

DIGITALES ARCHIV

ZBW – Leibniz-Informationszentrum Wirtschaft
ZBW – Leibniz Information Centre for Economics

Meriküll, Jaanika; Tverdostup, Maryna

Book

The gap that survived the transition: the gender wage gap over three decades in Estonia

Provided in Cooperation with:

University of Tartu

Reference: Meriküll, Jaanika/Tverdostup, Maryna (2020). The gap that survived the transition: the gender wage gap over three decades in Estonia. Tartu : The University of Tartu FEBA.
<https://majandus.ut.ee/sites/default/files/mtk/dokumendid/febawb127.pdf>.

This Version is available at:

<http://hdl.handle.net/11159/4962>

Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

Standard-Nutzungsbedingungen:

Dieses Dokument darf zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden. Sie dürfen dieses Dokument nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen. Sofern für das Dokument eine Open-Content-Lizenz verwendet wurde, so gelten abweichend von diesen Nutzungsbedingungen die in der Lizenz gewährten Nutzungsrechte.

<https://zbw.eu/econis-archiv/termsfuse>

Terms of use:

This document may be saved and copied for your personal and scholarly purposes. You are not to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public. If the document is made available under a Creative Commons Licence you may exercise further usage rights as specified in the licence.

THE GAP THAT SURVIVED THE TRANSITION: THE GENDER WAGE GAP OVER THREE DECADES IN ESTONIA

Jaanika Meriküll and Maryna Tverdostup



This publication was funded by
the European Union's Rights,
Equality and Citizenship
Programme (2014-2020) by the
European Union.

GA no 820778 InWeGe (Income, Wealth and Gender)

Tartu 2020

ISSN-L 1406-5967
ISSN 1736-8995
ISBN 978-9985-4-1242-8 (pdf)
The University of Tartu FEBA
<https://majandus.ut.ee/en/research/workingpapers>

The gap that survived the transition: the gender wage gap over three decades in Estonia

Jaanika Meriküll ^{a)} and Maryna Tverdostup ^{b)} *

Abstract

This paper looks at the gender wage gap throughout the transition from communism to capitalism and throughout fast economic convergence. The case of Estonia is used, and the labour force survey micro data is employed from 1989 to 2020. The communist regimes were characterized by highly regulated wage determination and the high educational attainment and labour market participation of women. Despite a formally egalitarian regime, the raw gender wage gap was as large as 41% in 1989. The large gender wage gap under communist rule diminished quickly during the transition to a capitalism, mainly due to the erosion of distortions in the labour market, such as low returns to education. The paper has two main messages, first, the position of women in the labour market has improved over the last three decades. The mechanism behind their gains is similar to those in other formerly centrally planned economies, the education of women is even better now, they are employed in better occupations and their returns to education are higher. Second, the gender wage gap was large already three decades ago and the unexplained part has been resistant to decline. This points to strong inertia in the gender wage gap and to the importance of longer-term factors in it. The decline in the gap is related to the overall decline in wage inequality, minimum wages have also contributed to this process. While gender attitudes have become much more egalitarian, it is difficult to prove their role.

Keywords: gender wage gap, wage distribution, decomposition, post-communist economies, gender attitudes

JEL codes: J31, J71, P23

^{a)} PhD, Senior Research Fellow, University of Tartu; Senior Economist, Bank of Estonia. ^{b)} PhD, Research Fellow, University of Tartu, PhD student, University of Innsbruck. Corresponding author: merikyll@ut.ee, +372 5663 9435, Narva mnt 18, 51009 Tartu, Estonia. The authors thank prof. Anneli Kaasa, prof. Tiiu Paas, prof. Maaja Vadi and seminar participants from Tallinn University of Technology and University of Tartu for insightful comments. We thank Michael Haagenzen and Robin Hazlehurst for language editing. The financial support from the project InWeGe (Income, Wealth and Gender), financed by European Union's Rights, Equality and Citizenship Program (2014–2020), No 820778 is acknowledged.

1. INTRODUCTION

The gender gap in educational attainment and labour market participation has closed fast since the 1980s, contributing to the lowering of the gender wage gap (Blau and Kahn 2017, Gallen et al. 2019). The gap has closed much more sluggishly in recent decades, especially at the top of the wage distribution (Blau and Kahn 2017, Fortin et al. 2017). New factors, such as the productivity dispersion of firms (Bruns 2019), the different segregation of men and women between firms (Cardoso et al. 2016, Gallen et al. 2019) and labour market institutions (Bruns 2019, Fortin et al. 2018) have increased in importance as alternative explanations.

The aim of this paper is to understand the long-run determinants of the gender wage gap. We contribute to the literature on long-run determinants of the gender wage gap by studying a country with a communist past. The paper calculates and analyses the origins of the gender wage gap in Estonia since communist times in 1989 until 2020. The individual-level data from the Estonian Labour Force Survey is applied to derive the long time-series of the unconditional and conditional wage gap. In addition to conditioning on conventional factors, such as demographics, education, labour market experience, firm-level factors, occupation and industry, the role of various country-level factors is also analysed. The natural experiment of switching from communism to capitalism allows us to analyse factors which role is more difficult to disentangle under a stable economic and political regime. For example, wage inequality, labour market institutions and gender attitudes have usually only limited variation over time and this complicates the analysis of their role in time-series setting.

The paper is linked to three lines of literature: the recent literature on the long-run determinants of the gender wage gap, the role of the communist past in the gender wage gap, and the role of gender attitudes in the gender wage gap.

In the first, these are papers using the data from North American or Western European countries. The findings are that the gap between the educational attainment of men and women has closed since the 1980s and the role of education in explaining the gender wage gap has declined (Blau and Kahn 2017, Gallen et al. 2019). It has also been shown that the role of occupational segregation in the gender wage gap has declined and that the role of segregation between firms has increased in importance (Cardoso et al. 2016, Gallen et al. 2019). The segregation between firms has become important in explaining the gender wage gap among the top wage earners (Cardoso et al. 2016, Bruns 2019), which overlaps with the increase in between-firm productivity dispersion and the rise of superstar firms (Van Reenen 2018, Autor et al. 2017). It has been shown that labour market institutions, such as union density and minimum wages, have an important effect on wage dispersion (Fortin et al. 2018) and unions have had a role in the sluggish convergence of the wages of men and women (Bruns 2019).

In the second, the role of the communist past in the gender wage gap, there is no consensus in the literature on how the communist past has contributed to gender income gaps in post-communist economies. On the one hand, there are findings that gender income gaps increased during the transition process from communism to capitalism (e.g. Pastore and Verashchagina 2011, Trapido 2007); on the other hand, there are also studies that find gender income gaps decrease throughout the transition process (Brainerd 2000, Jolliffe and Campos 2005, Kecmanovic and Barrett 2011, Newell and Reilly 2001, Heyns 2005). One of the conclusions of this literature is that while women won from the transition in the majority of the former communist countries, there were exceptions, such as Russia and Ukraine, where women lost from the transition because wage distribution widened and women ended up at the lower end

of the distribution (Brainerd 2000). It has also been discussed that the low quality of data or non-comparability of the data before and after the transition can explain the inconclusive results on whether women won or lost from the transition (Jolliffe and Campos 2005). It has been suggested that human capital variables such as education and labour market participation cannot explain gender income gaps in post-communist economies, because the education level and labour market participation of women were high in communist economies (Semykina and Linz 2010). There is evidence that men were more successful than women in moving up to better paid jobs during the transition process (Trapido 2007).

The paper closest to ours is a paper by Jolliffe and Campos (2005), who study the longer time-series of the gender wage gap from the time of the communist area. However, even in their study, the timespan covers the first decade in transition, the implications of further decades are unstudied. The same data as in our study has been used by Orazem and Vodopivec (2000), but only to study the very first effects of economic transition on the gender wage gap, in 1989–1994. To the best of our knowledge, the long-run implications of the communist past on the gender wage gap have not been analysed before. We aim to contribute there by studying a timespan of three decades. The value added from our study is that we derive a long time-series of a comparable *conditional* gender wage gap and estimate the additional role of country-level variables in it. The latter cannot be done using a single cross-section or only a small number of years.

