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THE IMPACT OF PARENTHOOD ON THE DIVERGENCE OF WOMEN'S AND MEN'S WAGES IN ESTONIA

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Supervisor: Simona Ferraro, PhD

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I hereby declare that I have compiled the thesis independently
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ABSTRACT

The aim of the thesis is to shed a light on how parenthood contributes to the divergence of women's and men's wages in Estonia. To date, the role of parenthood has had little empirical attention in Estonia, the country in Europe with the highest gender wage gap. Adopting the Mincerian wage equation, separately for mothers, childless women, fathers, childless men, the author explains wages as a function of some individual's decisions. Then, the author uses a "threefold" Oaxaca-Blinder model to decompose the parenthood pay gap into endowment, coefficient and interaction effects using Estonian Labour Force Survey data for the span 2009-2019. The findings suggest that both mothers and fathers experience wage premium (3.3% and 12.2% respectively), which contradicts the existing evidence of motherhood penalty in most developed countries. Nevertheless, the findings indicate that young mothers under 35 years of age face a significant wage penalty (23.8%) compared to their childless counterpart. Controversially, parents aged 35 or more experience a significant wage premium (15.4% for mothers and 19.6% for fathers).

Keywords: Family gap, motherhood penalty, fatherhood premium, Blinder–Oaxaca decomposition, Mincer-type wage equation, Estonian Labour Force Survey.

INTRODUCTION

"Women have always been courageous... They are always fearless when protecting their children and in the last century they have been fearless in the fight for their rights."
Isabel Allende

Over the last decades, women are increasingly participating in the labour force and are more qualified – even out-perform men in terms of tertiary education in most[1] developed countries. The education gap is notably high in Estonia, where 51% of women hold a higher education compared to 31% of men. (Eurostat[2], table [edat_lfse_03], see appendix 1(1)) Women stay, however, underrepresented in the labour market in terms of wages and employment rates, despite the conversion of the roles of men and women in the last century. In all European Union (EU) Member States, the employment rates for women are lower compared to men (Eurostat, table [lfsq_ergaed], see appendix 1(2)).

One of the most significant career interruptions is childbirth, which marks a breaking point in women's labour market activity. On average, women's careers are one third shorter than men's and they are far more likely to work part-time or stay inactive. (OECD 2017, 168). In Estonia, parents are provided with the most generous parental leave scheme among the EU and Organisation for Economic Co-operation and Development (OECD)[3] countries (OECD table [PF2.1]). As a result, around 40% of mothers in Estonia withdraw from the labour market for more than two years after childbirth and this can have a long-lasting effect on their earnings and labour force participation (OECD 2017, 168; Estonian Labour Force Survey (ELFS) 2010). This phenomenon, called "family gap", "motherhood gap" or "motherhood penalty", might cause pay and employment gaps between parents and childless individuals.

[1] Except for German-speaking countries in Europe (Germany, Austria, Switzerland) and Mexico, Korea, Turkey.
[2] Age 25-64; year 2018; EU28 average – 35% of women vs 30% of men hold a tertiary education level. Estonian women are one of the most educated in the EU, following Finland with 52% of women holding a higher education.
[3] 84 weeks of full-rate paid maternity and parental leave in Estonia, compared to 36 weeks in EU28 and 30 weeks in OECD on average.

In their study, Ponthieux and Meurs (2015) define motherhood wage penalty as the main reason behind the gender wage gap in high-income countries. In Estonia, the cost of motherhood seems to be higher compared to other OECD countries – the gender pay gap[4] among men and women with at least one child was 41.5% in 2014, which is almost double the difference between men and women without children (25.5%) (OECD 2017, 160). Earlier studies confirm the existence of the motherhood penalty and fatherhood premium in the form of a wage gap. However, to the knowledge of the author, there is little research on the impact of parenthood in Estonia, regardless of the long period of leave that parents can take. Therefore, the impact of paid parental leave on parent's earnings and participation in the labour market is an important issue that should be investigated in more detail.

The aim of the thesis is to examine whether parenthood contributes to the divergence between women's and men's wages in Estonia. This study attempts to better understand the mechanisms behind the existence of the gender wage gap from the perspective of the gender-specific parenthood-based wage gap. The main focus will be on the impact of motherhood, as more than 90% of parents taking parental leave in Estonia are women (Statistics Estonia table TKS07).

The thesis seeks answers to the following questions:

1. Do mothers experience a wage disadvantage compared to women without underage children in Estonia?
2. Do fathers experience a wage advantage compared to men without underage children in Estonia?
3. Does parenthood contribute to the divergence of women's and men's wages in Estonia?

In the thesis the following hypotheses are tested:

H_1: Mothers face a reduction in their wage, relative to childless women while having an underage child;

H_2: Fathers face an increase in their wage, relative to childless men while having an underage child;

H_3: Parenthood contributes to the divergence of women's and men's wages in Estonia.

[4] In median hourly earnings among full-time-employed men and women in 2014. OECD Secretariat calculations based on the European Union Statistics on Income and Living Conditions survey (EU-SILC).

The thesis is structured as follows. The first chapter reviews the state-of-art providing theoretical relevance on how parenthood may affect the parents', primarily mothers' wages. Next, the author gives an overview of family policies, their importance within society and whether laws have been adopted with a focus on the EU. The third sub-chapter gives an insight to the family policy in Estonia describing its history and evolution since the beginning of the 20th century.

The second chapter gives an overview of the methodology and data used. In the methodology section, the author presents a description, justification and limitations of the chosen methods – Mincerian wage equation and Oaxaca-Blinder decomposition. In the data section, the Estonian Labour Force Survey (ELFS) for the time span 2009-2019 is presented together with the sampling procedure. The author gives an overview of the chosen variables, based on theories discussed in chapter 1.1 and provides descriptive statistics.

The third chapter presents the main empirical findings of the effect of parenthood on women's and men's wages and their divergence in Estonia. Adopting the Mincerian wage equation separately for mothers, childless women, fathers, childless men, the author explains wages as a function of some individual's decisions. The empirical analysis is conducted using a threefold Oaxaca-Blinder approach to decompose the parenthood pay gap into endowment, coefficient and interaction effects. In subsection 3.2, the author carries out robustness checks by compiling subsamples to find out which parents experience the highest premium or penalty. Lastly, in subsection three the author discusses the results.

I would like to thank my supervisor Simona Ferraro for her support, advice and help; Catriona O'Sullivan for her help in reviewing this paper linguistically and Statistics Estonia for providing access to data. However, I am responsible for the content and for any errors that it may contain.

1. THEORETICAL FRAMEWORK

1.1. Theories on the Family Pay Gap

Previous literature and empirical research have revealed that having children may lower women's wages and contribute to wage premium for fathers compared to childless individuals (Cukrowska-Torzewska, Lovasz 2020). This phenomenon, called "motherhood gap/penalty", "family gap" or "child penalty" might cause a labour market outcome disparity for mothers relative to men and childless women (*ibid*; Sieppi, Pehkonen 2019, 5). This observation is explained by several competing and overlapping theories, which are, among others, the human capital theory, the compensating wage differentials theory, the work-effort theory, the sex specialisation theory, the discrimination theory and spurious correlation.

The most wide-spread explanation is the human capital theory developed by Gary Becker (1964), along with Theodore Schultz (1961) and Jacob Mincer (1974). The human capital theory states that work experience has positive gains on wage; experience requires training that makes the employees more productive. With time spent away from the labour market, mothers' labour market skills deteriorate and they have less time to accumulate them. Becker explains that the interruption of a mothers' career results in the motherhood penalty. (Becker 1964; Budig, England 2001, 204; Schönberg, Ludsteck 2014, 477) The decision to stay away from the labour market might depend on the level of existing human capital. Women with higher human capital and higher earnings are more likely to stay in the labour market compared to the women with lower human capital and lower incomes, who are more prone to taking up unpaid work, including childcare (Cukrowska-Torzewska, Lovasz 2016, 263).

While mothers' careers are interrupted, they miss crucial in-work transitions, such as change of employer, job or contract type compared to those who stay active in the labour market. These transitions promote stronger career advancement and increase the income by 8% (OECD 2018b). Women with small children (aged three years or less) are 4.2 percentage points less likely to experience in-work transition and promotion compared to their partners (*ibid.* 228-231, Bronson,

Thoursie 2019). These in-work transitions generally happen in the first 10-15 years after entering the labour market, which is also the period when most women have their first child (OECD 2018b). Consequently, younger mothers may experience a more severe motherhood penalty compared to older mothers who have already accumulated labour market skills (Kahn *et al.* 2014). Chung *et al.* (2017) show that women who gave birth aged 25-35, did not close the parental earnings gap relative to that of their husbands even by the time their child became an adult. For women who had their child outside of their prime career-building time, the parental gap closed 16 years after the birth of the first child. Lack of women's in-work transitions and job mobility in the early stages of their career, enlarges the initially small gender pay gap (OECD 2018b).

The second most common theory is the compensating wage differentials theory, which refers to equalising differences between monetary and non-monetary advantages or disadvantages (Rosen 1986). In the case of parenthood, non-monetary advantages refer to special work requirements such as teleworking, flexible working hours and part-time schedule; while the monetary disadvantage means that parents might accept lower-ranking jobs for which they are overqualified, in order to adjust to the needs of their children. This means that they may opt for a position where they have room for flexibility in exchange for a lower salary (Anderson *et al.* 2003, 275). Compensating wage differentials theory overlaps with the human capital theory – when accepting "mother-friendly" jobs and working hours, women accumulate less work experience (Abhayaratna *et al.* 2008). While women with children accept mother-friendly positions, fathers choose jobs with fewer amenities (often longer hours) but a higher wage to support one's family (Budig, England 2001, 204; Chun, Lee 2001, 307). Mother-friendly jobs and the possibility of working part-time can prevent mothers from withdrawing from the labour market completely. Yet, this situation can become permanent for many women. Such patterns emerge in the Netherlands, Germany, Austria, France and, to some extent, in the UK. (OECD 2018b, 232, 234, annex 6.A.4.)

It is possible that family planning already impacts women's labour market behaviour before the birth of their first child. Women may invest less in their human capital and choose mother-friendly occupations knowing they will experience severe labour market disadvantages after childbirth. Adda *et al.* (2017) and Lovász *et al.* (2019, 160) studied this occurrence in the examples of Germany, Italy, Czech Republic and Hungary. Their findings show that the wages of future mothers differ from the wages of women who are not planning to have children. Similar result was found in Canada, where women received 9% lower salary compared to men just because they assumed to become mothers in the future. (Erosa *et al.* 2005)

The third theory is work effort theory related to labour productivity. As women's careers are interrupted during the period after childbirth, they have less experience and therefore, considered to be less productive (Waldfogel 1998, 507). This theory partly overlaps with the previous two, claiming that mothers bring less effort to the labour market. Mothers may be less productive than non-mothers, even when their human capital is equal. Work effort theory advanced by Gary Becker (1985) states that the productivity differential is a result of lack of energy. This is driven, to some extent, by the unequal division of childcare and housework between men and women (Morgan 2002; Dunatchik, Özcan 2017). Women bear a lopsided responsibility for unpaid work in the home – women in developed countries spend twice as much time[5] as men doing unpaid work (OECD 2017, 160). Long working hours combined with household duties cause stress and lack of sleep, leisure and personal care (Ruhm 2004, 3). As they are tired and distracted, they will be less productive (Budig, England 2001, 204).

Often employers see working mothers as less committed and less competent employees (Bernard, Correll 2007, 619), which makes them avoid hiring or giving promotion to mothers (Cukrowska-Torzewska, Lovasz 2016). But when mothers are productive and successful at work, they experience "normative discrimination" i.e. a form of bias, where employers see successful women as masculine with qualities such as assertiveness or dominance. In their view, these personal qualities are not anticipated of mothers, who are expected to be warm and nurturing. Mothers who are committed to their work, are seen as less likeable, harsh and hostile compared to other similar childless workers. As a result, they face the "glass ceiling", which prevents them from gaining managerial positions. (Bernard, Correll 2007)

Employees may also avoid hiring married women in the fear of them staying on parental leave. Becker *et al.* (2019) conducted a large-scale correspondence test in German-speaking countries (Germany, Austria, Switzerland) noting that employers find married women without children particularly "risky" to hire, as they are the most likely to have children in the near future. The lowest call-back rate was for married childless women applying for a part-time job, whereas the highest rate was for women with two older children (the gap between these two groups was 14%,

[5] OECD (2020c) average for age 15-64 – women spend 262 minutes daily on unpaid work at home, while men 136 minutes.

while the average call-back rate was 19%). On the contrary, employers may support men, whose wives are not in the labour market (Chun, Lee 2001, 307).

This leads to discrimination theory, where cultural expectations shape women's employment through the gendered values regarding work, care and the "correct" work-care division within families. Often, welfare and labour market policies are a result of these cultural expectations. (Pfau-Effinger 2017) Generous parental leave period might reflect the gendered assumptions of mothers' behaviour. A three-year parental leave might suggest that women ought to stay at home for an extended period and take care of the child, while the father goes to work and provides financial support (Budig *et al.* 2012, 165-166). Kleven *et al.* (2019b) suggest that the persistence of motherhood penalty is being transmitted by patriarchal upbringing throughout generations – if the cultural attitude supports males as breadwinners and females as caregivers, the gap remains high in the long-run. The gender gap has decreased over the past decades in most European countries except in countries where patriarchal ideology is more ingrained (Budig *et al.* 2012, 166).

As marital status is correlated to motherhood, sex specialisation theory states that women may face a wage gap due to specialisation at home (Becker 1981). Cukrowska-Torzewska and Lovasz (2016) claim that marriage has a negative effect on women's and positive effect on men's wages. Married mothers may shift their energy ratio from labour market towards children – focus on child-rearing and completely withdraw from the labour market. Single parenthood has a greater impact on woman's income as they are more likely to carry the burden of housework, childcare and financial responsibility without the support of the father (Cukrowska-Torzewska, Lovasz 2020). Separation may initiate lone mothers' labour market transitions either by engaging more (to increase financial capacity) or by engaging less (reducing working hours to be able to take care of the child) (OECD 2018a, 144).

Most prominent theories that offer economic and social explanations for the motherhood penalty are reported in Table 1. Unobservable factors theory, also called spurious regression theory, on the contrary, suggests that there is no causal effect of motherhood on wages. Perhaps some individual characteristics or priorities result in lower earning. For example, career ambitions may lower fertility as career-oriented women may postpone having children. (Budig, England 2001, 210)

Table 1 Competing explanations for the motherhood pay gap

Theory	Type	Motherhood penalty	Fatherhood premium
Human capital theory	Economics	Break in employment. Fail to accumulate human capital (experience, training).	*As fathers normally do not stay on parental leave, no changes in human capital accumulation*
Wage differentials theory	Economics	Job matched to parent's requirements, not skills. Job status or pay traded for mother-friendly position.	Fathers choose positions with fewer amenities, but a higher wage to support one's family
Work effort theory	Economics	Reduced commitment, quitting managerial positions. Limited career aspirations, as child takes precedence over work.	Fathers devote more effort and time on wage-earning, especially when partner interrupts employment.
Sex specialisation theory	Sociology	Gender differences in attitudes reinforced through motherhood. Reallocation of paid/unpaid tasks between household partners.	Assumptions that their partner takes up unpaid household work (including childrearing).
Discrimination theory	Sociology	Sexist presumption that caring makes woman less productive. Negative effects of employers' hiring and career decisions.	Employers may support and positively discriminate men, whose partners are not in the labour market.

Source: Grimshaw, Rubery 2015, 35; composed by the author

In conclusion, the impact of children on wages is the biggest when a woman becomes a mother in her prime career-building years (age 25 to 35), period when most women have their children. (Chung *et al* 2017) By withdrawing from the labour market, mothers lose work experience and deteriorate their skills, which are necessary for accumulating human capital. When returning to labour market, mothers are likely to choose a mother-friendly occupation, sector and working hours. Despite this, they are prone to feeling tired and distracted as they bear a disproportionally large share of housework and child-care as a result of cultural gender expectations. All these components may lead to discrimination – an assumption that mothers are less productive, or less experienced leads to a lower call-back rate after interviews, or lower salary offers.

1.2. Family Policy as an Instrument to Tackle the Family Gap

Changing cultural expectations and increasing educational attainment of women have widened their options in the labour market. Institutions have created family policies to allow and encourage women to take advantage of these options. (Sjöberg 2010, 34-35) Most common family policies are paid parental, maternity and parental leave. These leave options provide a job-protected period,

which generally are remunerated by the state and/or the employer (van Belle 2016, 5). They are aimed at promoting the well-being of the parents and their children, gender equality and job protection (Addati 2015). Parental leave exists in almost every country in the world – 96% of countries provide paid leave for mothers and 44% provide leave for fathers; the United States is the only developed country that does not provide any paid leave for the newborn's parents (Heymann, McNeill 2013). Among developed countries, Estonia offers the most generous paid parental leave with a full rate of 84 weeks, compared to 36 weeks in EU27 and 30 weeks in OECD (OECD table PF2.1, see figure 1).

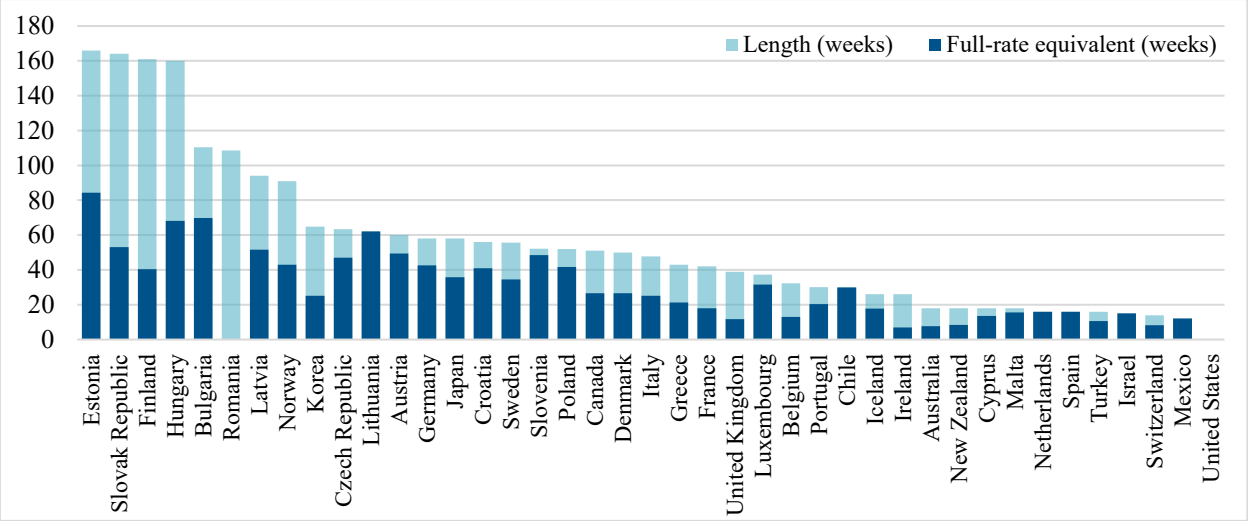

Figure 1 Parental leave available to mothers, total and full-rate equivalent in weeks, 2018
Source: OECD (Table [PF2.1.A]); composed by author

Building upon strong evidence of the positive effects of breastfeeding, the World Health Organisation (2001, 7) and UNICEF (Chzhen *et al.* 2019, 4) recommend exclusive breastfeeding up to six months of age and suggests continuing partial breastfeeding up to two years of age. The first year is as an especially important period for the child, in terms of brain development, self-esteem and emotional security (Ruhm 2004, 1). Therefore, the suggested paid parental leave length is at least six months. Other studies show that parental leave has a positive influence on women's employment on the condition that it does not exceed two years (Thévenon, Solaz 2013; OECD 2012).

Up to 2019, existing family policies in Europe had not enabled mothers and fathers to keep their work and family life balanced (European Commission 2017, COM/2017/252); European countries had been struggling to find a balance between economic and extensive social protection. Several

measures were proposed by OECD (2018b, 213) and Eurofond (2016) to be implemented by the institutions to reduce the burden on mothers:

- Developing inclusive maternity, paternity and parental leave policies;
- Enhancing labour market policy measures;
- Reconsolidating work-family balance by offering flexible working hours;
- Improving access to childcare facilities and therefore encouraging labour market participation (Thévenon, Solaz 2013).

