programmes		
Women	0.022* (0.005)	0.049 (0.010)		
D <sub>2012</sub>	0.245* (0.005)	0.660* (0.013)		
Women × D <sub>2012</sub>	0.028* (0.007)	0.114* (0.017)		

Note: The decision to apply to higher education was estimated on the whole sample of secondary school graduates in 2011 and 2012. Control variables are age, results of the secondary school graduation exam, and regional fixed effects. The other models were estimated on the subsample of secondary school graduates who applied for higher education. The control variables in these estimations – in addition to the former ones – were an indicator for low socio-economic status and the type of the secondary school of the applicant.

\* Significant at 5 percent.

A structural model was estimated to measure the extent to which secondary school graduates consider admission probabilities when making their application decisions. The model allows for gender differences in preferences for the different fields of study and gender differences in responsiveness to expected admission probabilities. (For the description of the model see *Annex 5.4*). The estimation process consisted of two steps. First, based on the data of 2011, the probability of admission to the first ranked programme was estimated with a binary logit regression. Next, the probability that a high school graduate chooses a particular study program at a specific institution was estimated with a conditional logit model.<sup>4</sup> *Table 5.4.3* presents the results of the conditional logit model and shows significant gender differences in the choice

<sup>4</sup> The estimation results on the first step are not published here, for the results see at [CERS HAS](#).

between the several study fields. First, women are less likely to apply for technology and ICT than men, but there is no gender difference in the choice for natural science programmes. This means that it is not the case in all STEM fields that women are less likely to choose them. Next, the estimation results show that women are more responsive to admission probabilities when making their choices in higher education. This can be related to the findings of previous studies that women are more risk-averse in their choices than men.

**Table 5.4.3: Application decisions of first ranked options**

	Economics, Business	Technology, ICT	Teacher training	Health	Natural Science	Agricultural
Constant	-7.442* (0.085)	-8.591* (0.099)	-5.124* (0.129)	-8.329* (0.141)	-7.925* (0.173)	-7.220* (0.148)
Male	-0.719* (0.043)	1.593* (0.058)	-2.707* (0.140)	-1.185* (0.068)	0.227* (0.084)	0.149* (0.072)
+19 years	0.076 (0.041)	-0.209* (0.045)	-0.101 (0.073)	-0.356* (0.065)	-0.482* (0.085)	-0.083 (0.074)
Mathematics	4.123* (0.111)	5.413* (0.126)	0.503* (0.199)	3.270* (0.152)	3.545* (0.192)	2.267* (0.186)
Hungarian language	2.181* (0.137)	1.224* (0.139)	1.444* (0.241)	2.921* (0.215)	1.330* (0.246)	1.338* (0.238)
History	1.718* (0.150)	0.570* (0.154)	0.913* (0.256)	2.663* (0.229)	2.120* (0.281)	2.028* (0.263)
Budapest	-0.805* (0.044)	-1.080* (0.047)	-0.689* (0.081)	-0.613* (0.067)	-0.841* (0.084)	-1.152* (0.082)
Self	-0.838* (0.172)	-3.074* (0.257)	-2.881* (0.300)	-2.007* (0.303)	-4.026* (1.013)	-2.370* (0.281)
	Legal, admin- istrative	Arts	Humanities and Social Sciences	Self-financed programme	Probability of admission	Distance from the institution
Constant	-7.283* (0.125)	-6.426* (0.108)	-7.551* (0.092)	-	1.756* (0.065)	-0.015* (0.000)
Male	0.057 (0.055)	-0.121* (0.056)	-0.853* (0.046)	0.519* (0.098)	-0.673* (0.085)	0.000 (0.000)
+19 years	-0.084 (0.058)	-0.121* (0.057)	0.077* (0.043)	0.179* (0.085)	-	-
Mathematics	1.000* (0.146)	1.055* (0.151)	0.453* (0.148)	-1.708* (0.239)	-	-
Hungarian language	5.053* (0.200)	2.229* (0.182)	4.553* (0.148)	-2.967* (0.276)	-	-
History	1.371* (0.208)	1.408* (0.197)	1.922* (0.156)	-1.456* (0.301)	-	-
Budapest	-1.279* (0.062)	-0.304* (0.056)	-0.572* (0.046)	0.968* (0.082)	-	-
Self	-0.148 (0.185)	-2.530* (0.222)	-1.277* (0.182)	-		

Note: Robust standard errors in parentheses; \*  $p < 0.05$ . The probability of ranking an option first is estimated with a conditional logit model. The model is estimated on the sample of all high school graduates of 2011. Results must be interpreted relative to the base category of not applying to higher education.

Finally, we used the model to study the possible impact of an alternative admission policy in higher education. We simulated an open access policy in STEM programmes. This hypothetical policy allows all high school graduates, irrespective of high school background, to start at all STEM options in higher education. This hypothetical policy stimulates enrolment in STEM programs without discouraging students to apply to other programs. *Table 5.4.4* compares the outcomes of this simulation with the status quo of 2011.

**Table 5.4.4: The simulated impact of the alternative higher education policy.  
Counterfactual analysis: the impact of open access to STEM programs**

	Status quo in 2011			Counterfactual policy		
	state-financed	self-financed	total	state-financed	self-financed	total
<b>Men</b>						
STEM	25.1	0.1	25.2	37.4	0.0	37.4
Non-STEM	27.6	1.6	29.2	23.0	1.3	24.2
Total	52.7	1.7	54.4	60.3	1.3	61.6
<b>Women</b>						
STEM	7.1	0.0	7.1	16.6	0.0	16.6
Non-STEM	52.9	1.9	54.7	47.4	1.7	49.0
Total	60.0	1.9	61.9	64.0	1.7	65.7

Note: Predicted outcomes are expressed as percentages of 2011 high school graduates.

Outcomes of the counterfactual policy are expressed as percentage point changes relative to the status quo.

Under the counterfactual scenario of an open access policy in subsidized STEM programs, more men and women would apply to higher education. More men and women would apply to STEM programs and fewer high school graduates would apply to non-STEM programs. While the relative increase in applications to STEM programs is larger for women, the increase in the total number of students applying to STEM programs is larger for men.

Our analysis shows that changes in admission standards can encourage students to apply to STEM programmes. At the same time, we show that secondary school graduates do not perceive all higher education programmes as close substitutes. A certain proportion of students – and especially women – even desist from applying to higher education if the chance of admission and therefore the utility of applying decreases for their preferred programmes. The analysis also revealed that men and women not only differ in their preferences for STEM fields, but women are also more responsive to admission probabilities when making their application decisions. The results also showed that there are no gender differences in the probability of applying to certain fields within STEM – namely natural sciences – if we control for the results in mathematics and other characteristics of our model. However, in order to identify the reasons for the considerable gender difference in the technological and IT fields further research is needed.

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## 5.4 Annex

A student  $i$  applies to a study program  $j \in J$  at an institution  $k \in K$  to maximize the utility of studying. The utility of applying to a specific study option is given by

$$U_{ijk}(X_i, \lambda_{ijk}, d_{ik}) = \alpha_0^i + \alpha_1^i X_i + \alpha_2^i \lambda_{ijk} + \alpha_3^i \lambda_{ijk} X_i + \alpha_4^i d_{ik} + \alpha_5^i d_{ik} X_i + \varepsilon_{ijk}$$

$$U_{ijk}(X_i, \lambda_{ijk}, d_{ik}) = V_{ijk}(X_i, \lambda_{ijk}, d_{ik}) + \varepsilon_{ijk} ,$$

with  $V_{ijk}(X_i, \lambda_{ijk}, d_{ik})$  the deterministic part of utility. Utility depends on an alternative specific constant  $\alpha_0^i$ , and personal characteristics such as gender and high school background  $X_i$ . Utility also depends on the admission probability  $\lambda_{ijk}$ . Students obtain a higher utility from programs for which they have a high-

er probability of being admitted. We interact this probability with gender to assess whether women are more responsive to admission probabilities when making their application decisions. Admission probabilities differ between programs but also between institutions. Given that students must pay a fee for each study program they rank after their third option, students might strategically apply to a less popular institution for which they have higher admission probabilities. Previous literature shows that travel distance is an important factor of participation in higher education and the decisions where and what to study. Students prefer study options located in their neighborhood. We therefore include the travel distance  $d_{ik}$  between the location of the high school of the student and the institution as a determinant of utility. Finally, utility depends on an unobserved preference shock  $\varepsilon_{ijk}$ , which is iid type 1 extreme value distributed. The probability that student  $i$  chooses for study program  $j$  at institution  $k$  is then given by the logit formula

$$P_{ijk} = \frac{\exp V_{ijk}(X_i, \lambda_{ijk}, d_{ik})}{\sum_{j' \in j, k' \in k} \exp(V_{ij'k'}(X_i, \lambda_{ij'k'}, d_{ik'}))}.$$

In the model, students consider the probability of being admitted when applying to higher education. The probability that student  $i$  is admitted to study program  $j$  at institution  $k$  is given by

$$\lambda_{ijk}(M_i, cap_{jk}) = \beta_0^j + \beta_1^j M_i + \beta_2^j cap_{jk} + \eta_{ijk},$$

and depends on a program alternative specific constant  $\beta_0^j$ , a vector of matriculation exam scores  $M_i$ , and a measure of the capacity of program  $j$  at institution  $k$ :  $cap_{jk}$ . Capacity of the program is defined as the ratio of admitted students relative to the total applicants in the study option. The capacity of the program serves as an exclusion restriction. Capacity influences the utility of applying to an option only indirectly through the effect on the admission probability. We assume that there is no direct effect of capacity on the utility of applying to specific options. Finally, the admission probability depends on an iid type 1 extreme value distributed error term  $\eta_{ijk}$ .



## 6 HUMAN CAPITAL, PART III

### THE ROLE OF NON-COGNITIVE SKILLS

#### 6.1 THE IMPACT OF THE INCREASING SIGNIFICANCE OF NON-COGNITIVE SKILLS ON THE LABOUR MARKET SITUATION OF WOMEN

KÁROLY FAZEKAS

The labour market situation of women has improved in most countries of the world over recent decades: their enrolment ratio has increased and a higher share have entered upper-secondary and higher education. The proportion of entrants to the labour market with upper-secondary or higher education qualifications has increased, the likelihood of their employment in jobs requiring a higher education qualification has grown significantly and the gender wage gap has narrowed (*Autor–Wasserman, 2013, Deming, 2017, Cortes et al. 2018*). However, the likelihood of women becoming managers or entrepreneurs has not changed and the gender wage gap at the higher end of the wage distribution is still very large (*Cortes et al. 2018, Collischon, 2018*).

Improvements in the labour market situation of women are accompanied by the relative deterioration in the situation of men. In the labour market of the United States, the educational attainment, employment probability and real wages of men at around the median of the wage distribution have also worsened in absolute terms over recent decades. This trend is so conspicuous that not only research articles discuss it (*Jacob, 2002, Lai, 2010, Cortes et al. 2018*), but numerous popular books, essays and blogposts analyse the reasons for boys' and men's failures at school, in the families and at workplaces as well as how the trend is related to technological development and demographic, social and political trends (*Zimbardo, 2015, Farrel–Gray, 2018, Peterson, 2018, Smialek, 2018, Gross, 2018*). This shift took place in a period when the returns on *non-cognitive skills* increased considerably in the labour market (*Borghans et al. 2008, Deming, 2017, Deming–Kahn, 2017, Edin et al. 2017*). Its reasons and consequences were explored in one of the *In Focus* chapters of last year's *Hungarian Labour Market* (Fazekas, 2018. p. 149.). Based on relevant literature, this Subchapter presents how the increasing importance of non-cognitive skills has been related to changes in the labour market situation of women.

Empirical research in economics on the characteristics of, and reasons for, gender-related differences in the labour market mainly focuses on the effects of human capital. It is problematic that the usual variables of the discipline (educational attainment, school marks and the results of cognitive skills tests)

do not explain a substantial part of the differences. Therefore new research that covers previously not included fields such as non-cognitive skills, cultural contexts or preferences for social roles (Grove *et al.* 2011, Lundberg, 2017) is of great significance. Analyses on the impacts of human capital have usually differentiated between the cognitive and non-cognitive skills of employees in recent years (Heckman *et al.* 2006, Borghans *et al.* 2008). Cognitive skills enable us to understand the information flooding us from the moment of birth and to process it in the course of learning (for example writing skills, reading comprehension, numeracy and intellectual capacity). Non-cognitive skills, on the other hand, ensure that one is motivated to accomplish learning or work-related tasks, give self-confidence to take risks, encourage one to compete and enable oneself to trust others when undertaking tasks in efficient cooperation with other people.

It is certainly a welcome trend to include new, previously neglected areas in economic narratives. However, it is crucial for economic analysis to integrate the newly included factors in a uniformly interpreted, coherent conceptual framework and to be able to measure their qualities in a uniformly interpreted, standardised way (Zhou, 2016).

The gender differences in non-cognitive skills and their impact on education, the labour market and career success have a huge psychological, sociological and economic literature (Autor *et al.* 2016, Rosen *et al.* 2010). Relevant research generally suggests that there are significant differences in the majority of non-cognitive skills between boys and girls (usually to the advantage of girls) already in early childhood and this gap has a considerable impact on the school success and failures of boys and girls (Jacob, 2002, Feingold, 1994, Baron-Cohen *et al.* 2005, Koenig *et al.* 2011).

It is a particularly important finding that the differences seen in kindergarten and primary school age children tend to increase over the years (DiPrete–Jennings, 2012). As early as in primary school, girls are found to be more disciplined, able to focus more on learning tasks and more motivated to achieve better learning outcomes (Frenette–Zeman, 2007). However, this mainly results in better school grades rather than better test results. This difference directed the attention of researchers towards the role of teachers marking children's work. Presumably, teachers also take the *quality of non-cognitive skills* into account when marking the *quality of cognitive skills* of individual children. Researchers think this explains why school marks predict further education rates, the probability of dropping out and even labour market success or failure following graduation as well as individual social characteristics more precisely than school test results measuring only cognitive skills (Cornwell *et al.* 2011, Martins 2017). At the same time, several empirical studies show that boys tend to have greater self-confidence, be more inclined to take risks and perform better in a highly competitive environment (Altonji–Blank, 1999).

These differences partly explain why there is a higher proportion of men than women in management positions (*Niederle–Vesterlund*, 2007, *Harrington* 2017, *Koenig et al.* 2011).

According to the relevant literature, the gender gap in non-cognitive skills in early childhood partly has evolutionary causes (*Baron-Cohen et al.* 2005), and is partly the result of parental, familial and community upbringing and early cultural impacts. Parents and individuals in the residential environment of the family convey, from infancy onwards, expectations about the gender roles accepted in the given culture. This also means that parents and the school set differing expectations for boys and girls and try to develop their various non-cognitive skills to a different degree.

The increasing importance of non-cognitive skills has had substantially different impacts on the labour market situation of women and men over recent years (*Deming*, 2017, *Sheikh*, 2015). This trend is partly related to the nature of technological development. As a result of the spread of computer-controlled, automated and, more recently, artificial intelligence governed production and service systems, the share of routine tasks requiring low qualification, physical strength and dexterity as well as the share of analytical tasks requiring high qualification and advanced cognitive skills declined, while the share of tasks requiring emotional intelligence and non-cognitive skills increased. Available data indicate that women and men adapted to these changes to a very different degree. From 1981 to 2015, the number of female employees performing routine tasks decreased from nearly 60 per cent to below 35 per cent, the number of those performing non-routine, analytical tasks stagnated, while the proportion of women performing tasks requiring social skills increased from 48 per cent to over 65 per cent in the United States (*Seikh*, 2015). It is not only that the number of jobs in the labour market requiring social skills is increasing but the proportion of women in these jobs is also growing.

The emergence of non-cognitive skills highly depends on cultural conditioning and gender stereotypes, which affect the development of skills and in this way educational attainment, employment and the gender wage gap. A good example is the number of women employed in jobs requiring science, technology, engineering and mathematics (STEM) skills and knowledge of mathematics and natural sciences. *Deming* (2017) calculated that the share of tasks requiring *both* good social skills and good cognitive skills such as mathematics and science competences has increased most in recent years in the labour market of the United States. At the same time, school test results showed that girls' STEM skills are worse and girls get worse grades in STEM subjects than boys. However, research suggests that these differences are not due to biological attributes but due to educational and cultural impacts faced from early childhood onwards. In a sufficiently encouraging environment, the STEM results of girls are not at all worse than those of boys. Improving female

employability and increasing wages in STEM jobs encourage an increasing proportion of girls already at school to improve their STEM skills.

The changing labour market position of women is not simply a result of technological changes with a varying impact on skills. This change is an extremely complex, multifactorial process, with largely social and demographic reasons. Because of the increasing proportion of services, including the share of those working in human, healthcare and geriatric services, the share of tasks requiring empathy and advanced emotional intelligence also increases. Since such skills of women are generally better than those of men, they are able to perform these tasks more easily and successfully.

Numerous empirical analyses show that skill levels achieved in early childhood determine life events experienced in later life (*Cunha–Heckman*, 2008, *Cunha et al.* 2010). Empirical studies on the gender gap in non-cognitive skill levels measured in early childhood are mainly from developing countries (*Lavado et al.* 2014, *Nakajima et al.* 2016). Research undertaken in rural Indonesia indicates that girls are better than boys in cognitive and non-cognitive skills already in early childhood. Skill levels are affected by the quality indicators of the environment, participation in early childhood development programmes, the quality of early childhood education institutions and parenting methods. Research from both developed and developing countries suggests that girls have an advantage in non-cognitive skills as early as in kindergarten, and they retain this advantage throughout primary and lower-secondary education. It is very well illustrated by the results of the Early Development Instrument (EDI) used in Australia and Canada for measuring non-cognitive skills in early childhood. It reveals a particularly large difference in the cooperation skills, the willingness to follow norms and the emotional stability of children. (*Australian Government*, 2013, *Janus–Duku*, 2007).

In accordance with a recent social trend, the educational attainment of women exceeds that of men globally to an increasing extent and in an increasing number of social groups. In the sixties in the United States twice as many men than women graduated from university, while today the number of women obtaining a Bachelor (BA) degree exceeds that of men by 30 per cent. Several empirical studies showed that the participation rate of women in higher education is primarily explained by their better non-cognitive skills. This does not only mean that women with better non-cognitive skills achieved better test results at upper-secondary school and thus were able to enter universities in higher proportions. *Jacob* (2002), based on data from the turn of the millennium, found that the effect of non-cognitive skills remains significant even after controlling for upper-secondary school test results. This trend was also observed in Hungary in this period (*Székelyi et al.* 1998).

The characteristics of and the reasons for the gender wage gap are discussed in the Subchapter *In Focus 2.1*. It is well-known that men and women with

identical cognitive skills have very different patterns of occupational and workplace choices as well as wage levels. The gender wage gap at workplaces is usually explained by discrimination against women and the dissimilar occupational structure (*Cobb-Clarck*, 2011). If that is true, it is also likely that the dissimilar non-cognitive skills of men and women to some extent explain the gender wage gap through occupational choice. Relevant empirical research shows that it is actually so and the effect is significant although not very strong. Men and women with very similar non-cognitive skills choose very different occupations. Nevertheless, the lower relative wages of women in general are due not only to the differences of male and female occupational choices but also to the fact that women are paid less than men in the same occupation.

The results of relevant studies more or less consistently reveal that data controlled for age and qualification still show a 20 per cent wage advantage for men. These data clearly indicate that differences in non-cognitive skills have a considerable role in these differences. Overall, including non-cognitive skills in the analysis increases the explanatory power of the models that examine the reasons for the gender wage gap (*Fortin*, 2008, *Nikolaou*, 2012, *Yamaguchi*, 2012). The better non-cognitive skills of women indeed improve their wage situation. Nonetheless, half of the gender wage gap cannot be explained by either cognitive or non-cognitive skills (*Brenzel-Laible*, 2016).

A major part of the wage gap is obviously attributable not to the wages characteristic of the occupation concerned but to the position held in the management hierarchy of a given firm (*Collischon*, 2018). The fact that women with the same cognitive skills as men are considerably less likely to become managers is often called the 'glass ceiling' in relevant literature. The phenomenon is partly explained by the differences in non-cognitive skills: women tend to take less risks and have lower self-esteem and self-confidence. (*Harrington*, 2017, *Chen et al.* 2017.) However, this relationship strongly depends on the cultural context in which the skill gap is seen in the labour market, for example, what skill differences between men and women decision-makers recruiting managers assume in spite of these skill differences existing or not in a particular case.

Research on the differences in the non-cognitive skills of women and men holding management positions suggests that these differences have a significant impact on the probability of becoming a manager. *Barrett-Staneva* (2017) reports that extroverted men are more likely to become chief executive officers than extroverted women. *Harrington* (2017) analyses the impact of four groups of non-cognitive skills (non-cognitive personality traits, self-confidence, self-esteem and willingness to take risks) on the probability of becoming a manager. Findings show that assertiveness, self-confidence and high-risk tolerance significantly but not strongly affect the probability of becoming a manager.