In the third stream, the role of gender attitudes in the gender wage gap, the focus of this literature is usually on long-lasting cultural factors such as the role of agriculture (Hansen et al. 2015) or type of agriculture (Alesina et al. 2013), language (Gay et al 2013, Shoham and Lee 2018) or religion (summarised by Giuliano 2017) in gender attitudes. Another approach has been to show the persistence of gender attitudes by estimating the effect of shocks decades or centuries ago on gender attitudes today; for example, gender-biased demographic shocks (Acemoglu et al. 2004, Goldin and Olivetti 2013, Grosjean and Khattar 2019, Teso 2019). These papers exploit mostly cross-sectional data to reveal whether various historical episodes explain the current variation in gender attitudes. A similar setting has also been used to study the effect of the communist political regime on gender attitudes (Bauernschuster and Reiner 2012, Campa and Serafinelli 2019), household behaviour and structure (Lippmann et al. 2020) and even the gender gap in maths (Lippman and Senik 2018). However, much less is known about the interchange of gender attitudes and the gender wage gap in a time-series setting. Our empirical data provides a good opportunity for that. First, we have reasonably long time-series over three decades about the conditional gender wage gap and its possible country-level determinants. Second, the country-level determinants have rich variation; for example, the wage Gini has dropped 15 percentage points, the ratio of minimum wages to average wage has varied between less than 20 to 40% and the gender attitudes have changed from highly traditional to more egalitarian than in Western Europe.

The paper demonstrates that the raw gender wage gap of full-time workers was as large as 41% during the communist times in 1989. A quarter of the gap can be explained by characteristics such as field of activity, occupation and education, while firm size cannot explain the gap. The unexplained gender wage gap is smaller, 31%, but still very high compared to studies from other developed countries. The raw gender wage gap diminished quickly after the introduction of the market economy, but much less of the gap could be explained by observable characteristics. The reforms towards economic independence started in 1990, and the year 1989 can be taken as the last year under traditional communist rule in Estonia (Kukk 2014). The unexplained gender wage gap has been highly persistent, around 25–30% for most of the

timespan, and declining only in recent years. Women have definitely won from the transition from the communist to market economy, their education is rewarded higher by the labour market and they have much better education than men nowadays. Women have accessed better jobs as the role of occupational segregation in explaining the gender wage gap has diminished. The only factor that has a similar enlarging effect on the gender wage gap in 1989 and in 2020 is the sectoral segregation; there are still much more women employed in low wage sectors such as education and services. These trends have also been observed in other developed countries without a communist past.

We show that despite the fast and liberal economic reforms and successful economic convergence, the gender wage gap has been resistant to decline. Estonia had the largest gender wage gap among the communist countries in 1989 (Brainerd 2000, Orazem and Vodopivec 2000) and the largest gender wage gap in the EU in 2018 (Eutostat series TESEM180). This is even more surprising given the high female labour force participation rate and turn towards more egalitarian gender attitudes. However, we demonstrate that country-level factors such as wage inequality, minimum wages and gender attitudes have contributed to the decline in the gap. The strongest effect originates from the wage inequality, as women are much more likely low-wage earners, the reduction in wage inequality benefits women more than men. The gradual increase in minimum wages has likely had its role there. As the female labour force participation rate is also high, it does not seem that the positive effect on female wages is reached at the cost of employment detachment for women. The gender attitudes have also contributed to the lowering of the gender wage gap; however, their role is much more difficult to prove and they are likely responsible for a smaller effect than that of wage inequality.

The paper is organised as follows. The next section provides an overview of related literature, focusing on the long-run determinants of the gender wage gap. This section also provides an overview of the economic and institutional background of our sample country, Estonia. The third section describes the data and methods. The fourth section provides results on the unconditional and conditional gender wage gap over three decades. The fifth section analyses whether institutional factors such as wage inequality, minimum wages or gender attitudes can explain the country-level dynamics in the gender wage gap. The last section summarises the findings.

2. RELATED LITERATURE AND BACKGROUND TO THE STUDY

2.1. Long-run determinants of gender attitudes and the wage gap

As cultural norms and attitudes are highly persistent over time, the determinants of the gender wage gap today can date back hundreds of years. The most common dependent variable in the studies on the persistence of cultural norms and attitudes towards gender is female labour force participation. In this subsection, we use this variable to compare the economic size of the effect from various historical episodes researched in different papers. The studies take female labour force participation as a proxy for cultural norms and gender attitudes. The effect of long-run determinants, such as gender attitudes on the gender wage gap, is much less frequently studied, but we will cover also these few studies.

The popularity of female labour force participation as a proxy for gender role attitudes is likely related to its wide and long availability in different data sources. We omit from using female

labour force participation as a proxy for gender attitudes in this paper, because the dynamics of this variable was strongly affected by the communist period and the transition process. The World Value Survey provides the most common qualitative measure of gender attitudes. We focus on the job-related gender attitudes from World Value Survey in this paper, because it has been shown to have stronger correlation with gender wage gap than other qualitative questions in the World Value Survey (Fortin 2005) and is available for the longest time-span. We focus on the question that Fortin (2005) found to have the strongest relationship with female labour force participation and the gender wage gap – if jobs are scarce, men should have more right to a job than women. Gender attitudes can also be captured by cultural dimensions such as Hofstede's cultural dimension of masculinity. We omit from using this variable in this paper because of two reasons. First, while this cultural dimension covers differences between men and women in social roles, the dimension captures also much wider elements of culture such as overall focus on career, ambition and admiration of strength (Hofstede 2011). Second, the masculinity has been shown to be quite persistent over time and not dependent on country's level of income (Tang and Koveos 2007).¹

Alesina et al. (2013) demonstrate that ethnicities that practiced plough agriculture, have less egalitarian gender attitudes; and nowadays exhibit lower labour market participation, entrepreneurial and political activity among women. They compare plough agriculture to shifting hoe cultivation. Men had an advantage in operating the physically demanding plough, this led to a division of labour, where men were working the fields and women engaged in activities at home. While shifting hoe cultivation was labour intensive and engaged both men and women in the fields. They introduce a large set of controls – historical, contemporary and geographical – and show that traditional plough use before industrialisation implies less egalitarian gender norms today. Their estimates using instrumental variables show a large effect from plough use on female labour force participation rates, -11 percentage points.

There is also evidence that engagement in agriculture itself implies less egalitarian gender attitudes today compared to the engagement in hunting and gathering. Hansen et al. (2015) show that the earlier timing of the Neolithic Revolution (i.e. the switch from hunter-gatherer to agricultural society) is related to the lower labour force participation and political engagement of women today. They argue that switching to agriculture enforced the masculine culture, women had more children because they did not have to carry them around and could focus on tasks at home. This led to a stronger division of labour where women worked on food processing and raising children at home and men producing food in the fields. While at the time of hunting and gathering, women produced more than half of the family's calorific intake, were more independent of men and had presumably higher bargaining power within the family. According to their study, a switch to agriculture a thousand years earlier implies around 4 percentage points lower female labour force participation rate. And this effect is robust to controlling for historical plough use, showing that not just plough use but agriculture itself had an effect on less egalitarian gender attitudes.

There are many insightful variables that have a long-run impact on gender attitudes or carry a culture of or information on gender attitudes. For example, countries with gender neutral languages have a higher female labour force participation rate and more active participation of women in politics (Gay et al. 2013). Gay et al. 2013 distinguish four indexes based on gender-related features of languages and show that gender neutral languages have more egalitarian

¹ We limit ourselves from discussing the role of psychological attributes or personal traits in this paper (see e.g. Bertrand 2011). However, these are intertwined with gender attitudes, can be elements of it or can be affected by it. There is evidence that gender differences in personality traits vary by language or culture (Pulver et al. 1995).

gender attitudes, even after controlling with a large set of controls, such as geography, climate, colonization, continent, religion and even plough use. Languages with the lowest aggregate gender intensity index score 0, such as Finnish or Estonian, have 20 percentage points higher conditional labour force participation rate of women than languages with the highest score 4, such as Spanish or Arabic. Shoham and Lee (2018) show that the same gender intensity index also has an effect on the gender wage gap. One unit increase in the gender intensity score of the language increases the gender wage gap by 1.3 percentage points; comparing our sample country Estonia to Spain implies a four-unit difference in the index and corresponds to a 5.2 percentage point difference in the gender wage gap. The size of the effect is large and the authors claim that grammatical gender marking performs better in explaining the variation in the gender wage gap than survey-based cultural variables such as Hofstede's masculinity. The grammatical structure of languages are stable over time, capturing the underlying deep cultural factors better than the survey-based measures that are affected by current socio-economic activity.

Religion is also closely related to gender attitudes. As summarised by Giuliano (2017), Protestants have better education of women and less frequently have the traditional breadwinner family model compared to Catholics, Orthodox Christians or Muslims. The mechanism behind this difference is from the reformists idea that women should be able to read the bible in order to get to heaven. However, religious individuals from whatever religion have less egalitarian gender attitudes compared to unreligious people or those who do not go to church (Giuliano 2017).