In 2019, the EU adopted a directive[6] (2019/1158) on work-life balance for parents and carers. This directive established a minimum length of parental and paternity leave to all Member States – both parents have the right to take at least four months of parental leave, out of which two months are non-transferrable from one parent to another (EU Directive 2019/1158, 20-21). Also, the directive allows working parents to request remote working or flexible working schedules, where possible. The directive aims to boost women's reintegration to the labour market while encouraging fathers' greater involvement (EU Directive 2010/18/EU, EU Directive 2019/1158).

Some of the welfare states had already implemented an exclusive paternity leave before the EU Directive (2019/118) was adopted. The part of parental leave, which is reserved exclusively to fathers, is often called "father's quota" or "daddy quota". Fathers taking up paternity/paternal leave supports mothers' return to the labour market and reduces the gender employment gap as a result. It also promotes better work-family life balance for as housework and childcare division is more equal compared to traditional gender roles, where it often falls on mothers. (European Parliament 2014, 73-76; Petts *et al.* 2018) Despite the attempts to raise the uptake of parental leave by fathers, the numbers remain low in many countries – in the EU, only 2% of men stay at home to take care of the child (van Belle 2019, 2). More than half of both genders feel that it is easier for women to take leave (Flash Eurobarometer 2018, Q14T.3).

The best examples for work-life balance and the dual-earner model are the Nordic countries – namely Norway, Sweden and Iceland – where the "father's quota" is 15, 13 and 13 weeks respectively. Research done on Nordic countries, where the paternity leave is exclusive shows that leave increases mothers' wages and therefore reduces the gender wage gap. In Sweden, each month that father stayed on leave, the mother's earnings increased by 7% (Johansson 2010). Similar

[6] EU Directive 2019/1158 builds on EU Directive 2010/18/EU.

results were found in Denmark (Andersen 2018) and Norway (Petersen *et al.* 2010, Petersen *et al.* 2014). Dunatchik and Özcan (2017), however, did not find any effect on women's wages once five-week-long paternity leave was implemented in Canada. They suggest that men taking up paternity leave is a cultural change, which might take a longer time to show effect than five years post-reform. Nonetheless, mothers were 7% more likely to participate in the labour force and 5% more likely to work full time. Despite efforts in the Nordic countries to achieve gender equality, large gaps remain between mothers and fathers. Using full-population administrative data, Kleven *et al.* (2019b) show that women's earnings drop 21% after having their first child in Denmark, while the wage gap remains constant in the long run. Similar results were found in Finland (25%) and Sweden (26%) (Sieppi, Pehkonen 2019, Kleven *et al.* 2019a).

Anglo-Saxon countries (the UK and Ireland) and Continental Europe (Germany, Austria, the Netherlands, France and Belgium) have a rather similar institutional context. These groups are characterized by relatively high female employment with a high share of part-time positions. The differences appear in the length of paid leave – in Austria and Germany the full-rate paid parental leave is longer (42-50 weeks), whereas the Netherlands, Belgium, the UK and Ireland have much shorter leaves (12-18 weeks). (Cukrowska-Torzewska and Lovasz 2020; Thévenon 2011) Kleven *et al.* (2019a) found a substantial long-run penalty in Germany (61%), Austria (51%) and in the UK (44%) using a difference-in-differences event study. Ondrich *et al.* (2002) noticed that in Germany, each month on parental leave reduces mothers' wage growth by 1.5%, and if the mother stayed out of the labour market for six months, wage growth drops about 15% over five years. Schönberg and Ludsteck (2014), on the contrary, find that the long-run effects in Germany on mothers' post-birth labour market outcomes are small.

In contrast, Southern European countries (Spain, Portugal, Italy, Greece) have strong traditional gender norms, low female participation in the labour market and high availability of part-time positions. Cukrowska-Torzewska and Lovasz (2020) detected a motherhood premium in the Southern European countries – working mothers are earning more than childless women. The parental leave is short, and mothers return to work quickly. Pacelli *et al.* (2013) have noted that the availability of part-time positions in Italy increases the likelihood of mothers staying in the labour market. However, they experience lower wages compared to women without children. The gap was estimated at 3%. Molina and Montuenga (2009) found a loss of 6% in Spanish household's income after first child and 14% after the second one.

Whereas Eastern European countries implement "refamiliarization" policy – long paid parental leaves with employment security cause a considerable share of women to leave the labour market after giving birth (Ruhm 1998, Saxonberg, Szelewa 2007). Castro-García and Pazos-Moran (2016) claim that the impact of having a child is the severest in post-socialist European countries – around 10% reduction in wage. Cukrowska-Torzewska and Lovasz (2016), using Blinder–Oaxaca decomposition, recorded a motherhood penalty of 7% in Hungary and 2% in Poland, and fatherhood premium of 8% in Hungary and 13% in Poland.

Below in figure 2, the most important policy directions are demonstrated by region.

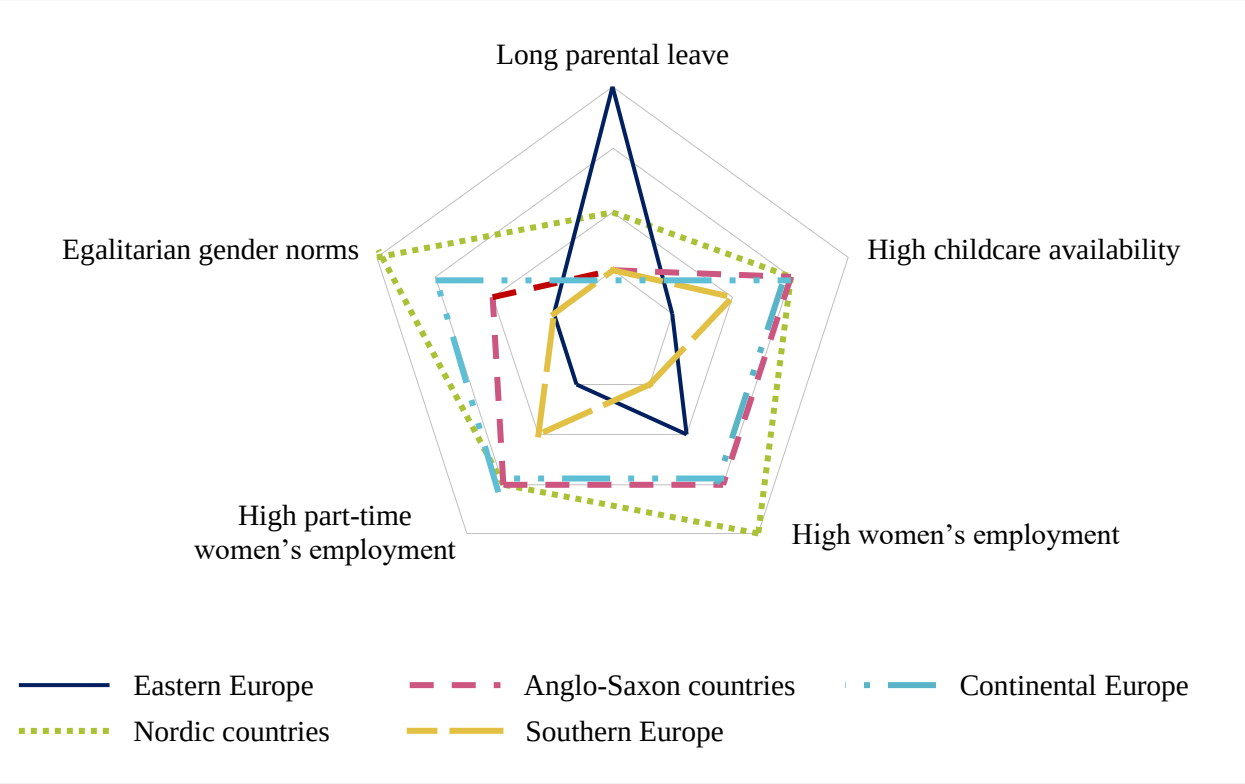

Figure 2 Institutional family policy characteristics by European country groups.
Source: Cukrowska-Torzewska, Lovasz (2020).

There has also been an extensive amount of research about countries outside of Europe. A big share of the motherhood penalty related studies focuses on the US, as there is no parental leave (Chung *et al* 2017). In Australia, Livermore *et al.* (2011) found a motherhood penalty of 5% for one child and 9% for two or more children using Heckman-corrected Mincer wage model and fixed effects estimates. They found that the impact on wage emerged over time as reduced wage growth, instead of immediate wage decline after childbirth. Asai (2019) examined the labour demand in Japan and found that generous parental leave policies, which were designed to promote diminishing the gender wage and employment gaps, discouraged firms from hiring female workers due to higher

costs of employment. The motherhood wage penalty is notably high in less developed countries – Agüero *et al.* (2011) estimated the raw motherhood penalty an average of 42% for 21 less developed countries.

OECD (2018b, 214) suggests countries locate the largest source of the gender gap and use it as a guideline for policy action. For example, in most Eastern European countries and Austria, where a large share of women withdraws from the labour market after childbirth, policies could focus on conciliating parental care responsibilities with working and offering quality childcare. In Mediterranean countries (Greece, Spain, Italy), where a large share of women never enters the labour market, policies could focus on promoting women's participation in the labour market at young ages.

In conclusion, most previous studies find a negative effect of children on women's wages; ranging from small effects in Northern European countries, where an equal breadwinner-caregiver model is practised; moderate effects in Western European countries and the US, where the modified male breadwinner model is present; to large negative effects in the Eastern European countries, where strong traditional family models are present.

1.3. Family Policies in Estonia: Historical and Cultural Evolution and Implications on the Family Gap

Previous empirical research mainly focuses on big Western economies, such as the US, the UK, Germany and the Nordic countries. To the best knowledge of the author, there are no studies on the motherhood penalty and its effects for Estonia. The country in focus for this research is rather unique due to its small size, its post-communism transition and its generous family benefits. In Estonia, parents are granted a parental leave of 435 days with 100% of the previous salary, in addition to 140 days of paid maternity leave (PHS § 34, § 37; TLS § 59; RaKS § 54). Lengthy paid and unpaid leave places Estonia to be the most generous among the EU and OECD countries[7] (OECD table PF2.1). The United Nations Children's Fund (UNICEF) has rated Estonian family policy system one of the best in the world after Sweden, Norway and Iceland (Chzhen *et al.* 2019, 6).

[7] 84 weeks of full-rate paid maternity and parental leave in Estonia, compared to 36 weeks in EU28 and 30 weeks in OECD on average.

In Estonia, similarly to many other Eastern European countries, presence of a small child leads to inactivity in the labour market (OECD 2018b; Thévenon 2009, 46). Almost 40% of mothers withdraw from the labour market for more than two years after childbirth (ELFS 2010 question LL05, see figure 3). Around 60% of women with children age 20-24 and 40% of age 25-29 stay inactive (OECD 2018b, see appendix 2). This can have a long-lasting effect on their earnings and labour force participation (OECD 2017, 168). It is worth noting that the labour market status 'employed' does not necessarily mean that the women are working – they might be employed yet stay away from labour market up to three years per child.

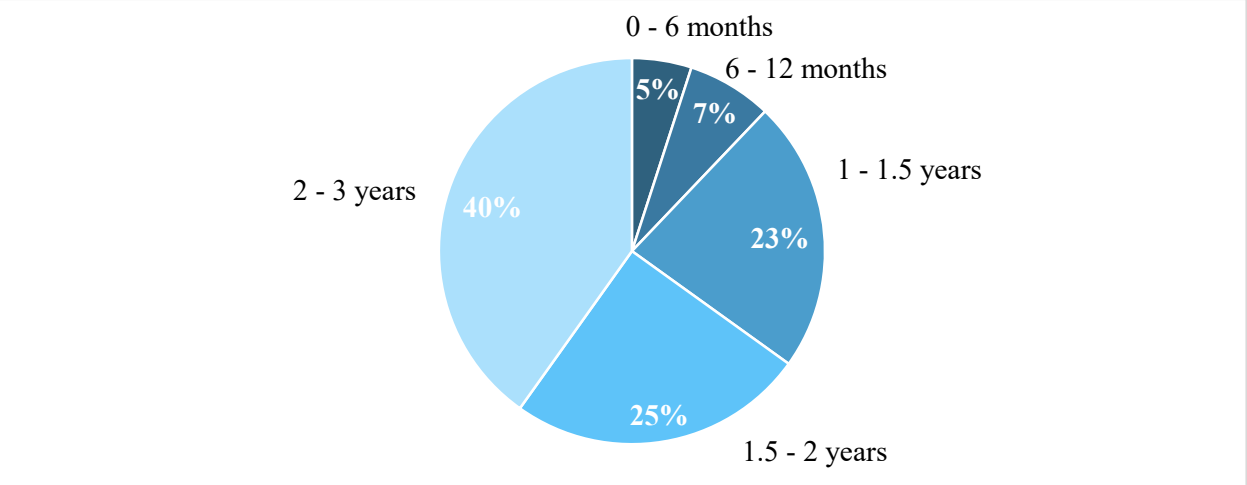

Figure 3 Proportion of mothers by duration of parental leave
Source: ELFS 2010 question LL05, composed by author

Historic events and gender role evolution may give an explanation to the high inactivity of young women in the labour market. The first Estonian family leave of ten weeks was adopted in 1913. During the Soviet socialist regime in the 40s and 50s, women were entitled to similar maternity leave as adopted in 1913 – they could take 35 days of leave before and 42 days after giving birth (see appendix 3 for more details). Work conditions were regulated, and employers had to provide safe and suitable jobs without any night or overtime work. Nevertheless, in the Soviet Union, imposed labour market equality and full employment was demanded from both sexes; not working was condemned and punished. Women had to take up sometimes physical jobs, but they also earned leading positions. Even though the employment rate of women was high and there was gender equality in the labour market, the state supported traditional gender roles and family models. Women had to take care of housework and children in addition to working fulltime. (Tiit 1990 through Karu, Pall 2009)

After Estonia restored its independence in 1991, extreme regulation was followed by extreme deregulation; transformation from communism to capitalism led to uncertainties and social risks (e.g. by 1998, 40% of children lived in absolute poverty[8]). (Karu, Pall 2009, 74) This resulted in decline in birth rates to as low as 1.3 births per woman by the end of 20th century (Statistics Estonia table RV033, figure 4). After half a century of compulsory labour market equality, women were tired of working full time both at work and at home – the employment rate fell by 20 percentage points (from around 85-90% in 1990 to 65-70% in 2000). The society returned to the traditional family model – male breadwinner model, and ideally, women stayed home with children at least until they turned three years old. (Kutsar 1991 through Karu, Pall 2009, 75) Fathers were given an opportunity take parental leave, yet less than 1% claimed the leave. In 1995, the government proposed tax initiatives to increase the wages of men to support the whole family, so the women would be able to be the caregivers. (Ainsaar 2002, through Karu, Pall 2009, 74) The number of kindergartens declined as they were thought to be bad for children.

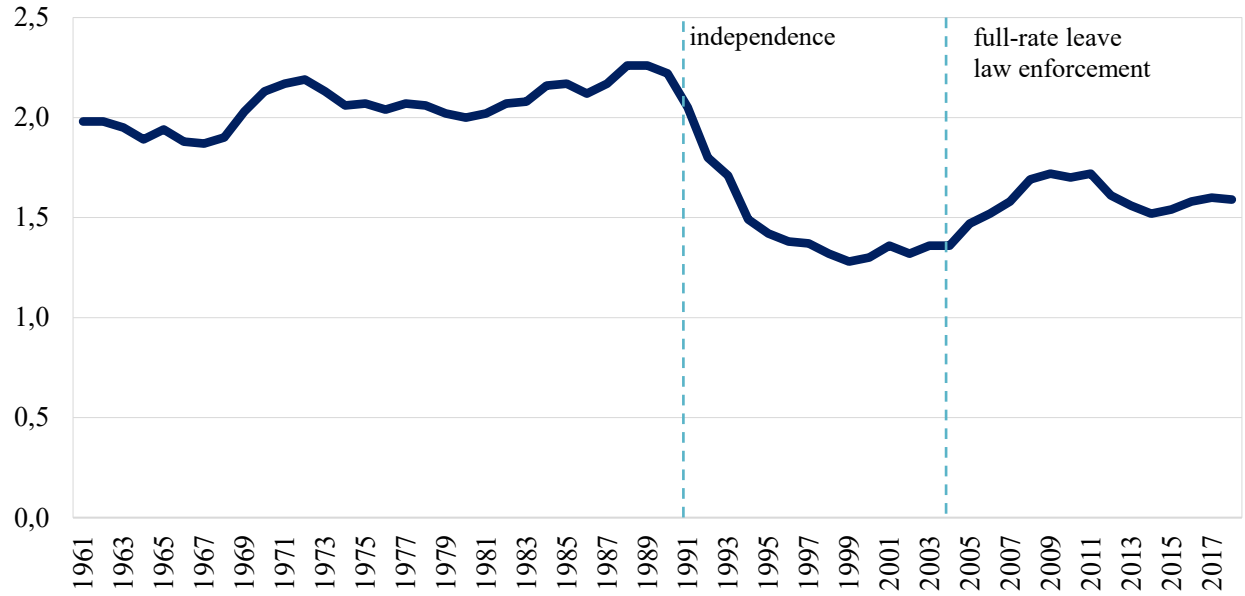

Figure 4 Fertility rate in Estonia (average number of children born per woman)
Source: Statistics Estonia (table RV033), composed by author

In the beginning of the 21st century, family policy in Estonia reached a new stage, as women's role in the society was changing once more, and gender equality reappeared on the policy agenda. Economy was thriving and labour demand was increasing, which led to women's active

[8] In comparison, in 2018, 1.6% of children lived in absolute poverty (Statistics Estonia table LES81).

participation in the labour market. Women postponed having children, birth-rates were dropping to new lows and this unfavourable trend became one of the main discussions in the 2003 parliamentary election campaign. There were various propositions in the discussion, all focused on changing the parental leave and benefits system. The lack of kindergartens was not seen as an obstacle. After the elections, a new strategy was developed, influenced by the EU's aims and legislations. In 2004, the newly elected government turned towards the Nordic welfare ideology and introduced a generous parental benefit at 100% earnings for 435 days. (Karu, Pall 2009, 77) As hoped, the birth-rate started to rise from 1.3 births per woman in 2002 to 1.7 births in 2010 (Statistics Estonia table RV033, figure 4) and the employment rate for women with small children aged 3-6 increased substantially – 25 percentage points from 2000 to 2018 (see figure 5).

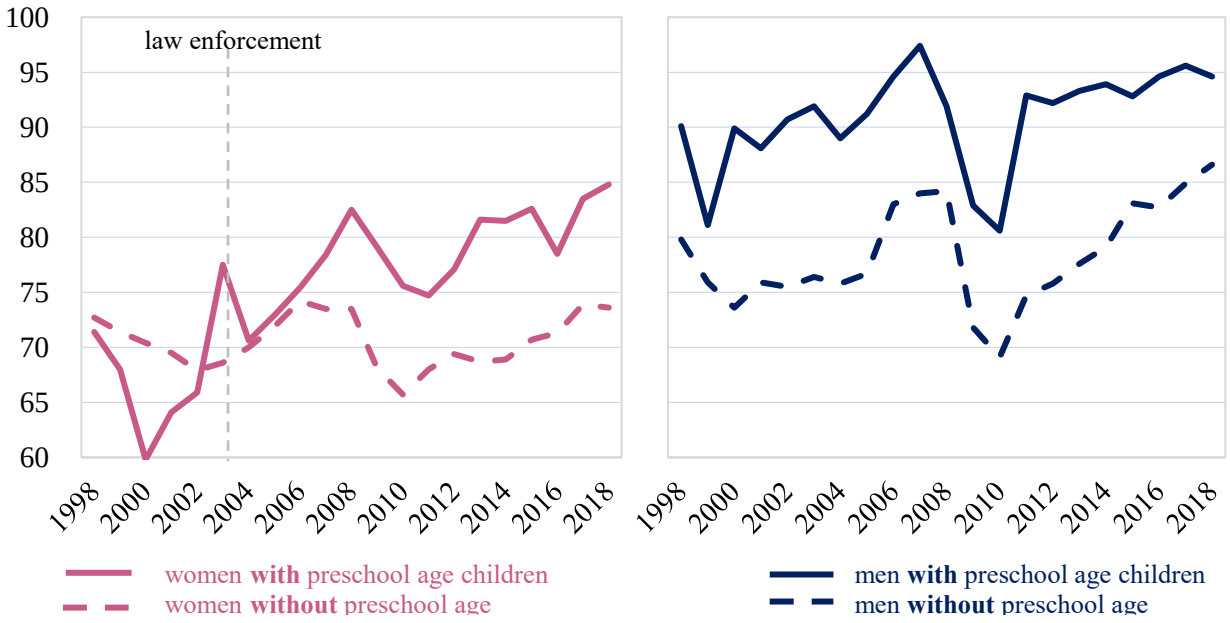

Figure 5 Employment rate by presence of children age 3-6 in Estonia in 1998-2018, %
Source: Statistics Estonia (table TKL29), composed by author

Politicians believed the measure to be effective and extended the parental benefit two times more, reaching 575 days of 100% earnings by 2008. However, the generous leave has increased women's motivation to establish their position in the labour market before becoming a mother – the age of women having their first child increased three years since the law was implemented (24.6 years in 2003 to 27.7 years in 2018; Statistics Estonia, table RV033; Võrk *et al*. 2009). Nearly 60% of Estonians also believe that is difficult for women with small children to find a good job and that they have worse job development opportunities than women without children (Karu 2009, 70). Extension of the parental benefit has also caused mothers to delay their return to the labour market

after giving birth. (Võrk *et al*. 2009) According to the World Values Survey (vol 6, Q V50), almost 75% of Estonians think that if the mother works for pay, the child suffers.