It is well-known that women are considerably underrepresented among entrepreneurs. According to the relevant literature, this has strong cultural reasons in different societies. In developed countries, the differences in the non-cognitive skills of women undoubtedly have an important role in their underrepresentation. *Koellinger et al.* (2013), in their study covering 17 countries, found that this is not because of differences in the survival rate of companies run by men and women but because of the difference in entrepreneurship between men and women. The reason for this principally lies in the lower self-confidence and risk taking of women (*Segal*, 2014).

The gender gap in non-cognitive skills emerging in early childhood has a strong impact on the enrolment ratio, the dropout rates in upper-secondary education and the chances of entering higher education. (*Cunha–Heckman*, 2008, *Cunha et al.* 2010, *Cornwell et al.* 2011, *DiPrete–Jennings*, 2012). Experience shows that the cognitive skills of children can be developed more in early childhood, while socio-emotional skills can also be developed at later stages (*Cunha–Heckman*, 2008, *Almlund et al.* 2011, *Kautz et al.* 2014).

The increasing importance of non-cognitive skills transforms the labour market positions of men and women, it undoubtedly improves the employment opportunities of women and reduces the gender wage gap. However, this trend is strongly context dependent and cannot be examined separately from the cultural attributes of society. Improvement in the labour market positions of men and women ultimately depends whether society is aware of the transformation of skills necessary for the development of the economy induced by the technological revolution and to what extent it is able to develop these from the moment of birth, throughout life, in accordance with individual personality traits and gender-related attributes.

Considering the increasing significance of non-cognitive skills and the considerable lagging behind of men in these skills, it is important that adult education programmes take these characteristics into account and that the development of non-cognitive skills receives more focus in the curricula, teacher evaluation and initial teacher education.

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### K6.1 Gender differences in the stability of personality traits over time

JÁNOS KISS HUBERT & ÁGNES SZABÓ-MORVAI

Non-cognitive skills include many characteristics and personality traits, for example the notion of the locus of control (Rotter, 1966). According to this, those who believe life's outcomes are due to their own efforts have an internal locus of control, while those with an external locus of control think that the results of events do not depend on their own actions but on external factors (chance, luck or other people).<sup>1</sup> Persons with an internal locus of control – *ceteris paribus* – tend to achieve better school performance and are more likely to continue their studies (see Piatek–Pinger, 2016). Concerning the stability of the locus of control, Cobb–Clark–Schurer (2013) found that the locus of control did not or only minimally changed within a timeframe of 1–4 years in most people, and it is mainly young people and the elderly who tend to change substantially in this respect. Further findings show that positive life events (marriage, promotion) do not have a significant effect on the locus of control; however, very many negative life events (at least nine within four years) such as illness or unemployment will push the person towards an external locus of control.

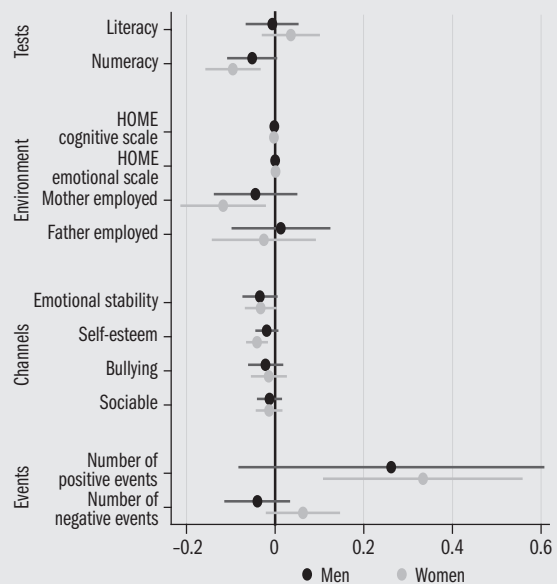
Relying on the Hungarian Life Course Survey launched in 2006, it is possible to give a detailed assessment of the situation in Hungary. The database containing 10 thousand cases provides information on family background in addition to school performance. Participants of the survey also completed a test on locus of control in 2006 and 2009.<sup>2</sup> The present study explores how stable the locus of control is and what determines changes to it.

We found that, considering the whole sample, correlation (0.179) between the values for the locus

of control measured at the two dates is lower than in the abovementioned Australian sample (0.533 across quarters), which is not surprising, since that study involved the total population, while the Hungarian survey only involved teenagers, whose personality traits have not yet fully evolved. The correlation is stronger in the case of girls: the value of the locus of control changes less in their case, while among boys it changes more considerably (in line with their later maturation) and their internal control increased in the period examined.

Regression analysis has been performed to assess what the locus of control is associated with – the results are presented in Figure K6.1.1.

Figure K6.1.1: Association between changes in the locus of control and individual characteristics and life events



Note: The HOME Inventory measures the extent of stimulation provided by the home environment. Items of the HOME cognitive scale include the number of books owned, newspaper subscriptions, extra-curricular activities, visits to museums and the cleanliness of rooms. The HOME emotional scale includes items such as whether the child tidies up, meets relatives, eats together with his or her parents or whether

1 When presenting the definition of the locus of control and its labour market related impact, we rely on the excellent synthesis study of Cobb–Clark (2015).

2 The locus of control index ranges between 0–4: the lower the value, the more internal control is characteristic of the given individual. Therefore change in the locus of control ranges from –4 to +4, with the negative (positive) change indicating that the person shifted in the direction of internal (external) control.

the mother showed positive feelings when talking to the child during the interview (Bradley *et al.* 2000).

As opposed to girls, change in the locus of control among boys is not associated with individual characteristics and life events. Girls with better results in the mathematics tasks of the National Assessment of Basic Competences in 2006 tended to shift towards internal control. This is consistent with the finding that internal control and good school performance are closely linked. The internal control of girls also increased if their mothers had a job. Increased emotional stability and self-esteem were associated with internal control, this coincided with

the expected impact. This finding is consistent with the hypothesis that children whose parents ensure a stable emotional background, peaceful environment and stress-free life are more likely to have internal control (see Carton–Nowicki, 1994, Skinner *et al.* 1998 or Stephens–Delys, 1973). When examining life events, negative life events were not found to be associated with changes in the locus of control, but positive life events increased external control for girls.<sup>3</sup>

<sup>3</sup> Cobb-Clark–Schurer (2013) report that certain positive life events reduce internal control.

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## 6.2 GENDER DIFFERENCES IN PREFERENCES IN THE LITERATURE

LUCA FLÓRA DRUCKER, DÁNIEL HORN & HUBERT JÁNOS KISS

The innate and learned characteristics of women and men may profoundly determine their educational and labour market choices. This chapter focuses on gender differences in a group of non-cognitive skills:<sup>1</sup> risk preferences, competitive preferences, and social preferences.<sup>2</sup> These preferences may have an impact on labour market performance. For example, risk-averse individuals are more likely to choose professions with secure pay, while more competitive individuals tend to perform better in professions where they are under daily pressure. The chapter strongly relies on relevant summary papers of *Bertrand* (2011), *Croson–Gneezy* (2009), and *Niederle* (2015).

### Risk preferences

Risk aversion is measured by experiments involving various tasks in economics. One of the most famous lab experiments was conducted by *Holt–Laury* (2002). In this experiment, participants had to choose between two options (*A* and *B*). In option *A*, participants had a chance to win 2 dollars with probability  $p$ , and 1.6 dollars with probability  $1 - p$ . In option *B*, the probabilities were the same but the amounts were 3.85 dollars and 0.1 dollars. Participants made ten consecutive choices between *A* and *B*, across which the probability ( $p$ ) changed from 0.1 to 1, in 0.1 increments. Obviously, when  $p = 1$ , option *B* is more attractive, as one will surely get 3.85 dollars instead of 2 dollars. However, when  $p = 0.1$ , the expected value of *A* is 1.17 dollars higher than that of *B*, therefore participants will be more likely to choose *A*. The question is, when does a person switch between *A* and *B*. The switching point is regarded as the measure of risk-taking. Risk-lovers tend to prefer higher rewards (3.58 dollars) already at low values of  $p$ , while risk-averse people switch only when there is a fairly high probability of winning the larger reward. There are other types of tasks, as well. For example, *Eckel–Grossman* (2002) alter rewards instead of probabilities in the consecutive choices, while several other studies rely on the investment game introduced by *Gneezy–Potters* (1997), or the bomb risk elicitation task invented by *Crosetto–Filippin* (2013).

Most papers either find that women are more risk-averse or do not find gender differences in risk preferences. *Holt–Laury* (2002) report that women are slightly more risk-averse over small stakes (with no significant difference with larger stakes), while *Eckel–Grossman* (2002) find that women are considerably more risk-averse. *Charness–Gneezy* (2012) review studies using the investment game of *Gneezy–Potters* (1997) and report that in most studies (14 out of 15)

1 The stability of non-cognitive skills over time is discussed in Subchapter 6.1 and Box K6.1.

2 One of the most researched preferences is time preference; however, gender differences in this preference do not receive much attention in the literature, therefore we did not include it in this paper (for example *Dittrich–Leipold* [2014] found men less patient but *Wang et al.* [2016] did not find gender differences).

women are more risk-averse than men. However, *Crosetto–Filippin* (2016) do not find gender differences when using the bomb risk elicitation task.

The results obviously raise the question whether it is possible to assess attitudes to risk in a simple experiment or risk preferences are more complex. This is the idea behind domain-specific risk-taking. *Weber et al.* (2002) evaluate risk-taking in five domains (ethics, finances, health/ safety, social relations, recreation) by voluntarily completed questionnaires. The findings indicate that the magnitude of risk-taking does depend on the domain. The findings are consistent with *Dohmen et al.* (2011), who find that women are more risk-averse than men in all domains.

Overall, the majority of surveys and studies suggest that women are more risk-averse. However, we agree with *Niederle's* (2015) warning that the size of gender differences (if one finds any) in risk preferences depends on the way of measuring them, and that these differences are mostly small, even if statistically significant. The results of the experiments and surveys show that risk taking is a complex matter and is impossible to evaluate it with a single indicator, therefore we must give due consideration to whether the indicator used in a given study is generalizable.

As for the labour market consequences, *Bonin et al.* (2007), using German data, find that more risk-averse individuals tend to choose a profession with a more stable pay. Additionally, *Dohmen–Falk* (2011) reveal that more risk-tolerant people are more likely to choose a job with a performance-based pay, and women are less willing to work for a flexible pay. The results of *Le et al.* (2011), relying on Australian data, are also consistent with the above: women are more risk-averse than men. The authors also report that higher risk tolerance is associated with higher pay and therefore the gender difference in risk preferences contribute to the gender pay gap. This effect is not significant, and it explains a maximum of 3 per cent of the pay gap.

### Competitiveness

Psychology literature generally accepts the observation that boys spend more time playing games involving competition, while girls tend to prefer games without winners and losers. They also find that boys are more likely to consider themselves competitive than girls (*Campbell*, 2013). As several important and highly paid professions have a competitive environment, it is not surprising that women are underrepresented in them. Experimental economics has provided numerous useful insights over the past 15 years into what is behind gender differences in attitudes towards competition.

The first experiment about competition was conducted by *Gneezy et al.* (2003). At one of the most prestigious technical universities of Israel (where there is strong competition for admission), students faced a computer-based task: they had to solve as many mazes as possible in fifteen minutes. When in

the first round students got a reward for each solved maze (piece-rate pay), there was no significant difference between the performance of boys and girls. In the next round there was a competition-based pay scheme. There were three boys and three girls in a group. Only the best-performing group member was rewarded, but the reward was six times as much as the piece-rate in the first round.<sup>3</sup> This time the performance of boys significantly improved compared to the round with piece-rate pay, while the performance of girls did not change. Thus boys performed considerably better than girls in a competitive environment.

However, there are two important differences between piece-rate pay and competitive pay. On the one hand, when competing, reward is partly dependent on the performance of others, on the other hand, reward is less secure compared to piece-rate pay – and, as mentioned before, women may be more risk averse. In the third round (random pay), based on the number of solved mazes, a randomly selected participant received a reward of similar size as in the competitive round, in order to eliminate the effect of risk aversion. In this way the insecurity of payment remained but there was no competition. Now, boys and girls performed similarly as in the piece-rate round. Therefore, the gender difference in average performance is probably due to attitudes towards competition.

The authors also explored whether gender composition of the groups has an impact on performance. They repeated the competitive round with same-gender groups. Boys performed equally well as in the earlier competition with mixed-gender groups. By contrast, the performance of girls significantly improved when they had to compete against girls. Several other studies reported similar findings (*Günther et al.* 2010, *Shurchkov*, 2012).

It should be noted though that boys usually only performed better in ‘boyish’ tasks when competing but in more ‘girlish’ tasks (such as reading comprehension) the studies did not find such differences. Moreover, *Cárdenas et al.* (2012) found that when the task was rope jumping, girls performed better when they had to compete. In conclusion, the performance of girls either does not improve or improves less than that of boys in a competitive situation.

*Niederle–Vesterlund* (2007) and later research revealed that women are more likely to avoid competition than men. For example, even though there is no difference between genders in the likelihood of successfully completing a task, girls tend to choose piece-rate pay instead of a potentially higher but competition-based pay.<sup>4</sup> This results in relative losses for girls, as they do not participate in competition, which could allow them to make greater profit.

Gender differences in preferences for competition already emerge in kindergarten (*Sutter, Glätzle–Rützler*, 2014). They persist throughout the entire career (*Mayr et al.* 2012), although they change with age and follow a reverse U-shaped curve. Social background also influences preferences for competition: the higher his or her socio-economic background, the more competitive one is. Nevertheless, while there is no difference in competitiveness between

<sup>3</sup> Different students participated in the different rounds, thus it is not the impact of competitive or non-competitive settings on an individual that results reveal, but how the performance of boys and girls changes in such cases on average.

<sup>4</sup> This statement remains true when risk preferences are also taken into account.



boys and girls of low socio-economic background, with high socioeconomic background, boys are more willing to compete than girls (*Bartling et al.* 2012).

In addition to identifying individual characteristics influencing competitiveness, it is also important to identify institutional changes that could reduce the gender gap in competitiveness. Large gender gap in competitiveness may result in a significant loss in social welfare if good-performing women do not dare to enter competition and therefore do not enrol in schools or enter occupations where their performance could realise. Since we saw that women are more willing to compete against women but less willing to compete against men, competition could be distorted in a way to promote women's interest in it. For example, if not only the best performance but also the best female performance was rewarded, women might be more inclined to compete. *Bala-foutas–Sutter* (2012) and *Niederle et al.* (2012) reported that these ideas actually work in experiments and more good-performer women are willing to engage in competition. Obviously, more research is needed into the topic.

Preferences for competition may significantly affect how one performs in education and at work. For example, they may have an impact on school admission results (*Ors et al.* 2013), on achievement in vocational competitions (*Iriberry–Rey–Biel*, 2018), or on study choices (*Buser et al.* 2014). Attitudes to competition also play a role in choosing a workplace. Relying on British and American data, *Manning–Saidi* (2010) and *Flory et al.* (2015) report that women are less likely to choose a competitive job. Also, according to *Reuben et al.* (2017), gender differences in competitiveness and self-confidence explain nearly four-fifth of gender differences in wage expectations.

In summary, the gender difference in preferences for competition is one of the most robust observations of experimental economics, and this difference partly explains later gender gaps in education and at work.

### Social preferences

The simplest definition of social preferences is that the utility of an individual does not only depend on her own payoff but also on the payoff of others. Thus, altruism, envy, attitudes towards inequality, and reciprocity may all be manifestations of social preferences. Women are usually considered to be more social (less selfish, more cooperative etc.), because there are significantly more women in occupations requiring cooperation with others (e.g. nursing and teaching). But is this really the case?

Researchers usually study social preferences with incentivized tasks. Redistributive preferences can be analysed most easily with dictator games. Here, one of the parties divides a sum of money between herself and the other party. Since the experiment is usually anonymous and participants do not know each other, absent social preferences (such as generosity) we expect the 'dictator' not to give anything to the other party. We can interpret the amount



allocated to the other party as the manifestation of altruism.<sup>5</sup> When only considering the amount of money given to the other party, there are no conclusive results on whether women are more generous (*Croson–Gneezy*, 2009, *Engel*, 2011, *Niederle*, 2015).

There is another classic game, called the ultimatum game, which is different from the dictator game in that here the other party is not passive. If the other party accepts the amount offered, the proposed allocation is realized, if she rejects, both parties leave empty-handed. The interpretation of the ultimatum game is not as straightforward as that of the dictator game. In the ultimatum game, the decision of the proposer is also defined by risk aversion in addition to altruism, since she wishes to avoid the other party rejecting her offer. Accordingly, there are mixed results concerning gender differences: sometimes women, sometimes men offer higher amounts.

Results vary similarly concerning the trust game, the third classic game, where the first party can send any fraction of a given amount to the second party. The sent amount increases (most often triples), and then the second party decides how much of this increased amount she sends back to the first party. *Croson–Gneezy* (2009) reported that women's decisions varied more in these experiments: apparently, they are more responsive to the details of the experiment than men.

Social preferences also include cooperation skills, which are typically assessed by the prisoners' dilemma game, or its generalisation, the public goods game, as well as by other social dilemma games. One of the most important characteristics of these games is that from the individual point of view, the dominant strategy is to be selfish, however, total payoff is maximised by unselfish behaviour. Studies usually conclude that there is no profound difference between genders in the amounts offered if the gender of the other party is unknown. In mixed pairs, women are more cooperative than men but when comparing single-sex male or female pairs, men cooperate more (*Balliet et al.* 2011).

Gender differences in bargaining and negotiation are also related to social preferences. Women tend to be less competitive during bargaining: they ask for less money and are less likely to engage in bargaining at all (*Säve–Söderbergh*, 2007, *Small et al.* 2007). *Bowles et al.* (2005) observe that women are better at bargaining when they do it for others than when they do it for themselves, while as for men there is no such difference. It may be because women are more caring with others than with themselves, or because they are afraid of the negative reactions they get if they stand up too strongly for themselves. *Bowles et al.* (2007) claim the latter is a real fear: the participants of the experiment tended to be more critical towards women fighting for higher wages.

In summary, although there are no significant gender differences in social preferences in lab experiments, there may be substantial differences in characteristics such as bargaining skills.

<sup>5</sup> *List* (2007) and *Bardsley* (2008) showed that minor changes to the experiment easily make participants less altruistic, therefore the generosity seen in the dictator game may be also due to the design of the experiment in addition to altruism.

## Conclusion

How important are gender differences in preferences? *Niederle* (2015) notes that she sees two camps of researchers studying gender differences. One of these camps emphasise the differences between the genders, while the other the similarities. Based on the findings we reported, the situation concerning preferences is not so simple: the given context defines whether one finds differences or similarities between the genders. Considering competition, studies largely agree that men are more competitive. As for risk preferences and social preferences, the situation is not that clear-cut. Women may be more risk-averse than men but it also depends on the domain, the situation, and the assessment method, while in the case of social preferences the picture is even less clear. It is important to note that although the advantage of lab experiments is that effects may be better separated, and in this way the presence of gender differences may be confirmed with more certainty, the statistically significant differences found in lab experiments are not necessarily significant in real life – their impact in everyday life may be negligible. Furthermore, it is well-researched that non-cognitive factors have a great impact in school, in the labour market and in other segments of life (for example *Borghans et al.* 2008, *Manning–Swaffield*, 2008); however, we have less information on how important are gender differences in preferences in differences in real-life outcomes.

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## K6.2 Gender differences in the use of cognitive skills at work

RITA PETŐ & BALÁZS REIZER

Gender pay gap decreased worldwide during recent decades mainly due to the increase of the average relative educational level of women compared to men and therefore women became segregated less and less into occupations with low skills and wage level (*Blau–Kahn, 2000*).

As a result of this process the gender pay gap *within* occupations is now larger than *between* occupations. *Black–Spitz–Oener (2010)* also demonstrated that the wage disadvantage of women mainly originates in the fact that women in the same occupation use their cognitive skills less than men. This is a surprising result as occupations are defined with detailed lists of tasks, which determines all tasks the employee should fulfil in the given occupation (*ISCO, 2008*). Thus, if the definition of occupations is exact, no systematic gender differences could exist in the use of skills within occupation.

In our related study (*Pető–Reizer, 2018*) we examined the possible reasons why the skills use of women at work lags behind. For this work, the survey called Programme for the International Assessment of Adult Competencies (PIAAC)<sup>1</sup> was used. The survey asked employees directly how often they carry out certain activities (e.g. using Excel, writing a letter etc.) and based on the answers a standardised index of skills use has been created. Based

on our results the disadvantage in the skills use of women by 0.2–0.3 standard deviation is the same as if women in the same occupation attended school 4 years less than men. This disadvantage does not disappear even if differences in demographic and other employment related characteristics are filtered out. The disadvantage in skills use of women appears in all the 16 countries assessed by PIAAC at all qualification levels. In addition, based on the outcomes of PIAAC tests in mathematics and reading it can be also proved that the reason behind the less intensive skills use of women is not the lack of the necessary skills.