Drastic gender-biased demographic shocks can also have a long lasting effect on gender attitudes and the labour market participation of women. Grosjean and Khattar (2019) demonstrate that Australian districts that had extremely high male-female ratios back in the 18th and in the beginning of 19th century (because of male convicts sent from Britain to Australia), have less egalitarian gender attitudes, lower labour market participation of women and less women in highly ranked positions today. The temporary excess number of men in the society led to higher marriage rate of women and stronger engagement of women in life at home instead of professional life and this had a persistent effect on gender attitudes even after the gender bias in demographics disappeared. They do not find a statistically significant effect on the female labour force participation rate, but confirm the statistically significant sizeable negative relationship for hours worked.

Similarly, the female-biased demographic shocks can have the opposite effect. Teso (2019) shows that the transatlantic slave trade had a persistent impact in terms of a higher labour market participation of women and lower fertility rates in districts of Sub-Saharan Africa, where more slaves were traded. The transatlantic slave trade exported mostly male slaves from Africa, leaving behind ethnic groups where the ratio of men to women dropped dramatically.² As a result, women took up traditional male jobs. The majority of the slave trade took place in the 18th, although it lasted for a longer period from 15th to 19th century, and the authors show that this shock had a persistent impact on gender attitudes towards working women, and not necessarily towards the engagement of women in political life, till today. The slave trade shock increased the female labour force participation rate by 5 percentage points in ethnic groups that were exposed to the trade.

² To put the size of the shock to perspective, the male convicts shock in Australia lead to male-female ratio of size four (Grosjean and Khattar 2019), while the transatlantic slave trade shock resulted in female-male ratio of size two in some regions (Teso 2019).

A well-studied female-biased demographic shock is the effect of World War II on the labour market activity of women in the US. Goldin and Olivetti (2013) show that this effect persisted till the 1960s. Women took up the jobs of men during the war and stayed in the labour force even decades later, after the men had returned from the front. Goldin and Olivetti (2013) use state level mobilisation rates data and find that women from high mobilisation states had 5–6 percentage point higher employment rate compared to women from low mobilisation states. The shock was persistent especially for women who entered white-collar jobs at the time when the shock appeared. This supply shock also had implications for wages. Acemoglu et al. (2004) show that the wages of women declined more due to this shock than the wages of men, implying that the gender wage gap, of those employed, increased. So, the positive effects found on female labour force participation do not necessarily imply that the gender wage gap is reduced, at least not in the short-run.

2.2. The effect of a communist past

The natural experiment of communism is widely used to understand the effect of a political regime on gender attitudes. The example of the division and reunification of Germany is the most popular empirical ground for these studies, but there are other empirical settings where Eastern Europe with its communist past is compared to Western Europe. Bauernschuster and Reiner (2012) show that former East Germans hold much more egalitarian gender attitudes than former West Germans. They find that there has not been any convergence between gender attitudes in the East and West after reunification. This indicates the persistence of gender attitudes, unlike other attitudes, such as those towards redistribution that have shown convergence. Similarly, Campa and Serafinelli (2019) demonstrate that women of former East Germany had more egalitarian gender attitudes and higher employment than women from former West Germany shortly after the reunification. This difference was as large almost 25 years after the reunification, confirming again the strong persistence of gender attitudes. They use an alternative empirical setting by comparing US immigrants from European countries with and without a communist past and confirm the same finding, immigrants from communist countries have more egalitarian gender attitudes.

The male breadwinner model in a family has been rooted much more deeply in Western Germany than in Eastern Germany. Lippmann et al. (2020) show that household behaviour and structure has been influenced by the period of communism. If a woman starts to earn more than a man in a household, the woman in West Germany starts to compensate by increasing her hours of housework, while the woman in East Germany reduces her hours of housework. In addition, the risk of divorce increases if a woman starts to earn more than a husband, but the risk increases only in West Germany and not in East Germany. Similarly, if a woman starts to earn more than a man or can potentially earn more than a man, it increases the risk of withdrawing from the labour market in West Germany, but not in East Germany. They also show that the positive effect of communism on women's employment carries on to the second generation, from mothers to daughters.

Communism has also affected the educational attainment of women, not only by encouraging women's entrance to higher education, but also making them better in maths. Lippman and Senik (2018) show that the gender gap in student maths scores is lower in East Germany than in West Germany. They demonstrate that the same holds for a larger group of European countries, the conditional gender gap in student maths scores is twice as low in Eastern Europe than in Western Europe. They assign this difference to long-lasting gender attitudes. The communist regime saw men and women as equal in the labour market, encouraged women to

enrol to industries where maths was needed, and this has an effect on the maths performance of girls even decades after the fall of the Berlin Wall.

Some authors are critical of the treatment of communism in East Germany as a natural experiment. Becker et al. (2020) argue that there were already remarkable differences in gender attitudes between East and West Germany before World War II. The Protestant East already had a higher female labour force participation rate before the War. There was also a lot of migration from the East to the West before the Berlin Wall was set to stop it, approximately one fifth of East Germans emigrated to the West and the emigration was likely selective; for example, those with less egalitarian gender attitudes or less prone to redistribution could have left. They conclude that some of the studies may have overestimated the effect of communism on gender attitudes and female labour force participation, but they do not doubt that the effect of communism was and is there.

The effect of communism on the labour force participation of women is also confirmed on a wider set of countries using a sample of 150 countries from all over the World by Alesina et al. (2013). The aim of their study is not to estimate the effect of political regime on the labour force participation of women, but they use the communist past as an additional control variable in their study on the effect of plough use on gender attitudes. They use cross-sectional data, but as the set of control variables is very rich, the effect has a causal flavour. Countries with a communist past had 7–8 percentage points higher female labour force participation in 2000 (please refer to their web appendix). This is a sizeable effect, given that the average female labour force participation rate was 51%.

Less is known about the dynamics of gender attitudes in the Soviet Union. Nakachi (2011) discusses that, while the 1950s was a time when gender norms returned to pre-war norms in the West, this was not the case in the Soviet Union. Women stayed in the workforce because the economy needed them and because many men did not return from the front. While the liberation movement in the West in the 1970s demanded greater economic activity for women, the women in the Soviet Union already made up more than 50% of the labour force at that time. Despite the high labour force participation of women in the Soviet Union, they were also responsible for the majority of the within household duties (Brainerd 2000, Nakachi 2011).

Beside the effect of communism on gender attitudes and the labour force participation of women, there is a large number of studies analysing the dynamics of the gender wage gap before and after the changeover from communism to capitalism. Unlike the studies on attitudes, this literature takes a short-run perspective, often comparing one observation point before and after the transition. The exception is the study by Jolliffe and Campos (2005) that study the gender gap in Hungary over 12 years. The research question in these studies is whether women won or lost from the transition, and for the majority of European countries, it has been shown that women won from the transition (Brainerd 2000, Giddings 2002). However, there have been countries where women also lost from the transition, such as Russia or Ukraine (Brainerd 2000), where the gender wage gap increased due to the widening of the wage distribution. The main explanation for why women won from the transition has been that women started to enrol to better education and the returns to their education increased, while from the demand perspective, the economy went through a structural change towards more services, which was a field mostly occupying women (Orazem and Vodopivec 2000, Brainerd 2000, Giddings 2002).

To the best of our knowledge, none of the gender gap studies have analysed the long-run implication of a communist past on the gender wage gap. We aim to contribute to this discussion by studying the dynamics of the gender wage gap over a long time-span, three decades, and seek to reveal the longer-run implications of a communist past on the gender wage gap.

2.3. The empirical background: Estonia vs other countries with a communist past

The aim of this subsection is to provide a comparative view of how our sample country, Estonia, fares compared to other former communist countries and the developed World. Estonia was a big bang reformer taking a very liberal route, its price and wage liberalisation was introduced quickly and privatisation was fast (see Figure 1 for the dynamics in the index of economic freedom – unfortunately the data series begins in 1995). The wage distribution was more compressed in the Soviet Union than in other centrally planned Eastern European countries; for example, the average wage of women reached the 37th percentile of the wage distribution of men in Russia, while the average wage of women was only at the 17th percentile of the wage distribution of men in the Czech Republic (Brainerd 2000). The reform paths taken by formerly centrally planned economies differed. While Ukraine and Russia led the explosion of the wage distribution with minimum wages becoming extremely low and not binding; the Central European countries and Baltic countries took a more moderate route where the ratio of minimum wages to average wages did not decline to such an extreme (Brainerd 2000). The economic reforms in the Baltics resembled those of Central European countries and less those of other countries from the former Soviet Union. However, the Estonian reforms were likely the most liberal in the region and economic freedom there is rather comparable to the US than to other countries with a communist past. The labour market institutions induced a rapid restructuring via low firing costs for employers and low unemployment benefits for workers who were laid off (Orazem and Vodopivec 2000).