As opposed to the Nordic welfare system, Estonia has deep-rooted gender stereotypes, where the equal breadwinner model has not emerged (Karu 2012, 94). Despite genderless parental leave, the father's uptake of parental leave is still low – less than 10% of all parental benefit recipients are men (Statistics Estonia table TKS07). The father's decision whether to stay home depends on subjective norms, attitudes and perceived behavioural control. A prominent reason for refusing paternal leave is a fear of losing their job due to employer's negative attitude. Besides dreading the reaction of their supervisor, men felt like they would be letting down their co-workers and clients. Fathers seem to be more afraid to let down their colleagues than their family and children. But the main reason why Estonian fathers do not take paternal leave is biological: they feel that absence of mother and thereby breastfeeding would cause suffering to the child. (Karu, Kasearu 2011, 29)

Even though women, who have children aged 3-6 are on average more active in the labour market (figure 5), they are experiencing a larger gender wage gap compared to women without preschool age children (figure 6). While the average raw gender wage gap in 2009-2019 of individuals without children was 21%, the average gap with one child was 24% and with two or more children 30% (Statistics Estonia table TKS01, figure 6).

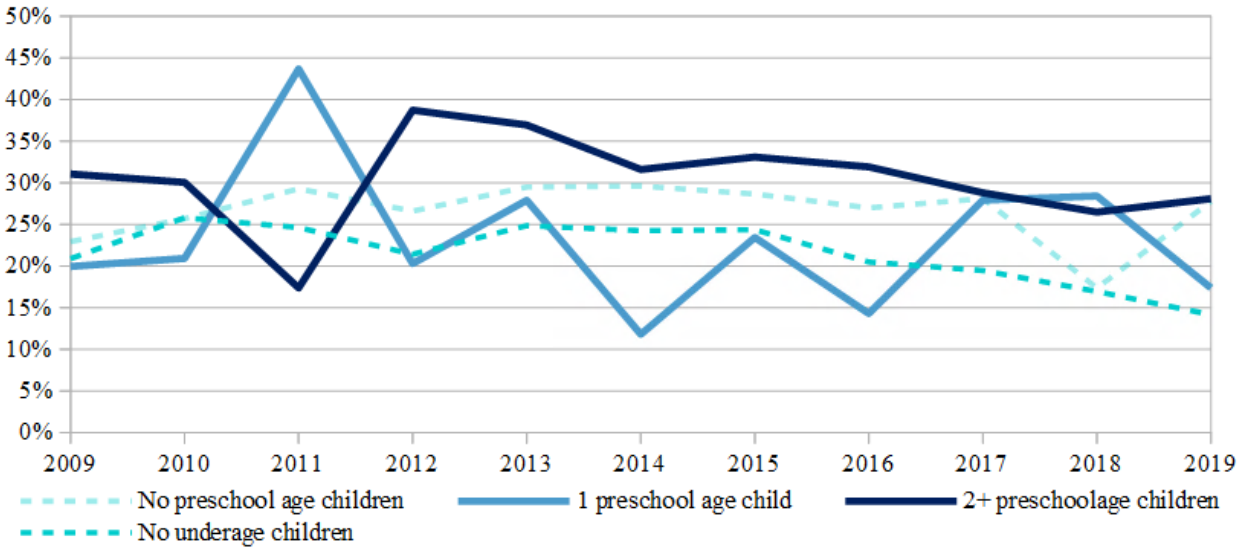

Figure 6 Raw gender pay gap by number of children (aged 3-6) as a percentage of average hourly net wage, 2009-2019
Source: ELFS 2009-2019, author's calculations

Using the ELFS, Anspal *et al*. (2010) assessed the gender wage gap in Estonia for the span of 2000-2008. One of the principal variables included in the Mincerian wage regression were the number of children and the age of youngest child. For mothers, only coefficient that is significant, is the number of school-aged children (age 7-18) – mothers of children in this age group earn 1.5% less than other women. In case of fathers, the coefficient indicating the number of children aged 0-3 is statistically significant – it shows that fathers of small children earn 5% more per child than other men. (Anspal *et al.* 2010, 63) On the contrary, O'Dorchai (2008) found a motherhood wage premium of 12% in Estonia among five other EU countries and that parenthood leads to convergence of men's and women's wages in Estonia, Luxembourg, Italy, Greece and Poland.

In conclusion, in Estonia, parents' wages and employment are insured with one of the most generous parental leaves among the developed countries. As a result, around 40% of mothers in Estonia withdraw from the labour market for more than two years after childbirth and it can have a long-lasting effect on their earnings and labour force participation. The current leave length is an inheritance of Soviet Union's family-oriented mentality, which controversially aims for gender equality in the labour market. As a result, the generous family policy engages for high employment rates of mothers with small children (aged 3-6). Nevertheless, large wage gaps between parents persist.

2. METHODOLOGY AND DATA

2.1. Methodology

This thesis aims to estimate the impact of parenthood on the divergence of women and men's wages. The selection of the method to measure the impact, largely depended on the dataset available. After observing the vast amount of literature, the author divided the studies into three larger categories based on the dataset: 1) full-population administrative data, 2) longitudinal data, and 3) cross-sectional surveys, such as the Luxembourg Income Study and European Union Statistics on Income and Living Conditions (EU-SILC, see appendix 4).

Using full-population administrative data (mostly European studies) and longitudinal surveys (mostly US studies), researchers observe wage trajectories over the life-course of parents, including the period before having their first child and their situation in the labour market years later. The selected methods are ordinary least square (OLS) and fixed-effect models for longitudinal surveys and difference-in-difference (DID) event studies for full-population administrative data (Angelov *et al.* 2016; Kleven *et al.* 2019b; Sieppi, Pehkonen 2019).

In the case that administrative or longitudinal data is not available, the wage penalty is reported on raw and adjusted estimates of the gap. Researchers use various statistical techniques (most prominent being Mincerian wage equation) and implementing the techniques on various control variables, such as age, education, work experience, sector, etc. While holding the observable factors constant, it must be considered that the model faces an endogeneity problem – becoming a parent and staying on parental leave is not an exogenous shock. The variables are closely connected with the selection into motherhood and employment.

The selection bias into motherhood indicates that not all women decide to have children and the decision might be correlated with various factors and mainly with the wage. For instance, highly educated women with greater potential to earn higher wages are more likely to stay in the labour market longer, before having their first child and returning faster after childbirth and/or having less

or no children compared to other women (Grimshaw, Rubery 2015, 5). Selection bias into employment, on the other hand, means that not all women decide to stay or even enter the labour market. In Estonia's case, it may not be relevant as mothers participate actively in the labour market (Statistics Estonia table TKL29; see figure 5 in chapter 1.3). There are however, several ways to correct selection bias and one of the most used in empirical analyses is the Heckman's (1979) selection model, which accounts for the potential non-random nature of women's labour market participation (Grimshaw, Rubery 2015, 6). The model is adapted by using human capital and family-related variables such as the number of children, the age of the youngest child, marital status, partner's labour market status and earnings (Davies, Pierre 2005; Harkness, Waldfogel 2003).

There are some additional methodological issues related to the calculation of the parenthood wage gap, brought to attention by Grimshaw and Rubery (2015, 23-31). First, the impact of anticipated motherhood is unknown, and it may distort the control group consisting of childless women. For example, women may sabotage the wage gap by choosing mother-friendly occupations and investing less in their human capital, knowing they will experience severe labour market disadvantages after childbirth (Hakim 1991; Adda *et al.* 2017; Lovász *et al.* 2019, 160). Or, employers are not inclined to hire women without children as they are the most likely to have a child in the near future (Becker *et al.* 2019). Also, mothers' heterogeneity raises questions such as (Grimshaw, Rubery 2015, 11):

- Does the number of children aggravate earnings potential?
- Does the motherhood penalty diminish once the child goes to school?
- Is the experience of single parents significantly different from those in a couple?
- Do lower-educated mothers experience higher motherhood penalties?
- Does employment in the public sector provide better wage protection for parents returning from parental leave compared to the private sector?
- Do parents of ethnic minorities experience a larger wage penalty due to biases?

The author seeks answers to these questions in chapter 3.2.

In Estonia, it is difficult to directly assess the motherhood penalty due to career breaks as this required a panel data covering a long period (at least 15 years), but no longitudinal data survey exists in Estonia (Anspal *et al.* 2010). Full-population administrative data could show the effect of career breaks. Nevertheless, administrative data is difficult to obtain due to personal data

protection laws and it might be complicated to check for heterogeneity due to lack of background information (hours worked, occupation, tenure, marital status, etc.). In Estonia, the motherhood penalty can be assessed indirectly using Mincer-type wage regression, where the dependent variable wage is regressed to a set of variables (Mincer, Polachek 1974). It is assumed that wage is an exponentially increasing function with respect to the independent variables and, for this reason, in labour economics it is used the logarithmic form of wages to make the distribution of the dependent variable closer to the normal distribution. (Anspal *et al.* 2010) The findings are based on ordinary least-squares (OLS) regressions (Mincer, Polachek 1974, S88). The set of control variables are chosen according to the theories discussed in chapter 1.1 based on previous empirical research.

The following Mincer-type wage equation is being estimated for six separate cohorts:

$$\ln w_c = \beta_0 + \beta_c X_c + \varepsilon_c \quad (1)$$

where

- w_c – hourly wage (natural logarithm);
- β_0 – coefficient of time invariant factors influencing the wage;
- β_c – coefficient vector;
- X_c – vector of characteristics of control variables;
- ε_c – statistical residual (other factors influencing the wage, such as abilities, effort, productivity, work ethic, quality of education);
- c – index for cohort (men (*m*), women (*w*), mothers (*mo*), childless women (*cw*), fathers (*fa*), childless men (*cm*)).

The estimates of Mincer's wage equation coefficients indicate the approximate percentage change in wages when the corresponding control variable changes by one unit. The estimated coefficient on the principal variable associated with the number and age of children indicates the parenthood wage gap (Nestić 2007). Some difficulties arise while interpreting the results of the categorical variables as these variables do not have "zero" as a reference point, for instance industry or occupation. A common practice is to omit one group, which is regarded as the reference group, and the rest are transformed into binary dummy variables. (Fortin *et al.* 2011, 39-40)

Succeeding the Mincer-type wage regression, the author constructs a counterfactual wage distribution, which suggests what would be the average wage of parents if they had the same

characteristics as non-parents. This forms the basis of Oaxaca-Blinder decomposition, which assesses the extent of differences between parents and non-parents, and also the extent to which the pay gap is described and not described according to the chosen factors. Oaxaca-Blinder decomposition works on decomposing mean differences in the dependent variable – natural logarithm of hourly wage – based on linear regression models i.e. the Mincerian wage regressions. (Jann 2008, 453, see figure 7)

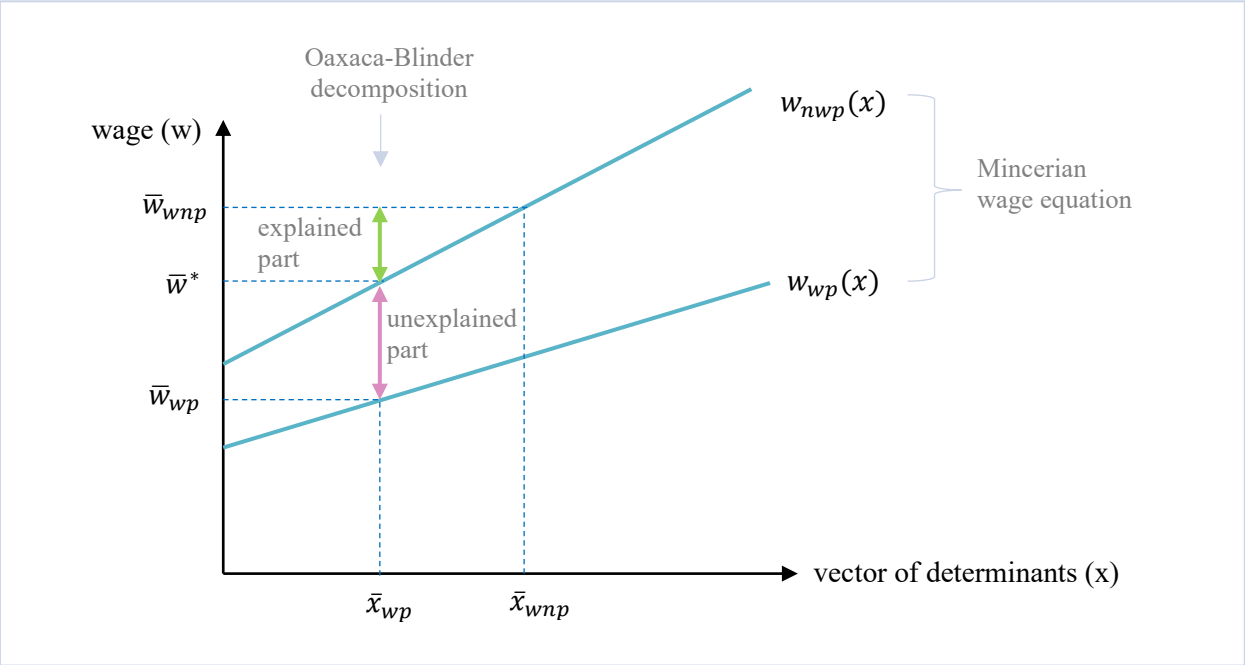

Figure 7 Oaxaca-Blinder decomposition of Mincer-type wage regressions
Source: O'Donnell *et al.* 2008, 148; composed by the author

To avoid the interaction of gender discrimination with discrimination due to parenthood, the thesis applies the wage structure of parents as the reference in the decomposition and the following cohorts are compared:

1) The wage gap among mothers (*mo*) and childless women (*cw*) – childless women as reference group (see equation 2);
2) The wage gap among fathers (*fa*) and childless men (*cm*) – childless men as reference group (see equation 3).

The specification follows a modified Cukrowska-Torzewska and Lovasz (2016) model using a more standard Oaxaca-Blinder. The gender wage gap decomposition, defined as the mean difference in log wages of parents and non-parents is presented in equations (2)-(3):

$$\overline{\ln w_{cw}} - \overline{\ln w_{mo}} = \left(\overline{X_{cw}} - \overline{X_{mo}}\right)'\widehat{\beta_{mo}} + \overline{X_{cw}}\left(\widehat{\beta_{cw}} - \widehat{\beta_{mo}}\right) + \left(\overline{X_{cw}} - \overline{X_{mo}}\right)\left(\widehat{\beta_{cw}} - \widehat{\beta_{mo}}\right) \quad (2)$$

$$\overline{\ln w_{cm}} - \overline{\ln w_{fa}} = \left(\overline{X_{cm}} - \overline{X_{fa}}\right)'\widehat{\beta_{fa}} + \overline{X_{cm}}\left(\widehat{\beta_{cm}} - \widehat{\beta_{fa}}\right) + \left(\overline{X_{cm}} - \overline{X_{fa}}\right)\left(\widehat{\beta_{cm}} - \widehat{\beta_{fa}}\right) \quad (3)$$

where

- $\overline{\ln w_c}$ – average wage of the cohort;
- $\overline{X_c}$ – means of characteristics for the cohort;
- $\widehat{\beta_c}$ – regression estimates of the returns for the characteristics;
- c – index for cohort (mothers (*mo*), childless women (*cw*), fathers (*fa*), childless men (*cm*)).

The left-hand side in equations 2 and 3 is the difference between the average wages of being parents and non-parents (i.e. the raw difference). The right side of the Oaxaca-Blinder equation is divided into three parts (Etezady *et al.* 2020; Liu *et al.* 2000; Jann 2008):

1) Endowment effect – captures differences in the outcome variable due to differences in explanatory variables, such as education or work experience for the two groups (explained effect);
2) Coefficient effect – effects due to the structure of returns of those endowments, often regarded as discrimination and other characteristics that are not observable (unexplained effect);
3) Interaction effect – accounts for differences in endowments and coefficients exist simultaneously, i.e. the interaction of those two effects.

There are a few limitations to the Oaxaca-Blinder decomposition. The model assumes that one of the groups is considered as the base group and all employees in the base group are receiving the "correct" wage depending on their productivity, namely without facing discrimination. In reality, it is difficult to determine which group is receiving the "correct" wage. This quandary is called the "index number problem" or "base group problem". The complication arises when the result is different depending on which group is chosen as the reference base. Therefore, Oaxaca-Blinder decomposition rather presents a possible value instead of a single estimate. One possible solution is to compare previous studies on the same topic and deduce which group was taken as a reference base. (Oaxaca 1973; Jann 2008, 456-457; Anspal *et al*. 2009, 113) Cotton (1988) suggests using the average coefficients for the non-discriminatory parameter vector. In this thesis, the author takes

childless individuals as a base group and assumes that once the group is treated (childbirth), their wage will be discriminated, either positively (fathers) or negatively (mothers).

Even though there are some significant limitations to this research – such as lack of control variables for work effort and discrimination, possible selection bias into parenthood and employment, mother's heterogeneity – it could offer an insight into the extent and nature of the inequalities caused by parenthood status in the labour market outcome. The analysis is conducted in Stata 14.

2.2. Data

The methodology described in section 2.1 is applied on the dataset of the ELFS provided by Statistics Estonia. It is a quarterly sample survey, which collects information on both a household and a personal level since 1995. The data is collected on a rotational panel. All individuals are interviewed four times – two consecutive quarters and after one year, in the same quarters. Since some of the households/individuals drop from the sample and new ones are added each quarter, the dataset forms an unbalanced panel. The advantage of ELFS over the full-population data is its granularity. ELFS provides information on labour status, income, job characteristics, education, training, household structure, and socio-demographic background. Besides the main questions, each survey contains a module, where the theme changes each year. In 2005, 2010 and 2018 the added module concerned questions about the reconciliation of work and family life. (Statistics Estonia 2012, Eesti tööjõu-uuring 2018) As the format of the survey changed in 2009, the analysis covers the period 2009-2019.

For the empirical analysis, the author drops duplicate values, as most respondents answered the survey four times and restricts the sample to employed individuals with existing wage information, while observations with outlying wage values are disregarded. The author further restricts the sample to individuals aged 25 to 54, which is considered to be the "prime" age to work and to rear children. During the analysis, a further 8,670 observations are dropped by Stata due to missing values in important covariates used for the empirical analysis. The final sample size is 24,996, out of which 54% are parents of underaged children. The total number of interviewed individuals is shown below in table 2.