Finally, we demonstrate that the gender gap in skills use disappears if we filter out the impact of the time spent with housework. Those women who do more housework also fulfil less skill-intensive tasks at their workplace than men in the same occupation, with the same educational level and with equal test results in mathematics and reading.

It follows from our outcomes, that measures aiming at decreasing segregation *between* occupations are not able to eliminate gender gaps at workplaces. Besides this, it is apparent that activities at work and at home are closely connected therefore gender distribution of tasks at work and in the free time have to be understood jointly in order to decrease gender inequalities at work.

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<sup>1</sup> *Programme for the International Assessment of Adult Competencies (PIAAC)* is an overall international survey established by the OECD, which measures basic competencies of the adult population used in everyday life and at work in the participating countries. The internationally harmonized assessment of skills started in 2003. Hungary joined the assessment of skills in 2008 – unlike the other rounds of 2003 and 2013 in which surveys Hungary did not participate.

### K6.3 The effect of motivation and feedback

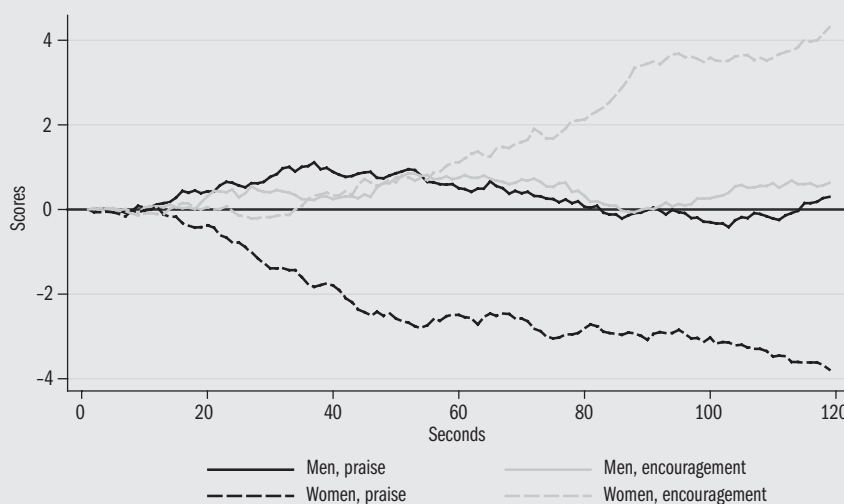
ANNA LOVÁSZ & ÁGNES SZABÓ-MORVAI

Gender related differences in school and work performance may partly be explained by the differences in non-cognitive characteristics between the genders (for example men tend to have greater self-confidence and be more competitive) and that the conditions and rules of a given environment (such as the labour market) favour men because of the attributes characteristic of them (for example those with more self-confidence are more successful at wage negotiations and those who like to compete are more likely to be promoted) (Niederle, 2016).

A recent study (Lovász et al. 2017) explored whether encouragement ('You can do it') or praise ('Well done!') affect performance differently, de-

pending on gender. In an online game, individuals were randomly assigned to a control group (did not get encouragement or praise) or a treatment group (got encouragement or praise). *Figure K6.3.1* presents the differences in the average scores of the treatment and control groups during the game. Women were affected more strongly by both encouragement (positively) and praise (negatively) than men. These effects are strongly related to the lower self-confidence of women: men with low self-confidence were influenced by both treatments similarly to women. This suggests that individualised, subjective feedback may increase the performance of certain (less confident) groups, especially of women, during certain tasks.

**Figure K6.3.1: The impact of praise and encouragement according to gender – difference in scores between the treatment and control groups during the game**



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## 7 HUMAN CAPITAL, PART IV

### HEALTH AND LABOUR MARKET PARTICIPATION AMONG WOMEN

ANIKÓ BÍRÓ, RÉKA BRANYICZKI & PÉTER ELEK

Ability to work is affected by mental and physical health, which may contribute to the fact that Hungarian women, especially those over 50, fall behind the EU average in labour market participation. At the same time, labour market participation also has an impact on health.

Based on international literature, we know that unemployment has a negative impact on mental health (*Thomas et al.* 2005, *Schaller–Stevens*, 2015); however, there is no consensus regarding its impact on physical health. As for the health effects of retirement, research results are not consistent either (for example *van der Heide et al.* 2013, *Insler*, 2014, *Behncke*, 2012). On the other hand, bad health has been found to have a negative impact on employability (*García-Gómez et al.* 2013, *Riphahn*, 1999) and it reduces the probability of re-employment after unemployment (*Stewart*, 2001).

Due to a lack of individual-level panel data on health, there is little knowledge of the causal link between health and labour market participation in Hungary. Based on administrative and questionnaire-based data, this subchapter provides an overview of the relationships between the health and labour market participation of women and points out divergence from European patterns and possible causalities.

#### Health and labour market participation among women aged 50+ in European comparison, based on SHARE data

##### *Descriptive analysis*

The SHARE (Survey of Health, Ageing and Retirement in Europe) database<sup>1</sup> provides detailed data on the health and labour market participation of women over 50. It is an internationally harmonised, multidisciplinary panel survey, which collects data biannually about the health, labour market situation and socio-economic characteristics of the population over 50, allowing the comparison of the health of working and non-working women. The data are available to the entire research community free of charge.

Hungary joined the survey in its fourth wave, in 2011,<sup>2</sup> with a sample of about 2000 households including 1700 women, nearly half of whom were working age according to the retirement age effective in 2011 (aged 50–62). Since 93 per cent of women aged over 60 are in retirement, we focused on a younger middle-aged age group: we compared the health of women aged 50–59 based on their employment status. Employed people were defined as those who reported to

1 We are using data from the 4<sup>th</sup> wave of share SHARE (DOI: 10.6103/SHARE.w4.611), for details on methodology see *Börsch-Supan et al.* (2013). The SHARE data collection was primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N° 211909, SHARE-LEAP: N° 227822, SHARE M4: N° 261982). Additional funding was provided by the German Ministry for Education and Research, Max Planck Society for the Advancement of Science, U.S. National Institute on Ageing (U01\_AG09740-13S2, P01\_AG005842, P01\_AG08291, P30\_AG12815, R21\_AG025169, Y1-AG-4553-01, IAG\_BSR06-11, OGHA\_04-064, HHSN271201300071C) (see [share-project.org](http://share-project.org)).

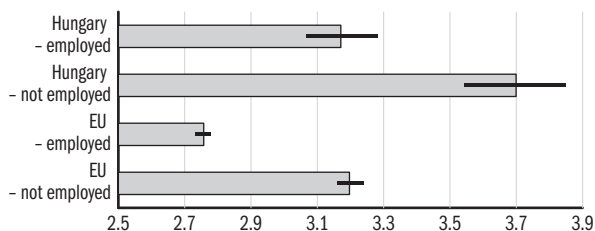
2 The 4<sup>th</sup> wave of SHARE includes the following countries: Austria, Belgium, the Czech Republic, Denmark, Estonia, France, Holland, Poland, Hungary, Germany, Italy, Portugal, Spain, Switzerland, Sweden, Slovenia. The next data collection was conducted in 2017 in Hungary, the data from which were published in spring 2019.

work (as an employee or self-employed), while the category ‘not employed’ included old-age pensioners, the unemployed and homemakers. The long-term sick and the disabled were not included in this part of the analysis although it is telling that their share among women aged 50–59 is 16 per cent in Hungary, more than double of the European average. Thus the sample included about 280 ‘employed’ and 170 ‘not employed’. We note that the second half of this paper will focus on the health indicators of disability pensioners.

The SHARE database contains several health-related indicators: the self-reported general health of respondents, the number of chronic diseases or symptoms, the number of health problems affecting ‘activities of daily living’ (ADL), occurrence of various diseases, body mass index (BMI, which relates weight to height) and depression based on the Euro-D scale.<sup>3</sup> Results from a grip test are also available, which measures grip strength, and is strongly related to the general physical condition of the elderly.

Figures 7.1–7.6 present the average value of the above indicators among working age women in Hungary compared to the other countries of the sample, broken down by employment status. On average, those who work are healthier among both European and Hungarian women. It is striking that the health of Hungarian women, particularly that of the ‘not employed’ group, is generally worse than the European average.

Figure 7.1: Subjective health by employment status



Note: Average self-reported subjective health ranging from 1 (excellent) to 5 (poor) among women aged 50–59. 95 percent confidence interval of the mean is presented. Source: Authors’ compilation based on data from *SHARE*.

Overall, the self-reported health of working Hungarian women is good, while that of women not working is only between good and fair, and the European averages are by half a category better in both groups (*Figure 7.1*). Those not working suffer from more than two chronic diseases on average and the number of their symptoms exceeds two and a half. Working women report nearly one disease and one symptom less in Hungary (*Figure 7.2*). Women not working lag behind the EU average more seriously in both indicators. The average number of health problems affecting ADL was negligible in all groups assessed.

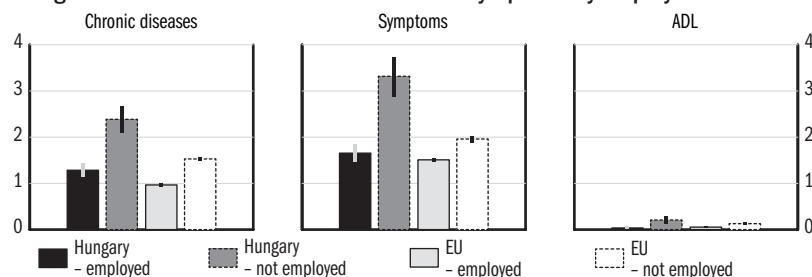
In Hungary, half of the women not working and more than one-third of working women had high blood pressure (the corresponding European averages being 32 per cent and 22 per cent respectively), although the difference

<sup>3</sup> The Euro-D measures the symptoms of depression using a 12-point scale (*Prince et al. 1999*).



between the two groups was not statistically significant. There is a considerable difference between the working and not working groups in the prevalence of heart attack, diabetes and chronic lung disease (*Figure 7.3*).

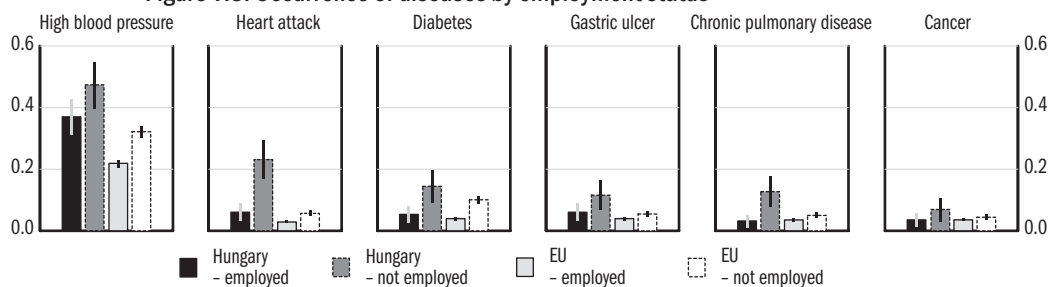
**Figure 7.2: Number of chronic diseases and symptoms by employment status**



Note: The average number of chronic diseases, health symptoms (for example back pain, heart problems, choking, persistent cough etc.) and health problems affecting ADL among women aged 50–59. 95 percent confidence interval of the mean is presented.

Source: Authors' compilation based on data from *SHARE*.

**Figure 7.3: Occurrence of diseases by employment status**

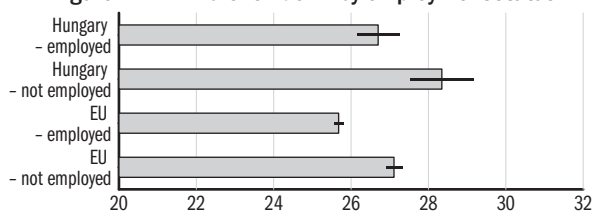


Note: The average rate of occurrence of diseases among women aged 50–59. 95 percent confidence interval of the mean is presented.

Source: Authors' compilation based on data from *SHARE*.

Even though the age group 50–59 was found overweight on average in both Hungary and Europe (BMI average over 25), the probability of being overweight is higher in the non-working population (*Figure 7.4*). The grip test revealed that the grip strength of those not working is also weaker (*Figure 7.5*).

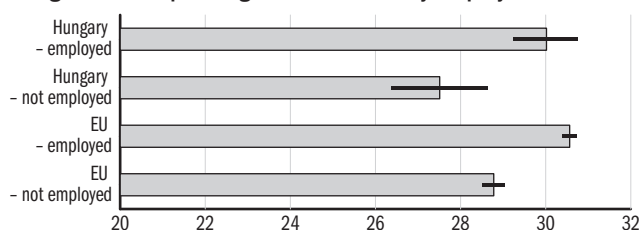
**Figure 7.4: BMI broken down by employment status**



Note: Average BMI among women aged 50–59. 95 percent confidence interval of the mean is presented.

Source: Authors' compilation based on data from *SHARE*.

**Figure 7.5: Grip strength broken down by employment status**

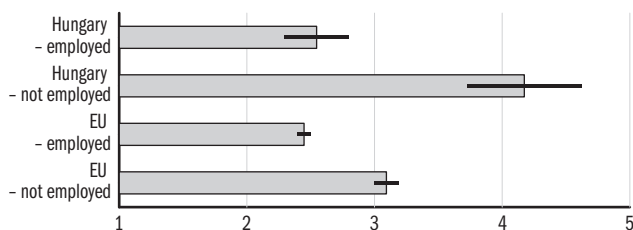


Note: Average grip strength (kilogramme) among women aged 50–59. 95 percent confidence interval of the mean is presented.

Source: Authors' compilation based on data from *SHARE*.

Working women have better mental health (*Figure 7.6*). The Hungarian and European averages substantially differ in the non-working group. The average Hungarian figure for non-working women exceeds four, which is classified as clinically significant depression.

**Figure 7.6: Depression broken down by employment status**



Note: The average degree of depression on the Euro-D scale among women aged 50–59. 95 percent confidence interval of the mean is presented.

Source: Authors' compilation based on data from *SHARE*.

### *Controlling for factors affecting health and labour market participation*

We showed that working women are healthier both mentally and physically than those not working. This may have several reasons: working may be associated with a more active and healthier lifestyle but it is also possible that women not working have left or were cut off from the labour market because of their worse mental and physical health. Although it is impossible to establish causal links in cross-sectional *SHARE* data, it is worth examining whether working women are also healthier if individuals of the same age, qualification, marital status and type of settlement of residence are compared in Hungary.

*Table 7.1* presents the results of three linear regressions, with subjective health (1: excellent, 5: poor), the number of chronic diseases and grip strength (kilogramme) as dependent variables. All the three indicators show that working women are healthier, even after controlling for the above demographic characteristics. Also relying on the *SHARE* database, *Divényi–Kézdi* (2013) found that the employability of individuals with the best health and cognitive skills, aged 50–59 in Hungary is very similar to the European average, while the employ-

ability of those with worse health and cognitive skills is increasingly lagging behind the European average. It was also revealed that the difference between the Hungarian and German employment rates decreases if cognitive skills and the distribution of health in addition to demographic factors are controlled for. When partly reproducing these linear models (where the dependent variable is employment status again), it is seen that the 20 percentage points lag of Hungarian women aged 50–59 compared to German women would decrease to 12 percentage points if both the demographic composition and the health of the population would correspond to the German average (*Table 7.2*).

**Table 7.1: Average differences in health indicators by employment status, controlling for demographic and socio-economic factors, among women aged 50–59 in Hungary**

	Subjective health (1)	Number of chronic diseases (2)	Grip strength (3)
Working	-0.364*** (0.123)	-0.707*** (0.208)	1.908** (0.932)
Control variables	Yes	Yes	Yes
Number of observations	334	334	326
R <sup>2</sup>	0.167	0.188	0.095

Note: Robust standard errors in brackets.

Control variables: *age variables* (age and age squared), *qualification* (5 ISCED categories), *marital status* (married or cohabiting, single, widow), *type of settlement* (five categories from urban to rural).

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: Authors' calculation based on data from *SHARE*.

**Table 7.2: Differences in employment rates between countries, controlling for age, qualification, type of settlement and the distribution of health, among women aged 50–59**

	Employment (1)	Employment (2)	Employment (3)
Hungary	-0.200*** (0.0503)	-0.162*** [0.0511]	-0.122** (0.0512)
Country indicators (reference: Germany)	Yes	Yes	Yes
Age variables	Yes	Yes	Yes
Type of settlement	Yes	Yes	Yes
Qualification	-	Yes	Yes
Health variables	-	-	Yes
Number of observations	5,614	5,542	5,326
R <sup>2</sup>	0.130	0.181	0.211

Note: Robust standard errors in brackets.

Control variables: *age variables* (age and age squared), *qualification* (based on ISCED), *type of settlement* (five categories from urban to rural), *health* (number of chronic diseases, grip strength, subjective health).

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: Authors' compilation based on data from *SHARE*.

## The associations between labour market status, health expenditure and mortality

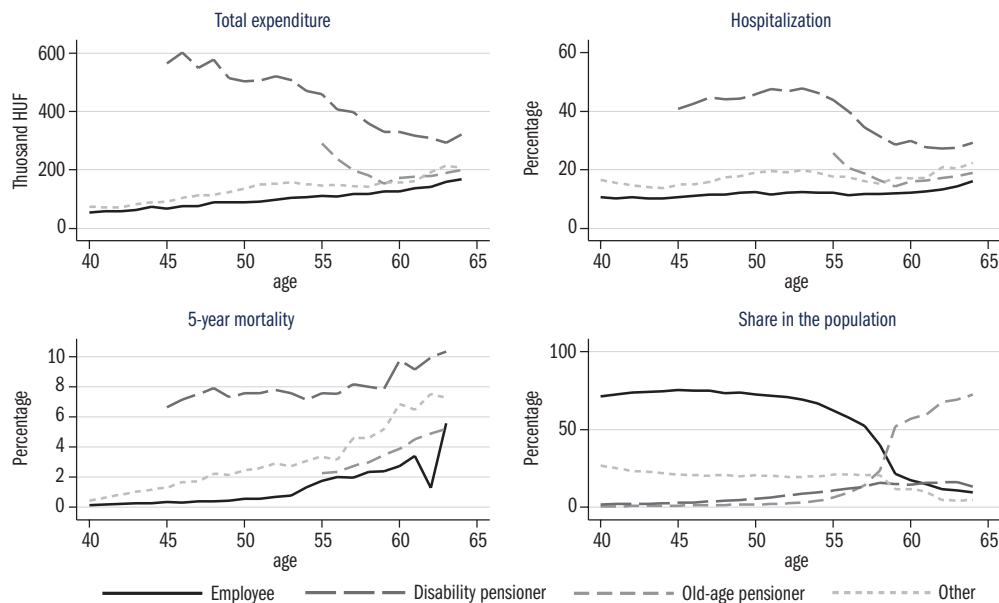
### *Health expenditure and mortality by labour market status*

The individual-level administrative panel database of the Databank of the Institute of Economics of the Centre of Economic and Regional Studies of the Hungarian Academy of Sciences (IE CERS HAS), which covers a randomly selected 50 per cent of the population in the period 2003–2011, does not contain direct information on disease but includes data on healthcare use, mortality and labour market information. From these data an association between health and labour market status may be inferred, and hence the findings from the SHARE data can be supplemented.

Figure 7.7 presents the average health expenditure for 2011 (the sum of outpatient, inpatient and prescribed pharmaceutical expenditures), the probability of hospital stay, and the probability of death calculated from 2006 onwards by age, for the categories of working women, those receiving disability or old-age pension and for women not belonging to any of the above three categories. The bottom right panel of the Figure contains the share of the various employment categories by age within the entire population in 2011.<sup>4</sup>

<sup>4</sup> Expenditure data are annual, therefore the analysis takes years as timescale. Women are considered working if they worked at least for six months in a given year. A person on old-age pension or disability pension is defined as someone who is not in employment and received the benefit for at least six months in the given year. Figure 7.7. only includes data on categories whose share in the given age group reached a minimum threshold in 2011.

**Figure 7.7: Annual per capita health expenditure, probability of hospital stay, five-year probability of death and the share in the total population by employment category, women aged 40–64**



Note: Data are from 2011, except for the five-year probability of death, which is from 2006.

Source: Authors' calculation based on the administrative database of IE, CERS, HAS.

The Figure reveals that 4–8 times more healthcare expenditure is allocated to disability pensioners than to working women in the 45–54 age group. The Figure does not show but the difference within the category is similar (4–10-fold) for inpatient care and prescription medicines but it is only threefold for outpatient expenditure. The annual probability of hospital stay in this age group is 10–12 per cent for working women, while it is 41–46 per cent for women on a disability pension. All this points to the dramatically worse health of women on a disability pension, confirmed by the bottom left panel of *Figure 7.7.* showing the five-year probability of death by age and employment category. Women on a disability pension have a 7 per cent, while working women a much less than 1 per cent risk of death within five years in the 45–54 age group.