The dissolution of the existing production system and vast liberal reforms led to economic decline in all the CEE countries during the mid 1990s. The Estonian economy declined 38% in real terms between 1989 and 1994, which was less than in other Baltics and in Ukraine and more than in Central European countries. The year 1989 can be taken as the last year under traditional communist rule, the switch towards independent and market-oriented economy started in 1990. Estonia regained independence in 1991, experienced a period of hyperinflation before the monetary reform took place in 1992 and took a route of shock therapy or big bang reforms with a quick switch towards a highly liberal economic system (Kukk 2014). The years after have shown convergence with the high-income World, the convergence path has been clearly faster among post-communist economies who became members of the EU than those who did not (not referring to any causal interpretation here). Our sample country has had an above average growth rate within the group of new EU members with a communist past, the purchasing power parity adjusted GDP per capita reached 84% of the EU-27 average in 2019 (Eurostat series SDG_10_10).

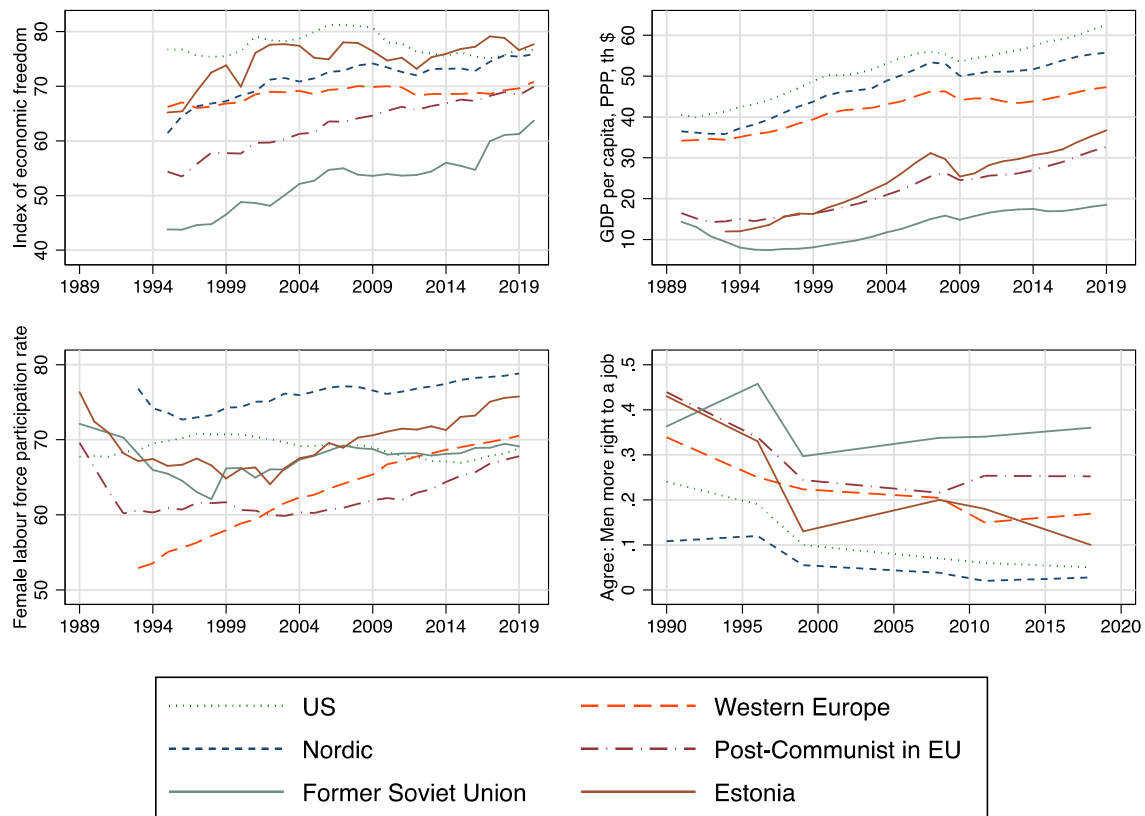


Figure 1. Economic performance and gender attitudes in post-communist countries vs the developed World

Notes: The set of countries covered is determined by the availability of data in the World Value Survey. US refers to the United States. Western Europe covers Austria, Cyprus, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, Switzerland and the United Kingdom. Nordic countries are Denmark, Finland, Iceland, Norway and Sweden. Post-Communist countries in the EU cover Bulgaria, Croatia, Czechia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia. The sample country Estonia is not included there and is shown as a separate category. The former Soviet Union covers Belarus, Georgia, Russia and Ukraine.

The group of the Former Soviet Union covers only Russia for Female labour force participation.

Sources: Index of economic freedom, overall score: [Heritage.org/index](https://www.heritage.org/index). GDP per capita, PPP (constant 2017 international \$): World Bank, World Development Indicators database. Female labour force participation rate, age 15–64: Eurostat series *lfsi_emp_a* and ILO Labour force participation rate by sex and age (%). Jobs scarce: Men should have more right to a job than women: proportion agreeing: World Value Survey and European Value Survey data collected by Online Analysis tool of World Value Survey.

The indicators of gender attitudes also show vivid dynamics. The two most popular indicators of gender attitudes are female labour force participation and agreement or disagreement with a statement that if jobs are scarce, men should have more right to a job than women. Fortin (2005) shows that the latter question has the strongest correlation with gender gaps in employment and wages. This question is also widely available over waves and countries in the World Value Survey and European Value Survey. The majority of studies on gender attitudes use these indicators on cross-sectional data and find that the attitudes are highly persistent over time. However, there seems to be a lot of dynamics in these variables. Western countries have moved gradually towards more egalitarian gender attitudes in recent decades, the female labour force participation rate has been increasing and agreement with a statement that men should have priority for a job has declined. Countries with a communist past had a high female labour force participation rate already at the end of 1980s, the rate declined throughout the first decade of transition and started to increase again later on. Women are economically as active now as they

were at the time of communism in many of the EU members with a communist past. The dynamics of views on jobs have a similar trend towards more egalitarian gender attitudes; the views have become more egalitarian in post-communist countries in the EU than in former Soviet countries that are not EU members. It seems that female labour force participation and views about jobs do not have a strong within-group correlation in post-communist economies in the EU (see Figure 1 lower panels), rather there seems to be dual equilibrium, the high labour force participation was accompanied with conservative gender attitudes under communism and with egalitarian gender attitudes decades after communism.

Another surprising regularity from the communist era is that the high labour force participation of women and highly regulated wages did not imply a low gender wage gap. The gender wage gap under communism was quite high, around 30% in most of the countries at the end of the 1980s, which was comparable to the US at the time (Brainerd 2000). Existing comparative studies on the gender wage gap in post-communist European countries show that Estonia had the largest wage gap before the transition (Orazem and Vodopivec 2000, Brainerd 2000, Newell Reilly 2001). Estonia was quite closely followed by the Czech Republic, while other formerly communist economies had lower gender wage gaps before the transition. This trend for Estonia has continued as Estonia has had the largest gender wage gap in the EU since 2006, when the comparative time-series starts to be available (Eurostat series TESEM180). However, the gap has been declining in Estonia, from 30% in 2006 to 23% in 2018 according to the methodology of Eurostat. Countries with a communist past have higher gender wage gaps in the EU than Western countries; the difference is especially stark when comparing the unexplained gap. As Eastern European women often have a better education and occupation than men, the unexplained gap is often larger than the raw gap (Leythienne and Ronkowski 2018).

Given the long-run determinants discussed in the previous subsection, our sample country, Estonia, possesses factors that cause more egalitarian gender attitudes and also less egalitarian gender attitudes. The more egalitarian attitudes are supported by the relatively recent transition to an agricultural society in Europe, like its Baltic neighbours and Finland. The linguistic system of the Estonian language has high gender neutrality, scoring the lowest across all four features of gender intensity index together with Finnish and Hungarian. According to the studies of Gay et al. (2013) and Shoham and Lee (2018), the effect of the linguistic system on female labour force participation is sizeable, the largest of all the factors discussed in the previous subsection. Similarly, the Protestant background and low attachment to religion should support more egalitarian gender attitudes.³ Whether or not the female-biased demographic shock at the end of World War II also contributed to the high labour market participation of women could also be discussed. From the opposite direction, the historical plough use deepened the masculine culture in Estonia and practicing agriculture itself, although not for as long as in its Southern European neighbours. However, unlike the gender wage gap, many of its long-run determinants are the same in Estonia as in its closest neighbours, which makes it difficult to explain the high gender wage gap in Estonia with these long-run determinants.