Table 2 Sample creation process

Criteria	Total	Mothers	Childless women	Fathers	Childless men
Total 2009-2019	213,684	49,156	62,249	41,976	60,303
After removing…					
…duplicates	83,317	19,836	23,405	17,079	22,997
…inactive	49,891	12,974	11,993	13,127	11,797
…<25 and 54<…	33,338	11,102	5,970	10,120	6,146
Dropping observations with missing values…					
Final sample	24,668	7,376	5,841	5,903	5,548

Source: ELFS 2009-2019; composed by author

Previous studies define parenthood status as following (Cukrowska-Torzewska, Matysiak 2018):

- The presence of child(ren) as a dummy variable;
- The number of children as a continuous variable;
- The number of children as a categorical variable (for example one child, two children, three or more children);
- The number of children in a given age group as a categorical variable (for example the number of children aged <1; 1-3; 4-6).

The author tests for all four model specifications with the Mincerian wage equation and employs the number of underage children (as a continuous variable) in the Oaxaca-Blinder decomposition. In ELFS, there are two indicators related to children – the number of underaged (<18 years old) children and the age of the youngest child. The "childless individuals" control group may include individuals who have children aged 18 and over. Majority of the women in the sample have either one or two children – 52% and 36% respectively. The distribution of the number of children is rather similar in the case of fathers (48% and 38%). Regarding the age of the children, only 2% of mothers who are employed have a child under one year of age, 15% rear a child aged 1-3. A third of mothers in the sample have a preschool-age child (0-6), while for fathers the figure is 55%. The description of the variables is presented in appendices 5, summary statistics on the variables in appendix 6 while descriptive statistics are reported in appendix 7.

The dependent variable can be presented as an hourly wage, monthly salary or yearly earning. In this thesis, the dependent variable is the natural logarithm of the net real hourly wage. Hourly wage allows part-time employees to be added to the sample. As the ELFS provides information only on monthly earnings, the hourly wage is computed as the quotient of monthly wage and hours worked.

The author estimates net real wages by deflating nominal net wages by the Estonian Consumer Price Index (CPI) deflator, using 2015 as the basis year (CPI is derived from OECD 2020c). The salary information for years 2009 and 2010 must be converted from kroon to euro (conversion rate €1=kr15.6466). Figure 8 shows the kernel density estimation of the log hourly wage to estimate the wage distribution of the four cohorts. While women with and without children have a rather similar wage distribution, in case of men, fathers' wage density is rightward directed compared to the one of childless men.

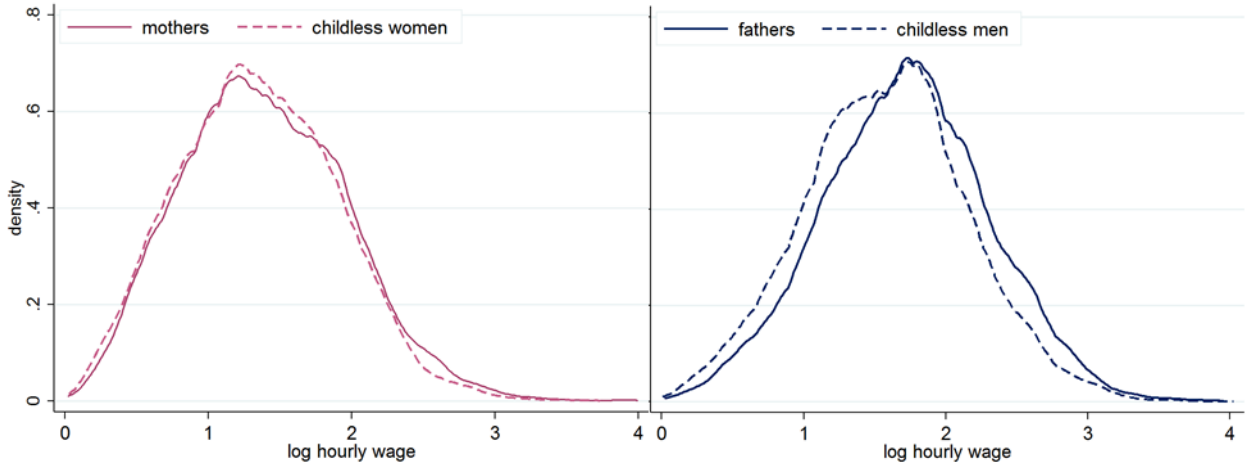

Figure 8 Log hourly wage kernel density estimator by cohort
Source: ELFS 2009-2019, author's calculations, composed in Stata14

This research measures the parenthood gap with selected independent variables based on theories discussed in chapter 1.1. The human capital theory, which assumes investments into human capital bring higher productivity and salary, is tested with age, education, work experience and tenure i.e. the length of time the employee has worked for their current employer. ELFS does not include data on total work experience, but it can be found indirectly through the month and year when the individual started working for the first time. As it is not known whether the individual has been working continuously or has had some inactive periods (such as rearing a child), work experience should be regarded as potential work experience. In the statistical models, years of potential work experience is in a quadratic function. Average potential work experience in the sample is the highest for childless women and the lowest for mothers – 19 years for mothers, 20 for fathers, 23 for childless women and 20 for childless men. The author allocates levels of education into three categories – primary, secondary and tertiary education. (see appendices 5, 6 and 7)

The compensating wage differentials theory, which states that the carers choose "mother-friendly" jobs to consolidate work-family life, is tested by job characteristics such as occupation, industry, sector (private or public) and a few indicators for the work-schedule adjustment (hours of work, possibility of working from home). In the sample, mothers are working slightly less hours than childless women, while for men it is the opposite – fathers work longer hours than childless men (see appendix 6). Both occupation and industry are aggregated into generalising categories (see appendix 5). With regards to managerial positions, parents are less likely to hold a managerial position than their childless counterparts.

The work effort theory is more complicated to test than the previous one mentioned above. The author has chosen two variables that possibly indicate effort: 1) whether the individual holds a position, which presupposes a lower level of education, and 2) whether the employee has supervisory responsibilities. It seems, on the contrary, parents are less likely engage in a job that presumes lower education level than what they possess (10% of mothers and 14% of childless women; 6% of fathers and 9% of childless men).

The author assesses the sex specialisation theory by creating three binary dummy variables – married, single or divorced. It also serves the purpose of controlling selection into work, as married women are more likely to stay inactive and married men are more likely to be active in the labour market. Looking at the distribution of marital status among the cohorts, mothers and fathers are more likely to be married or cohabitating (80% and 90% respectively). 20% of the mothers are either single or divorced, while for childless women the figure is 37% and for childless men 44%.

Some theories, such as work effort theory, discrimination theory or spurious "effects", are hard or even impossible to measure directly. These may appear as unmeasured residual effects in the outcome. In general, previous studies on the motherhood wage gap interpret "unexplained" wage gap as discrimination (Cukrowska-Torzewska, Lovasz 2020). In table 3, the author concludes the most important information about the methodology and data from chapters 2.1 and 2.2.

Table 3 Overview of the sample, method and variables

Country coverage	Estonia
Years	2009-2019
Data source	Estonian Labour Force Survey
Sample	All individuals, who are active in the labour market and aged 25-54
Sample size	24,668
Focus groups	Individuals with underage child(ren) – mothers & fathers
Control (reference) groups	Individuals without underage child(ren) – childless women & men
Method	Mincerian wage equation Three-fold Oaxaca-Blinder decomposition
Adjustments for bias	Heckman two-step model (number of children, age of the youngest child; marital status, education)
Robustness check	Various restrictions on the total samples based on theories
Dependent variable	Hourly net wage (real wage, 2015 as reference)
Principal independent variables	Number of children, age of youngest child, child dummy
Control variables	The human capital theory; o Age; o Education level; o Work experience and its quadratic function; o Tenure; Wage differential theory; o Occupation; o Industry; o Work-schedule (part-time vs full-time); o Sector (public vs private); o Hours of work; o Teleworking; Work effort theory; o Job correspondence to the level of education; o Supervisory responsibilities; Sex specialisation; o Marital status (married, single, divorced); Dummies; o Region (north, east, south, west, centre); o Nationality (Estonian, other); o Number of employees in the firm/unit.

Source: composed by the author

3. RESULTS AND DISCUSSION

3.1. Main results

First, the author checks for selection bias into employment and parenthood for all cohorts using Heckman selection model (two-step estimates). The Inverse Mills Ratio is statistically insignificant in case of all cohorts (see appendix 8) and it can be concluded that there is no selection bias problem, and the author continues the analysis with Mincerian wage equations (OLS) for six cohorts (appendix 9). The principal independent variable "number of children" -structured as categorical variable - shows neither wage penalty nor premium for mothers while men receive a premium of 1.6% per child (see table 4). The author further explores the impact of children by changing the principal independent variable to a dummy variable. The existence of underage child brings 0.6% of wage increase for women and 3.7% for men. Another specification is also assessed with age range of children by creating five age categories. It appears that for men, the fatherhood premium increases once the child gets older but, in case of women, the wage difference fluctuates between -5.5% (for under 1-year-old child) to 2.6% (for 7-12-year-old child). Women's coefficients, however, are statistically insignificant.

Table 4 Mincerian wage equation – results (principal independent variable and its alternatives)

The number of children is…		Women		Men	
continuous variable	0-9 children	0.000		0.016	***
dummy variable	yes=1	0.006		0.037	***
categorical variable	1	0.003		0.024	*
	2	0.021		0.059	***
	3+	-0.028		0.028	
categorical variable (per age group)	<1	-0.055		0.025	
	1-3	0.018		0.047	**
	4-6	-0.008		0.048	**
	7-12	0.026	*	0.058	***
	13-18	-0.009		-0.008	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: ELFS 2009-2019; author's calculations

The results of the Mincer wage equation for four cohorts (mothers, childless women, fathers, childless men) are presented in table 5.

Table 5 Mincerian wage equation – results

	Variables	Mothers	Childless women	Fathers	Childless men
Human capital theory	age	0.0110***	0.00345	0.00733**	-0.00146
	experience	0.00810*	0.00147	0.0116**	0.0103**
	tenure	0.00212**	0.000996	0.00183	0.00477***
	secondary edu	0.0617**	0.00820	0.0137	0.164***
	tertiarty edu	0.227***	0.188***	0.186***	0.318***
Wage differencials theory	NACE - G-J	-0.116***	-0.124***	-0.0180	0.0136
	NACE - K-N	-0.0212	-0.0545**	-0.0861***	-0.0728**
	NACE - O-S	-0.308***	-0.323***	-0.390***	-0.294***
	occ-craft	0.156***	0.115***	0.139***	0.102***
	occ-clerk	0.110***	0.0633***	-0.0737**	-0.0325
	occ-manager	0.346***	0.284***	0.198***	0.253***
	teleworking	0.242***	0.257***	0.232***	0.221***
	part-time	-0.00296***	-0.000951***	-0.00117***	-0.000991**
	public-sector	-0.110***	-0.0638***	-0.0174	-0.0444*
Work effort theory	job is harder	0.0247	-0.0791	0.0906**	0.115**
	job is easier	-0.135***	-0.180***	-0.174***	-0.184***
	supervisor	0.153***	0.149***	0.144***	0.140***
Sex specialisation	single	0.0617***	0.0518***	-0.135**	-0.0550***
	divorced	0.0202	0.0261	-0.0567	-0.0243
Dummies	region-center	-0.169***	-0.160***	-0.102***	-0.0893***
	region-east	-0.203***	-0.212***	-0.124***	-0.149***
	region-west	-0.194***	-0.154***	-0.130***	-0.103***
	region-south	-0.173***	-0.176***	-0.140***	-0.130***
	Estonian	0.130***	0.157***	0.117***	0.146***
	no-employees	0.174***	0.152***	0.246***	0.206***
	Constant	0.996***	1.114***	1.200***	1.276***
	Observations	7,376	5,841	5,903	5,548
	R-squared	0.385	0.402	0.247	0.296

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
The reference groups are as follows: level of education=primary education; region=North-Estonia; marital status=married; number of employees=1–10; occupation=low-skilled; sector of activity = industry. More details in appendix 9.
Source: ELFS 2009-2019; author's calculations

The estimated coefficients related to the human capital theory shows large disparity of hourly wage gain due to higher education among cohorts. Turning to wage differentials theory, for fathers working in a public administration sector leads to 10 percentage points larger wage drop compared to childless men. Also, for mothers there is 11% lower salary if they work in a public sector compared to mothers who work in a private sector. Looking at the work effort theory variables,

results suggest that mothers face the smallest wage loss (13.5%) when taking up a job which requires lower level of education, and the highest gain (15.3%) when having supervisory responsibilities and a managerial position (34.6% increase compared to low-skilled position). Lastly, sex specialisation indicates that women experience a marriage penalty of 6.1%, while men have a marriage premium of 6.6% compared to single individuals. Mothers experience hence, a slightly bigger marriage penalty compared to women without children – 6.2% vs 5.2%. This result is also in line with Cukrowska-Torzewska (2016, 8) study about Poland and Hungary. Being divorce does not provide any extra information to the analysis as the coefficient is not statistically significant.

Diagnostic tests on the model are also checked like goodness of fit (see appendix 9). The ratio of explained variation compared to the total variation (R^2) is between 0.28 and 0.40 for all six models, which means that around one third of the variation in wages across the sample is explained by the selected variations. After inspecting Variance Inflation Factor (VIF), there are no signs of multicollinearity while the Breusch-Pagan test suggests homoskedasticity in case of childless men. For improving the OLS estimates, the author specified the model by Huber/White/sandwich estimator. No significant outliers are detected and by a kernel density estimator, the author verified that the residuals are approximately normally distributed (see appendix 9).

Testing for the functional form of the model, Ramsey Regression Equation Specification Error Test (RESET) revealed that the models are misspecified when the initial sample is split into different cohorts. The reasons for this may be disregarding for significant non-linearities and interactions, or omissions of significant variables from the model. In reality, it is nearly impossible to provide all appropriate variables because statistical surveys do not reveal many aspects, such as ability, quality of education and skills. (Anspal 2015, 36-37). Ramsey RESET test remained statistically significant after testing the models with different variables (including proxies), along with their interactions, quadratic and cubic functions. When interpreting the results, it must be considered that the values may be biased and overestimated.

Figure 9 shows the evolution of the wage gap between parents and non-parents for the span 2009-2019. Fathers have a wage advance compared to childless men, fluctuating between 6% in 2010 to 24% in 2012. Since 2013, the positive discrimination of mothers has decreased at a steady pace, and in 2019 there was no wage difference between mothers and childless women.

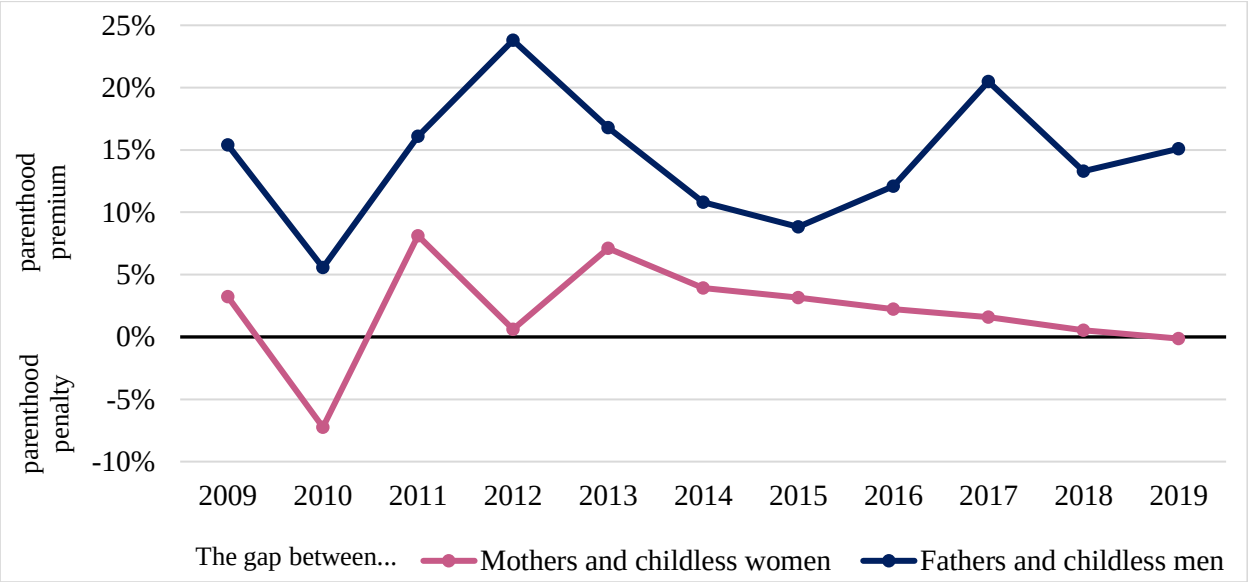

Figure 9 Evolution of motherhood and fatherhood wage gap, Oaxaca-Blinder decomposition, %
Source: ELFS 2009-2019; author's calculations

The wage gap between parents (mothers and fathers) and non-parents (childless women and men respectively) is investigated by a threefold Oaxaca-Blinder decomposition analysis. The main baseline results of the Oaxaca-Blinder decomposition model are reported in Table 6.

Table 6 Results of Oaxaca-Blinder decomposition – full sample

	Group 1: childless women Group 2: mothers	Group 1: childless men Group 2: fathers
Wage (in natural logarithm)	Group 1: 1.339 *** Group 2: 1.371 ***	Group 1: 1.581 *** Group 2: 1.704 ***
Difference (in log points)	-0.033 ***	-0.122 ***
Endowments (in log points)	-0.121	-0.112 ***
Coefficients (in log points)	0.002	-0.037 **
Interaction (in log points)	-0.021 *	0.026
Share of endowments	37.12%	91.80%
Share of coefficients	-0.92%	30.08%
Share of interactions	63.80%	-21.88%
N	Group 1: 5,874 Group 2: 7,416	Group 1: 5,590 Group 2: 5,935

Significance level * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: ELFS 2009-2019; author's calculations

Comparing mothers to childless women, results show that mothers experience motherhood premium of 3.3% with about 37% of it explained by the endowments of mothers while merely 1% is explained by coefficients. The effects, however, are statistically insignificant. Regarding the

interactions between endowment and coefficient effects, the model shows almost 64% that might explain the gap (offsetting scenario, significance level of 0.1). In line with previous studies, fathers experience wage premium – 12.2% – compared to childless men. In this case, 92% of the wage gap is explained by the inferior endowments of fathers while a smaller portion of 30% is explained by the coefficients and 22% from their interactions (double disadvantage). Therefore, the share of endowment, coefficient and interaction effects differ between gender (detailed results are available in appendix 11).

The three components are also studied separately. As both mothers and fathers experience a positive discrimination compared to childless individuals, the minus sign in front of the variable means the characteristics of being parents are "better" and the variable is increasing the gap between parents and childless individuals. On the contrary, a positive value of the variable is decreasing the gap as in that case the characteristics of childless individuals are "better".

The gap between women with and without children is investigated. As mentioned above, 37% of the gap between two female cohorts is explained by the observed characteristics. This value indicates the predicted change in disparity if childless women have the same characteristics as mothers. Endowment effect reveals that women without children have better endowments than the mothers in certain aspects (see figure 10), for example, work experience. In fact, age and work experience reduce the pay gap the most by 3.2% and 4.2% respectively. Childless women are also in advantage when it comes to higher education, marital status, tenure, size of the firm/unit and region. On the other hand, the gap is increased by mothers' advantage concerning working hours, job and education level correspondence, as well as choice of industry and occupation (statistically insignificant).