The figures indicate a smaller difference in the health indicators of women on old age pension and those working beyond the retirement age. In 2011 the early retirement age was 59 years and that was when the majority of women working in their fifties retired. Over this age, the healthcare expenditure and the probability of death of those on an old age pension only slightly exceeded those of women continuing work. This suggests that it is the relatively healthier that continue to work in higher proportions after the retirement age; however, health has less significance than at a younger age, when taking a disability pension. Of course, it is also possible that the healthcare expenditure of old age pensioners and women continuing work is only different because of the changing incentives at the time of retirement itself. Nevertheless, *Bíró–Elek* (2018) reported that retirement actually reduces the probability of attending specialist outpatient care and the consumption of any prescribed medicine, thus this mechanism does not explain the slightly higher healthcare expenditure of old age pensioners compared to working women.

Finally, the probability of the death of women belonging to the category ‘Other’ (not working and not receiving a pension) is considerably higher than that of working women but lower than that of women on a disability pension and their healthcare expenditure is only slightly higher than that of working women.

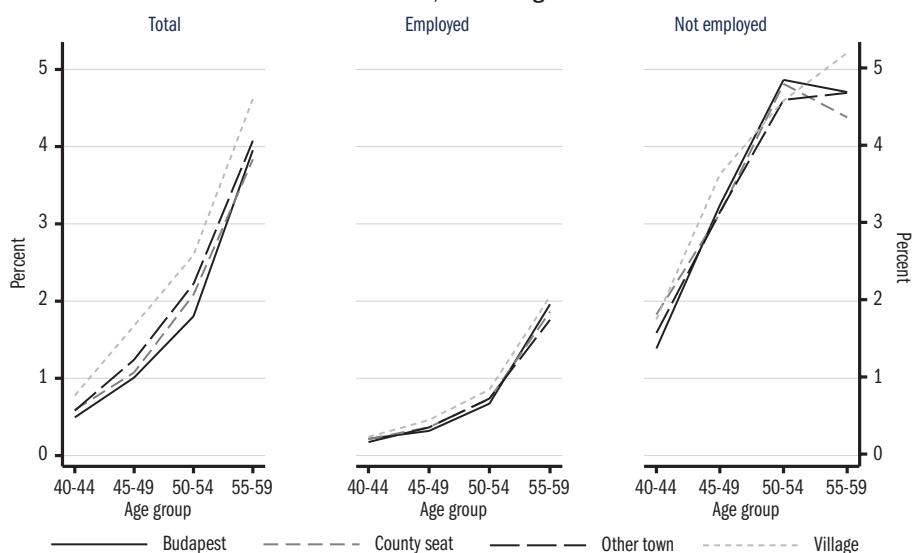
### *Associations with the type of settlement*

The above results, with minor modifications, hold even after controlling for local supply and demand factors in the regression framework, using the county and the type of settlement of residence. In the following, the five-year probability of death by type of settlement will be examined. The left-hand panel of *Figure 7.8* shows that the raw mortality indicator in the 40–54 age group of women is one and a half higher in villages than in the capital (in county seats and other cities the figures are between these two values and the data are somewhat more balanced in the 55–59 age group).<sup>5</sup> At the same time, the

<sup>5</sup> *Figure 7.2.* presents age groups spanning five years within the 40–59 age group, because the low mortality rates broken down by settlement type and employment status could only be measured with a large error.

middle and the right-hand panel indicate that within the working and within the non-working groups there are no substantial differences in mortality according to the type of settlement. In other words, the difference between the probability of death of working and not working women is nearly the same within each type of settlement. It suggests that the significant difference in the raw mortality in the various settlement types is due to the fact that the employment rate is considerably lower in villages than in the capital. This is consistent with the Hungarian literature on health inequalities, which examines the role of several variables, among them employment, in mortality and other health differences (see for example *Orosz–Kollányi* 2019).

**Figure 7.8: Five-year probability of death by settlement type and employment status in 2006, women aged 40–59**



Source: Authors' calculation based on the administrative database of IE, CERS, HAS.

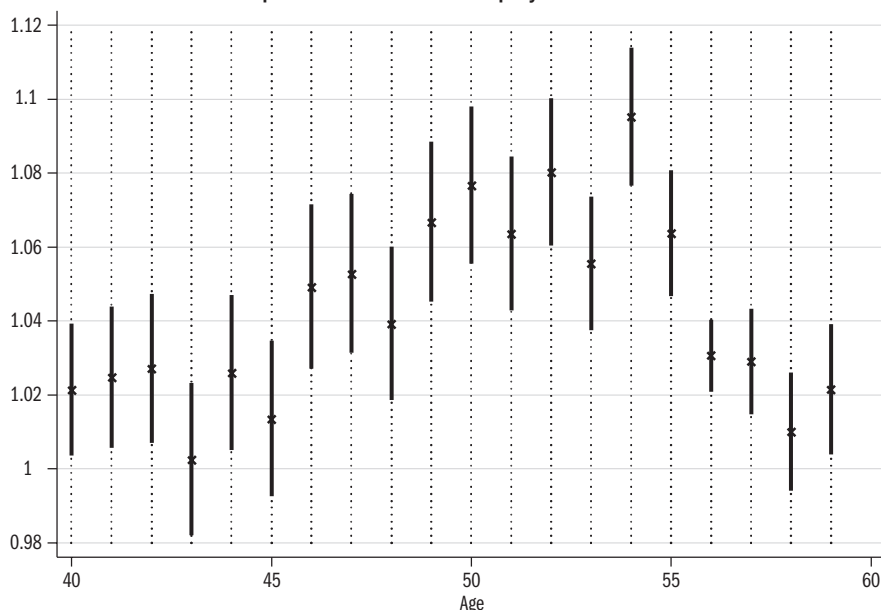
### *Healthcare expenditure predicts exit from employment*

Based on the above, those not working are in significantly worse health (with worse mortality indicators) than working women and consequently healthcare expenditure, primarily on inpatient care and on prescribed pharmaceuticals, is substantially higher. In the following we demonstrate that health (measured by healthcare expenditure) also has an impact on the probability of exiting employment, even after several years.

A logit model is estimated on the probability of a working person permanently exiting employment in a given year (defined as not taking up work in either of the following two years). The key explanatory variable is individual healthcare expenditure  $k$  years before, measured as a percentile of the distribution of expenditure of women of a given age. Healthcare supply and demand

factors are controlled for using the age, estimated educational attainment<sup>6</sup> and the county and settlement type of the place of residence of individuals as well as the calendar year.

**Figure 7.9: The effect of healthcare expenditure decile one year before on permanent exit from employment**



Note: Odds ratios obtained from the logit model with their 95 per cent confidence interval.

*Explanatory variable:* interaction of age and the decile (10 times the percentile) of healthcare expenditure incurred one year before.

*Control variables:* see in text. Reference years: 2008–2009.

Source: Authors' calculation based on the administrative database of *IE*, *CERS*, *HAS*.

The estimates show that if the healthcare expenditure spent on the individual one year before was one decile (ten percentiles) higher, the odds of exiting employment permanently increased 1.041-fold (standard error for the estimated odds ratio is 0.002).<sup>7</sup> Furthermore (not shown in detail), healthcare expenditure five years before also has a significant positive effect on the probability of permanent exit (odd ratio approximately 1.013, standard error 0.002). *Figure 7.9.* presents the age-specific effect of the decile of healthcare expenditure one year before on permanent exit from employment. It reveals that prior healthcare expenditure has the strongest effect on the exit of the 46–55 age group.

## Conclusions

Both questionnaire-based (SHARE) and administrative data indicated that among the active age population working women are in better physical and

<sup>6</sup> Educational attainment was estimated using the occupational (Hungarian Standard Classification of Occupations, HSCO) code of the employment of the person, based on the median of qualifications relating to the given HSCO code in the Labour Force Survey (LFS) conducted by the Central Statistical Office.

<sup>7</sup> Note: the annual probability of permanent exit from employment is around 5 per cent in the 40–54 age group, which increases substantially, over 20 per cent after reaching retirement.



mental health than women not working. The healthcare expenditure and mortality rate of women receiving disability pensions in this age group were many times greater than the healthcare expenditure and mortality rate of working women.

The poor health indicators in Hungary partly explain the low employment rate of middle-aged women by European comparison. Health status is a strong explanatory variable of future labour market status (1–5 years later).

In conclusion, improving the health of middle-aged women may significantly contribute to increasing their labour market participation.

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## 8 MARRIAGE, HAVING CHILDREN

### 8.1 THE EFFECTS OF TEENAGE MOTHERHOOD

ANNA ADAMECZ-VÖLGYI

This chapter looks at the relationship between teenage motherhood, female labour supply and self-declared late-life health. While there is ample evidence on the negative consequences of teenage motherhood, we know surprisingly little about the channels of these effects. Teenage mothers not just have their first child at an early age but also have more children during their lives than women who delay childbearing to their adult years. In this research we aim at investigating whether having a higher average number of children could be a potential channel of the long term effects of teenage motherhood.

#### Measuring the effects of teenage motherhood

An extensive literature considers the effects of teenage motherhood; however, the identification of its causal impacts is not straightforward. Women having their first child before age 20 are inherently different from women who have their first child later or might not have a child at all. Some of these differences might be observed for the researcher (i.e. family background), most of these however are unobserved and thus cause a selection bias. The literature applies three identification strategies to solve the selection problem and pin down the causal effects of teenage motherhood (statistical matching, twin fixed effects, instrumental variables), and, these methods lead to inconsistent conclusions. Several authors agree that teenage motherhood has negative effects on female health (*Webbink et al.* 2008), and these effects can even be detected late in life (*Angelini–Mierau*, 2015). However, there is no agreement on its labour market and education effects, and we know especially little about the potential channels of its impact.

Teenage mothers have on average more children during their lives than women who delay motherhood to post-adolescence. Theoretically, having more children, independently of the timing of the first birth, could be a reason why teenage mothers are less likely to be employed or have poorer health later in life. This investigates whether having a higher number of children could be a potential channel of the long term effects of teenage motherhood.

#### Data and methods

We use the second and the third wave of the European SHARE survey.<sup>1</sup> The sample consists of 12,650 women from 14 European countries who were born between 1920 and 1959 and were 50–89 years old when the data of the third wave (SHARELIFE) were collected.<sup>2</sup> The data allow us to control for

1 A Survey of Health, Ageing and Retirement in Europe (SHARE). See more in *Börsch-Supan et al.* (2013).

2 Those having really poor health in childhood or later are less likely to be still alive and be in our sample; thus, the sample is selected in this respect.

the childhood socio-economic background, health and cognitive abilities of women, and controlling for this rich set of childhood characteristics hopefully decreases the estimation bias due to the selection of teenage mothers.

Building on *Angelini–Mierau* (2015), we are estimating the relationship between having the first child before age 20, and, our two outcome variables (life-long employment history of women, late life health) using linear probability models. We extend their empirical strategy with two elements. First, in addition to their measure of self-declared health status, we define an outcome variable that captures the probability of employment between ages 20–65. Second, we are investigating whether the baseline relationship changes between teenage motherhood and the two outcome variables if we control for the number of children women chose to have.

*Table 8.1.1* compares the explanatory variables between teenage mothers and women who either had their first child after age 20, or did not have a child (comparison group). Teenage mothers tend to come from lower socio-economic backgrounds but their childhood health has not been worse than those of the comparison group. Teenage mothers are less likely to have one or two and more likely to have three or more children than women in the comparison group.

**Table 8.1.1: Background characteristics and fertility of women**

	Comparison group	Teenage mothers	Two-sided t-test p-values
<b>Fertility</b>			
Has child	0.88	1.00	0.000***
One child	0.16	0.09	0.000***
Two children	0.41	0.38	0.079*
Three children	0.19	0.29	0.000***
Four children	0.07	0.12	0.000***
Five or more children	0.05	0.13	0.000***
Age at the time of the survey	66.30	64.57	0.000***
<b>Childhood characteristics: family</b>			
Parents smoked	0.61	0.61	0.801
Parents were heavy drinkers	0.08	0.13	0.000***
Parents had mental problems	0.03	0.03	0.170
Mother lived with the child	0.96	0.95	0.112
Father lived with the child	0.92	0.84	0.000***
<b>Childhood characteristics: housing</b>			
No. of rooms per person in the family	0.73	0.62	0.000***
Bathroom	0.32	0.24	0.000***
Cold running water	0.69	0.64	0.002***
Hot running water	0.34	0.24	0.000***
Inside toilet	0.52	0.41	0.000***
Central heating	0.18	0.13	0.000***

	Comparison group	Teenage mothers	Two-sided t-test p-values
<b>Childhood characteristics: number of books at home</b>			
0-10	0.41	0.5	0.000***
11-25	0.23	0.26	0.075*
26-100	0.23	0.18	0.000***
101-200	0.07	0.04	0.000***
200+	0.06	0.04	0.001***
<b>Childhood characteristics: higher skills relative to peers</b>			
Math	0.32	0.25	0.000***
Grammar	0.41	0.31	0.000***
<b>Childhood characteristics: occupation of the head of the household</b>			
Legislator, senior official or manager	0.05	0.03	0.021**
Professional	0.04	0.01	0.000***
Technician or associate professional	0.05	0.02	0.001***
Clerk	0.06	0.03	0.000***
Service, shop or market sales worker	0.08	0.07	0.200
Skilled agricultural or fishery worker	0.28	0.26	0.432
Craft or related trades worker	0.21	0.23	0.109
Plant/machine operator or assembler	0.05	0.06	0.222
Elementary occupation	0.16	0.24	0.000***
<b>Childhood characteristics: childhood health in general</b>			
Excellent or very good	0.34	0.35	0.449
<b>Childhood health: prevalence of illnesses</b>			
Infectious disease	0.84	0.83	0.694
Polio	0.01	0.01	0.593
Asthma	0.02	0.02	0.564
Respiratory problems	0.03	0.03	0.794
Allergies	0.03	0.04	0.717
Severe diarrhoea	0.01	0.01	0.796
Meningitis/encephalitis	0.01	0.01	0.764
Chronic ear problems	0.03	0.03	0.146
Speech impairment	0.00	0.01	0.110
Difficulty seeing even with eyeglasses	0.02	0.02	0.585
Severe headaches or migraines	0.05	0.06	0.323
Epilepsy, fits or seizures	0.00	0.01	0.331
Emotional, nervous, or psychiatric problems	0.01	0.02	0.219
Broken bones, fractures	0.06	0.06	0.765
Appendicitis	0.09	0.13	0.001***
Childhood diabetes	0.00	0.00	0.303
Heart trouble	0.01	0.01	0.457
Leukaemia or lymphoma	0.00	0.00	0.616

*No. of observations:* comparison group: 11,669 teenage mothers: 981.

Sources: Own estimation from the SHARELIFE data.

## Results

The first three columns of *Table 8.1.2* show the relationship between teenage motherhood and the probability of employment while the second three columns of the table show the relationship between teenage motherhood and

late-life good health. Having no control variables in the models, both the probability of employment and late-life good health is negatively correlated with teenage motherhood (*column 1 and 4*). The negative relationship prevails even after controlling for a rich set of childhood characteristics of women (*column 2 and 5*): teenage mothers work with a 4-percentage-point lower probability throughout their active years and they are 6 percentage points less likely to assess their health as good at the time of the data collection (in ages 50–89) than the comparison group. Expressed in percentages, the effect on employment is –6% while the effect on self-assessed health is –20%.

**Table 8.1.2: The relationship between teenage motherhood and the outcome variables**

	The effects of teenage motherhood on the probability of					
	employment			late-life good health		
	(1)	(2)	(3)	(4)	(5)	(6)
Coefficient of teenage motherhood	-0.055*** (0.011)	-0.043*** (0.011)	-0.004 (0.011)	-0.091*** (0.013)	-0.061*** (0.013)	-0.066*** (0.013)
Control variables						
Age, age squared	x	x	x	x	x	x
Country fixed effects	x	x	x	x	x	x
Childhood controls*		x	x		x	x
No. of children			x			x
No. of observations	12,650	12,650	12,650	12,650	12,650	12,650

\* Childhood controls: all variables that are listed in *Table 8.1.1*. Robust standard errors in parentheses.

The average probability of employment is 0,502 (standard error: 0,003), the average probability of good late-life health 0,285 (standard error: 0,004) in the comparison group. The comparison group contains women having their first child after age 20 and childless women. Result are similar if childless women are not included in the sample.

Sources: Own estimation from the SHARELIFE data.

The 3<sup>rd</sup> and 6<sup>th</sup> columns extend the models with the number of children women had during their lives. Controlling for the number of children practically eliminated the negative effects of teenage motherhood on the probability of employment (3<sup>rd</sup> column) while it has not changed the effect on late-life good health (6<sup>th</sup> column). It seems that the number of children could be a potential channel of the effect of teenage fertility on employment, while teenage motherhood affects late-life health outcomes through other channels.

## Conclusions

It has to be emphasized again that this chapter does not claim to identify the causal effects of teenage motherhood. Although the SHARE data allow us to control for a rich set of childhood characteristics of women, these characteristics can only explain a small share of the variation of teenage motherhood.<sup>3</sup> In spite of this, it is interesting that controlling for the number of children

<sup>3</sup> Teenage motherhood as a binary variable regressed on the explanatory variables of our models gives  $R^2 = 0,03$  and  $F = 7$ , both indicates really poor performance.

eliminates the negative effects of teenage motherhood on employment while it does not change the effect on self-assessed health. The next step of this research is to set up a credible identification strategy to look at the causal effects of teenage motherhood on late-life outcomes, and, to include objective measures of late-life health.

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## 8.2 THE IMPACT OF CHILDCARE AVAILABILITY ON FEMALE LABOUR SUPPLY

ÁGNES SZABÓ-MORVAI & ANNA LOVÁSZ

The employment situation of women is highly influenced by the fact that they fall out of the labour market by reason of having children. One of the most important measures of the employment policy in connection with this is the establishment of nursery and kindergarten places, which – by liberating the time of mothers – enables them to return to work before the child reaches school-age. The impact of the kindergarten<sup>1</sup> places on employment could, however, differ among countries, and therefore the outcomes in the literature are also ambiguous. Several studies show that the availability of childcare promotes female employment (*Lovász–Szabó-Morvai*, 2013, *Nollenberger–Rodríguez-Planas*, 2015 and *Bauernschuster–Schlotter*, 2015), while several other studies did not find a significant link between kindergarten availability and the employment of mothers (*Bettendorf et al.* 2015, *Lundin et al.* 2008, *Givord–Marbot*, 2015).

This, however, only appears to be contradictory. In reality, the extent of the impact depends on the elements of the institutional setting, for example, the length and amount of in-cash benefits, the flexibility of employment, or relevant social norms. Medium length parental leaves coupled with generous childcare benefits help mothers the most to efficiently return to the labour market. The lack of leaves, or leaves that are too short restrains maternal employment because their employment protection ends before they are able to return to their former job. On the other hand, long paid leaves encourage mothers to stay absent from the labour market for long time periods, which in general leads to lower wages and occupation levels (*Budig et al.* 2012). The availability of flexible work arrangements (for example part-time employment or remote work) contribute strongly to the employment of mothers with young children by allowing for a more gradual separation from the child. The attitude of society regarding the employment of mothers with young children is an important issue too. If mothers – in line with society's expectations – stay home with their child for a lengthy period (for example, in the case of Hungary and other Central-Eastern European countries, for three or even more years), then the expansion of the availability of childcare places may be less effective in increasing the employment of mothers with children under 3.

Based on data from seven European countries, *Szabó-Morvai–Lovász* (2017) studied the institutional conditions under which the availability of kindergarten places could increase the labour supply of mothers. The analysis relied on the data of the European Labour Force Survey (EU-LFS), and analysed the interaction between the impact of the availability of kindergarten places and

<sup>1</sup> In fact, we have to consider both nursery and kindergarten services, as the composition of the child-care system differs from country to country, therefore the age of the children of the mothers in different studies varies between the ages of 0–12. However, the majority of articles consider ages 3–5 as the most relevant in this respect.



the institutional surroundings using a regression discontinuity design. The essence of the method is that in countries where a kindergarten enrolment threshold exists – i.e. those who were born before a certain date are able to enrol into kindergarten for sure, while those who were born after cannot – the impact of kindergarten availability can be estimated by comparing the labour supply of mothers whose children were born just before this date with those whose children were born just after. *Table 8.2.1* summarizes the results of the estimation and the most important institutional characteristics by country. The  $\beta$  values show the estimated impact of kindergarten availability on the labour supply of mothers.