The communism period had diverse effects as it raised the labour force participation and education level of women, but these egalitarian developments were accompanied by high gender wage gap and traditional gender attitudes towards male priority on jobs. It can be

³ Church attendance is related to less egalitarian gender attitudes (summarised by Fortin 2005 and Giuliano 2017). The communist block was strongly atheistic, it was forbidden to go to church. The fall of the Berlin Wall and restoration of human rights in the communist bloc, allowed people to go to church again and many formerly communist countries have moved to highly religious patterns nowadays. The best examples are Orthodox Christian Russia and Ukraine, and Catholic Poland.

speculated whether high labour force participation and education level of women, and the high gender wage gap was inherited from the communist period. At the same time, the gender attitudes towards jobs have become much more egalitarian in the last three decades⁴.

3. DATA AND METHODS

3.1. Data

This paper uses the Estonian Labour Force Survey (LFS) from 1989 to 2019, which follows the ILO methodology and is the official source of labour market statistics for labour market activity in Estonia. Statistics Estonia collects the data from the resident population using face-to-face interviews or telephone interviews.⁵ The first years of the data, 1989–1994 were collected retrospectively in 1995. The retrospective collection of data was continued till 2000, the data for 1995–1996 was collected in 1997, the data for 1997 in 1998, the data for 1998 in 1999 and the data for 1999 in 2000. The reference period for wages was always the autumn of the year or in October for this period. Since 2000, the data has been collected throughout the year and the reference period is the last week before the survey. This implies that for the period 1989–1999 the data on wages represent wages in autumn and for the period 2000–2020 the data on wages represent the average wage of the whole year.

The labour force survey collects representative data for the age group of 15–74. Table 1 provides an overview of the number of observations for wages and the share of missing observations for wages. The sample size varies over the years and has been increasing over time, while the item non-response for wages has also been increasing over time. Since 2018, only the imputed wages have been provided for data users. Both, unimputed and imputed wages are provided for 2016 and 2017, and these years allow us to estimate the potential role of item non-response in wage gap estimates of the LFS. The estimates show that there is no difference between the gender gap based on unimputed or imputed data, the difference between these two is -0.4 percentage points in 2016 and 0.4 percentage points in 2017. This raises confidence that men and women do not misreport wages systematically differently in the LFS.

The wages in net terms are used throughout this paper because net wages are available for most of the sample years.⁶ Table 1 also shows the average wage collected by the labour force survey and that of the official statistics on wages. The LFS shows systematically lower wages than the official statistics. The reason for this may emerge from the different unit responding. The official statistics on wages is collected from firms and not from individuals, as in the LFS. The LFS data, which is collected from individuals, aims to also capture the shadow economy, which is not covered by firm-level surveys. So, the most plausible explanation for the deviation from the official average wages is that the LFS covers also wages of unofficially hired workers or unreported employment. It has been shown that rather marginalised or low wage workers participate in the shadow economy in Estonia (Kriz et al. 2007), which can explain the lower average wages in the LFS than in official wage statistics.

⁴ The Hofstede cultural dimension of masculinity puts Estonia also to the group of feminine countries with a score 30 compared to the EU28 average with a score 46 in 2015 (<https://geerthofstede.com/research-and-vsm/dimension-data-matrix/>).

⁵ For the methodology, please refer to: <https://www.stat.ee/en/find-statistics/methodology-and-quality/esms-metadata/40701#18-Statistical-processing-17>

⁶ It is not explicitly stated whether to report wages in net or gross terms in the questionnaire covering the first four years.

Table 1. Number of observations for wages and descriptive statistics compared to the official reference source

	Calculations from labour force survey (LFS)				Official estimates	
	Item non-response of wages of full-time workers	No of observations of wages of full-time workers	Average net wage of full-time workers ^a	Gender gap in net wages of full-time workers	Average net wage ^a	Gender wage gap in gross terms
1989 ^a	2.6	5624	353	40.8		
1992	2.6	5444	43	26.2		
1993	2.2	5191	72	30.4		
1994	1.2	5245	105	30.1		28.9
1995 ^b	0.9	2515	138	27.3		26.7
1996 ^b	0.6	2525	162	25.1		27.4
1997	1.5	5785	161	33.4		28.0
1998	2.0	5313	179	28.3		25.8
1999	0.1	2905	195	27.2		26.5
2000	0.2	2959	217	24.9	246	24.6
2001	0.0	6093	230	23.3	277	24.3
2002	0.0	5710	250	24.3	305	24.1
2003	2.2	5504	266	23.3	331	24.2
2004	2.1	5286	298	24.2	363	23.5
2005	5.3	5577	346	27.3	411	25.4
2006	9.6	7342	415	28.7	484	27.8*
2007	11.0	8454	509	31.5	583	28.7*
2008	13.1	8171	602	30.6	670	25.6*
2009	15.5	6106	587	27.5	637	
2010	19.8	5630	588	28.5	637	24.1*
2011	23.1	6244	637	26.0	672	22.9
2012	26.2	7049	652	29.3	706	24.6
2013	25.0	7260	708	29.0	757	24.8
2014	22.3	7612	763	27.0	799	23.5
2015	24.4	7591	806	29.2	859	22.2
2016	28.7	6793	897	27.6	924	20.9
2017	29.9	7880	940	24.5	986	20.9
2018	NA	11388	1068	20.4		18.0
2019	NA	11375	1152	21.1		17.1
2020 ^c	NA	8789	1190	20.4		

Notes: ^a The wages in 1989 are shown in roubles, for the rest of the years the wages are shown in euros. Before the changeover to euro in 2011, the kroon is transformed to the euro using the exchange rate during the changeover. Estonian kroon exchange rate was fixed to the German mark in 1992–2001 and to the euro in 2002–2010.

^b The wages are provided only in gross terms, the rest of the wages are shown in net terms.

^c The year 2020 covers only the data from the first three quarters.

Sources: Authors calculations from the LFS and Statistics Estonia (net wages – table PA5331, gender wage gap – tables PA604, PA701, PA621 and PA5335). * refers to the gender wage gap calculated from the Structure of Earnings Survey. The rest of the gender wage gaps are from official wage statistics based on hourly wages or on full-time workers.

The gender wage gap was very high in communist times, 41% in 1989, and dropped quickly below 30% in 1992 after the introduction of market reforms and the dissolution of the Soviet Union. There are no official estimates of the gender wage gap provided before 1994, the LFS provides unique estimates for this period. The gender wage gap in the LFS and according to official estimates was quite close from 1994 till 2007, which raises confidence about the LFS estimates before 1994. However, there are reasons to doubt the estimates from the early years of the LFS. Jolliffe and Campos (2005) are critical to the retrospective collection of data back to the communist times. The early years of data are likely subject to recall bias and attrition bias. Alternative source of wage data is from Klesment and Sakkeus (2010) who digitalised the microdata of Estonian household income surveys collected during the communist period in

1958, 1975 and 1981. We use their estimates of raw gender wage gap to validate our estimates. Their microdata-based estimates of gender wage gap point to lower, but also high gender wage gap during the communist period, 36.8% in 1958, 34.4% in 1975 and 33.5% in 1981. The quality of their wage data is high, the wage data was not self-reported, but was collected from the employers of the respondents.

The LFS estimates of the gap became systematically higher than that based on official estimates for 2007–2017, after which the difference has declined again. Alternatively, Eurostat provides another measurement of the gender wage gap, based on the Structure of Earnings Survey methodology. This methodology excludes workers from enterprises with less than 10 employees and agricultural and the public sector. According to these statistics, Estonia has the largest gender wage gap in Europe. The Eurostat methodology gives a higher gender wage gap than the estimates of Statistics Estonia, as the public sector usually has very low gender wage gap. However, all the statistical sources show that the gender wage gap in Estonia has been declining (see Figure 1 in Appendix 1). The dynamics of the gap in the LFS follows the estimates of Statistics Estonia and that of Eurostat, which is most important given our aim to understand the long-run determinants of the gap.

3.2. Methods

The raw gender wage gap is decomposed into explained and unexplained parts using Oaxaca-Blinder decomposition:

$$\bar{w}_{M,\tau} - \bar{w}_{F,\tau} = (\bar{X}_M - \bar{X}_F)a_{M,\tau} + \bar{X}_F(a_{M,\tau} - a_{F,\tau}) \quad (1)$$

Where $\bar{w}_{M,\tau}$ denotes the log wage for men and $\bar{w}_{F,\tau}$ the log wage for women. The decomposition is undertaken for the gap in mean wages for men and women, and over the distribution of wages. The subscript τ denotes whether the decomposition is done for the mean or particular quantile of the distribution. The simple OLS is used for the decomposition of the gender gap in the mean and unconditional quantile regression by Firpo et al. (2009) for the decomposition of the gender gap in quantiles. The separate wage equations are estimated for men and women, where from the characteristics or mean values of explanatory variables, \bar{X}_M and \bar{X}_W are obtained together with the estimated coefficients $a_{M,\tau}$ and $a_{F,\tau}$. The first term on the right hand side captures the part of the gender wage gap explained by characteristics (using the male coefficients as a base) and the second term captures the unexplained part or the difference in coefficients (using the female characteristics as a base).