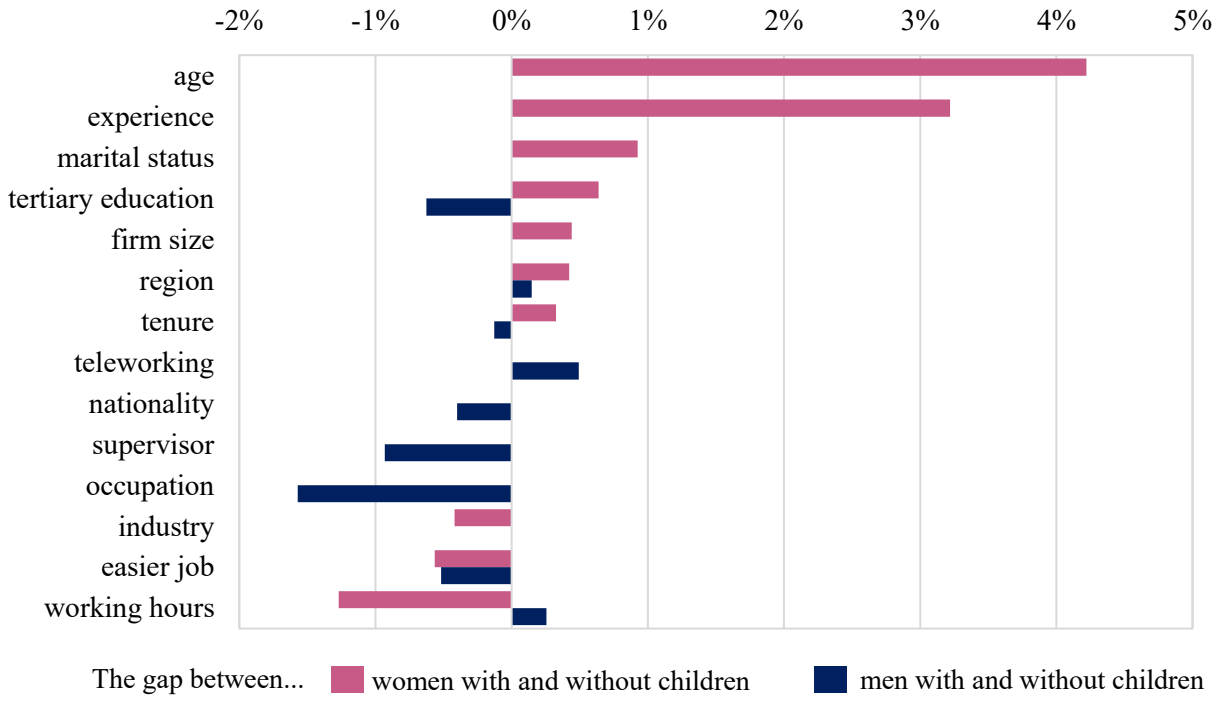

Figure 10 Contribution of statistically significant characteristics to the endowment effect, %.
Source: ELFS 2009-2019, author's calculations

Whereas fathers' characteristics have negative values. This essentially indicates that the characteristics of the fathers in the sample are better than those of the childless men. Taking occupation, supervisory obligations, higher education and nationality into account, the pay gap increases in favour of fathers. Nearly 92% of the gap between two male cohorts is explained by the observed characteristics.

The author also observes the coefficient effect, which is the differences of the coefficients given the two groups have exactly the same endowments. It appears that the working hours significantly attribute to the negative discrimination of mothers (-31.2%). There is a particularly strong link between wage and age in case of both genders, however, with an opposite sign. This indicates a slower wage growth of mothers compared to women without children, unless they work longer hours. Figure 11 further explains that fathers are discriminated based on their age and education level.

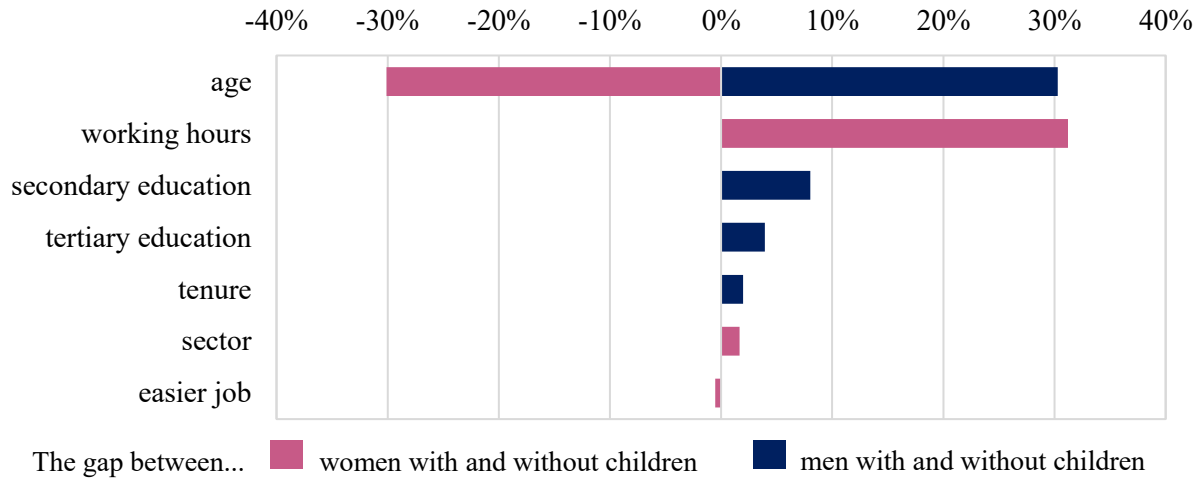

Figure 11 Contribution of statistically significant characteristics to the coefficient effect, %.
Source: ELFS 2009-2019, author's calculations

The interaction effect showed in figure 12 captures the simultaneous effect of endowments and coefficients components. It is negative in case of women, meaning that mothers face a "double advantage" i.e. there is an effect from both individual characteristics and returns of characteristics.

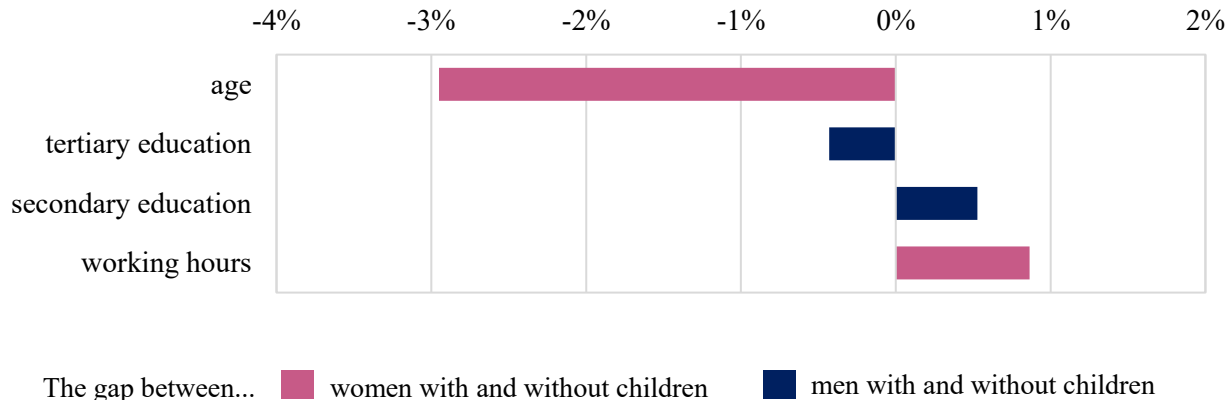

Figure 12 Contribution of statistically significant characteristics to the interaction effect, %.
Source: ELFS 2009-2019, author's calculations

In conclusion, both mothers and fathers experience wage premium, while fathers' premium (12%) is 9 percentage points higher than mothers' (3%). Thus, on average, parenthood leads to divergence of women's and men's wages in Estonia. Most significant variables which led to disparities of wages between parents and non-parents were age, work experience and working hours in case of women (in favour of childless women), and education and job characteristics (occupation, industry, teleworking) in case of men (in favour of fathers).

3.2. Robustness check

The following subsection examines the behaviour of the wage gap in different settings. The author implies the methodology on various subsamples to observe whether the results contrast to the full sample and to one another (e.g. between different age groups). The raw wage gap is derived from the Oaxaca-Blinder decomposition, composed for a specific subsample (for example, in case of age variable, the author restricted the sample for different age ranges). Negative values indicate parenthood penalty (parents experiencing negative discrimination) and positive values indicate parenthood premium (parents experience positive discrimination). Third element in these tables is information whether the wage difference led to divergence or convergence of women's and men's wages in the specific subsample.

Subgroups are also related to theories discussed in section 1.1. For human capital theory, both mothers and fathers are influenced by human capital accumulation (see table 7).

Table 7 Oaxaca-Blinder decomposition's raw gap, robustness check – human capital theory

Sample restricted to…		Motherhood premium/penalty	Fatherhood premium/penalty	Divergence of wages?
Age group	25-29	-0.270 ***	-0.050	Divergence
	30-34	-0.299 ***	-0.035	Divergence
	35-39	-0.052	0.137 ***	Divergence
	40-44	0.152 ***	0.151 ***	Convergence
	45-49	0.160 ***	0.147 ***	Convergence
	50-54	0.115 ***	0.167 ***	Divergence
Education level	Primary	-0.022	0.236 ***	Divergence
	Secondary	0.055 ***	0.092 ***	Divergence
	Tertiary – BA	0.038 **	0.076 ***	Divergence
	Tertiary – MA+	0.076 **	0.159 ***	Divergence
Work experience	≤5	-0.301 ***	-0.105	Divergence
	6-15	-0.192 ***	0.066 ***	Divergence
	16-25	0.029	0.108 ***	Divergence
	26≤	0.122 ***	0.160 ***	Divergence
Tenure	<1	-0.047	0.103 **	Divergence
	1-5	-0.042 **	0.098 ***	Divergence
	6-10	0.075 ***	0.111 ***	Divergence
	11+	0.172 ***	0.162 ***	Convergence

Significance level * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: ELFS 2009-2019, author's calculations

Women with children experience a motherhood penalty when they are young (under 34) and have participated in the labour market up to 15 years (penalty up to 30%). They also experience lower salary than childless women in the first 5 years in a new workplace (penalty up to 5%), however, after accumulating tenure more than 10 years, they are likely to earn 17% of wage premium compared to women without children. The author also restricted the sample to indicators related to the wage differentials theory (see table 8). In this case, results suggest that fathers are more impacted by the job characteristics. Looking at the occupation choice, the wage gap between mothers and childless women is statistically insignificant. Regarding industry, mothers earn significantly more than childless women in fields related to finance (12.5%) and public service (6.2%). In case of men, the highest gap lies in finance (15.7%) and industry (15.5%).

Table 8 Oaxaca-Blinder decomposition's raw gap, robustness check – wage differentials theory

Sample restricted to…		Motherhood premium/penalty	Fatherhood premium/penalty	Divergence of wages?
Occupation	Low-skilled	0.035	0.137 ***	Divergence
	Craft	0.033	0.135 ***	Divergence
	Clerk	0.004	0.047	Divergence
	Manager	0.028 *	0.051 **	Divergence
Industry	Industry	0.001	0.161 ***	Divergence
	Business economy	-0.009	0.068 ***	Divergence
	Finance	0.057 ***	0.154 ***	Divergence
	Public service	0.000	0.042	Divergence
Sector	Public	0.051 ***	0.153 ***	Divergence
	Private	0.023	0.116 ***	Divergence
Teleworking	Yes	0.025	0.048	Divergence
	No	0.029 **	0.121 ***	Divergence
Part-time	Part-time	0.232 ***	0.182 ***	Convergence
	Full-time	0.005	0.117 ***	Divergence

Significance level * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Source: ELFS 2009-2019, author's calculations

Exploring the work effort theory, it reveals that parenthood leads to wage premium (see table 9). Looking at the correspondence between a job and the education level, parents are in an advantage. Mothers earn 5.5% more than childless women in case the job presupposes a lower level of education, which could indicate a "mother-friendly" job. In case of fathers compared to childless men, the gap is double and around 12.5%. Parenthood leads to small and statistically insignificant convergence of wages in case the job presupposes a more advanced level of education. Having

supervisory responsibilities at work results in premium for both parents, however, it is not much bigger compared to positions where there are no supervisory responsibilities.

Table 9 Oaxaca-Blinder decomposition's raw gap, robustness check – work effort theory

Sample restricted to…		Motherhood premium/penalty	Fatherhood premium/penalty	Divergence of wages?
Job correspondence to education level	Job is easier	0.055 *	0.125 ***	Divergence
	Corresponds	0.012	0.114 ***	Divergence
	Job is harder	0.085	0.053	Convergence
Supervisory responsibilities	Yes	0.045 *	0.091 ***	Divergence
	No	0.031 **	0.106 ***	Divergence

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01
Source: ELFS 2009-2019, author's calculations

The results of sex specialisation theory presented in table 10 reveal a motherhood penalty of 10% for lone mothers and a gender wage convergence in case of divorced parents.

Table 10 Oaxaca-Blinder decomposition's raw gap, robustness check – sex specialisation theory

Sample restricted to…		Motherhood premium/penalty	Fatherhood premium/penalty	Divergence of wages?
Marital status	Single	-0.106 ***	0.000	Divergence
	Married	0.080 ***	0.107 ***	Divergence
	Divorced	0.087 **	0.054	Convergence

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01
Source: ELFS 2009-2019, author's calculations

As age subsamples had the widest range of values, the author executed Mincerian wage regression on two subsamples – individuals under 35-years and individuals 35 and over. Results shown in table 12 allow to conclude that both parent's wages are negatively impacted by children when the parent is under 35. On average, the existence of children caused a wage loss of 13% compared to childless women. The number of children is of great importance – while mothers of one child earn 12% less than their childless counterpart, then mothers of three or more children experience nearly 26% lower wage. Fathers face the largest wage drop when the child is less than one-year-old (10%). On average, men lose 5.4% of salary and 3.5% for each child.

Table 11 Mincerian wage equation – subsample of individuals under 35-years-old

The number of children is…		Women (under 35y/o)	Men (under 35y/o)
continuous variable	0-9 children	-0.076 ***	-0.035 ***
dummy variable	yes=1	-0.130 ***	-0.054 ***
categorical variable	1	-0.120 ***	-0.041
	2	-0.138 ***	-0.070 **
	3+	-0.255 ***	-0.113 *
categorical variable (per age group)	<1	-0.175 ***	-0.097 **
	1-3	-0.114 ***	-0.035
	4-6	-0.132 ***	-0.043
	7-12	-0.146 ***	-0.090 *
	13-18	n/a	n/a
N		3,299	3,765

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01. n/a if less than 100 observations.
Source: ELFS 2009-2019, author's calculations

Following, the author used the Mincerian wage regressions to estimate the Oaxaca-Blinder decomposition for the subsample of under 35-year-olds. The results shown in table 12 indicate that childless women earn 23.8% more than mothers. Endowment effect of the number of children is 7%, which is statistically significant. Nevertheless, the Oaxaca-Blinder decomposition shows a fatherhood premium of 2.1%, contrary to the Mincerian regression found earlier. However, the Oaxaca-Blinder result is statistically insignificant.

Table 12 Results of Oaxaca-Blinder decomposition – subsample of individuals under 35-years-old

	Group 1: childless women Group 2: mothers	Group 1: childless men Group 2: fathers
Wage (in natural logarithm)	Group 1: 1.536 *** Group 2: 1.298 ***	Group 1: 1,666 *** Group 2: 1.687 ***
Difference (in log points)	0.238 ***	-0.021
Endowments (in log points)	0.163 ***	-0.053
Coefficients (in log points)	0.150 ***	-0.042 *
Interaction (in log points)	0.076 **	0.010
Share of endowments	68.49%	252%
Share of coefficients	63.03%	200%
Share of interactions	-31.52%	-352%
N	Group 1: 1,442 Group 2: 1,851	Group 1: 2,151 Group 2: 1,587

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01
Source: ELFS 2009-2019; author's calculations

On the contrary, results in table 13 indicate a wage premium for parents aged 35 or over. On average, both mothers and fathers earn 3% of premium per child. Parents' wage premium is the largest when the child is up to 3-years-old, which may indicate that they have had an opportunity to accumulate human capital beforehand.

Table 13 Mincerian wage equation – subsample of individuals aged 35 and over

The number of children is…		Women (over 35y/o)	Men (over 35y/o)
continuous variable	0-9 children	0.030 ***	0.032 ***
dummy variable	yes=1	0.064 ***	0.073 ***
categorical variable	1	0.054 ***	0.051 ***
	2	0.095 ***	0.107 ***
	3+	0.058 ***	0.076 ***
categorical variable (per age group)	<1	n/a	0.150 ***
	1-3	0.130 ***	0.087 ***
	4-6	0.079 ***	0.084 ***
	7-12	0.100 ***	0.099 ***
	13-18	0.029 **	0.022
N		9,933	7,732

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01. n/a if less than 100 observations.
Source: ELFS 2009-2019, author's calculations

After decomposing the Mincerian wage equations, it displays that childless women earn 15.4% less than mothers (see table 14). Similar results appear when decomposing the cohorts of men – childless men earn 19.6% less than fathers. Large share of the gap is explained by the endowments.

Table 14 Results of Oaxaca-Blinder decomposition – subsample of individuals aged 35 and over

	Group 1: childless women Group 2: mothers	Group 1: childless men Group 2: fathers
Wage (in natural logarithm)	Group 1: 1.251 *** Group 2: 1.406 ***	Group 1: 1.516 *** Group 2: 1.712 ***
Difference (in log points)	-0.154 ***	-0.196 ***
Endowments (in log points)	-0.095 ***	-0.163 ***
Coefficients (in log points)	-0.053 ***	-0.071 ***
Interaction (in log points)	-0.007	0.038
Share of endowments	61.68%	101.88%
Share of coefficients	34,44%	36,22%
Share of interactions	4.55%	-38.10%
N	Group 1: 4,432 Group 2: 5,565	Group 1: 3,439 Group 2: 4,348

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01
Source: ELFS 2009-2019; author's calculations

3.3. Discussion

The aim of the thesis was to examine if parenthood contributes to the divergence of women's and men's wages in Estonia. To achieve the aim, the thesis sought answers to the following questions: Do mothers experience a wage disadvantage compared to women without underage children in Estonia? Do fathers experience a wage advantage compared to men without underage children in Estonia? Does parenthood contribute to the divergence of women's and men's wages in Estonia? The results of this work are compared to previous empirical research below.

As a result of the Oaxaca-Blinder decomposition, the average motherhood premium in Estonia for the span of 2009-2019 is 3.3%. Mothers earning motherhood premium is contradictory to most previous empirical research, where mothers experience wage penalty. Looking at the studies on motherhood penalty in post-soviet countries, including Estonia, premium has been recorded instead. Similar result was found by O'Dorchai (2008), who identified a motherhood premium of 12.4% in Estonia, among six other EU in 2004-2005. This indicates that there may have been a drop in the motherhood premium after generous parental leave scheme was adopted in write the year.

Fathers gain a 12.2% higher wage relative to childless men when having an underage child. This result is consistent with most previous studies on fatherhood premium. Anspal *et al.* (2010) recorded a fatherhood premium of 16% in Estonia (for period 2000-2008). Changes in men's wage after becoming a father are mostly associated with changes in the working hours, job traits and specialisation at home (Killewald, Gough 2013). Premium has also been recorded in Denmark of 6% (Simonsen, Skipper 2008), in US 4-9% (4%; Killewald, Gough 2014; 6% Budig *et al.* 2014; 9% Lundberg, Rose 2000). Meanwhile, some studies have recorded fatherhood penalty in Norway (1.5%; Cools, Strom 2014) and in Thailand (Liao, Paweenawat 2019). Cools and Storm (2014) found that a substantial share of penalty is explained by the paternity and parental leave.

As fathers gain more wage premium than mothers, parenthood contributes to divergence of men's and women's wages and therefore to gender wage gap in Estonia. Anspal *et al.* (2010, 44) found similar result for the span of 2000-2008, which indicates the gap has not decreased compared to the period where there were extensive changes in the family policy and the great recession. There are a few subgroups, where parenthood led to convergence of wages: 1) Part-time employees (5% of convergence); 2) Divorced (3.3% of convergence, statistically not significant in case of men);

3) Job is harder compared to the education obtained (3.2% of convergence, statistically not significant); 4) Age group of 40-49 (up to 1.3% of convergence). 5) More than 11 years of tenure (1% of convergence).

Results are, however, heterogeneous and the robustness check demonstrates that it is not possible to generalise parenthood wage premium and divergence of wages. The size of the wage penalty or premium due to having children depends on many different factors – e.g. demographic and socio-economic background. The author found that the most vulnerable groups to wage penalty are young (up to 35-years-old) parents with potential work experience up to 10-15 years, as well as single mothers. These subgroups might face a penalty of 30%. These results correspond with OECD (2018b), Kahn *et al.* (2014) and Chung *et al.* (2017) studies stating that younger mothers may experience a more severe motherhood penalty, as most in-work transitions happen in the first 10-15 years after entering the labour market. On the contrary, parents over 35 experience a premium up to 15.4% (mothers) and 19.6% (fathers) on average. Thus, the rather small statistically insignificant motherhood premium for the full sample might be a result of the two cancelling each other out by having similar coefficient but of opposite signs. Whereas fathers hardly ever experience wage discrimination compared to childless individuals.