**Table 8.2.1 The impact of the availability of child-care services on the labour supply of mothers ( $\beta$ ) and the most relevant institutional characteristics**

	Enrolment rate of children in nursery and kindergarten (percent)		Impact of the kindergarten $\beta$	Female employment by the age of the child (percent)		
	age 2	age 3		0–2 years	3–5 years	6–14 years
Austria	26.5	54.7	0.29***	67.0	74.0	82.0
France	58.0	86.2	0.25	61.0	74.0	79.0
Hungary	16.7	60.2	0.19**	12.0	63.0	75.0
Czech Republic	7.0	41.9	0.20*	20.0	70.0	87.0
Slovak Republic	6.7	46.4	0.28**	15.0	56.0	80.0
Greece	28.7	49.1	–0.07	50.0	54.0	59.0
Italy	38.4	81.5	–0.02	51.0	53.0	56.0
	Availability of informal child care (relatives, neighbours)	In-cash services			Flexibility of employment: Share of part-time employment within the total employed female population (percent)	Norms: the child suffers <sup>a</sup> (percent)
		length of leave (weeks)	average replacement rate of the leave (percent)	in-cash benefits at the age of 3 of the child as a percentage of the median wage		
Austria	18.7	60	85.3	12.6	46.0	54.8
France	7.9	42	44.7	12.1		41.0
Hungary	18.9	160	44.5	23.0	9.0	54.7
Czech Republic	24.3	110	51.1	16.4	10.0	
Slovak Republic	16.3	164	32.0	17.7	6.0	44.4
Greece	32.5	43	53.9	5.2	12.5	65.3
Italy	18.0	48	52.7	5.2	31.6	61.8

<sup>a</sup> A child below school-age suffers if their mother works (0 percent: do not agree at all, 100 percent: totally agree).

Note: Table prepared after Szabó-Morvai–Lovász (2017).

\*\*\*  $p < 0,01$ , \*\*  $p < 0,05$ , \*  $p < 0,1$ .

Source: Own calculation based on the data of *OECD Family Database*, *Eurostat*, and the *European Values Study*.

Based on the outcomes, childcare availability has a significant and high impact on the employment of mothers in the Central Eastern European countries (Czech Republic, Hungary, Slovak Republic). The labour supply of mothers is very low prior to age of three of children compared to that of mothers of

older children. The availability of child-care places at nurseries is limited, and, additionally, parental leave also ends around age three of children. In Southern European countries (Italy, Greece), the results do not show a remarkable impact around age three of children. A significant portion of mothers fall out of the labour market permanently after childbirth, while those mothers who return to the labour market do so much earlier, due to the short length of child-care leaves. The impact in the two Western countries differs: in Austria – where the coverage of child-care services is much lower and the society's attitude is more traditional – there is a positive impact, while in France the impact is not significant. Overall, the results suggest that the labour supply of mothers in Central-Eastern Europe could be significantly increased through the expansion of child-care services. The impact, however – especially in the case of the development of the capacities of crèches – could be constrained by the societal attitudes against the use of child-care services at an early age, and the long period of the paid parental leave.

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## K8.1 Development of nursery capacities

ÁGOTA SCHARLE

Day-care of children under age 3 is mainly provided by their own families in Hungary. Formal day-care capacities (traditional nurseries or community-based care, mini and workplace nurseries) are limited, so only 11–12% of all children are enrolled in formal day-care (this rate is smaller than the official data provided by the Hungarian Central Statistical Office, because the latter is calculated as the ratio of official capacities and potential recipients instead of actual enrolment).

Nursery capacities increased slowly but continuously between 2001 and 2016. In 2017 the growth stopped, and a downturn was reported likely caused by changes in the regulations on community-based day care ('családi napközi', see chapter 11.1).

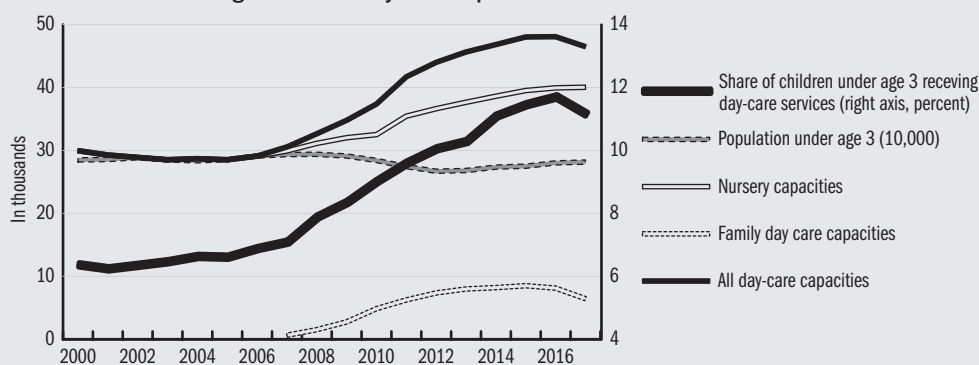
Most of the existing nurseries are run by the municipalities financed by a per capita grant from the central budget (Makay, 2012, KSH, 2018). Until

2018, the funding system did not promote the extension of capacities. The government grant does not fully cover the costs of service provision, and the tax and social security contributions of mothers returning to work are paid to the central budget. Thus, even if the expansion of nursery services were to yield a positive return at the macro level, the balance is not necessarily positive for most municipalities.

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Figure K8.1.1: Day-care capacities between 2000–2017



*Nursery capacities* were higher by 20% than the official data provided by the Central Statistical Offices before 2009 due to previous regulations that allowed nurseries to derogate from the authorised capacity limit by 20%.

*Community-based care capacities* include community-based care ('családi napközi') and mini and workplace nurseries in 2017.

Source: 'Day-Care Services in 2017' titled special data provision of Central Statistical Office.

### 8.3 CAREER BEFORE AND AFTER HAVING A CHILD

ANNA LOVÁSZ, EWA CUKROWSKA-TORZEWSKA  
& ÁGNES SZABÓ-MORVAI

The wage disadvantage of mothers and the wage advantage of fathers following the birth of their child compared to individuals without children has been documented in many countries (for example *Davies–Pierre*, 2005). The wage disadvantage of mothers is highly dependent on the institutional context (such as the availability of child-care services and the length of paid parental leave) and the cultural background, therefore its magnitude differs across countries. (See *subchapter 8.4*) Based on the available previous evidence, the wages of mothers are generally lower compared to both women without children and fathers. This could be explained by specialization within households: after the birth of the child, mothers spend their time on childcare, while fathers focus more on earning money.

Due to this specialization, there could be differences in the decisions and the labour market situation of future mothers even prior to having a child, even though there are no real time constraints related to childcare present yet, but rather as a consequence of their expectations. It is possible that future mothers already invest less into their career during this time since they know that having a child will lead to serious labour market disadvantages, and therefore it is not worthwhile for them to make substantial investments in their careers. Thus, even before the birth of their first child, the wages of future mothers could differ from the wages of future fathers, and from women who do not plan to have children.

#### International evidence

So far, the pre-parenthood wage gap has only been studied in relatively few countries, mainly due to the lack of appropriate data that allows us to follow both the labour market characteristics and the child-birth situation of future parents over a longer term. Based on German administrative data, *Adda et al.* (2015) showed that family planning has an impact on the labour market decisions of women even before the birth of their child, as a lot of women choose an occupation which is reconcilable with child-care. According to the results of *Angelov et al.* (2016), in Sweden there is only a slight difference between the income and the monthly wage of future mothers and fathers prior to the birth of the child. However, following the birth, the relative income of mothers shrinks considerably due to the sudden reduction of the working time. At the same time, their hourly wage does not decline sharply, but rather more gradually until the child becomes 15 years old, which can be explained by the longer run child-care activities of mothers.

*Kleven et al.* (2018) revealed that in Denmark, there are considerable changes in connection with working hours, occupational levels, and hourly wages of mothers after the birth of their first child. Over time, these differences after the birth explain a greater and greater part of the gender wage gap. However, the gender wage gap prior to parenthood has narrowed in the last decades: women invest more into their careers before their first child's birth, despite the fact that afterwards they still face significant disadvantages in the labour market.

### The Hungarian situation in European comparison

Based on data from the 2006–2016 waves of the *European Union Statistics and Living Conditions (EU-SILC)* survey collected by Eurostat, we carry out a comparative estimation. The analysis presents the relative mean wages of mothers and fathers in Hungary and some other countries before and after the birth of their first child. The relative wages of mothers and fathers were estimated based on wage equations, first for the time period from four years prior to the birth of their first child, and then when their child was 3–6 years old. The dependent variable was the logarithm of the hourly wage,<sup>1</sup> therefore the effect of differences in the number of hours worked was filtered out. The equations also controlled for educational attainment and calendar year. Besides the the wage gap between mothers and fathers, the gender wage gap was also estimated for the sample of individuals without children, which was used to assess the reasons behind the pre-parenthood wage gaps.

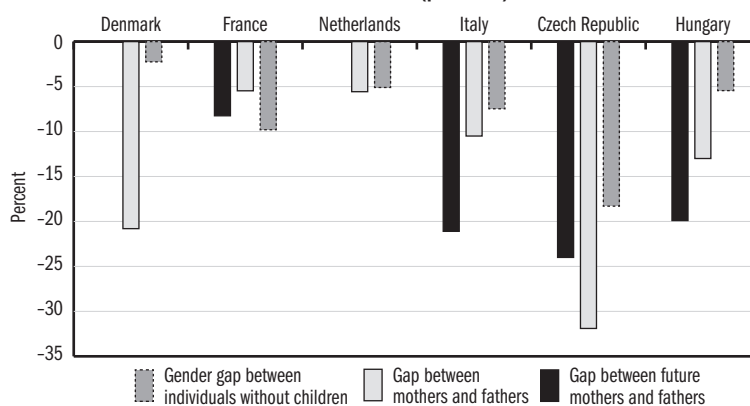
The estimated differences are summarized in *Figure 8.3.1*. There are no significant differences in the mean hourly wages of future mothers and fathers in Denmark or in the Netherlands prior to childbirth. Mothers in France earn approximately 8 percent less compared to men before becoming parents. In Italy, the Czech Republic, and Hungary, however, the wage gap among future parents is higher, between 20 and 24 percent. The disadvantage in the hourly wage of mothers with children aged 3–6 showed a significant link – although its extent differed country by country. The disadvantage in hourly wages after having a child was lower in France, Italy, and Hungary than before childbirth. This is likely related to labor market selection: only those mothers return to work when their child is between the age of 3–6 whose labour market outlook is more favourable or who are more committed to their careers.

The results show that in the Western-European countries studied women do not suffer any wage disadvantage (or only to a small extent) compared to men prior to having a child in the near future. In Southern and Eastern European countries, however, a wage gap already exists prior to the childbirth. The wage disadvantage of mothers in Western countries is the same or lower compared to the wage gap between men and women without children, while in Southern and Eastern European countries it is significantly higher. The results presented suggest that the wage disadvantage of future mothers in Southern and

<sup>1</sup> Calculated on the basis of the annual income, the monthly activity, and the number of usual working hours.

Eastern Europe does not only depend on external, institutional factors (such as employer discrimination) but is also the consequence of the choices (application to a higher position, career choices) of women themselves. Although the result does not provide evidence on a causal link, it appears that in countries where mothers with young children face higher disadvantages, mothers-to-be already constrain their labor market activity in the years before the childbirth.

**Figure 8.3.1: The differences in the hourly wages of mothers and fathers before and after the birth of their first child, and the difference between men and women without children (percent)**



Source: Own calculation based on the data of *EU-SILC*.

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## 8.4 THE ROLE OF PARENTHOOD IN THE GENDER WAGE GAP

ANNA LOVÁSZ & EWA CUKROWSKA-TORZEWSKA

One of the obvious causes of gender-related labour market differences – including the average wage gap – is having children and the impact of related obligations. Empirical research based on data from several countries showed that mothers have lower mean wages than women without children (*Davies–Pierre, 2005*). The main reasons for the wage penalty of mothers include: the effects of the duration of absences from the labour market (depreciation of human capital, obsolete network of contacts); changes in the preferences for workplace characteristics and wage differentials compensating for this (for example more flexible work hours, stress-free work), as well as employer discrimination, which is also related to the duration of absences before and after giving birth. As for fathers, research usually reveals a considerable wage premium (*Lundberg–Rose, 2000*), resulting from extended work hours and effort, as well as more conscious requests for promotions and pay raises by fathers, and their positive discrimination by employers.

Some of the activities undertaken after the birth of their child are biologically determined for women. However, regarding long-term preferences for child-care, it is more difficult to establish which part is innate, and which is a result of social norms and the system of institutions. How long they wish to stay at home with their children after the birth, when they feel they are able to trust others with caring for their children, and how much time they wish to spend working and being with their children depends on the individual mother and father. Nevertheless, individual preferences and labour market situations are influenced by both the cultural and institutional environment. Assessments of the differences in the employment and wage penalty of mothers across countries also point to the importance of these factors (*Budig et al. 2012*).

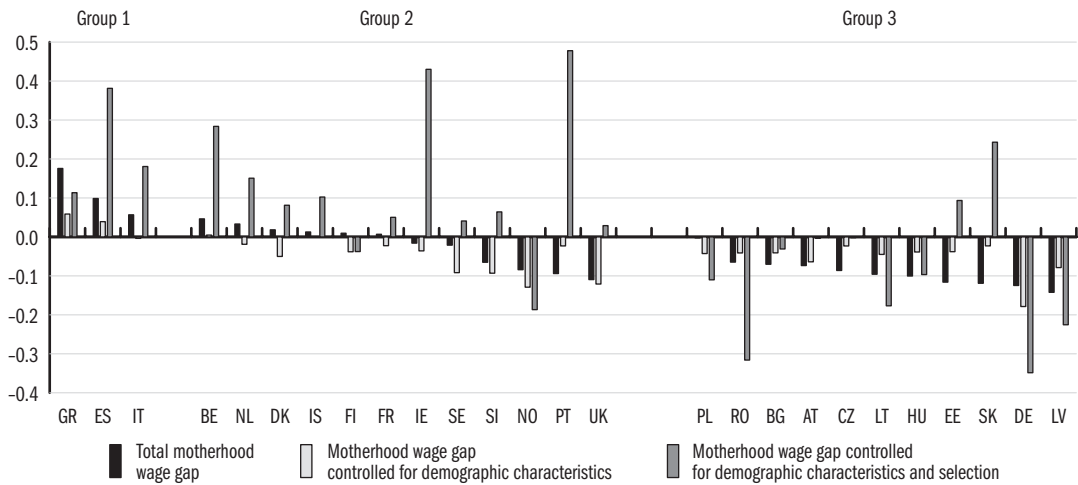
Both the mothers' wage penalty and the fathers' wage premium increase the average gender wage gap. One study covering 26 EU countries estimated the motherhood and fatherhood wage gaps as well as the gender gap among childless individuals, and also to what extent these explain the overall gender wage gap (*Cukrowska-Torzewska–Lovász, 2017*). *Figure 8.4.1* shows the estimated extent of the maternal wage gaps in the countries examined. They are estimated using three methods: a) without controls, b) taking the observed characteristics (age, education, region) into account, and c) additionally controlling for labour market and parenthood selection effects. Non-significant estimates are coloured in white.

Based on the most relevant elements of the institutional environment, the countries are classified into three groups. The first group includes Southern European countries, where maternity leave is usually short, childcare avail-



ability is low, and social norms are conservative. *Figure 8.4.1* reveals that in these countries, mothers do not face a wage penalty, and actually earn more on average than childless women. This is due to the fact that a significant proportion of mothers leave the labour market permanently following the birth of their children; however, mothers who do work are especially motivated and highly capable, and return to work after a short leave. The second group mainly includes Western European countries, with relatively generous, moderate length maternity leaves, a high availability of childcare and flexible work arrangements, and societies supportive of mothers' work after having children. In these countries, alongside the higher employment rates of mothers, there is a moderate motherhood wage penalty, related to the wide-spread availability of part-time employment and related lower wages.

**Figure 8.4.1: Average wage differences between mothers and childless women by country**



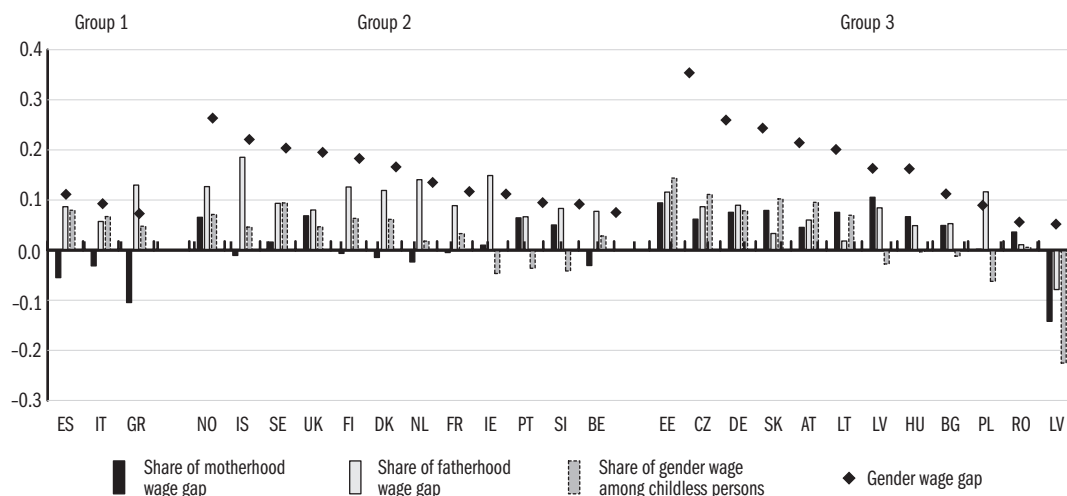
Source: Authors' calculations from the *EU-SILC* database (2004–2014).

The third group consists of Central and Eastern European countries, including Hungary, with typically very long maternal leaves, low availability of childcare and flexible work arrangements, as well as traditional social norms. The highest motherhood wage penalty is seen in this group: mothers return to their protected jobs after long absences, which has a negative impact on their promotion prospects and wages. Fathers receive a – fairly substantial – wage premium in each of these countries.

*Figure 8.4.2* indicates how motherhood and fatherhood wage gaps, as well as the gender wage gap among childless individuals, contributed to the overall gender wage gap. The gender wage gap in Southern European countries is due to the fatherhood wage premium and the wage gap among childless individuals, while the motherhood wage premium has a negative impact on it. In Western European countries, the role of fatherhood premium is decisive.

The motherhood wage penalty contributes to a smaller but still significant extent, as does the wage gap among childless individuals. In Central and Eastern European countries, however, alongside the still significant fatherhood wage premium, the role of the motherhood wage penalty is also decisive.

**Figure 8.4.2: The contribution of the motherhood and fatherhood wage gaps and the gender wage gap among the childless to the overall gender wage gap**



Source: Authors' calculations from the *EU-SILC* database (2004–2014).

These findings suggest that Hungary and other countries with similar institutional systems could significantly improve the relative wages of women with policy measures that encourage the earlier return of mothers to the labour market and the better reconciliation of work and family. These measures include: increasing the flexibility of the length of paid parental leave, expanding childcare provision – especially nursery places –, increasing the length of paternal leave and promoting its uptake, supporting the spread of flexible work arrangements, and shaping public opinion regarding the employment of mothers and the more active participation of fathers in childcare.

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## K8.2 Opportunities provided by the Hungarian Birth Cohort Study

BALÁZS KAPITÁNY & ZSUZSANNA VEROSZTA

Cohort '18 (the Hungarian Birth Cohort Study) is a longitudinal study launched by the Hungarian Demographic Research Institute of the CSO.<sup>1</sup> The structure of the survey is presented in *Figure K8.2.1*.<sup>2</sup>

The study aims at providing a comprehensive overview of children growing up in Hungary and the factors influencing that childhood. The questions included are multidisciplinary in order to collect data on several aspects (demographic, social, psychological, health etc.) of the welfare of children and young adults as well as the factors affecting it and to assess the multiple interactions among them.

The comprehensive analysis of the raising of children evaluates *the various indicators of growing up*. These outcomes cover several areas including physical development, cognitive development, socio-emotional development, health, wellbeing, performance and (in future stages) mobility.

The study aims at both identifying the *determi-*

*nants of growing up* and evaluating their *impacts*. Family and social environmental factors (socialization), social disparities, access to institutions, health as well as the employment position, lifestyle, supply of information, the expectations and plans of the family raising the child are considered decisive in how the child develops.

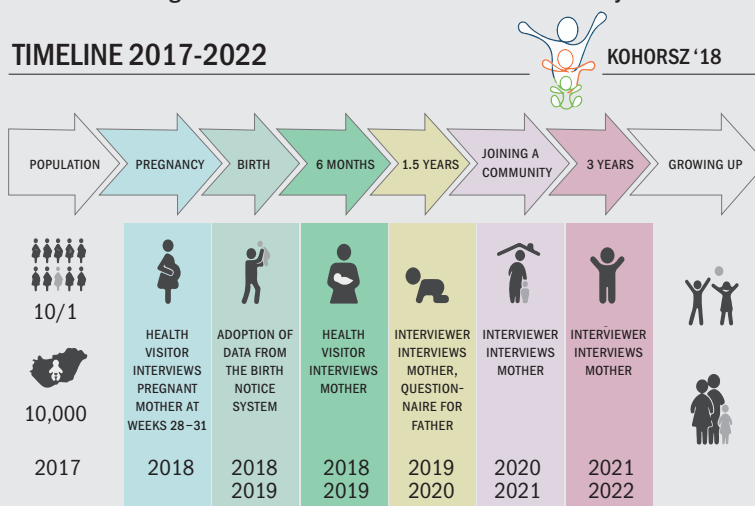
The ongoing waves of data collection (gestational and 6-month-old survey) will provide excellent opportunities for exploring the following areas, among others: division of work within the family and its modification after the birth of children, exit from the labour market prior to giving birth, the labour market plans of women and their realisation before and after giving birth, the circumstances of an early return to employment of women with young children and the take-up of family benefits and social benefits by families with young children with various types of employment contracts.