The following observables are used to explain the gender wage gap. The main criterion for their choice has been their comparative availability throughout all the waves of the data. The variables have been grouped into five major groups:

- Demographics: age, age squared, ethnicity
- Education: level (tertiary, secondary, primary) and field of education (nine groups)
- Employer side factors: size (seven groups), tenure at employer, foreign ownership dummy
- Occupation: nine main ISCO groups
- Sector: 15 NACE groups

The results of the wage regressions for the mean and the mean values of explanatory variables in 1989, 1992 and 2020 are shown in Appendix 2. These have been used to derive the explained and unexplained parts for the mean gap according to equation (1). Only the most crucial years have been shown to save space. The estimates for the unconditional quantile regression have

not been presented. All the omitted intermediate estimates are available from the authors upon request.

4. RESULTS

4.1. Gender wage gap at the mean

The results of the decomposition are presented in Figure 2. The raw gender wage gap was the largest in 1989, 42 log points, and dropped quickly after the introduction of market reforms. The gap has been around 25 to 30 log points throughout the rest of the timespan. The unexplained gender wage gap has been even more stable over the whole timespan because a larger part of the gap was explained at the beginning of the timespan. As much as 10 log points or roughly one fourth of the gap was explained in 1989, while by 1992 none of the gap could be explained by the same set of explanatory variables. The unexplained gap even increased for some years, implying that for wage earning potential, women had better characteristics than men. Only the last three years of the sample have shown some reduction in the gap, the unexplained gender wage gap has dropped below 20 log points.

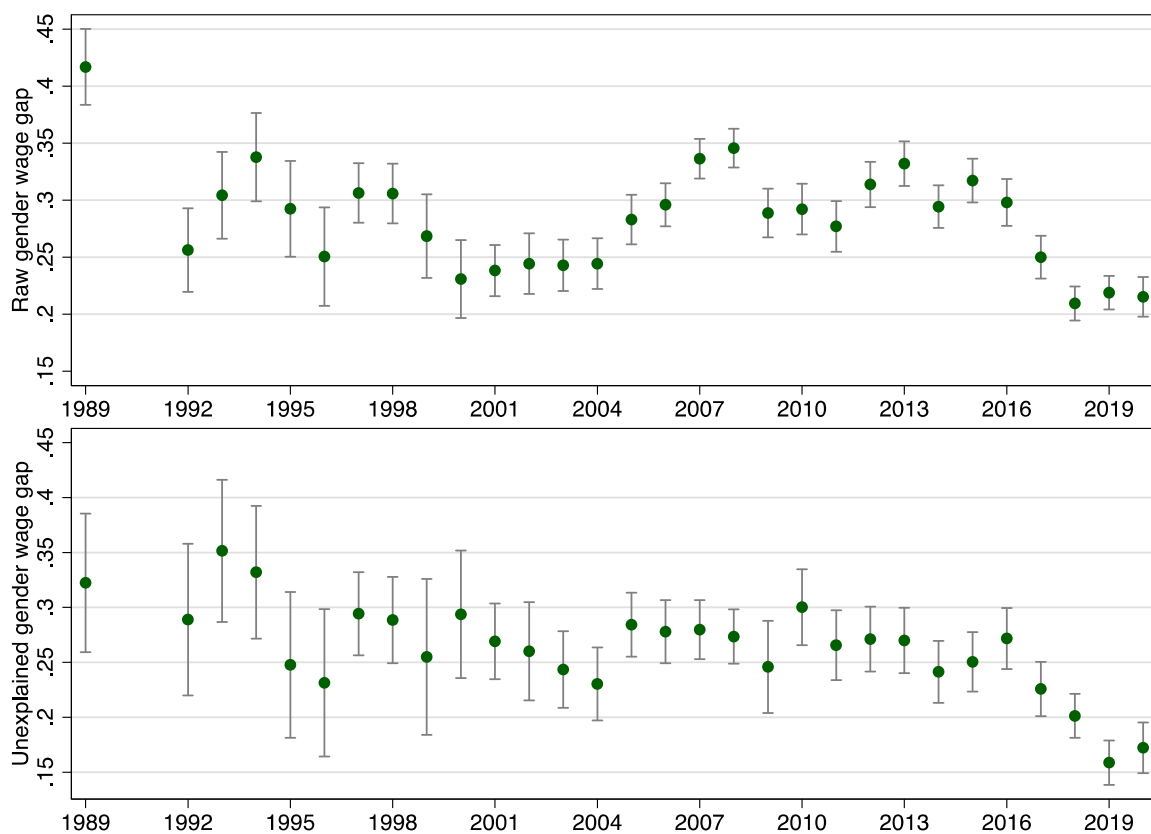


Figure 2. Raw and unexplained gender wage gap, in log points, 1989–2020

Notes: The gaps on vertical scale are in log points. The point estimates are reported with 90% confidence intervals. Source: Authors calculations from LFS.

The contribution of each group of explanatory variables is shown in Figure 3. The role of demographics is negligible as expected, the male and female participants on the labour market have on average the same age and ethnic background. The role of education was positive in

1989; that is, men had a better education than women. But by 1992 this effect had become negative, showing that women had a better education than men. This is similar to trends in other Western countries like the US or Denmark, where the educational gap started to close in the 1980s and reversed in favour of women by today (Blau and Kahn 2017, Gallen et al. 2019). The educational attainment of women increased substantially in the last three decades, the share of women with higher education has increased from 16% to 45%, while the share of men with higher education increased from 15% to 30% (see Appendix 2 Table 2). These developments can be explained by the entrance of private universities to the educational market and also by higher number of students in public universities.

The effects of employer side characteristics have been the same for men and women throughout the timespan. It does not appear that men and women have had different wages because they work for companies with different size, have different tenure at the company or work for companies with a different ownership structure. The role of occupation in the gender wage gap has been similar to that of education, initially women had somewhat worse occupational structure than men but this has turned around and women have had better occupations for most of the timespan. By better occupations we mean that women are more likely employed in high wage occupations than men.

The most important explanatory factors of the gender wage gap originate from sectoral segregation, more men are employed in sectors where wages are high than women. The sectoral segregation explains 5–10 log points throughout the sample. These developments, the decreasing or even negative role of education and occupation and the constant role of sector segregation, are similar in the US and Western Europe (Blau and Kahn 2017, Gallen et al. 2019).