These results should be treated with caution – they should not be taken as uniform interpretation but a rather as a direction and severity indicator. How can the wage of parents act under certain circumstances? The author aimed to detect general effects of parenthood on both mother's and father's wages and to find vulnerable groups, whose situation could be alleviated through policy changes. First reason why the interpretation should be handled with care is the "index number problem". The result of Oaxaca-Blinder composition depend on which group is considered base, who so to say receive "correct" wage. (Jann 2008, 456-457) Second the selection bias into parenthood and employment. After executing Heckman two-step selection model resulting in statistically insignificant Inverted Mills Ratio, the author rejected the selection bias. This was not unexpected as the employment rate of parents is higher than the one of non-parents. However, the bias is still probably there, as it is nearly impossible to rule out bias in social studies.

There are some other, more technical, limitations to this research. The most prominent limitation to the dataset was the absence of the length of actual work experience. The author used work experience as a subtraction of the year of the survey minus the start date of their first job. Neither does the ELFS indicate periods of inactivity since the entry of labour market. Potential work

experience may be severely misleading, as 40% of women stay inactive in the labour market for at least two years after childbirth. This means a woman who has two children and 10 years of potential work experience might have been active in the labour market just 4-6 years. Also, work experience is correlated with age, as most people start their career more or less at the same time. Another constraint of the dataset is its design – using Labour Force Survey, it is possible to observe only short-run effects on wages, and this limits the choice of methodology. And third, the absence of control variables for work effort and discrimination.

It seems the current family benefit system in Estonia does not cause severe impact on women's wages on average, unlike in many other developed countries. Nonetheless, further research could shed light on the long-term earnings' trend of the mothers. Therefore, the author suggests using full-population administrative data to observe the wage trajectories over the life-course of women, including period before having their first child and their situation in the labour market years later. This could be executed using difference-in-difference event studies, following Angelov *et al.* (2016) and Kleven *et al.* (2019b). To further develop that analysis, young mothers, who have been in the labour market under ten years, could be compared to mothers, who have had time to accumulate human capital before the birth of their first child.

The findings are also interesting in the light of EU work-balance directive adopted in 2019. The directive encourages mothers to enter labour market after certain time and fathers to stay on paternity leave for at least two months. It may be valuable to repeat the analysis in a few years, after the impact of the directive is perceptible. Will the motherhood premium increase and the fatherhood premium decrease as fathers' leave length is extended? Will the directive aid to converge men's and women's wages in Estonia? Previous research (Johansson 2010, Andersen 2018, Petersen *et al.* 2010, Petersen *et al.* 2014) indicates that men taking up family leave leads to women's more active participation in the labour market and therefore higher wages.

This research might offer an insight into the extent and nature of the impact of parenthood to the divergence of women's and men's wages and therefore into the inequalities of the labour market outcome.

CONCLUSION

The aim of this thesis was to examine whether parenthood contributes to the divergence of women's and men's wages in Estonia. This study attempts to better understand the mechanisms behind the existence of gender wage gap from the perspective of the gender-specific parenthood-based wage gap. To achieve the aim, the thesis sought answers to the following questions: Do mothers experience a wage disadvantage compared to women without underage children in Estonia? Do fathers experience a wage advantage compared to men without underage children in Estonia? Does parenthood contribute to the divergence of women's and men's wages in Estonia?

To assess the impact of parenthood on men's and women's wages, the author employed Mincerian wage equation separately for mothers, childless women, fathers, childless men, the author explains wages as a function of some individual's decisions. The empirical analysis was conducted using a threefold Oaxaca-Blinder approach to decompose the parenthood pay gap into endowment, coefficient and interaction effects. The thesis applied the wage structure of non-parents as the reference in the decomposition of 1) the wage gap among mothers and childless women; 2) the wage gap among fathers and childless men.

The general results revealed a wage premium for both parents – 3.3% for mothers and 12.2% for fathers. While previous empirical studies confirm wage premium for fathers (fatherhood premium), they generally find a wage penalty for mothers (motherhood penalty). However, after applying the methodology on subsamples, the author detected some subgroups, where the individuals are more prone to face the parenthood penalty. The findings indicate that young mothers under 35-years-old experience a significant wage penalty (23.8%) compared to childless counterpart. Controversially, parents 35-years or older experience a significant wage premium (15.4% for mothers and 19.6% for fathers). Thus, the rather small statistically insignificant motherhood premium for the full sample might be a result of the two cancelling each other out by having similar coefficient but of opposite signs. Whereas fathers generally experience wage premium compared to men without children. Overall, parenthood status contributes to divergence

of men's and women's wages in Estonia with an exception of individuals working part-time, which leads to 5% of wage convergence.

The main advantage of ELFS is abundance of control variables that are brought forward in theories. However, there are important variables missing, such as work experience or time spent inactive. The author used potential work experience as a proxy, but this does not account for the time parents stay inactive in the labour market due to parental leave. Also, it is possible the model experiences bias due to selection into parenthood and employment. Therefore, when interpreting the results, it must be considered that the values may be biased and overestimated.

To the knowledge of the author, there are not many studies in Estonia solely focusing on the impact of children on wages. Including the number of children in the regression or decomposition model does not preclude the interaction of gender discrimination with the parenthood discrimination. As the gender wage gap is a rather indistinct area in Estonia, it is worth studying various aspects of this topic. The motherhood wage gap dependes largely on the age of the mother, therefore further research could shed light on the wage-trajectory of mothers in Estonia. This could be done by implementing full-population administrative data on Difference-in-Difference event studies and observing mother's labour market outcome at least a few years before the childbirth and up to ten years after to elucidate the long-term impact of parenthood.

KOKKUVÕTE

LAPSEVANEMA STAATUSE MÕJU SOOLISELE PALGALÕHELE EESTIS

Kristen Jalakas

Käesoleva lõputöö eesmärk on uurida, kas lapsevanema staatus mõjutab naiste ja meeste palkade lahknemist Eestis. Selle uuringuga püütakse paremini mõista soolise palgalõhe taga olevaid mehhanisme lapsevanema staatusest lähtuvalt soospetsiifiliselt. Põhirõhk on emaduse mõjul, kuna üle 90% Eestis lapsehoolduspuhkust võtvatest vanematest on naised. Eesmärgi saavutamiseks otsitakse lõputöös vastuseid järgmistele küsimustele:
1) Kas emad kogevad negatiivset palgalõhet võrreldes naistega, kellele ei ole alaealisi lapsi?
2) Kas isad kogevad positiivset palgalõhet võrreldes meestega, kellele ei ole alaealisi lapsi?
3) Kas lapsevanema staatus tekitab naiste ja meeste palkade erinevust Eestis?

Toetudes eelnevale kirjandusele, testiti lõputöös järgmisi hüpoteese:
H1: Naised, kellel on alaealised lapsed, saavad keskmiselt vähem palka kui naised, kellel pole alaealisi lapsi;
H2: Mehed, kellel on alaealised lapsed, saavad keskmiselt rohkem palka kui mehed, kellel pole alaealisi lapsi;
H3: Lapsevanema staatus tekitab naiste ja meeste palkade erinevust Eestis.

Töö esimeses peatükis tutvustab autor erinevaid teooriaid, kuidas vanemaks olemine võib mõjutada vanemate, peamiselt emade palka. Selle kohta, miks emade palgad pärast sünnitust vähenevad, on esitatud mitu selgitust. Kõige levinum tähelepanek on inimkapitali teooria, mis väidab, et töökogemusel on palgale positiivne mõju, kuid tööturult eemal veedetud aja jooksul halvenevad emade teadmised ja oskused. Teine levinud teooria on palgaerinevuste teooria, mis väidab, et vanemad võivad oma laste vajadustega kohanemiseks valida ametikoha, kus nad vahetavad töö paindlikkuse madalama palga vastu (Anderson jt 2003, 275). Kolmas, töökoormuse teooria väidab, et tootlikkuse erinevus tuleneb emade energiapuudusest. Seda tingib

lastekasvatamise ja majapidamistööde ebavõrdne jaotus meeste ja naiste vahel. Pikad töötunnid koos koduste kohustustega põhjustavad vanemates stressi ning unepuudust (Ruhm 2004, 3). Väsimus ja tähelepanu hajumine tingib madalama tootlikkuse/produktiivsuse. (Budig, Inglismaa 2001, 204). Neljas, soo spetsialiseerumise teooria väidab, et abielus emad võivad oma energia tööturult laste kasvatamisele nihutada. Viies, diskrimineerimise teooria väidab, et tööandjad võivad soorollide tulemusena emadesse negatiivselt suhtuda.

Järgmisena annab autor ülevaate perepoliitikatest, nende olulisusest ühiskonnas ja tutvustab olukorda Euroopa Liidus. Lapsehoolduspuhkuse eesmärk on edendada vanemate ja nende laste heaolu, soolist võrdõiguslikkust ja töökohtade kaitset (Addati 2015). Euroopa Liit võttis vastu direktiivi (2019/1158), mille eesmärk on soodustada naiste taas integreerumist tööturule, julgustades samas isade suuremat kaasatust lapsekasvatusse. Enamik varasematest uuringutest leiab, et lapsed mõjuvad naiste palkadele negatiivselt. Seejuures Põhja-Euroopa riikides, kus praktiseeritakse võrdset toitja-hooldaja mudelit on üsna väike mõju; Lääne-Euroopa riikides ja USA-s, kus on olemas modifitseeritud meestoitja mudel on mõõdukas mõju ja lastel on ema palkadele tugev negatiivne mõju Ida-Euroopa riikides, kus on juurdunud traditsioonilised peremudelid.

Kolmas alapeatükk annab ülevaate Eestis kehtivast perepoliitikast, kirjeldades selle ajalugu ja arengut alates 20. sajandi algusest. Eestis kindlustatakse vanemate palgad ja tööhõive arenenud riikide seas ühe heldeima vanemapuhkusega. Selle tulemusena lahkub pärast sünnitust 40% emadest enam kui kaheks aastaks tööturult ja see võib avaldada pikaajalist mõju nende sissetulekutele ja tööturul osalemisele. Praegune puhkuse pikkus on Nõukogude Liidu perekeskse mentaliteedi pärand, mille vastuoluline eesmärk on soolise võrdõiguslikkuse tagamine tööturul. Kuigi väikeste (3-6-aastaste) laste emade tööhõivemäär on kõrge, püsib emade ja isade vaheline palgalõhe suurem kui lastetute isikute vaheline.

Käesoleva töö autor kasutab Minceri palgavõrrandit, mis selgitab palga ja inimkapitali seoseid. Tulenevalt töö eesmärgist kaasab autor lisaks inimkapitali näitajatele teisi muutujaid, mis kirjeldavad eelpool mainitud teooriaid. Selleks, et hinnata palgalõhet vanemate ja lastetute indiviidide vahel kasutab autor Oaxaca-Blinderi dekomposotsiooni, mis nõuab kahte eraldi regressioonivõrrandit kahe grupi jaoks. Vältimaks soolise diskrimineerimise koosmõju lapsevanema staatusest tingitud diskrimineerimisega, võrreldakse lõputöös järgmisi rühmi: 1) Palgaerinevus emade ja lasteta naiste vahel – lasteta naised võrdlusrühmana; 2) Palgaerinevus

isade ja lasteta meeste vahel – lasteta mehed võrdlusrühmana. Saadud palgalõhe jaguneb kolmeks osaks: 1) sihtkapitali efekt (mõju, mis tuleneb rühmade erinevatest omadustest); 2) koefitsiendi mõju (mõju, mis tuleneb rühmade erinevatest hoiakutest); 3) koostoime efekt (kahe eelneva mõju üheaegne koostoime).

Eelnevalt kirjeldatud metoodikat rakendatakse Eesti Statistikaameti pakutava Eesti tööjõu-uuringu andmetel. See on kvartaalne valimiuuring, mis pakub teavet tööalase staatuse, sissetuleku, tööomaduste, hariduse, koolituste, leibkonna struktuuri ja sotsiaal-demograafilise tausta kohta. Empiiriliseks analüüsiks jätab autor ära dubleerivad väärtused, kuna enamik vastajaid vastas küsitlusele neli korda. Lisaks piirab autor valimit 25-54-aastastele isikutele, kelle kohta on olemas palgainformatsioon. Lõpliku valimi suuruseks on 24,996 isikut, kellest 54% on alaealiste laste vanemad. Sõltumatuks muutujaks on reaaltunnipalk, mis on teisendatud naturaallogaritmiks. Peamiseks sõltumatuks muutujaks on alaealiste laste arv ja noorima lapse vanus. Analüüsis kasutab autor järgnevaid sõltumatuid muutujaid: vanus, haridustase, töökogemus (ruutfunktsioon), ametis oldud aeg, amet, tööstusala, töögraafik, sektor (avalik või era), töötunnid, kodust töötamise võimalus, töötajate arv ettevõttes/üksuses, töökoha vastavus haridustasemele, järelevalve kohustused, perekonnaseis, piirkond ja rahvus.

Minceri palgavõrrandist järeldub, et laste mõju naiste palgale on minimaalne ja meeste palgale positiivne (kuni 3.7% suurem palk lastetute meestega võrreldes). Autor kasutab leitud Minceri võrrandeid, et leida palgalõhe lastevanemate ja lastetute indiviidide vahel. Mincer-Oaxaca dekomponeerimise tulemusest ilmneb, et keskmiselt teenivad emad 3.3% rohkem kui lastetud naised ning isad 12.2% rohkem kui lastetud mehed. Kui naiste palgalõhet mõjutab kõige enam vanus ning töökogemus, siis meeste palgalõhet mõjutavad haridustase ja töötunnused (näiteks amet, kodust töötamise võimalus ja järelevalve kohustused).

Järgnevalt uuris autor palgalõhe käitumist erinevates olude korral. Selleks piirati valimit vanuserühmade, haridustasemete, jne. kaupa. Tulemustest ilmnes, et enamikul juhtudest kogevad nii mehed kui ka naised palgasoodustust lastetute isikutega võrreldes. Sealjuures meeste soodustus on üldjuhul suurem, seega lapsevanema staatus soodustab naiste ja meeste palkade erinevust. Siiski esinesid mõningased erandid – osalise tööajaga ja 40-49-aastaste töötajate hulgas. Kõige suurema palgalõhe käes kannatavad noored, alla 35-aastased lapsevanemad esimese 10-15 tööturul veedetud aasta jooksul. Seetõttu jagas autor valimi kaheks – alla 35 aastased ja üle 35 aastased isikud ning leidis nendele alavalimitele Minceri palgavõrrandid. Sealt selgus, et alla 35-aastased

kannatavad negatiivse palgalõhe käes. Emad teenivad keskmiselt 13% väiksemat palka võrreldes lastetute naistega ning meeste puhul on see näitaja 5,4%. Sealjuures noored vanemad teenivad väiksemat palka iga laste arvu ja vanuse puhul. Seejärel võrdles autor neid tulemusi üle 35-aastaste palgavõrranditega. Sealt selgus, et üle 35-aastased teenivad iga laste arvu ja vanuse puhul palgapreemiat – naised keskmiselt 6,4% ja mehed 7,3%.

Nendesse tulemustesse tuleb suhtuda ettevaatusega, kuna tõenäoliselt on need hinnangud kallutatud emaduse ja tööhõive valiku tõttu (mitte kõik naised ei otsusta lapsi saada või tööturul osaleda). Sellegipoolest usub autor, et käesolev lõputöö pakub uut lähenemisviisi Eesti soolisele palgalõhele, mis on üks Euroopa suurimaid. Autori teada pole Eestis palju uuringuid, mis keskenduksid laste mõju palgale. Järgnevad uuringud võivad keskenduda laste pikaajalise mõju uurimisele. Selleks võiks kasutada rahvastiku haldusandmeid ja *Difference-in-Differences* mudelit, mis võimaldab järgida vanemate tööturu käitumist ja palka enne lapse saamist ja kuni 10-15 aastat hiljem.

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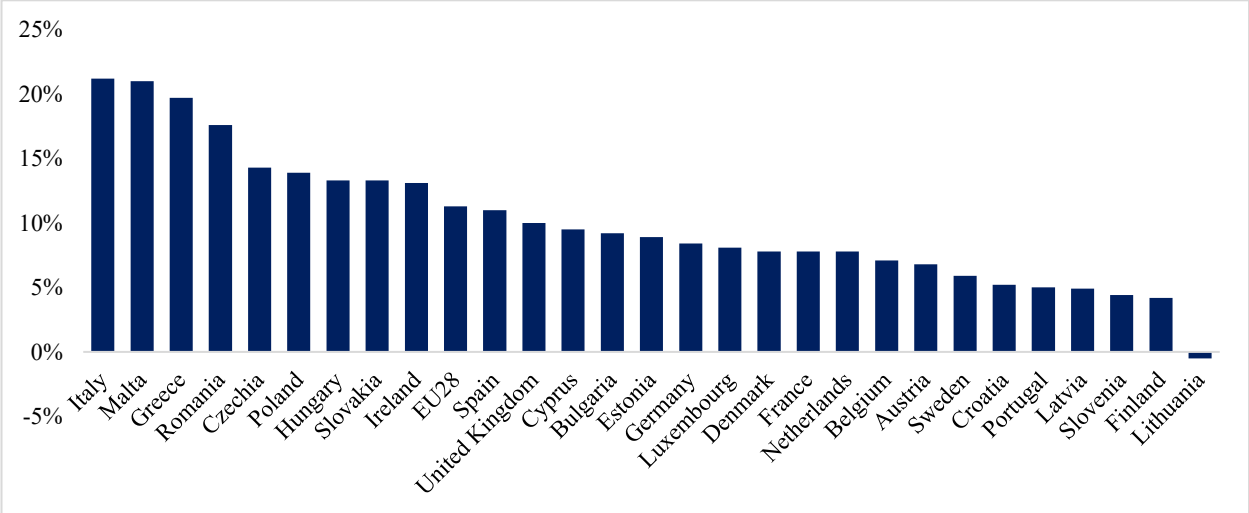
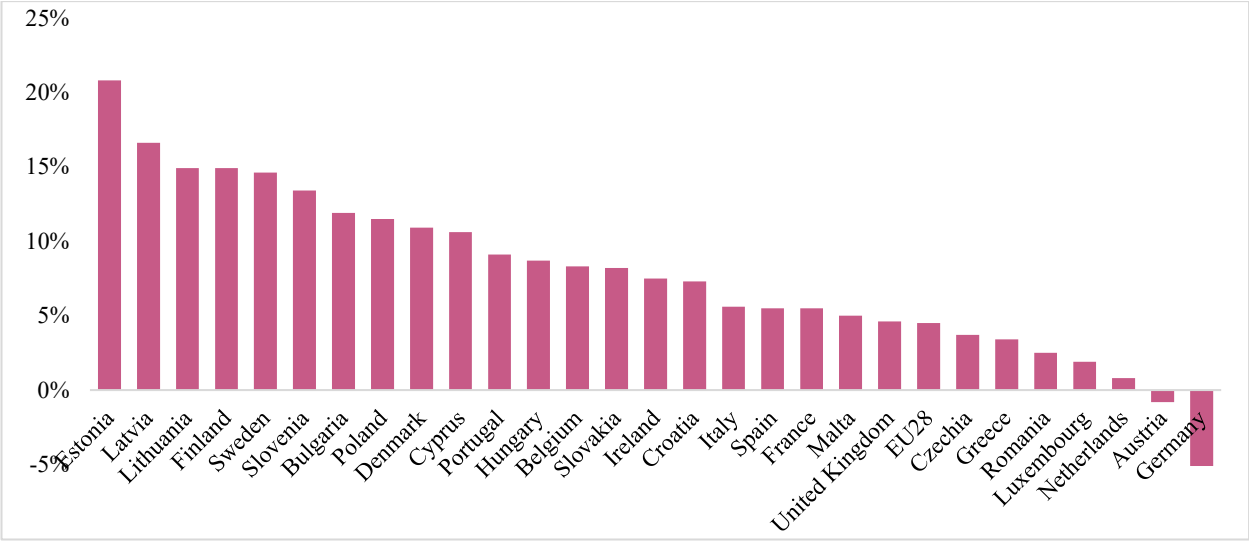
APPENDICES

Appendix 1. Employment and education gap in European Union



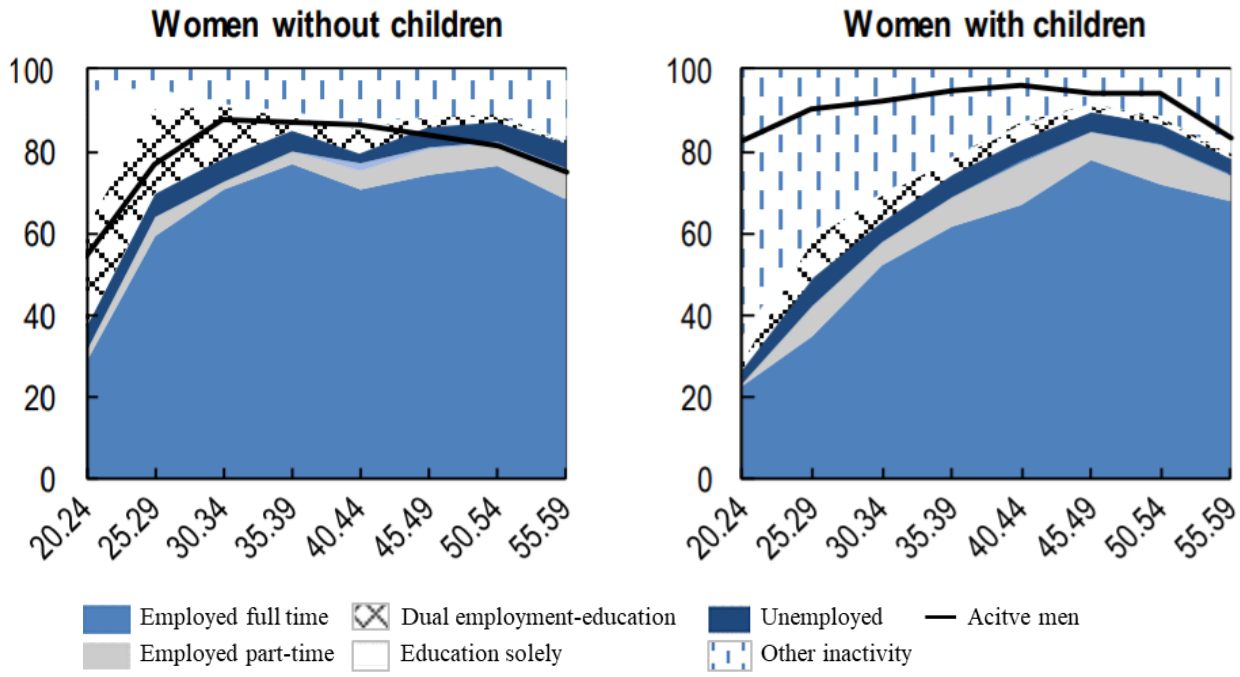
(1) Employment gap (age 25-54) in 2019Q4, %. Women as reference.