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- 1 The study was funded from the grant HRDOP 1.9.4. – ECOP-16 Ministry of Human Capacities (Renewing Methodology and Informatics in the Social Sector).
- 2 For more details on the survey, see the survey website, ([kohorsz18.hu/en](http://kohorsz18.hu/en)), and the research documentation publication: Veroszta (ed.) (2018).

Figure K8.2.1: Structure of the Cohort'18 survey



## 9 DIVISION OF LABOUR IN THE HOUSEHOLD\*

ÁGNES SZABÓ-MORVAI

Describing the labour market situation of women can only be made complete if tasks outside paid work are also taken into account. Furthermore, reconciling work and private life and sharing household tasks within the family are not only important for the labour market opportunities of women but also for the decision of the family to have children, the wellbeing of family members and the development of children. Empirical research shows that in the dual-earner model, families have more children when the mother is able to reconcile the requirements of paid work, children and the household, and where the mother has better chances to find employment (see for example *Prifti–Vuri*, 2013, *Rønsen*, 2004, *Rindfuss–Brauner-Otto*, 2008). In addition to flexible worktime, sharing the housework by partners may also contribute to that consequence. In his comprehensive literature review, *Blaskó* (2010) found that for the balanced and healthy development of children, the key is not how old the child should be when the mother returns to work (preferably after the age of one) but that the return should match the expectations of the mother and that a balance between work and private life should be achieved. The amount of time spent with the father also plays an enormous role in the development of the child: for example it supports considerably the development of social skills (*Huerta et al.* 2013). Highly qualified fathers were found to recently be spending more time with their children in several countries (*Chalasani*, 2007).

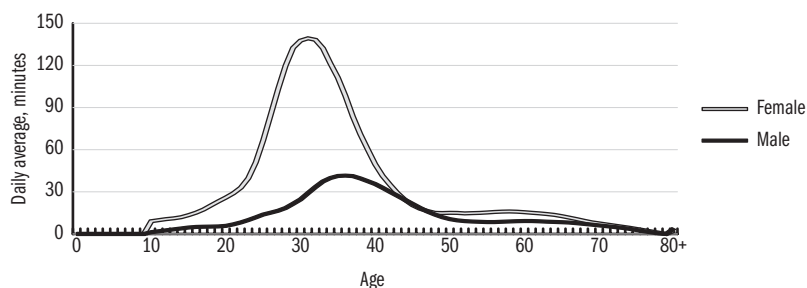
Sharing the housework within the family is strongly associated with the paid work of the wage earners of the family: they are probably interrelated (see for example *Becker*, 1965). Thus the division of work between women and men at home is highly dependent on the relative labour market position of spouses or partners. The share of the housework men undertake increases with the strength of the relative position of their wife or partner (*Rizavi–Sofer*, 2009), which is consistent with the predictions of theoretical works (*Chiappori*, 1997). Nevertheless, surveys show that the division of work is considerably influenced by traditional attitudes to roles, since the share of women in housework does not decrease further over time, even if they earn as much as, or more than, their partner (*Sevilla-Sanz et al.* 2010, *West–Zimmerman*, 1987).

Figures 9.1–9.4, based on the 2010 Time Use Survey of the CSO, indicate how much time women and men of a certain age spend doing various activities every week on average (for more details see *Gál et al.* 2017). The majority of childcare is carried out by women: there is a striking difference between the genders at childbearing age (between 20 and 40), which reaches a balance by the age of 45 and later on stays almost the same. It may largely contribute

\* I would like to thank *Róbert Iván Gál*, *Endre Szabó* and *Lili Vargha* for providing me with the Figures prepared from data of the Time Use Survey of the CSO.

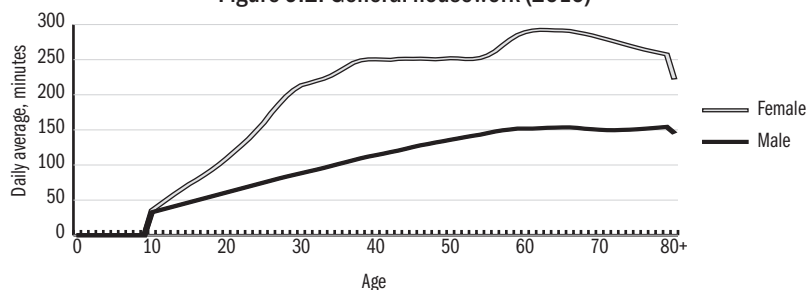
to the relatively great difference that a significant proportion of women do not return to employment until their children are three years old (*Figure 9.1*).

**Figure 9.1: Time spent with childcare broken down by age (2010)**



*Figure 9.2* shows the overall differences in housework. From the age of 10, Hungarian girls carry out increasingly more housework than boys: twice as much (about two hours a day on average) at the age of 20 as boys of the same age (one hour a day on average). The rate remains the same during the years of employment and later, in retirement. This suggests that in Hungary it is not so much the relative labour market position but rather the traditional gender roles that determine the division of housework between the genders.

**Figure 9.2: General housework (2010)**



Hungarians undertake relatively little unpaid work outside the household, a considerable proportion of which is time spent visiting children by divorced parents, mainly men (*Figure 9.3*).

**Figure 9.3: Unpaid work carried out outside the household (2010)**

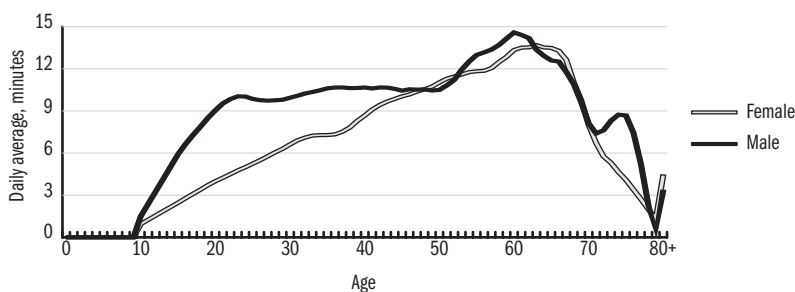


Figure 9.4 presents the time spent doing paid work during the individual life course. The greatest difference in paid work between men and women is seen around the childbearing age, typically around the age of 30, as mothers generally stay at home with children, while fathers increase their labour supply.

Figure 9.4: Time spent doing paid work during the individual life course (2010)

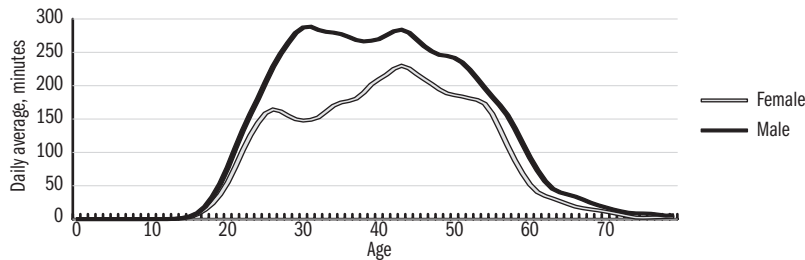
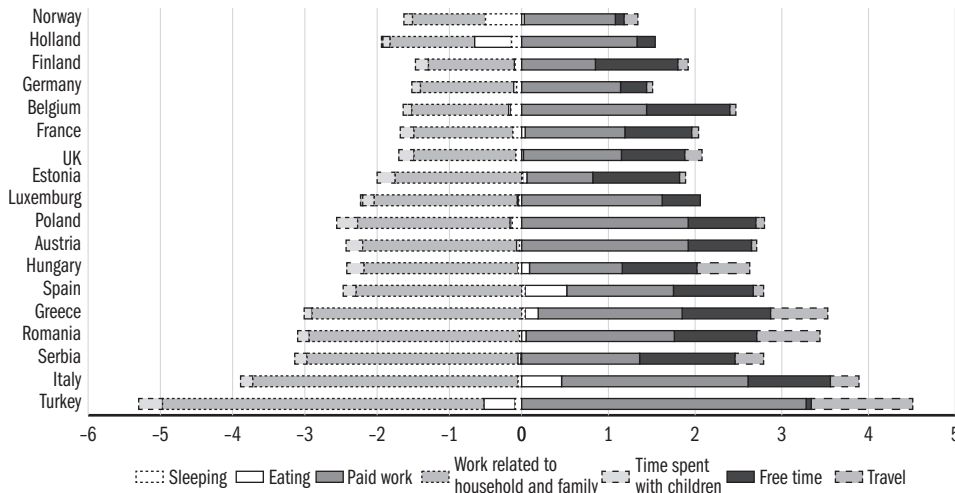


Figure 9.5 relies on data from the 2010 Time Use Survey of Eurostat.<sup>1</sup> It presents the differences in the time spent on the major groups of activities between men and women. Values to the left of zero indicate the extra time spent by women, values to the right of zero indicate the extra time spent by men. In most European countries, men work 1–3 hours more paid work per day, while the extra time of women spent on housework and childcare is similar. In the Southern and Eastern European countries, including Hungary, there is a relatively large difference: women do a total of 1–2 hours a day more paid and unpaid work on average, while in the Northern and Western countries this difference is negligible.

<sup>1</sup> Eurostat 2010. Including: Population and Social Conditions/Living conditions and Welfare/Time Use Survey (TUS).

Figure 9.5: Differences in the average time spent by men and women on certain activities per day in the European countries (2010)



Note: Negative values indicate the extra time spent by women, while positive values indicate the extra time spent by men. In the interest of clarity, categories of activities requiring little time were not included in the Figure, therefore the activities do not add up to 24 hours and the overall male-female difference does not equal zero.

Source: Eurostat, Time Use Survey, 2010.

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### K9.1 Spillover between work and private life\*

BEÁTA NAGY, GÁBOR KIRÁLY & MÁRTA RADÓ

According to spillover theory, the experiences one undergoes in one area of life positively or negatively influence (spill over to) another area. This spillover takes place in both directions: from private life to work and from work to private life. This study only explores the latter. Scientific papers (*Greenhaus–Powell, 2006*) usually differentiate between affective and instrumental spillover between work and family. Affective work-family spillover means taking home one's feelings and attitudes from work, while the transfer of skills is called instrumental spillover.

In the work-family spillover literature, temporal and spatial flexibility receives special focus. Flexible work arrangements may significantly support the reconciliation of work and family obligations but also often make establishing and maintaining borders between various areas of life difficult.

At the same time, the flexibility of work is also a privilege that not all groups possess. Men tend to be able to choose their place of work more flexibly than women. Similarly, individuals with a higher social status are more likely to have a job that does not require permanent presence and, in this way, may be carried out remotely.

As part of the Omnibus survey by TÁRKI, the study titled *Dilemmas and Strategies for Reconciling Family and Work (K104707)* by the Hungarian Scientific Research Fund explored, on a representa-

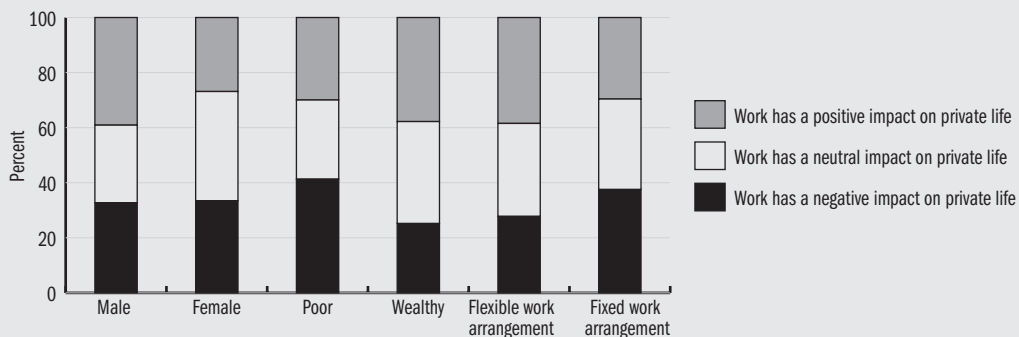
tive sample of the Hungarian adult population, in May 2014, to what extent work spills over to private life, merging negative and positive spillover effects in one index. The analysis primarily concerned the association between gender and spillover. *Figure K9.1.1* presents differences in spillover according to gender, financial well-being and flexibility of work. It shows that men, those enjoying financial well-being and those with more flexible work arrangements reported more positive spillover.

Then it was examined whether spillover is independent of gender if the flexibility of work and financial well-being are controlled for (*Figure K9.1.2*). The model below shows that after controlling for financial well-being and the flexibility of work, spillover is independent of gender.

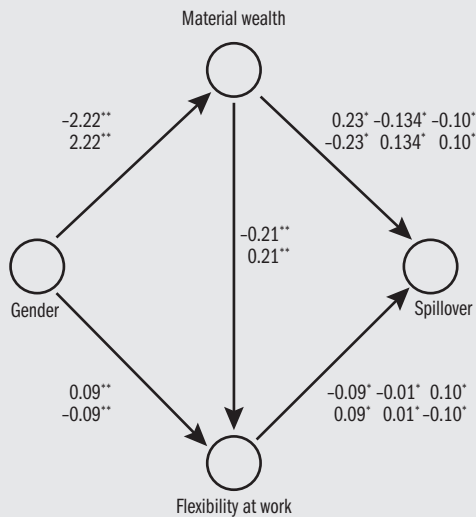
In order to better understand the estimated parameters of *Figure K9.1.2*, the categories of the variables should be examined in more detail. The gender variable assumes the value 1 if the respondent is male and the value 2 if the respondent is female. The financial well-being variable assumes the value 1 if the respondent is poor and the value 2 if the respondent is rich. The 'flexibility of work' variable assumes the value 1 if the respondent has flexible work arrangements and the value 2 if he or she has fixed work arrangements. Finally, the value of the *spillover* variable is 1 if work has a negative effect on private life, 2 if it has a neutral effect and 3 if it has a positive effect.

\* The detailed analysis in English is included in *Radó et al. (2015)*.

Figure K9.1.1: Spillover by gender, material prosperity and flexibility of work



**Figure K9.1.2: Parameters estimated for the path model**



Note: The graphical presentation of the loglinear path model also shows the estimated parameters on arrows. Provided that a hypothetical graph has two nodes ( $A$  and  $B$ ): if  $A$  and  $B$  were binary variables, only the non-redundant parameters related to the lower value would be provided. On the other hand, if two or three categories were related to  $A$  or  $B$ , all parameters would be provided. The estimated parameters in the  $i^{\text{th}}$  row and  $j^{\text{th}}$  column of arrow  $AB$ , correspond to the  $i^{\text{th}}$  value of  $A$  and the  $j^{\text{th}}$  value of  $B$  respectively.

Significance levels  $*** p < 0.01$ ,  $** p < 0.05$ ,  $* p < 0.1$ .

In conclusion, women are significantly less likely than men to have a job with a positive effect on family life, even though spillover is independent of gender, if financial well-being and flexible work arrangement are controlled for. This is because women are less likely to report financial well-being and flexible work arrangement, which would increase the possibility of positive spillover.

Our analysis revealed that gender disparities are caused and maintained by various social inequalities such as access to flexible work arrangements and subjective financial well-being. The results confirmed that men are characterised by better subjective financial well-being. The study also revealed that after controlling for subjective financial well-being, men are more likely to perceive they are able to influence their working conditions. The findings point out that equal access to flexible work arrangements and increasing the perceived financial well-being of women significantly improve the social position of women both directly and indirectly.

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## 10 CLASSIC LABOUR MARKET DISCRIMINATION

ANNA LOVÁSZ & BORI SIMONOVITS

The simplest definition of labour market discrimination is the following: members of a certain group receive unequal treatment – for example, during recruitment, wage setting, or promotion – compared to another group, and this differentiation is not based on their productivity but on their membership in the particular group (for example based on gender, age, ethnicity) (*Arrow*, 1998, *Loury*, 2002). As a result of discrimination in the labour market, the members of the disadvantaged group may have, on average, a lower employment rate, occupational level, and wage.

In addition to their productive characteristics, the labour market situation of employees also depends on their individual preferences. This determines which jobs they apply for given their level of human capital, how much time they spend working, and how much effort they put into getting promoted. The main difficulty of measuring discrimination empirically is that the *actual* productivity and preferences of individuals are rarely observed. This makes it difficult to establish to what extent any observed mean differences in wages and other outcomes at the group level are a consequence of discrimination, and to what extent are they due to the different characteristics and preferences of the groups.

Characteristics and preferences seen in the labour market are also influenced by discrimination prior to entering the labour market (for example, when teachers or parents discourage girls from choosing certain areas of study). Pre-labor market differences in group-level characteristics may be further increased by the expectations of the discriminated group: they may invest relatively less in their human capital if the expected returns in the labour market are smaller. Discrimination should therefore be regarded as a cumulative process, often manifesting in more than one area (*Blank et al.* 2004).

### The situation in Hungary

In view of the above theoretical considerations, we assess the available data sources in order to analyse the extent of labour market discrimination against women in Hungary. First, using the 2016 Wage Survey, various specifications of the gender wage gap are estimated. Next, the occurrence of discrimination is described using the limited labour market discrimination tests, data on the legal cases brought in front of the Equal Treatment Authority (ETA), and population surveys on the perception of labour market discrimination.

#### *Gender wage gap estimates*

Public and political discourse often cites the gender wage gap as evidence of discrimination against women. However, when interpreting any wage differ-

ences, it is important to be aware of what they actually measure – and what they don't. We estimated the gender wage gap in the private sector using data from the *Wage Survey* (Table 10.1). The estimated wage equations contain the logarithm of wage as the dependent variable, and the unexplained (residual) wage difference is represented by the coefficient of the female dummy variable. The advantage of relying on an administrative database is that it is representative; however, due to unobserved differences (for example, ability or motivation) these estimates do not precisely measure discrimination.

**Table 10.1: Gender wage gap estimates, private sector**

Dependent variable	(1)	(2)	(3)	(4)	(5)
	logarithm of monthly wages	logarithm of hourly pay			
Female coefficient	-0.136***	-0.093***	-0.130***	-0.123***	-0.092***
Control variables					
Educational attainment			x	x	x
Experience				x	x
Region				x	x
Type of employment contract				x	x
Occupation					x
Number of observations	159,752	159,753	159,753	159,753	159,753
R <sup>2</sup>	0.010	0.006	0.285	0.332	0.379

\*\*\* Significant at the 1 percent level.

Source: Authors' wage equation estimates based on the 2016 Wage Survey.

The model in column (1) of Table 10.1 shows the raw average wage gap in monthly wages. The estimated coefficient is 0.136, thus women's pay is 13.6 per cent lower than that of men. The monthly wage gap is partly due to the fewer hours women work. Therefore the hourly wage gap presented in model (2) is closer to the extent of labour market discrimination, and shows a smaller difference of about 9 per cent. Model (3) controls for the effect of gender differences in educational attainment on the wage gap. Accounting for these, the wage gap increases to 13 per cent, showing that women have higher educational attainment on average, and if this is also taken into account, their wage disadvantage is greater. We should note that so far as differences in educational attainment depend on innate skills and preferences, it is important to control for them, since the resulting wage differences are not due to labour discrimination. At the same time, by including education-related control variables, we restrict the estimation to the short-term impact of labour discrimination, and exclude the impact of any pre-labor market discrimination.

Model (4) controls for additional observed individual characteristics:<sup>1</sup> work experience, region, and the type of employment contract. When work experience is controlled for, the impact of child-related labor market absences – whether they are a result of individual preferences or external pressure – are also eliminated. The estimated wage gap barely changes after including these

<sup>1</sup> The control variables were included in order to account for the effects of dissimilar characteristics, but at the same time, the effects of any discrimination that occurs through these variables are also excluded from the estimated wage gap.

controls: it decreases to 12 per cent. Model (5) additionally controls for occupation (based on the first digit of the HSCO code) and the unexplained wage gap is reduced to 9 per cent. However, we do not know, to what extent the part controlled for by the inclusion of occupation variables is due to the individual preferences of women (for example they do not wish to work in better paid but more stressful positions), and to what extent it is due to discrimination by employers (for example, women are not hired or promoted into certain types of occupations). Therefore, this estimation may underestimate the extent of labour market discrimination.

### *Discrimination testing and legal cases*

Labour market discrimination testing, which is increasingly popular in the United States and in Western Europe (see *Bertrand–Duflo*, 2016), is able to measure the extent of employers' discrimination present in an area more precisely, because it is based on controlled experiments. The limitations of the method include the fact that the results come from a small sample and thus are not representative, that it usually provides information only on the first phase (application) of finding a job, and also that it is costly and therefore rarely used. In Hungary, the last comprehensive testing of the differences in the opportunities for entering the labour market (by sending CV-s and applying via the phone) took place in 2008 (see *Sik–Simonovits*, 2008). The extent of rejection due to gender was measured in the occupations of shop assistant, bartender/catering staff, cleaner, courier, and telemarketers via telephone applications, and the study pointed to the (approximately 20 percent) disadvantage of men in these positions. The fact that employers prefer hiring women for certain jobs suggests that the occupational segregation revealed by the above wage gap estimation is not exclusively due to the preferences of employees.