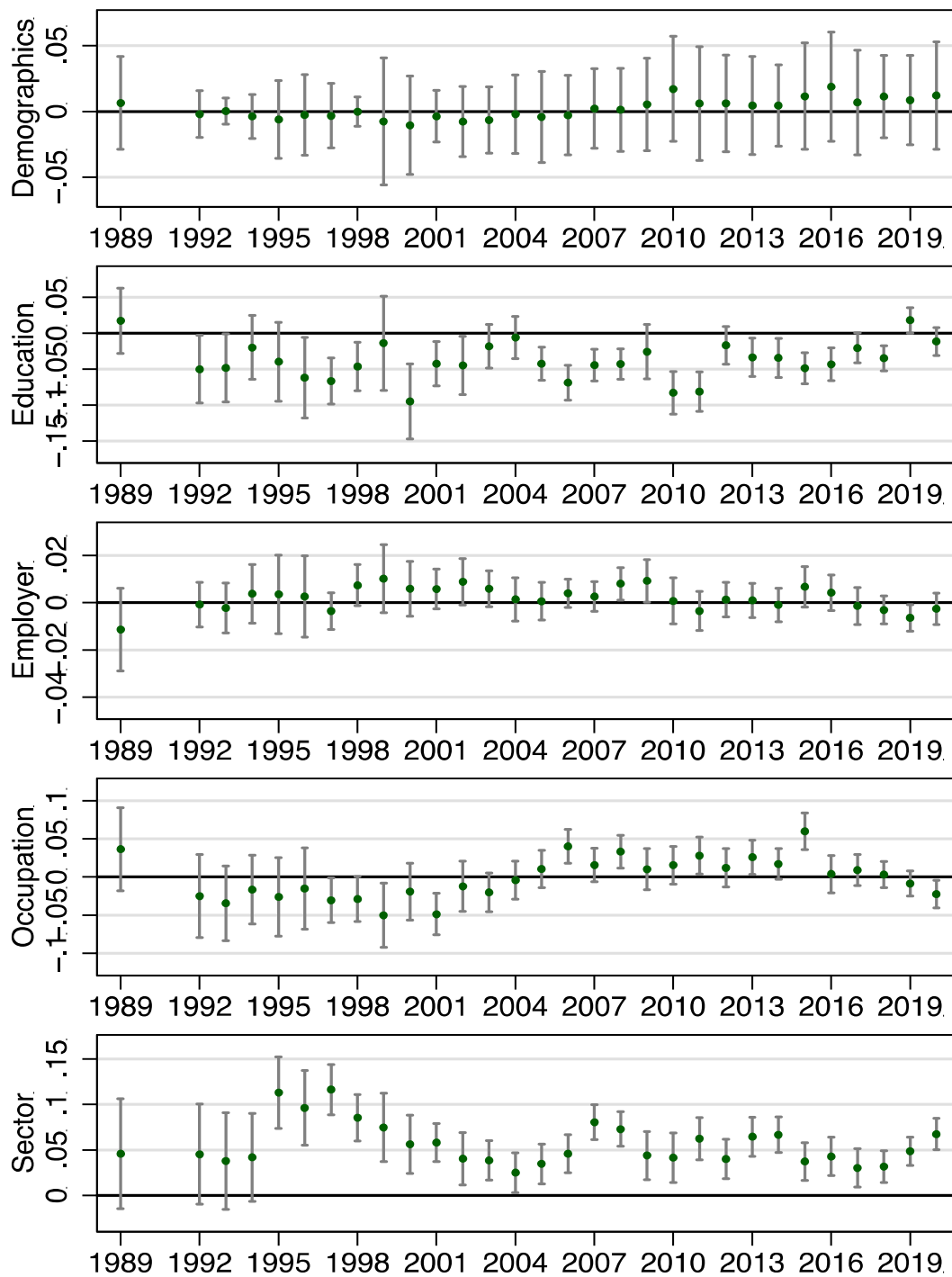


Figure 3. Contributions to the explained part of the gender wage gap, 1989–2020

Notes: The gaps on vertical scale are in log points. The point estimates are reported with 90% confidence intervals. Source: Authors calculations from LFS.

Given the large role of sectoral segregation, we take a more detailed look by deriving the indexes of segregation for men and women for all groups of explanatory variables. This approach is inspired by Gallen et al. (2019). The sectoral segregation of men and women has been high and even increasing over the years (see Figure 4). The segregation has increased also for the level of education as women have obtained tertiary education more frequently compared to men, the educational level of men and women was more or less the same during communist times (see also Appendix 2 Table 2). The segregation of men and women has declined for

occupation, field of education and firm size. These dynamics are surprisingly similar in Denmark as shown by Gallen et al. (2019).

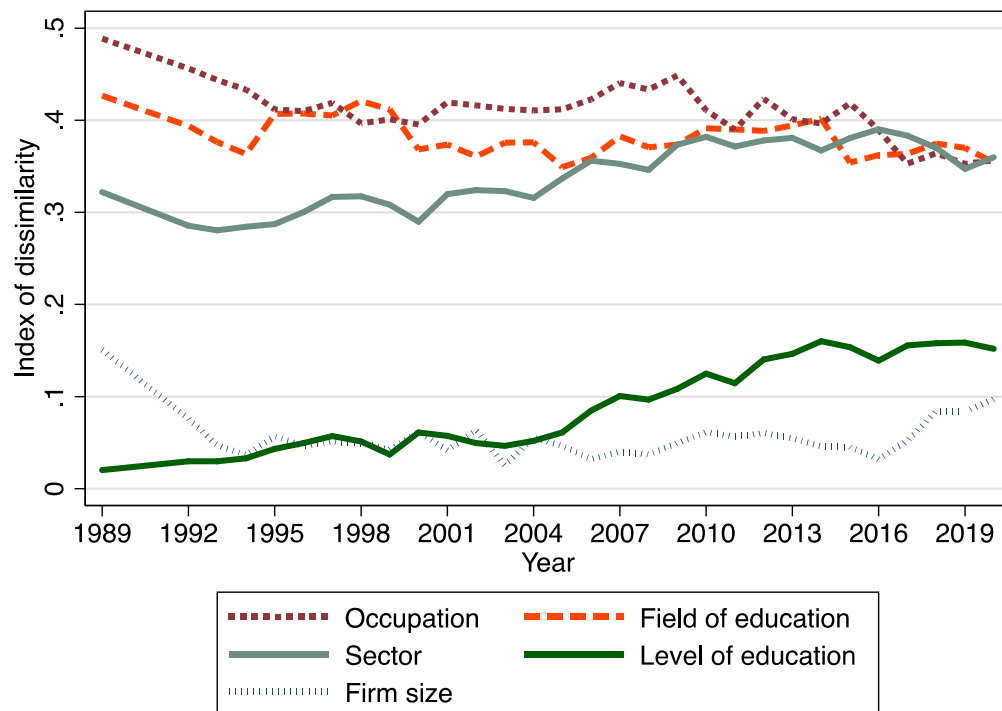


Figure 4. Dissimilarity of characteristics of men and women, 1989–2020

Notes: Duncan and Duncan (1955) segregation index derived as the sum of absolute differences in a category and divided by two.

Source: Authors calculations from LFS.

The unexplained part or differences in coefficients have also gone through remarkable changes over three decades (please refer to Appendix 2 Table 1). The most important change has taken place in returns to education, especially for women. While there was no return for men from higher education during the communist era and the returns for women were low, these returns were quickly established and sizeable by 1992. As in other countries with a communist past, the returns to education increased substantially. Women also gained from increasing returns to education in the social sciences, this captures the demand effect as there was strong structural change towards a market style economy.

Important changes have also taken place from the side of the employer. While the returns to working in larger companies were negative in the communist era, these have increased and turned positive by 2020. It seems that the Soviet wage structure did not capture the main features of economics as a scale effect, larger firms are usually more productive and provide wage premiums compared to smaller firms. The opposite held in the communist era; the smaller the firm, the larger the wages, *ceteris paribus*. There were also strong returns to working for a foreign owned company in the 1990s, these returns have declined by 2020.

The regulated wage system also strongly favoured working in agriculture and penalised working in services such as healthcare. For example, female agricultural skilled workers earned on average much more than managers or skilled white-collars. These distortions in the wage structure were removed already by 1992. As there were relatively more women working in services and less in agriculture, the structural shift that increased the role of services favoured

women. In sum, we can conclude the main findings from other countries that women won from the transition from communism to capitalism and mainly due to the increased returns to education, increased enrolment to education and structural change towards female dominated services-based economy.

4.2. Gender wage gap over the distribution of wages

This subsection takes a more detailed look at the wage distribution behind the mean dynamics discussed in the previous sub-section. Figure 5 plots the raw and unexplained gender wage gap over the whole distribution of wages. Two regularities can be brought out. First, the gap enlarges at the top at the beginning of the sample during the communist era, while this effect declines over time and has disappeared three decades later. Most of the research on the gender wage gap before and after transition has focused on the gender wage gap at the mean. Only Newell and Reilly (2001) have highlighted this enlarging top.

The discrimination literature calls this effect the glass ceiling. The possible mechanism behind the class ceiling effect in communist times could be that women were kept away from party membership, while in order to progress in their career and climb to the top jobs, one needed to be a member of the Communist Party. It is surprising that the glass ceiling effect survived so long in the wage structure, although political entry barriers to the top jobs were removed quickly. Given that the effect was present in many post-communist countries, it can be argued that it was inherited from communist times and had a long-lasting effect – it took almost three decades for the effect to vanish.

Another regularity is that the gender wage gap in the bottom of the wage distribution is as large as throughout most of the distribution in the communist era. This is an indication that minimum wages were not binding for the gender wage gap. This regularity in the wage gap disappeared in the mid-1990s and the gap for low wage earners disappeared. The minimum wages were strongly increased in the second half of the 90s (Hinnosaar and Rõõm 2003) and this is the most plausible explanation of this changing pattern of the wage gap at the bottom of the wage distribution.