(2) Tertiary education gap (age 25-64) in 2019, %. Men as reference.

Source: Eurostat (tables lfsq_ergaed and edat_lfse_03). Author's calculations.

Appendix 2. Detailed activity status of mothers and women without children in Estonia by age group in 2015



Source: OECD 2018b, Annex Figure 6.A.4.

Appendix 3. Family Benefit Law enforcements in Estonia

Enforcement	Description
1913	Fully paid leave of ten weeks (four before and six after birth) available to women working in the industry.
1920	Fully paid leave of ten weeks (four before and six after birth) available to all women.
1940s-50s	35 days of leave before and 42 days after giving birth.
1982	The leave was extended to a year and mothers received minimum wage.
1989	18 months of paid and up to three years of unpaid leave was enacted.
1991	Fathers can take leave.
January 2004	Allowing parents to claim parental benefit 100% of the previous salary up to 435 days.
June 2005	The period was extended to 455 days.
September 2007	New mothers could take parental benefit up to 575 days or until the child is 18 months old. Fathers could take parental leave after the child is 70 days old, instead of 6 months as it had been so far.
January 2017	Allowance for families with many children (more than 3 children - €300 per child).
March 2018	Parental benefit is not reduced if the mother is working and earning less than 1,660 euros per month.
June 2020	Fathers can stay on parental leave for 30 workdays instead of 10 and receive parental benefit for that period. Father can take leave during the same or different time as the mother.
July 2020	Parents can stop and continue taking parental benefit until the child is 3 years old. That means that the parents can either work halftime or take turns by being at parental leave.

Sources: Karu, Pall 2009; PHS § 34, § 37; TLS § 59; RaKS § 54; composed by the author

Appendix 4. Methods used in the previous studies on family gap

Data type	Author(s)	Method	Country & year
Longitudinal data (panel data)	Budig, England (2001)	Fixed-effect model & OLS	US 1982-1993
	Waldfogel (1997)	pooled cross-sectional models, difference models, and fixed-effects models,	US 1968-1988
	Lundberg, Rose (2000)	Random-effects model & fixed-effects model	Germany 1980-1992
	Anderson *et al.* 2003	Pooled cross-section and fixed-effect models	US 1968-1988
	Livermore *et al.* (2011)	Heckman-corrected Mincer wage model, fixed effects estimates	Australia 2001-2007
	Han *et al.* (2009)	Difference in Difference	US 1987-1994
	Gupta, Smith (2002)	ordinary least square	Denmark 1980-1995
	Molina, Montuenga (2009)	pool and fixed-effects methods (Mincer wage)	Spain 1994-2001
	Baum (2003)	difference-in-difference-in-difference	US 1986-1994
Full-population administrative data	Kleven *et al.* (2019b)	difference-in-differences event study; Oaxaca-Blinder decomposition; quasi-experimental approach based on event studies	Denmark 1980-2013
	Pacelli *et al.* (2013)	linear probability model	Italy 1985-2003
	Lalive *et al.* (2013)	regression discontinuity design, non-stationary model, Counterfactual policy simulations	Austria 1990, 1996, 2000
	Andersen (2018)	standard instrumental variables (IV) model	Denmark 1989, 1994, 1997, 1998, 2002
	Bütikofer *et al.* (2018)	the ordinary least squares (OLS)	Norway 1998-2000
	Angelov *et al.* (2016)	difference-in-differences event study	Sweden 1986-2008
	Sieppi, Pehkonen (2019)	quasi-experimental approach based on event studies	Finland 1987-2017

Appendix 4 continued

Micro cross-sectional data	Gamboa, Zuluaga (2013)	Blinder–Oaxaca decomposition	Colombia 2008
	Cukrowska-Torzewska, Lovasz (2020)	Blinder–Oaxaca decomposition	26 EU MS 2004-2013
	Thévenon (2009)	Log-linear model (OLS)	14 EU MS 1992-2005
	Phipps *et al.* 2001	OLS	Canada 1995
	Evertsson, Duvander (2010)	Multilevel, multiprocess model	Sweden 1991; 2000
	Budig *et al.* (2000)	OLS	EU
	Cukrowska-Torzewska, Lovasz (2016)	Modification of the Blinder–Oaxaca decomposition	Hungary, Poland 2006-2009
	Budig *et al.* (2012)	Pooled regressioon model	22 countries in LIS survey 2000
	Agüero, Marks (2011)	OLS / infertility instrument	26 developing countries (mostly Africa and Latin America) 1994-1999
	Nestić (2007)	OLS; quantile regressions; Machado-Mata decomposition analysis	Croatia 1998, 2005
	Liao, Paweenawat (2009)	Blinder-Oaxaca decomposition; Juhn-Murphy-Pierce decomposition	Thailand 1985-2017
	Pal, Waldfogel (2016)	OLS	US 1967-2013

Source: composed by the author

Appendix 5. Description of variables

Variable	Name	Description	ELFS code
Dependent variable	Ln hourly wage	*Derived by*	d25b / (d19*4.3)
Principal independent variable	Number of children	*Number of underaged (<18-years-old) children*	laps_18_arv
	Age of youngest child	*Observations were restricted to underage children*	n_lapse_vanus
Human Capital Theory	Age	Age in years	age
	Primary education	Dummy variable (primary education = 1) pre-primary, basic school and education, levels 0-3	educat
	Secondary education	Dummy variable (middle education = 1) general secondary, vocational or technical education, levels 4-7	educat
	Tertiary education	Dummy variable (tertiary education = 1) Professional higher education, technical education (after secondary education), Bachelor's, Master's or Doctor's degree, levels 8-10	educat
	Work experience	Years since started to working-life (Starting date of the first regular job – year&month)	i00a & i00b
	Tenure	Years since started working in the current workplace (Starting date of the current job – year&month)	d09a & d09b
Compensating Wage Differentials Theory	Occupation (ISCO – International Standard Classification of Occupations)	Manager (legislature, higher officials, managers, high-level specialists, medium-level specialists, technicians; levels 1-3); Clerks (office clerks, service and sales workers, levels 4-5); Handicraft (skilled specialists, agriculture and fishing; levels 6-7); Low-skilled (operators of equipment and machinery; levels 8-9).	d03k d03ku
	Industry (NACE – Statistical Classification of Economic Activities in the European Community)	B-E Industry (except construction) G-J Wholesale and retail trade; transport; accommodation and food service activities; information and communication K-N Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities O-S Public administration and defence; compulsory social security; education; human health and social work activities; arts, entertainment and recreation; other service activity; A, F, T, U – "low skilled", agriculture, construction.	emtak1 emtak1u
	Part-time	Part-time = 1, if d17=2	d17
	Hours worked	Usual working hours per week	d19
	Sector	Public_sector = 1, if d12=10 | d12=20	d12
	Teleworking	Occasional telework = 1, if d31=1	d31

Appendix 5 continued

Work Effort Theory	Job correspondence to education	Dummy variable (Easy_job=1) Categorical variable (eduxjob) Correspondence between a job and education level	d35
	Supervisor	Dummy variable (supervisory responsibilities = 1)	d04a
Sex Specialisation Theory	Married	Dummy variable (married=1, if marital=2) Sample of women who are married.	marital
	Single	Dummy variable (married=1, if marital=1) Sample of women who are single.	marital
	Divorced	Dummy variable (married=1, if marital=4) Sample of women who are divorced.	marital
Dummies	Geographical coverage	Northern Estonia (Tallinn, Harju) Central Estonia (Järva, Lääne-Viru, Rapla) Eastern Estonia (Ida-Viru) Western Estonia (Hiiu, Lääne, Pärnu, Saare) Southern Estonia (Jõgeva, Tartu, Põlva, Valga, Viljandi, Võru)	k03mkkoo
	Nationality	Dummy variable (estonian=1, if rahvus=1)	rahvus
	No of employees	Dummy variable (less than 10=1 if t_arv=1)	t_arv
Creating sample	Gender	male=1, female=2	k01d
	Employment status	For restricting the sample. Employed=1, if status=1.	status
	Duplicate values	Creating a new unique ID to find duplicate values, as each person is questioned four times in two consecutive years.	leibkond kysitletav quarter year k01c k01d
Person's weight		pweight=wgt	wgt_y

Source: ELFS 2009-2019, composed by the author

Appendix 6. Summary statistics of the variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ln_rhwage	26,148	1.50	0.59	0.01	4.03
age	33,338	40.29	8.45	25.00	54.00
exp	32,464	20.45	9.27	0.00	44.00
ten	32,996	7.08	7.00	0.00	38.00
Working hours	32,451	164.21	26.31	4.20	294.00

Source: ELFS 2009-2019, author's calculations

Appendix 7. Summary statistics of the sample

Number of children	Mothers	Fathers	Childless women	Childless men	Total
0			7,567	7,876	15,443
			100	100	46
1	4,957	4,060			9,017
	52	48			27
2	3,421	3,194			6,615
	36	38			20
3+	1,127	1,136			2,263
	12	14			7
Total	9,505	8,390	7,567	7,876	33,338
	100	100	100	100	100

Age of youngest child	Mothers	Fathers	Childless women	Childless men	Total
No child			7,567	7,876	15,443
			100	100	46
<1	185	760			945
	2	9			3
1-3	1,438	2,174			3,612
	15	26			11
4-6	2,008	1,639			3,647
	21	20			11
7-12	3,067	2,133			5,200
	32	25			16
1-18	2,807	1,684			4,491
	30	20			13
Total	9,505	8,390	7,567	7,876	33,338
	100	100	100	100	100

Education level	Mothers	Fathers	Childless women	Childless men	Total
Primary	764	1,218	409	1,193	3,584
	8	15	5	15	11
Secondary	4,121	4,719	3,404	4,671	16,915
	43	56	45	59	51
Tertiary	4,620	2,451	3,751	2,011	12,833
	49	29	50	26	39
Total	9,505	8,388	7,564	7,875	33,332
	100	100	100	100	100

Appendix 7 continued

Age	Mothers	Fathers	Childless women	Childless men	Total
25-29	824	735	1,284	1,897	4,740
	9	9	17	24	14
30-34	1,631	1,450	603	1,168	4,852
	17	17	8	15	15
35-39	2,398	1,939	367	772	5,476
	25	23	5	10	16
40-44	2,476	2,023	861	839	6,199
	26	24	11	11	19
45-49	1,585	1,493	1,828	1,313	6,219
	17	18	24	17	19
50-54	591	750	2,624	1,887	5,852
	6	9	35	24	18
Total	9,505	8,390	7,567	7,876	33,338
	100	100	100	100	100

	Mothers	Fathers	Childless women	Childless men	Total
Married	7,822	8,220	4,764	4,454	25,260
	82	98	63	57	76
Single	861	69	1,752	2,897	5,579
	9	1	23	37	17
Divorced	822	101	1,051	525	2,499
	9	1	14	7	8
Total	9,505	8,390	7,567	7,876	33,338
	100	100	100	100	100

	Mothers	Fathers	Childless women	Childless men	Total
Full time	8,295	8,152	6,849	7,471	30,767
	87	97	91	95	92
Part time	1,208	236	718	399	2,561
	13	3	9	5	8
Total	9,503	8,388	7,567	7,870	33,328
	100	100	100	100	100

	Mothers	Fathers	Childless women	Childless men	Total
Public sector	3,412	1,429	2,607	1,263	8,711
	36	17	35	16	26
Private sector	6,085	6,952	4,944	6,601	24,582
	64	83	65	84	74
Total	9,497	8,381	7,551	7,864	33,293
	100	100	100	100	100

Appendix 7 continued

easier job	Mothers	Fathers	Childless women	Childless men	Total
Corresponds	8,351	7,624	6,398	7,000	29,373
	88	91	85	89	88
Harder job	206	284	139	206	835
	2	3	2	3	3
easier job	937	472	1,022	655	3,086
	10	6	14	8	9
Total	9,494	8,380	7,559	7,861	33,294
	100	100	100	100	100

Experience	Mothers	Fathers	Childless women	Childless men	Total
<5	282	107	480	600	1,469
	3	1	6	8	4
'5-15	2,737	2,167	1,481	2,421	8,806
	29	26	20	31	26
15-25	4,143	3,721	1,156	1,511	10,531
	44	44	15	19	32
25-...	2,343	2,395	4,450	3,344	12,532
	25	29	59	42	38
Total	9,505	8,390	7,567	7,876	33,338
	100	100	100	100	100

Tenure	Mothers	Fathers	Childless women	Childless men	Total
<1	1,903	1,248	1,160	1,453	5,764
	20	15	15	18	17
1-5	3,153	2,756	2,417	2,960	11,286
	33	33	32	38	34
5-10	2,021	1,965	1,497	1,590	7,073
	21	23	20	20	21
10-...	2,428	2,421	2,493	1,873	9,215
	26	29	33	24	28
Total	9,505	8,390	7,567	7,876	33,338
	100	100	100	100	100

Appendix 7 continued

	Mothers	Fathers	Childless women	Childless men	Total
Not teleworking	8,278	7,312	6,703	7,095	29,388
	89	88	90	91	89
Teleworking	1,014	1,009	751	714	3,488
	11	12	10	9	11
Total	9,292	8,321	7,454	7,809	32,876
	100	100	100	100	100

Occupation	Mothers	Fathers	Childless women	Childless men	Total
Low-skilled	4,876	3,290	3,634	2,504	14,304
	51	40	48	32	43
Craft	2,572	665	2,124	775	6,136
	27	8	28	10	19
Clerk	431	2,418	359	2,267	5,475
	5	29	5	29	17
Manager	1,619	1,932	1,441	2,266	7,258
	17	23	19	29	22
Total	9,498	8,305	7,558	7,812	33,173
	100	100	100	100	100

Source: ELFS 2009-2019, author's calculations

Appendix 8. Heckman two-step selection model

	mothers ln_rhwage	childless women ln_rhwage	fathers ln_rhwage	childless men ln_rhwage
ln_rhwage				
y_edu	0.0884***	0.0720***	0.0758***	0.0755***
	(29.77)	(4.17)	(6.45)	(4.87)
age	0.0363***	0.0177	0.0779*	0.0364
	(3.64)	(0.69)	(1.88)	(0.83)
c.age#c.age	-0.000431***	-0.000278	-0.000965*	-0.000526
	(-3.47)	(-0.85)	(-1.87)	(-0.95)
_cons	-0.612**	-0.452	0.211	1.417
	(-2.33)	(-0.35)	(0.25)	(1.18)
select				
married	-0.0577	0.0262	-0.0532	0.0905***
	(-1.37)	(0.74)	(-0.47)	(2.60)
laps_18_arv	0.0435*		0.00138	
	(1.88)		(0.07)	
n_lapse_va~s	0.000302		-0.0101**	
	(0.07)		(-2.57)	
y_edu	-0.0113**	-0.00896	-0.0111**	-0.00703
	(-2.06)	(-1.45)	(-1.99)	(-1.20)
age	0.00411	-0.00233	-0.00881	0.00389
	(0.16)	(-0.12)	(-0.37)	(0.22)
c.age#c.age	0.0000369	0.0000542	0.0000901	-0.0000665
	(0.11)	(0.22)	(0.31)	(-0.30)
_cons	0.820*	0.994**	1.143**	0.674**
	(1.74)	(2.51)	(2.46)	(1.97)
mills				
lambda	0.151	1.758	-2.337	-3.212
	(0.35)	(0.42)	(-1.64)	(-1.57)
N	8980	7564	8089	7875

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Source: ELFS 2009-2019, author's calculations

Appendix 9. Mincerian wage regression results

The sample of employed individuals aged 25-54, dependent variable is the hourly wage log

	women ln_rhwage	men ln_rhwage	mothers ln_rhwage	childless women ln_rhwage	fathers ln_rhwage	childless men ln_rhwage
laps_18_arv	-0.0000557	0.0159***	-0.00337		0.00287	
	(-0.01)	(2.58)	(-0.39)		(0.30)	
age	0.00630***	0.00164	0.0110***	0.00345	0.00733**	-0.00146
	(3.71)	(0.71)	(4.63)	(1.35)	(2.35)	(-0.45)
experience	0.00576**	0.0102***	0.00810*	0.00147	0.0116**	0.0103**
	(2.02)	(3.06)	(1.88)	(0.36)	(2.22)	(2.35)
experience2	-0.000336***	-0.000419***	-0.000400***	-0.000222***	-0.000517***	-0.000371***
	(-5.40)	(-6.12)	(-3.82)	(-2.82)	(-4.49)	(-4.34)
tenure	0.00145**	0.00338***	0.00212**	0.000996	0.00183	0.00477***
	(2.19)	(3.79)	(2.17)	(1.12)	(1.58)	(3.63)
working_hours	-0.00213***	-0.00105***	-0.00296***	-0.000951***	-0.00117***	-0.000991**
	(-10.26)	(-3.21)	(-11.22)	(-2.91)	(-2.80)	(-2.18)
Education - primary as base						
2.edu	0.0476**	0.0984***	0.0617**	0.00820	0.0137	0.164***
	(2.45)	(5.58)	(2.56)	(0.25)	(0.57)	(6.53)
3.edu	0.224***	0.258***	0.227***	0.188***	0.186***	0.318***
	(10.47)	(11.26)	(8.38)	(5.35)	(5.86)	(9.87)
Job correspondace to education - "job corresponds to education" as base						
job harder	-0.0225	0.0976***	0.0247	-0.0791	0.0906**	0.115**
	(-0.67)	(2.95)	(0.57)	(-1.56)	(1.97)	(2.42)
job easier	-0.159***	-0.180***	-0.135***	-0.180***	-0.174***	-0.184***
	(-10.71)	(-8.34)	(-6.04)	(-9.06)	(-5.13)	(-6.61)
Nace - industry (B-E) as base						
NACE G-J	-0.122***	0.00244	-0.116***	-0.124***	-0.0180	0.0136
	(-7.84)	(0.16)	(-5.47)	(-5.50)	(-0.88)	(0.63)
NACE K-L	-0.0383**	-0.0789***	-0.0212	-0.0545**	-0.0861***	-0.0728**
	(-2.26)	(-3.87)	(-0.93)	(-2.19)	(-3.09)	(-2.53)
NACE O-S	-0.317***	-0.332***	-0.308***	-0.323***	-0.390***	-0.294***
	(-15.46)	(-9.89)	(-10.55)	(-11.26)	(-8.86)	(-6.07)
Occupation - low-skilled position as base						
occ_craft	0.138***	0.120***	0.156***	0.115***	0.139***	0.102***
	(6.04)	(7.74)	(4.55)	(3.76)	(6.37)	(4.67)
occ_clerk	0.0895***	-0.0486**	0.110***	0.0633***	-0.0737**	-0.0325
	(5.69)	(-2.38)	(5.16)	(2.74)	(-2.45)	(-1.17)
occ_manager	0.320***	0.231***	0.346***	0.284***	0.198***	0.253***
	(18.88)	(12.47)	(15.29)	(11.29)	(7.81)	(9.63)
t_arv	0.162***	0.228***	0.174***	0.152***	0.246***	0.206***
	(12.99)	(14.07)	(10.27)	(8.35)	(11.25)	(8.80)
d_telework	0.250***	0.226***	0.242***	0.257***	0.232***	0.221***
	(15.35)	(11.52)	(10.92)	(10.87)	(9.50)	(7.29)
public_sec~r	-0.0864***	-0.0318*	-0.110***	-0.0638***	-0.0174	-0.0444*
	(-6.67)	(-1.78)	(-6.31)	(-3.35)	(-0.74)	(-1.73)
supervisor	0.153***	0.140***	0.153***	0.149***	0.144***	0.140***
	(13.22)	(10.18)	(9.63)	(9.10)	(7.98)	(6.88)