The results of legal cases can also confirm the presence of discrimination in individual cases. These findings cannot be generalised, because the official statistics available only show 'the tip of the iceberg'. Adopting the equal treatment and equal opportunities laws<sup>2</sup> in accordance with European directives was a precondition to the EU accession of Hungary. The institutional system for enforcing the laws is ensured by the Equal Treatment Authority (ETA), established in February 2005. The legal cases of discrimination reported in a given year are available on the ETA website,<sup>3</sup> and based on this, the number of cases investigated and the number of decisions on gender discrimination seem very low: in 2018 the ETA found infringement in only 10 cases out of a total of 24 cases investigated, and a settlement was reached in 14 cases.

### *Perception of labour market discrimination*

Questionnaires on the perception of discrimination provide representative information on the perceptions of the population, but it is questionable how

2 Act CXXV of 2003 of Equal treatment and the promotion of equal opportunities.

3 [ETA](#).

precisely they measure the actual extent of discrimination. Opinions on these offences are highly dependent on individual factors (sensitiveness, judgement of the situation) as well as the legislation and culture of the given country (if it is a matter of shame or it is acknowledged) (*Sik-Simonovits*, 2010). The database of the European Institute for Gender Equality (EIGE)<sup>4</sup> shows that, based on responses to the Eurobarometer questionnaire, a relatively high share of Hungarians (12.5 per cent) think that discrimination against women is a significant problem: this is the 4<sup>th</sup> highest share among EU member states.

A comprehensive survey titled ‘Women’s affairs 2018’ was recently carried out regarding how Hungarian women feel about the division of labour in the family and labour market participation (*Gregor-Kováts*, 2018). The survey – conducted at the end of 2017 – showed that the four major groups of problems affecting the lives of Hungarian women are the following: 1) being a single parent, 2) raising a permanently ill child, 3) the expenses of raising a child, and 4) the low pay for part time work. Lower-status women were especially likely to report work and subsistence related problems, while gender-specific problems (such as the conflict between work and family life, the difficulties of returning to the labour market following maternal leave) were primarily reported by higher status women. This trend also reveals the hidden problems of perception surveys. Discrimination in a wider sense – including unequal treatment and the lack of appreciation – accounted for nearly one-tenth (9 per cent) of the total gender-specific problems reported ( $N = 688$ ); discrimination was spontaneously reported by nearly every fifth female respondent (19 per cent) in the 50–59 age group.

### Conclusions

Labour market discrimination against women is difficult to prove and to measure. Results based on different methods indicate a certain level of labour discrimination against women exists in Hungary; however, the disadvantage caused by this is difficult to quantify precisely. Estimates based on the Wage Surveys reveal an unexplained gender wage gap of about 0.09–0.13. The scarce available testing results point to occupational segregation and the related preferences of employers. The small number of legal cases suggests that rights awareness and demand for legal remedies are weak in the society. Perception surveys indicate that various forms of discrimination against women are present in the labour market and other areas of social life, and the problem is the most severe among older women.

<sup>4</sup> Gender Statistics database.

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### K10.1 Labour market discrimination, 1995–2016

GÁBOR KÖRÖSI

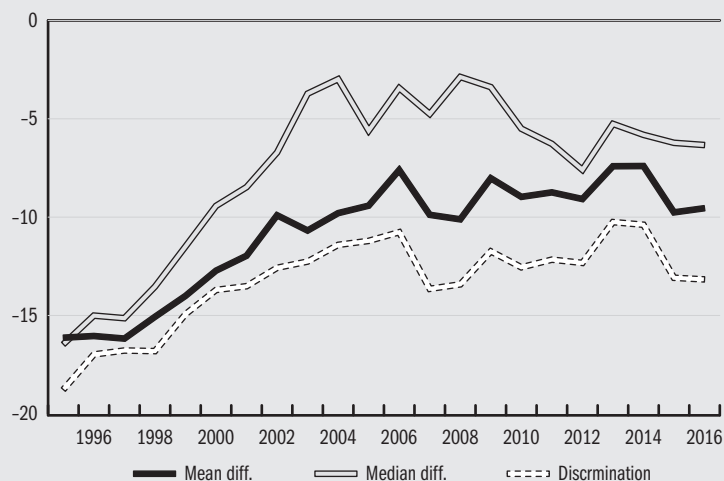
The wage survey data is available annually since the 1990's in a mostly comparable structure. Thus, the wage model can be estimated for two decades with a slight modification. It is eminently interesting how the gender wage gap changed over this period. A model very similar to Model 4 in Table 10.1 was estimated for the period between 1995 and 2016. The labour contract type had to be omitted from the regression. *Figure K.10.1* presents these estimates, together with the raw wage gap.

The gender wage gap declined until 2006, and stagnated afterwards. It is clear that the raw wage gap was not only smaller than the true discrimina-

tion, measured in a wage model, but the 'true' discrimination decreased less than one would guess from the raw gender wage gap.<sup>1</sup> *Figure K.10.1* also presents the difference in the gender specific median wages: the difference between a 'typical' female and a 'typical' male employee is significantly smaller than the average difference, indicating that the two wage distributions are different. That also means that the gender wage gap is not uniform for all.

<sup>1</sup> The raw gender wage gap is given by Model 1 in Table 10.1.

Figure K.10.1: Gender wage gap, hourly wage rate, corporate sector (percentages)





## 11 THE INSTITUTIONAL CONTEXT

### 11.1 CHANGES IN THE REGULATORY ENVIRONMENT AFFECTING FEMALE EMPLOYMENT

ÁGNES MAKÓ

This paper summarises the main changes to the regulatory environment affecting women's employment which have taken place in the past ten years, including child benefits, changes in the tax and pension systems as well as the various labour market policy instruments.

#### Child benefits

As a result of the cost cutting measures of the government in 2009, the upper age limit of granting a family allowance for children studying at school was reduced from age 23 to age 20 and its amount was frozen. As none of the ensuing governments have raised the amount since then, the amount of the family allowance has been unchanged since 2008 (see *Table 11.1.1*) (see Act LXXXIV of 1998).

**Table 11.1.1: The monthly amount of the family allowance per child, since 2008 (HUF)**

	Two parents	Single parent
One-child family	12,200	13,700
Two-child family	13,300	14,800
Family with three or more children	16,000	17,000
Family with a permanently ill or disabled child	23,300	25,900

Source: Act LXXXIV of 1998.

In 2009, the duration of the universal extended parental leave (*gyes*) and the parental leave (*gyed*) previously paid for the first three years of a child equaling the minimum old-age pension was maximised at two years in the case of children born after 30 April 2010 (Act LXXIX of 2009). Additionally, in order to be eligible for the pregnancy and confinement benefit (*terhészeti és szülési segély*) and the parental leave (*gyed*), women should have been insured for 365 days instead of an earlier 180 days. In December 2010 the new government extended the duration of parental leave (*gyed*) for three years again. The law was effective retrospectively, and in this way women who gave birth between April and December 2010 were also eligible for the benefit for three years. The new regulation granted the benefit for mothers after their return to employment only when they worked part-time for four hours a day (previously, after the child turned one year old, mothers were able to work full time and claim the extended parental leave [*gyes*]). By amending the family support law (Act LXVI

of 2010) the government introduced the category of extended parental leave for adoptive parents, which enabled all adoptive parents adopting a child younger than ten years to claim extended parental leave for six months. (Previously it was only possible when adopting children aged three or younger.)

In accordance with Act CCXXIV of 2013, the so-called '*gyed* extra', since 1 January 2014 after the first birthday of their child parents can pursue an economic activity without any limitation on the time worked, while continuing to receive *gyed* or *gyes*. (Pursuant to the earlier regulation, it was not possible to work at all while receiving *gyed* and work part-time while receiving *gyes*.) If a family has another child born on or after 1 January 2014 while still receiving one of the child benefits for their previous child/children, they can now receive both benefits. As mentioned, restrictions on work while receiving *gyes* or *gyed* after the first birthday of the child have been abolished. The same Act introduced the childcare fee (*gyed*) for students in higher education. This makes full-time higher education students and those within a year after graduation eligible for *gyed* until the first birthday of their child.<sup>1</sup>

The name of the pregnancy and confinement benefit (*terhészeti*) was changed to baby-care allowance (*cse*) on 1 January 2015, retaining the same eligibility conditions (NHIF, 2015). Since 1 January 2016, the law has enabled full time work while receiving childcare benefits after the child reached 6 months of age (NHIF, 2016). On 1 January 2018 the duration of *gyed* for students was extended from one year to two years (HST, undated).

Mothers paying back a student loan, with children born after 1 January 2018, are able to request suspension of the repayment after the third month of pregnancy. Half of the debt of women with a student loan giving birth to their second child after 1 January 2018 was waived as a form of non-refundable interest subsidy. Upon giving birth to their third child (or further children), all of their debt is written off.<sup>2</sup>

### Tax regime

The government significantly increased the extent of family tax credits in 2010. Act CXVII of 1995 on the personal income tax was amended by Act CXXIII of 2010, enacting the new tax regime on 1 January 2011. As opposed to earlier legislation, this includes tax credits for families with one or two children although to a smaller extent than that for families with three or more children. The family tax credit can only be claimed once for each child and may be shared among parents or partners living in the same household (Kormányi, 2011). A government decision in 2014 gradually increased the tax credit of families with two children from 10,000 to 20,000 HUF between 2016 and 2019 (the amounts are included in Table 11.1.2) (NTCA, 2017).

After amending Act LXXXIV of 1998, children placed in temporary care at the request of, or approval by their parents must be regarded as children

<sup>1</sup> Act CCXXIV of 2013.

<sup>2</sup> Preferential treatment related to Student Loans.

raised in the household as of 1 January 2018, and thus may be taken into account for the family tax credit (*NTCA*, 2017).

**Table 11.1.2: The monthly amount of family tax credit per child, 2011–2018 (HUF)**

	One-child family	Two-child family	Families with three or more children
2011–2015	10,000	10,000	33,000
2016	10,000	12,500	33,000
2017	10,000	15,000	33,000
2018	10,000	17,500	33,000

Source: National Tax and Customs Administration (*NTCA*, 2017).

### Pension system

As of 1 January 2011, women have been entitled to preferential retirement regardless of the retirement age, which is regulated by Act CLXX of 2010. Irrespective of their age, they are entitled to full old-age pension if they have at least forty year of insurance and they are not insured from the day starting their retirement. In terms of pension, insured periods include periods of economic activity and the periods of receiving childcare benefits.

### Labour market policy instruments

#### *Development of nurseries*<sup>3</sup>

Pursuant to the amendment of Act XXXI of 1997 on child protection by Act IX of 2002, it is obligatory to provide nursery care in all settlements with a population of at least ten thousand persons from 1 January 2005 onwards.

The most recent amendment of the Act in 2015 (Act CCXXIII of 2015) provides that from 1 January 2017 it is compulsory to organise nursery care not only in settlements with a population of at least ten thousand but also where there is a demand for it by at least five children or the number of residents of the settlement below three years of age exceeds 40 persons. The deadline for fulfilling the obligation was 31 December 2018.

The same amendment introduced three forms of provision in addition to the (classic) nursery: the mini nursery, the workplace nursery and the family nursery. At the same time, it abolished the family day care centre as of 1 January 2017. Family day care centres used to provide care for children aged 20 weeks to 14 years old but from 2017 onwards they have been only able to provide care for children younger than three years and operate under the name family nursery. Meeting these requirements, they continue to be eligible for per capita state funding. Care for children older than three years is provided by for-profit child day care centres, which are not granted state funding.

As of 1 January 2016, Act CCXXIII of 2015 extended the teacher career scheme to include nursery staff with a higher education qualification. This entitles nursery staff with a higher education degree, employed in a pedagogic

<sup>3</sup> The author hereby wishes to thank *Agota Scharle* for her assistance with the section ‘Development of nurseries’.

position to a wage supplement. In line with Government decree 416/2015. (XII. 23.), the national budget allocates funding for nursery operators for the wages of early childhood education staff with a higher education degree.

The state contributes to the operation of nurseries in the form of per capita funding specified in the budget act, amounting to 494,100 HUF/person annually, which did not change between 2010 and 2017 (CSO, 2014). Since the per capita funding does not cover the operational and maintenance costs of the institutions and the provision for children, a 2011 amendment of the child protection law [government decree 328/2011. (XII. 29.)] allows municipality-operated nurseries to collect, in addition to the costs of meals, so-called usage fees for the care from 1 January 2012 onwards. This must not exceed 25 per cent of the net income per family member of the families subject to a fee (CSO, 2013). On 1 January 2018 the per capita funding of nurseries and mini nurseries was replaced by task-based funding (Act C of 2017). The national budget in this way provides funding based on the average wage for the municipalities operating nurseries to contribute to wages and social security contributions. Additional operational costs are born by municipalities based on their tax collection capacities.

### *Protection from dismissal*

Act XXII of 1992 on the Labour Code provided that employers cannot terminate employment by regular notice during pregnancy, in the six months following giving birth and during the unpaid leave received for childcare purposes.

Act I of 2012 on the Labour Code, effective from 1 July 2012, also states that employers cannot terminate employment by regular notice during pregnancy, on maternal leave, in the six months following giving birth and during the unpaid leave received for childcare purposes and during assisted reproductive treatment. However, employees can only base their claims on these grounds if they informed the employer prior to their communicating the dismissal. The Constitutional Court in 2015 ruled that the requirement 'prior to communicating the dismissal' is unconstitutional and annulled it.<sup>4</sup> Therefore the law currently in effect states that the employee is entitled to base her claim on pregnancy if she has informed the employer and in fifteen days of receiving this information the employer is entitled to revoke the dismissal in writing.

### *Atypical forms of employment*

The stipulation of the Act I of 2012 on the Labour Code supports the return of women with children to employment, whereby parents with a child should be employed part-time at their request until the child is three years old or until the youngest child turns five years old in the case of having three or more children. The employer in this case must amend the employment contract to part-

<sup>4</sup> On protection of pregnant mothers from dismissal.

time employment equalling half of the overall full day employment but they must only accept an offer for a four-hour work day and may consider accepting a six-hour work day. Pursuant to the law, upon agreement of the employer and employee, part-time or flexible working hours may be applied at any time.

*Preferential treatment for employing members of disadvantaged groups in the labour market*

Based on Act CXXXIII of 2004, parents returning to employment within a year of the end of the childcare benefit or after their child turned one year old (while receiving *gyes*) were entitled to a Start Plus card between 2007 and 2013. The employer employing the holder of such a card was entitled to paying reduced social security contribution. Start Cards cannot be requested since 1 January 2013. The incentive system related to the employment of disadvantaged labour market groups was integrated in the job protection scheme provided by Act CLVI of 2011, which took effect on 1 January 2013. Under the job protection scheme, employers are able to pay reduced social security tax and vocational training contribution after employees with young children during or following entitlement to child benefits.

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- Act LXXXIV of 1998 on Family Support.
- Act IX of 2002 on the Amendment of Act XXXI of 1997 on the Protection of Children and the Administration of Guardianship.

- Act CXXIII of 2004 on the Promotion of Employing Entrant Youth, the Unemployed above the Age of 50, Persons Seeking Jobs Following Care-giving for Children or Family Members, and Scholarship Holders.
- Act LXXXIX of 2009 on the Amendment of Act XXXI of 1997 on the Protection of Children and the Administration of Guardianship and on the Amendment of Certain Acts on Social Welfare.
- Act CLXX of 2010 on the Amendment of Certain Acts on Retirement and Other Related Acts.
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- Act LXVI of 2010 on the Amendment of Act LXXXIV of 1998 on Family Support and Act LXXXIV of 1997 on the Protection of Children and the Administration of Guardianship in Relation to the Completion of Compulsory Education.
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## GOVERNMENT REGULATIONS

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## 11.2 FLEXIBLE WORK ARRANGEMENTS AND OTHER FAMILY-FRIENDLY MEASURES AMONG HUNGARIAN COMPANIES

ISTVÁN JÁNOS TÓTH, MIKLÓS HAJDU & ÁGNES MAKÓ

Companies might offer flexible work arrangements for their contracted employees,<sup>1</sup> which could considerably help workers to achieve a better work-life balance and promote the reconciliation between work and family life. As a result, these employment forms create family-friendly surroundings for the employees.

The empirical economic literature thoroughly addresses the question of the effect of flexible forms of employment on employee's productivity, job commitment, motivation and on the firms' productivity. The results so far (*De Menezes et al.* 2011) are controversial. While 30–60 percent of the research underlined that flexible work arrangements have a positive impact on job commitment, motivation and the productivity of the company another significant part of the research did not find any positive statistical link between these factors.

The ILO's overall analysis on small and medium enterprises (*Croucher et al.* 2013) came to very similar conclusions. According to these, flexible work arrangements might increase workers' productivity and also might promote work-life balance; they could increase workers' well-being, satisfaction, confidence and motivation although the empirical analyses did not underline the conclusion that these impacts would prevail everywhere and directly (*Croucher et al.* 2013). The analysis of the ILO particularly stresses that the gender factor has to be taken into account by the planning of policies promoting flexible forms of employment.

The new research of *Beckmann* (2016) studies the application of a certain type of flexible work arrangement, the *self-managed working time* (SMWT) by using German company panel data. According to his results, five years after its introduction, the SMWT increased the company's productivity significantly by 9 percent whilst it also raised the labour costs by 8.5 percent. The author stresses that SMWT contributed to the productivity gain both at the level of the individual (worker) and the company and this could be interpreted as the positive impact of the better incentive for workers and in connection with this the de-centralisation steps taken by the company.

The aim of this current research is to study the extent to which companies in Hungary use the different forms of flexible work arrangements and the types of companies affected. Furthermore, it also examines the link between the use of these forms and the adaptability of firms to the change of the business cycles. As the data collection analysed in our research is connected to

1 See: inc.com. The study examines three of these: 1) part-time work, 2) flexible working time and 3) home-office or remote work.



a survey on the short-term economic situation of the companies we also had the opportunity to examine the link between the companies' short-term economic situation and the use of flexible work arrangements. The use of certain types of these employment forms means the use of modern work organisation methods<sup>2</sup> at the same time and could therefore be interpreted as the proxy of the use of these methods. Our expectation therefore is, that companies using one or more types of flexible work arrangements are characterized by a better economic outlook in the given average business cycle than firms which do not use these forms because – due to the greater organisational flexibility – the former could faster adapt to the changes in the given business cycle and could make a better use of the advantages of it than companies which do not use flexible work arrangements or only to a lesser extent.

### Data

For the analysis three surveys (2013, 2014 and 2016) of the Institute for Economic- and Enterprise Research of the Hungarian Chamber of Commerce and Industry (MKIK GVI) were used which were carried out in the framework of the institution's research programme on the short-term labour market forecast.<sup>3</sup> For the data collection the interviewers visited the managers of the sampled companies personally. (At larger firms typically the HR managers while at smaller firms the owners or the executive directors.) This survey analyses such a subsample of the original data collection from which micro enterprises (with at the most 10 employees) are excluded and only those enterprises were taken into account which provided a valid answer to the questions regarding flexible work arrangements. The analysis examined the pooled sample of the three data collections. In 2013 2,976, in 2014 3,429, in 2016 4,056 companies and in total 10,461 companies were taken into account in the sample analysed.

### Flexible work arrangements and other benefits

Companies could use more types of incentives and benefits in order to help their employees with families. Based on the data collection of 2013 and 2014 67 percent of the Hungarian companies take into account the opening times and periods of the educational institutions for the organisation of the working time and for the granting of the paid-annual leave.<sup>4</sup> This is followed by the opportunity for part-time work (57 percent),<sup>5</sup> flexible working time (42 percent), school starting support (35 percent), organisation of family events (28 percent), time off work for employees with families (14 percent), opportunity for remote work/home office (11 percent), the reimbursement of holiday accommodation costs, support for children's day-care at crèches and nursery schools (3–4 percent) and finally ensuring day-care services for children (2 percent).

The data also illustrate that there are significant differences in the use of certain flexible work arrangements in Hungary and that 31 percent of the

<sup>2</sup> See Kallenberg (2001, 2003).

<sup>3</sup> See the descriptions of the data collections of 2013, 2014 and 2016 and the studies analysing the results *MKIK GVI* (2013), (2014), (2016).

<sup>4</sup> The question used in the data collection of 2016 differed from the previous ones. See question 43. on page 154 of *MKIK GVI* (2016). Therefore, the data of the 2016 survey is not directly comparable with the data of 2013 and 2014. On the one hand, non-answering decreased significantly compared to the previous surveys and on the other hand the results of the proportion on the use of flexible work arrangements were systematically lower than before. Therewith the order of the use of the flexible work arrangements studied did not change: part-time employment was the most widespread (52 percent), this was followed by the flexible working time (26 percent) and the home-office or remote work (7 percent). Consequently, the outcomes of the surveys of 2013 and 2014 show a higher proportion of flexible work arrangements than the real rates as non-answering could rather mean 'no' than 'yes'.

<sup>5</sup> These values are significantly higher than the proportion of employees in flexible forms of employment according to the Labour force survey of the CSO. The explanation for this might be that although a large proportion of companies use flexible work arrangements it affects only a small proportion of their employees.

companies did not ensure any of the three examined options – 1) part-time employment, 2) flexible working time, 3) home-office or remote work – for their employees. Additionally, 31 percent of the companies used only one, 26 percent two and only 7.5 percent all of the three preferential options at the same time.

### **The spread of flexible work arrangements – estimations**

Primarily, we studied the relationship between the examined elements of the flexible work arrangements and certain characteristics of the companies, and then we also examined its link with an important elemental indicator of the composite index of the examinations related to the business cycle of companies namely the *corporate leader's opinion on the current economic situation*. In these surveys, the answers to the question regarding the assessment of the current economic situation of the enterprise indicated the subjective opinion of the leaders interviewed (OECD, 2003) and, as such, the answers reflected the company's adaptability to the given period of the business cycle and the extent the company had been able to use the opportunities of the given cycle.

Our hypothesis regarding the economic situation of companies is that those firms which make more of the examined forms of flexible work arrangements available to their employees are more flexible and are able to react more quickly to the changes of the business cycle which also has a positive impact on their economic situation. On the other hand, in companies which do not offer any types of flexible work arrangements to their employees (and apparently are less likely to use modern work organisation practices and incentives in general) the organisational structure is rather rigid and this is accompanied by weaker adaptability and less successful economic activity. Therefore, we assume that family-friendly measures enhance the situation of employees by ensuring a better work-life or work-family balance while at the same time they could also contribute to the improvement of the companies' adaptability and flexibility.

The findings suggest that companies in the industrial and service sector use family-friendly arrangements to a larger extent: for example, the probability of part-time work and flexible working time is 22–25 percent higher at companies in the industrial sector than in the agricultural sector. At the same time the probability of the three, examined work arrangements (in order: part-time, flexible working time and home-office or remote work) in the service sector is higher by 38, 116 and 490 percent. Home-office and remote work is typical for companies in the commercial sector especially at service provider companies. The impact of the size of the enterprise is trivial: obviously, there are more positions at larger enterprises which could be transformed into flexible forms of employment than at smaller companies. Based on the outcomes the real difference exists between companies with less than 250 and those with more than 250 employees. The probability of part-time work, flexible work-

ing time and remote work at the latter is higher by 250 percent, 70 percent and 80 percent than at companies with 10–19 employees.

Majority foreign-owned firms allow part-time work less frequently, however the probability that they have employees in a flexible working time arrangement or who work in home-office or remote work is 31 and 66 percent higher. Exporting companies (with a maximum of 50 percent turnover from export and those with a turnover from export above 50 percent) are also more characterized by the use of these options: in order, the probability for flexible working time is 21 and 24 percent higher than at companies producing for the domestic market while the probability of home-office and remote work is 70 and 81 percent higher.

As regards the economic situation it seems that there is no difference in the connection with part-time employment among companies in a different economic situation while in the case of flexible working time and home-office or remote work it could be considered that companies in a favourable economic situation use these kind of flexible work arrangements with a 24–33 percent higher probability. The examination of the number of the flexible employment options – 1) part-time employment, 2) flexible working time, 3) remote work or home-office – used by the companies shows similar results. The picture is obvious in the case of foreign-owned firms: majority foreign-owned companies make multiple types of flexible work arrangements available at the same time more frequently than domestic-owned ones. This leads to the conclusion that this decision of the former companies might fit into a broader policy framework on the flexibility enhancement of the company structure. The same observation could be made in connection with exporting companies: the majority of exporters use more types of flexible work arrangements than the non-exporter companies.

There are also considerable differences by economic situation: the probability that companies in a favourable economic situation use multiple types of flexible work arrangements is 16 percent higher than at companies in a less favourable economic situation. Therefore, it is worthwhile to look at the converse of the issue and examine also separately if the number of flexible work arrangements used helps firms towards a better and more flexible adaptation i.e. the multiple use of flexible work arrangements is accompanied by a better economic situation.

The results show that the existence of this relationship is not obvious. The outcomes of the surveys in 2013 and 2014 suggested that the economic situation of firms using two or three types of flexible work arrangements simultaneously was significantly better than of those which did not use flexible work arrangements at all. If a company used all the three examined forms (part-time, flexible working time and remote work) its chances for the more favourable economic situation were 11–64 percent higher than a similar company

which did not use flexible work arrangements. These links however are not evident at all in 2016. Based on the results it could certainly be concluded that flexible work arrangements – while they contribute to the well-being of workers and the establishment of the right balance between work and family life – do not worsen the situation of companies nor decrease their chances for their adaptation to the changing economic climate.

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## 11.3 THE MAIN CHARACTERISTICS OF WOMEN IN PUBLIC WORKS

**IRÉN BUSCH & JUDIT LAKATOS**

The public works scheme was established as an answer to the unfavourable employment situation which came about due to the financial and economic crisis commencing in 2008. The scheme restarted in 2011 in a new form with special programmes including the ‘Start model programmes’ and the national and longer-term public works programmes.

Its initial goal was the activation of the inactive and the long-term unemployed and it also aimed at ensuring a transitional labour opportunity for those who had lost their jobs due to the economic crisis. The public works scheme plays an important role in the activities of the municipalities, especially where market-based labour demand is weak. With the change and improvement of the economic situation public works also has gone through continuous transformation: the number of public works participants has significantly decreased and currently its main goal is to ensure that public works participants attain a transition into the open labour market.

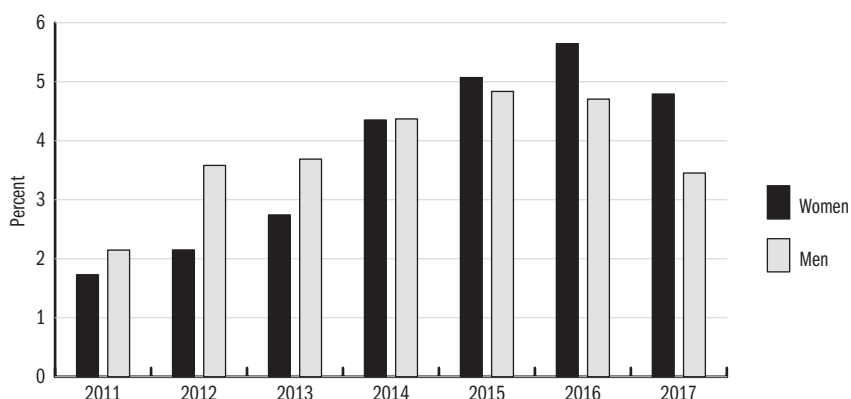
The data of the process-supporting integrated system (BM-IR) of the National Employment Service and the Labour Force Survey (LFS) of the CSO contain information on the characteristics of women enrolled in public works. The number of female public workers reached its peak in 2016 – by exceeding 112 thousand individuals and since then their number has been continuously shrinking (*Figure 11.3.1*). While the proportion of women within the total number of public workers was slightly above one-third in 2012 their number already exceeded the number of male public workers in 2016 and since that time there have been constantly more women involved than men.

Until 2013 the weight of public work in female employment lagged behind that of men. Then, in 2014 the participation rate of both men and women was 4.4 percent. It could be established that the role of public works played a more important role in female employment than in the case of men. The share of women within the public works was the highest – 5.6 percent – in 2016. Since that time their participation rate fell below 5 percent.

Over recent years the change in the composition of the educational attainment of women clearly demonstrates that public work programmes involve indeed the most disadvantaged individuals. Since 2011 the share of participants with less or no more than primary education (8 grades in Hungary) is more and more significant while the weight of women with a secondary vocational qualification and tertiary qualification shows a declining trend. The participation in public works became a less and less real alternative for younger or better educated women while at the same time this kind of employment

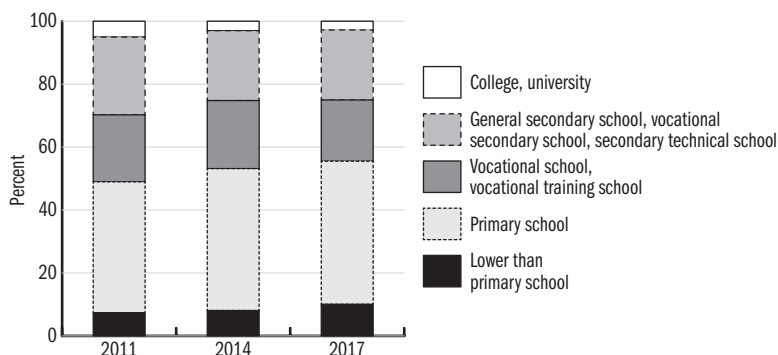
provides a sort of safety net for the unskilled or the older workers as well as for those living in a settlement which is lagging behind.

**Figure 11.3.1: The share of women within public workers according to the BM-IR compared to the number of employed women according to the LFS (percent)**



Source: Own editing based on BM-IR and LFS.

**Figure 11.3.2: The share of female public workers by educational attainment (percent)**



Source: Own editing based on the data set of BM-IR and the National Info-communication Service Zrt. (NISZ).

As well as the decline in the number of public works participants – and thus the decline of the female participants – those individuals have to be mentioned too who in spite of the favourable labour market conditions and the labour shortage in certain sectors are not able to leave public works. This is measured by the so-called locking-in indicator, which shows the number of months spent in public works by the individual before entering into public works referring to a certain period of time. If this indicator exceeds 12 months in the last three years the individual is considered to be locked-in in public works. In 2017 59.1 percent of women and 69.7 percent of men were recorded as locked-ins in the public works. Consequently, the long-term par-

ticipation in public works is less typical for women than men. Locking-in, however is more frequent among women over the age of 50 out of whom 72 percent belonged to this category. (In the case of 50+ men this proportion was 77.4 percent.) In 2017 the share of women below the age of 25 who were considered as locked-ins was 24.0 percent while in the case of women of the best working age (25–50 years) this proportion was 57.9 percent. After six months of leaving the public works 23.7 percent of women below 24 and 12.3 percent of women above 50 were in employment in the primary labour market. The same exit rate was only 4.8 percent among women with less or no more than primary education while among women with a tertiary qualification it was 44.5 percent.

In the labour force survey of the CSO the number of individuals<sup>1</sup> who chose ‘public works participant’ as labour market status was 190.9 thousand in the third quarter of 2017<sup>2</sup> which is 8 percent higher than the average staff number according to the administrative register on public workers in the same period however it was broadly consistent with the data calculated from the monthly average staff numbers.

Out of the 190.9 thousand public workers 104.5 thousand were women. More than half of female public workers lived in a household where they were the single person in employment (in a low-paid job). Or if there was another employed person in the household he/she was public worker too. This leads directly to the consequence that the per capita income in the majority of the households of public worker women was only enough to join the lowest income deciles. The proportion of those household members who work in the primary labour market was the highest in the age group 30–49 – to which half of the public worker women belonged. Nevertheless, this proportion barely reached 50 percent. The labour market characteristics of the households of male public workers seems to be even more unfavourable. Only less than one-third of their households had a ‘normal’ (primary labour market) employee and – not entirely independent of this – the proportion of households where the employed person was hired in the framework of public works was even larger than in the case of women.

Over the study period a child below the age of 15 was growing up in 45 percent of the households of female public workers while at least three children lived in 13 percent of the households. An undeniable advantage of the public works for mothers is that the employment is ensured at the place of residence and therefore it is more reconcilable with their child-care duties than a normal market job which in spite of the higher potential income would require daily commuting. 15 percent of the public worker women claimed themselves to be Roma. Public worker women were the single earners in 30 percent of the non-Roma households while this proportion was 38 percent in the case of Roma women.

1 As the result of the weighting

2 Due to the rotation-panel nature of the survey the analysis was limited to a typical quarter from the respect of public work.



## 12 DILEMMAS OF FEMALE40

ANDRÁS SIMONOVITS & MELINDA TIR

The program Female40 has been in operation in Hungary since 2011: basically it allows every Hungarian woman, who fulfills the eligibility criterion of working and caring small children for at least 40 years, to retire below the full benefit retirement age, without any actuarial deduction. Since 2012 any other channel for early retirement (with or without actuarial deduction) has been closed down. This dual system is unique to Hungary; in our opinion, it is dysfunctional and only the political circumstances keep it alive: the government prides itself on the generosity of Female40, while the opposition proposes its extension rather than its replacement with an international standard flexible (variable) retirement age.

In our study, first we present the data, then evaluate the program's advantages and disadvantages. Our starting point is *Augusztinovics* (2005) and *Augusztinovics–Köllő* (2009), which called attention to fragmented careers. In addition to *Mihályi–Vincze* (2016), we rely on the following papers: *Czegledi et al.* (2017), *Granseth et al.* (2019) and *Simonovits* (2018).

We commence the presentation of the data with the number and age of females who retired between 2007 and 2016 (*Table 12.1*). With a break on the rise between 2009 and 2012, the full benefit retirement age rose from 61 to 63.5 years (it was only 55 years in 1996). The number of new retirees jumped in two years: in 2007 due to the anticipation of the next year's drop in initial benefits; and in 2011 due to the sudden opening of Female40; otherwise both the numbers of all retirees and of Female40 retirees developed smoothly. The average (effective) retirement age of both categories rose quite slowly, and the introduction of Female40 diminished the first number by 2.2 years. In summary, the average retirement age rose by 3.2 years over a period of 10 years, and the Female40 beneficiaries' age by 1.4 years.

**Table 12.1: The number and age of females taking old-age retirement**

Year	Full-benefit retirement age	Total		Female40	
		number (thousand)	average age (year)	number (thousand)	average age (year)
2007	61	62.0	57.8		
2008		39.3	57.3		
2009	62	15.2	59.9		
2010		13.6	60.7		
2011		84.9	58.5	54.8	57.6
2012		51.2	59.2	26.6	57.8
2013	62	40.2	59.6	24.1	58.0
2014	62.5	39.1	59.6	27.6	58.3
2015		41.7	60.0	28.7	58.7
2016	63	54.9	61.0	28.7	59.0

Source: *Fazekas–Köllő* (eds.) (2017), Table 11.5, p. 269.

The average benefit received in Female40 was close to the male-female average benefit, i.e. it is significantly higher than the other females' average benefits.

At this point, we cite *Czeglédi et al. (2017)*. *Table 12.2* displays the situation of Female40 in 2013. The most populous cohort was born in 1955, their average retirement age was equal to 58 years; and their average career's length was equal to 41 years. The bulk retired with the minimal eligibility length, 40 years but 15 and 11 percent had 41 and 42 years, respectively.

**Table 12.2: Data of Female40, 2013**

Birth year	Relative average earning	Average initial benefit	Average length of employment	Size distribution according to contribution length (percent)				
				40	41	42	43	44
1953	4.9	60.0	41.5	37.7	29.4	18.4	4.9	5.1
1954	26.6	59.0	41.1	59.7	16.1	8.5	8.5	4.4
1955	32.9	58.2	41.1	61.4	9.3	15.2	10.5	1.7
1956	17.7	57.1	41.7	31.2	17.4	37.8	11.3	0.0
1957	9.3	56.1	40.7	65.6	23.6	7.2	0.0	*
1958	4.7	55.2	40.3	87.1	9.7	*	*	*
Average	100.0	57.9	41.1	56.3	14.8	15.9	8.2	2.0

\* Less than 0.05.

Source: *ONYF (2014)* 111–112. Table 6.9.

*Table 12.3* presents the same breakdown showing earnings and career's lengths.

**Table 12.3 Relative benefits of Females 40, retiring in 2013, in terms of nationwide net age**

Birth year	Size distribution (percent)	Average retirement age	Average length of employment	Size distribution according to contribution length (percent)				
				40	41	42	43	44
1953	0.938	0.771	40.5	70.6	18.2	60.9	20.3	10.2
1954	0.954	0.776	40.2	86.9	10.4	10.8	0.6	0.2
1955	0.954	0.775	40.2	90.2	8.0	10.2	0.4	0.2
1956	0.793	0.655	40.2	89.8	8.8	10.0	0.3	0.2
1957	0.792	0.639	40.2	91.7	7.6	0.6	0.0	*
1958	0.760	0.609	40.1	95.0	5.0	*	*	*
Average	0.897	0.731	40.2	88.2	9.1	10.5	0.6	0.3

\* Less than 0.05.

Note: Meanwhile the source *ONYF [2015]* has also been published and the data for 2014 attest basically the same situation.

Source: *ONYF (2014)* 111–112. Table 6.9 censored.

Through the Connected Administrative Database, available in the CERS's Data Bank, we can obtain a more precise picture on the situation of various types in 2011. We distinguish three types of old-age retirees: early retirees, Female 40 and those retiring at the full benefit age. In the following paragraphs, we shall compare them (with respect to fragmentation, pre-retirement earning and benefit).

According to our statistics, it is evident that every year the share of early retirees was very high, those retiring at full benefit form a minority. The average retirement age basically follows the rise of the full-benefit retirement age. Discussing *Table 12.3* we have already mentioned the critical role played by the career's length of 40 years; moreover, the differences between benefits of given cohorts (of those whose career's length are 35–39 and 40–44.)

The closing part summarizes the findings of *Granseth et al.* (2019) on the Hungarian pension system. In the framework of a public data request, the ONYF (which became part of the Treasury) sent us a detailed contingency table on the retirement age and the career's length of females retiring in 2016. Due to the loose–rigid system,<sup>1</sup> the bulk of the cells are empty (nobody could retire without having at least 40 years of eligibility or age 63). To save space, *Tables 12.4* and *12.5* present the data on career's length with full-benefit age and Female40 in a condensed form, respectively:

**Table 12.4: Condensed contingency table on females retiring in 2016, retirement age=63**

Length of contribution	20	21	22	23	24	25	26	27	28	29
Frequency	0.008	0.008	0.009	0.010	0.013	0.014	0.016	0.016	0.016	0.017
Length of contribution	30	31	32	33	34	35	36	37	38	39
Frequency	0.019	0.020	0.022	0.021	0.022	0.023	0.021	0.025	0.026	0.029

Source: *Hungarian State Treasury*.

**Table 12.5: Condensed contingency table on females retiring in 2016, Female40**

Length of contributions (year)	Retirement age								
	55	56	57	58	59	60	61	62	63
40	0.014	0.019	0.026	0.113	0.038	0.013	0.008	0.004	0.030
41	0.004	0.011	0.012	0.012	0.026	0.025	0.010	0.004	0.018
42	0.000	0.014	0.030	0.012	0.008	0.019	0.020	0.005	0.015
43	0.000	0.000	0.013	0.016	0.009	0.006	0.017	0.011	0.014
44	0.000	0.000	0.000	0.005	0.008	0.006	0.003	0.008	0.017
$\Sigma(S^*=41.2)$	0.018	0.044	0.081	0.058	0.089	0.069	0.058	0.024	0.094

Source: *Hungarian State Treasury*.

To save space, we aggregate the data of *Tables 12.4* and *12.5* into 3 categories in *Table 12.6*: *category 1*: females with at least 40 years of eligibility and younger than 63; *category 2*: females with less than 40 years of eligibility and not younger than 63; and *category 3*: females with at least 40 years of eligibility and aged at least 63. We call attention to the strongly negative correlation between retirement age and career's length.

*Table 12.7* contains the results of the 3-class aggregation. It is easy to see that under normal circumstances, on average, the beneficiaries of Female40 contribute less than, and the others contribute more than, they receive.

<sup>1</sup> Loose for the beneficiaries of Female40, and rigid for other retirees.

Table 12.6: Three-class aggregation: partial statistics

Category-1 (Female40) share	Category-2 (aged at least 63): share	Category-1 average retire- ment age	Category-2 average career's length	Relative standard error in 1	Relative standard error in 2
0.551	0.355	58.6	31.4	0.547	0.390

Table 12.7: Averages for the three classes

Name	Average retirement age	Average career's length	Standard error of retirement age	Standard error of career's length	Correlation coefficient
Data	60.6	37.8	2.6	5.7	-0.587

Source: Own calculations.

The real wage hike of 2016–2018, however, changed the situation (Statistical data, Table 1.1 and *Simonovits*, 2018). If we recalculate the lifetime balance, certain beneficiaries have recently suffered significant losses with respect to those staying. For example, assume that a woman of 40 years of eligibility and length of career retiring in 2016 with an annual benefit of 100 units which she will receive for 20 years. If she had stayed another 3 years and retiring in 2019, then her 80 percent replacement would have risen to 86 (7,5 percent rise) and due to valorization, from 2019 she would have received a real benefit of  $1.075 \times 127 = 137$  units, which she would have enjoyed approximately for 17 years. (As if on her pension account her investment had exceptionally high real rates of return in 2016–2018!) The two lifetime benefits are  $20 \times 100 = 2000$  units and  $17 \times 137 = 2329$  units – a significant advantage for the stayer!

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