Appendix 9 continued

Marital – married as base						
marital-single	0.0660***	-0.0614***	0.0617***	0.0518***	-0.135**	-0.0550***
	(5.08)	(-3.79)	(2.91)	(3.11)	(-1.98)	(-3.04)
marital-divorced	0.0214	-0.0420	0.0202	0.0261	-0.0567	-0.0243
	(1.41)	(-1.51)	(0.86)	(1.34)	(-0.73)	(-0.80)
Region – north as base						
region_centre	-0.166***	-0.0952***	-0.169***	-0.160***	-0.102***	-0.0893***
	(-11.24)	(-5.14)	(-8.47)	(-7.32)	(-4.21)	(-3.22)
region_east	-0.212***	-0.140***	-0.203***	-0.212***	-0.124***	-0.149***
	(-11.23)	(-6.25)	(-7.94)	(-7.71)	(-4.00)	(-4.75)
region_west	-0.181***	-0.116***	-0.194***	-0.154***	-0.130***	-0.103***
	(-12.28)	(-5.77)	(-9.86)	(-6.91)	(-4.98)	(-3.42)
region_south	-0.178***	-0.134***	-0.173***	-0.176***	-0.140***	-0.130***
	(-14.94)	(-8.84)	(-10.70)	(-9.92)	(-6.74)	(-6.01)
estonian	0.145***	0.131***	0.130***	0.157***	0.117***	0.146***
	(11.69)	(8.81)	(7.66)	(8.72)	(5.61)	(7.02)
_cons	1.091***	1.263***	0.996***	1.114***	1.200***	1.276***
	(17.87)	(16.31)	(11.44)	(12.35)	(11.05)	(11.92)
N	13217	11451	7376	5841	5903	5548
R^2	0.387	0.276	0.385	0.402	0.247	0.296
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Significance level * p < 0.1, ** p < 0.05, *** p < 0.01
The control groups are as follows: level of education=primary education; region=North-Estonia; marital status=married; number of employees=1–10; occupation=low-skilled; sector of activity = industry.
Source: ELFS 2009-2019, author's calculations

Appendix 10. Mincerian wage regression "goodness of fit"

(1) Multicollinearity – Variance Inflation Factor (VIF)

	w	m	mo	cw	fa	cm
laps_18_arv	1.38	1.48	1.15		1.09	
age	10.38	12.55	6.15	15.65	9.10	15.18
exp	30.76	31.91	22.04	43.27	28.09	35.15
c.exp#c.exp	24.92	22.53	21.11	26.07	21.99	23.20
ten	1.33	1.21	1.27	1.36	1.17	1.25
working_ho~s	1.08	1.05	1.08	1.07	1.04	1.07
edu						
2	4.79	2.54	4.11	5.97	2.57	2.52
3	5.85	3.54	5.23	7.01	3.72	3.42
eduxjob						
2	1.02	1.05	1.02	1.02	1.05	1.05
3	1.22	1.09	1.19	1.24	1.08	1.09
nace						
2	2.76	1.78	2.80	2.74	1.82	1.76
3	3.51	2.03	3.60	3.43	2.15	1.96
4	2.13	1.30	2.09	2.18	1.30	1.31
5	1.37	1.63	1.39	1.36	1.73	1.56
occ						
2	1.25	1.69	1.25	1.26	1.82	1.62
3	2.57	1.46	2.60	2.56	1.46	1.47
4	3.73	2.73	3.72	3.77	2.99	2.58
t_arv	1.16	1.09	1.18	1.14	1.09	1.10
d_telework	1.13	1.17	1.14	1.13	1.18	1.18
public_sec~r	1.87	1.50	1.89	1.85	1.55	1.46
supervisor	1.13	1.30	1.14	1.13	1.36	1.25
marital						
2	1.20	1.46	1.08	1.25	1.02	1.36
3	1.12	1.12	1.07	1.17	1.03	1.14
region						
2	1.17	1.19	1.17	1.17	1.18	1.20
3	1.23	1.29	1.22	1.25	1.28	1.31
4	1.21	1.20	1.23	1.20	1.22	1.18
5	1.29	1.28	1.30	1.29	1.28	1.28
estonian	1.45	1.44	1.48	1.45	1.44	1.45

men (*m*), women (*w*), mothers (*mo*), childless women (*cw*), fathers (*fa*), childless men (*cm*)

(2) Heteroscedasticity – Breusch-Pagan / Cook-Weisberg test

Women

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of ln_rhwage

        chi2(1)      =    145.72
        Prob > chi2  =    0.0000
```

Men

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of ln_rhwage

        chi2(1)      =     9.18
        Prob > chi2  =    0.0024
```

Mothers

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of ln_rhwage

        chi2(1)      =    111.94
        Prob > chi2  =    0.0000
```

Fathers

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of ln_rhwage

        chi2(1)      =     11.12
        Prob > chi2  =    0.0009
```

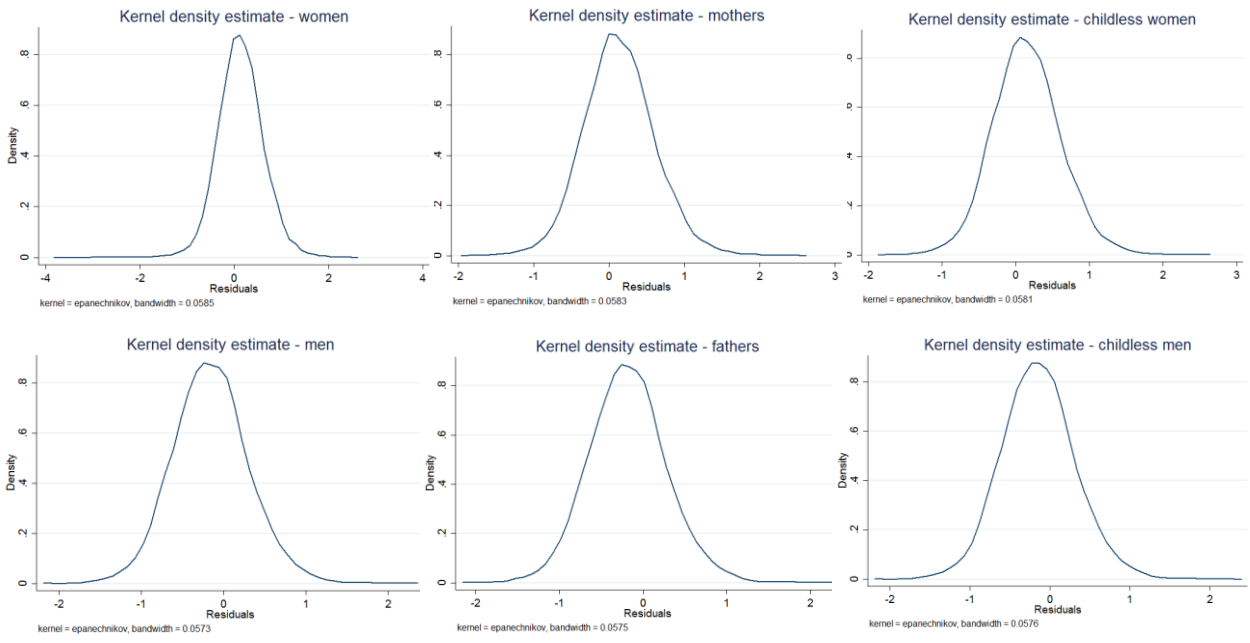
Childless women

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of ln_rhwage

        chi2(1)      =     34.47
        Prob > chi2  =    0.0000
```

Childless men

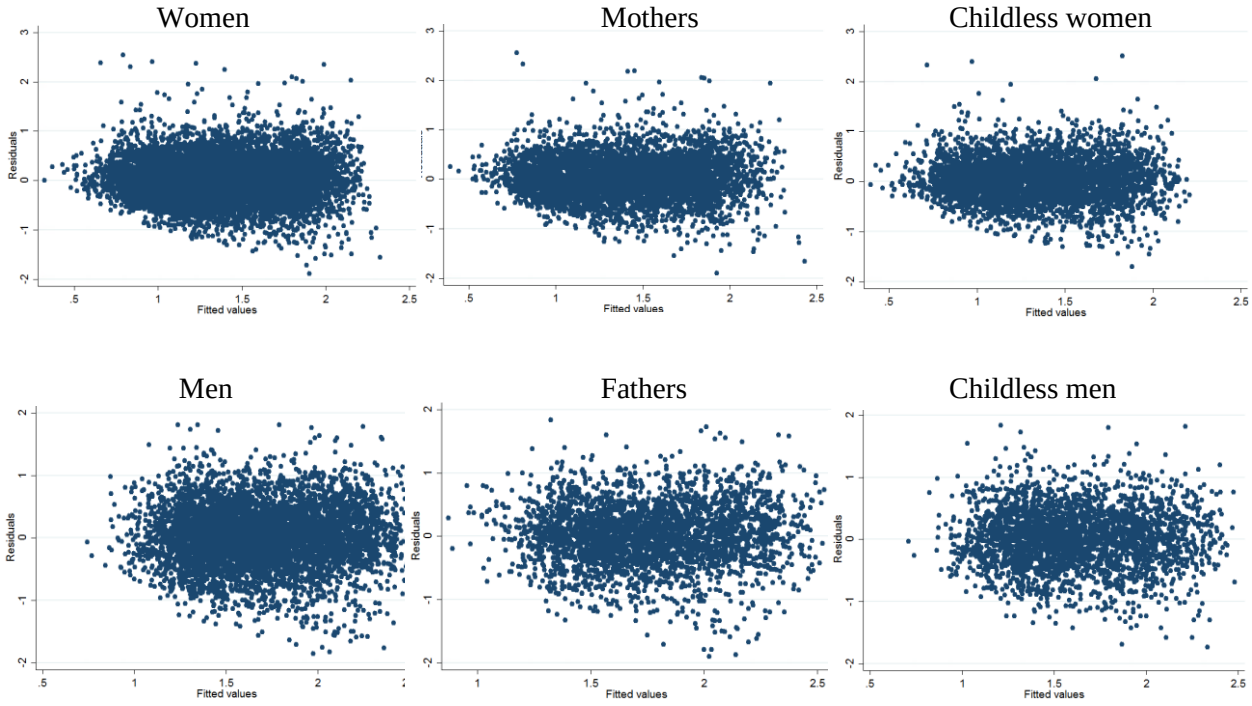
```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of ln_rhwage

        chi2(1)      =     0.40
        Prob > chi2  =    0.5291
```

(3) Kernel density estimation



Appendix 9 continued

(4) Residual-versus-fitted plot Residual-versus-fitted plot



(5) Ramsey RESET Test

1) Women

```
Ramsey RESET test using powers of the fitted values of ln_rhwage
       Ho:  model has no omitted variables
                 F(3, 13185) =     13.00
                   Prob > F =      0.0000
```

2) Men

```
Ramsey RESET test using powers of the fitted values of ln_rhwage
       Ho:  model has no omitted variables
                 F(3, 11419) =      8.79
                   Prob > F =      0.0000
```

3) Mothers

```
Ramsey RESET test using powers of the fitted values of ln_rhwage
       Ho:  model has no omitted variables
                 F(3, 7344) =     10.98
                   Prob > F =      0.0000
```

Appendix 9 continued

4) Childless women

```
Ramsey RESET test using powers of the fitted values of ln_rhwage
       Ho:  model has no omitted variables
                 F(3, 5810) =      5.20
                   Prob > F =      0.0014
```

5) Fathers

```
Ramsey RESET test using powers of the fitted values of ln_rhwage
       Ho:  model has no omitted variables
                 F(3, 5871) =     16.45
                   Prob > F =      0.0000
```

6) Childless men

```
Ramsey RESET test using powers of the fitted values of ln_rhwage
       Ho:  model has no omitted variables
                 F(3, 5517) =      2.81
                   Prob > F =      0.0380
```

Appendix 11. Oaxaca-Blinder decomposition results

sample of employed individuals aged 25-54, dependent variable is the log of hourly net wage

Group 1:	Childless woman	Childless man
Group 2:	Mother	Father
Dependent var:	ln_rhwage	ln_rhwage
overall		
group_1	1.339***	1.581***
	(159.00)	(169.19)
group_2	1.371***	1.704***
	(179.01)	(198.76)
difference	-0.0326***	-0.122***
	(-2.86)	(-9.64)
endowments	-0.0121	-0.112***
	(-0.79)	(-3.53)
coefficients	0.000245	-0.0367***
	(0.02)	(-2.70)
interaction	-0.0208	0.0260
	(-1.34)	(0.80)
endowments		
laps_18_arv	0.00714	-0.00637
	(0.52)	(-0.41)
age	0.0422***	0.00109
	(4.63)	(0.79)
exp	0.0322*	0.000818
	(1.80)	(0.34)
exp2	-0.0908***	-0.0296***
	(-3.76)	(-3.77)
ten	0.00325**	-0.00128*
	(2.14)	(-1.66)
t_arv	0.00440***	0.00322
	(2.94)	(1.42)
working_ho~s	-0.0127***	0.00256**
	(-6.24)	(2.38)
secondary_~u	-0.0000886	0.000549
	(-0.14)	(0.63)
tertiary_edu	0.00639***	-0.00627***
	(2.65)	(-2.90)
easy_job	-0.00565***	-0.00518***
	(-4.27)	(-3.49)
nace2	-0.000398	-0.0000687
	(-1.01)	(-0.21)
nace3	-0.00153*	-0.000125
	(-1.84)	(-0.37)
nace4	-0.00267*	-0.000689
	(-1.74)	(-0.45)
occ_clerk	-0.000657	-0.00522***
	(-0.32)	(-2.76)
occ_craft	-0.000727	0.00136
	(-0.93)	(1.60)

Appendix 11 continued

public_sec~r	-0.000130	0.0000115
	(-0.12)	(0.08)
supervisor	0.000615	-0.00931***
	(0.47)	(-5.05)
married	0.00925**	-0.0412
	(2.48)	(-1.47)
center	0.00139*	0.000900
	(1.78)	(1.58)
east	-0.000394	-0.00162*
	(-0.34)	(-1.81)
west	0.00283**	0.00309***
	(2.55)	(3.18)
south	0.00143	0.00132
	(1.04)	(1.10)
estonian	-0.00189	-0.00400***
	(-1.49)	(-2.81)
coefficients		
laps_18_arv	0.00714	-0.00637
	(0.52)	(-0.41)
age	-0.301**	-0.303*
	(-2.26)	(-1.77)
exp	-0.117	-0.0258
	(-1.09)	(-0.20)
exp2	0.0650	0.0533
	(1.28)	(0.92)
ten	-0.00757	0.0197*
	(-0.91)	(1.68)
t_arv	-0.0142	-0.0373
	(-0.72)	(-1.49)
working_ho~s	0.312***	0.0374
	(4.74)	(0.36)
secondary_~u	-0.0177	0.0803***
	(-1.01)	(4.20)
tertiary_edu	-0.0117	0.0394***
	(-0.52)	(2.82)
easy_job	-0.00540*	-0.000332
	(-1.70)	(-0.12)
nace2	0.00263	0.00588
	(0.30)	(0.74)
nace3	-0.00653	0.000744
	(-0.48)	(0.11)
nace4	0.000404	0.00329
	(0.10)	(1.38)
occ_clerk	0.00620	-0.000698
	(0.89)	(-0.20)
occ_craft	0.000811	-0.0246**
	(0.41)	(-2.43)
occ_simple	0.0112*	-0.0111
	(1.90)	(-1.43)

Appendix 11 continued

d_telework	0.00155	-0.000988
	(0.41)	(-0.20)
public_sec~r	0.0165*	-0.00429
	(1.85)	(-0.77)
supervisor	-0.000123	-0.000513
	(-0.02)	(-0.06)
married	0.0000908	-0.0343
	(0.01)	(-0.62)
center	0.00112	0.000273
	(0.43)	(0.08)
east	-0.000599	-0.00246
	(-0.19)	(-0.65)
west	0.00478	0.00189
	(1.47)	(0.45)
south	-0.00191	0.000278
	(-0.37)	(0.05)
estonian	0.0185	0.0223
	(1.06)	(1.08)
_cons	0.0359	0.150
	(0.28)	(0.93)
interaction		
laps_18_arv	-0.00714	0.00637
	(-0.52)	(0.41)
age	-0.0295**	-0.00127
	(-2.25)	(-0.77)
exp	-0.0268	-0.0000962
	(-1.09)	(-0.17)
exp2	0.0387	0.00770
	(1.28)	(0.91)
ten	-0.00182	-0.00184
	(-0.91)	(-1.59)
t_arv	-0.000437	-0.000586
	(-0.70)	(-1.03)
working_ho~s	0.00865***	-0.000463
	(4.01)	(-0.36)
secondary_~u	0.0000568	0.00527***
	(0.14)	(2.61)
tertiary_edu	-0.000655	-0.00431**
	(-0.52)	(-2.16)
easy_job	-0.00215	-0.000153
	(-1.64)	(-0.12)
nace2	0.000127	-0.0000444
	(0.29)	(-0.21)
nace3	0.000375	0.0000138
	(0.47)	(0.10)
nace4	0.0000481	0.000184
	(0.10)	(0.43)
occ_clerk	0.0000648	-0.000151
	(0.30)	(-0.20)

Appendix 11 continued

occ_craft	0.0000747	0.00160
	(0.38)	(1.50)
occ_simple	0.000763	-0.00269
	(1.20)	(-1.39)
d_telework	-0.0000915	0.000161
	(-0.38)	(0.20)
public_sec~r	0.0000566	0.0000168
	(0.12)	(0.08)
supervisor	-0.00000219	0.000103
	(-0.02)	(0.06)
married	-0.0000262	0.0182
	(-0.01)	(0.62)
center	-0.000101	-0.0000253
	(-0.42)	(-0.08)
east	-0.0000137	-0.000375
	(-0.16)	(-0.62)
west	-0.000637	-0.000419
	(-1.28)	(-0.45)
south	0.0000740	-0.0000127
	(0.35)	(-0.05)
estonian	-0.000389	-0.00113
	(-0.87)	(-1.03)
N	13290	11525

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

The reference groups are as follows: level of education = primary education; region = North-Estonia; number of employees = 1–10; occupation = low-skilled; sector of activity = industry.
Source: ELFS 2009-2019; author's calculations

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