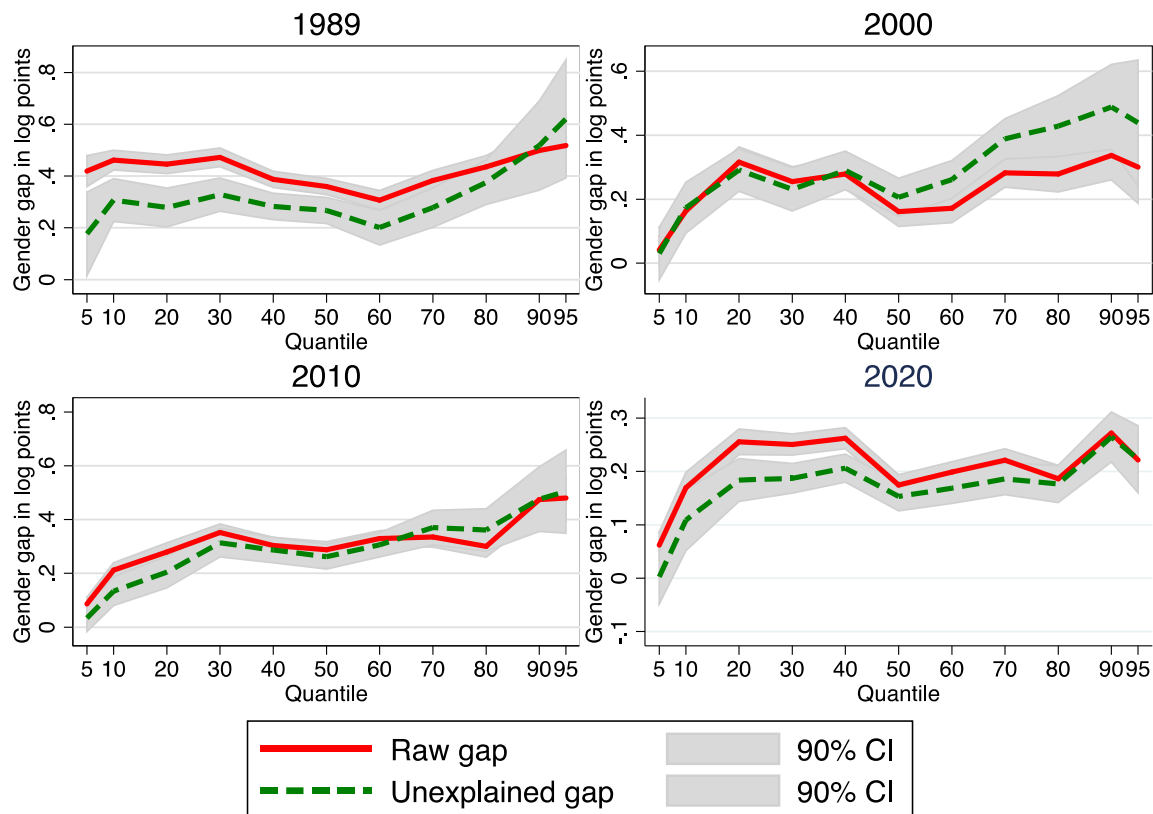


Figure 5. Distribution of the gender wage gap in 1989, 2000, 2010 and 2020.

Notes: CI denotes confidence intervals.

Source: Authors calculations from LFS.

5. WHAT COULD EXPLAIN THE AGGREGATE DYNAMICS OF THE GAP?

We have shown that the unexplained gender wage gap has been persistently high in our sample country. However, the distribution of the unexplained gap has changed substantially. It was almost flat and enlarged at the very top of the wage distribution at the beginning of the sample, 1989. This was the period when there was evidence of a glass ceiling at the top of the wage distribution. The glass ceiling effect disappeared by 1995 and the lower part of the gap started to diminish from 1996. The shape of the distribution has been more or less the same since then; it is close to zero at the fifth percentile, increases fast and is around 25–30 per cent throughout the rest of the distribution.

In this subsection we ask whether country-level institutional factors can explain the unexplained gender gap in the mean and over the distribution of wages. We test the role of three sets of factors: overall wage inequality, labour market institutions and gender attitudes. Figure 6 demonstrates the dynamics of these variables. First of all, it can be observed that wage inequality was highest in communist times and has followed a declining path since then. The Gini of net wages has declined as much as 15 percentage points over three decades. There is a strong positive and statistically significant correlation between wage inequality and the gender wage gap; the Pearson correlation is 0.62 (see Figure 7). The relationship remains statistically significant after controlling for the persistence in the gap; that is, running a regression where the unexplained gender wage gap is explained with its lagged term and the Gini index. Every

percentage point decline in the Gini is related to 0.44 decline in the unexplained gender wage gap. Given a total drop in the Gini of 15 percentage points, this corresponds to the decline in the unexplained gender wage gap by 6.5 percentage points.

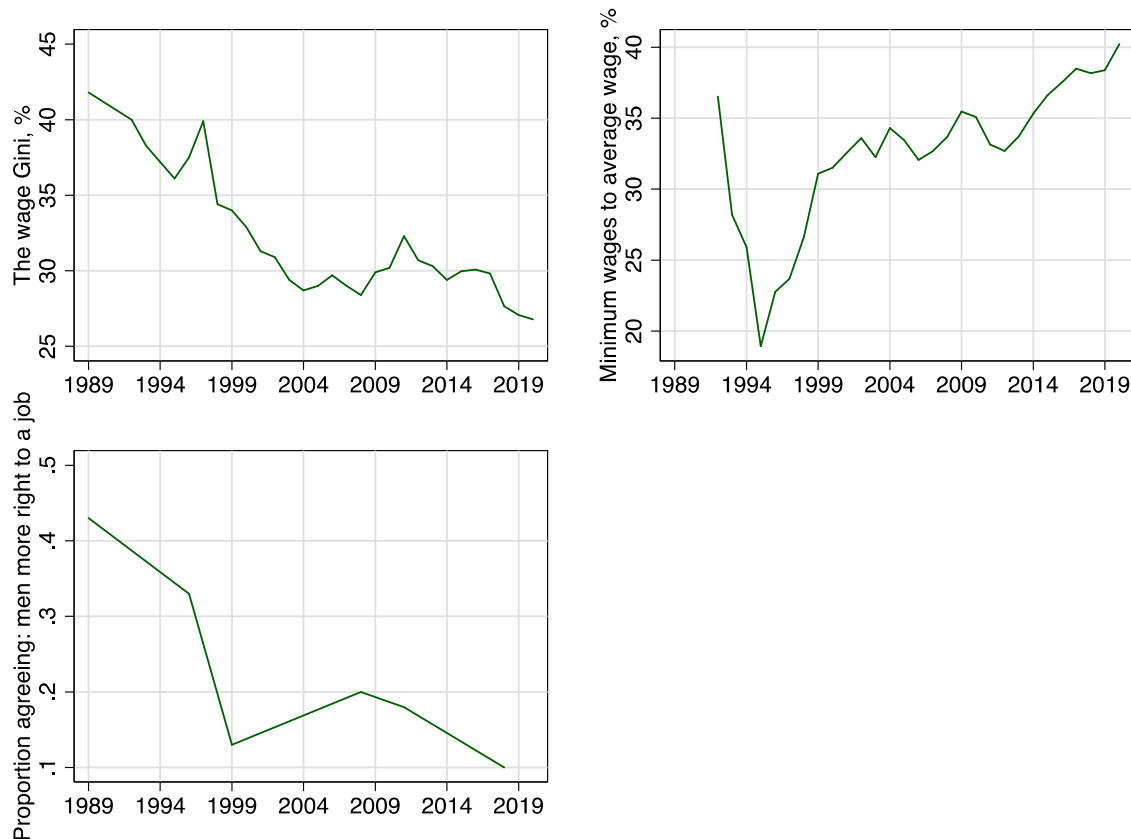


Figure 6. Development in wage inequality, minimum wages and gender attitudes, 1989–2020
Source: Gini: Authors calculations from LFS. Minimum wages: Eurostat series TPS00155 and Hinnosaar and Rõõm (2003). Gender attitudes: World Value Survey.

Second, we test the role of labour market institutions in the dynamics of the unexplained gender wage gap. Labour market institutions such as minimum wages and union density compress the wage distribution at the lower end of the distribution and can lower the gender wage gap there (see e.g. Gogoladze 2019 and Ferraro et al. 2018). Figure 6 shows the development of minimum wages to average wages in Estonia for 1989–2020. The ratio of minimum wages to the average wage started to increase substantially in 1996 (Hinnosaar and Rõõm 2003). The ratio was also high in 1992, but the enforcement could have been low then. So, the decline in the gender wage gap at the bottom of the wage distribution coincides with the period when minimum wages become more binding. There is a strong negative and statistically significant correlation between minimum wages and the unexplained gender wage gap – the correlation is -0.45. The effect on the mean gap becomes statistically insignificant after controlling for the persistence of the gap. However, the effect remains statistically significant for the raw gender wage gap at the lower end of the wage distribution around quantiles 20–60. Given the total increase of the minimum wage ratio from 1995 to 2020, it could explain as much as 3.4pp of the decline in the unexplained gender wage gap.

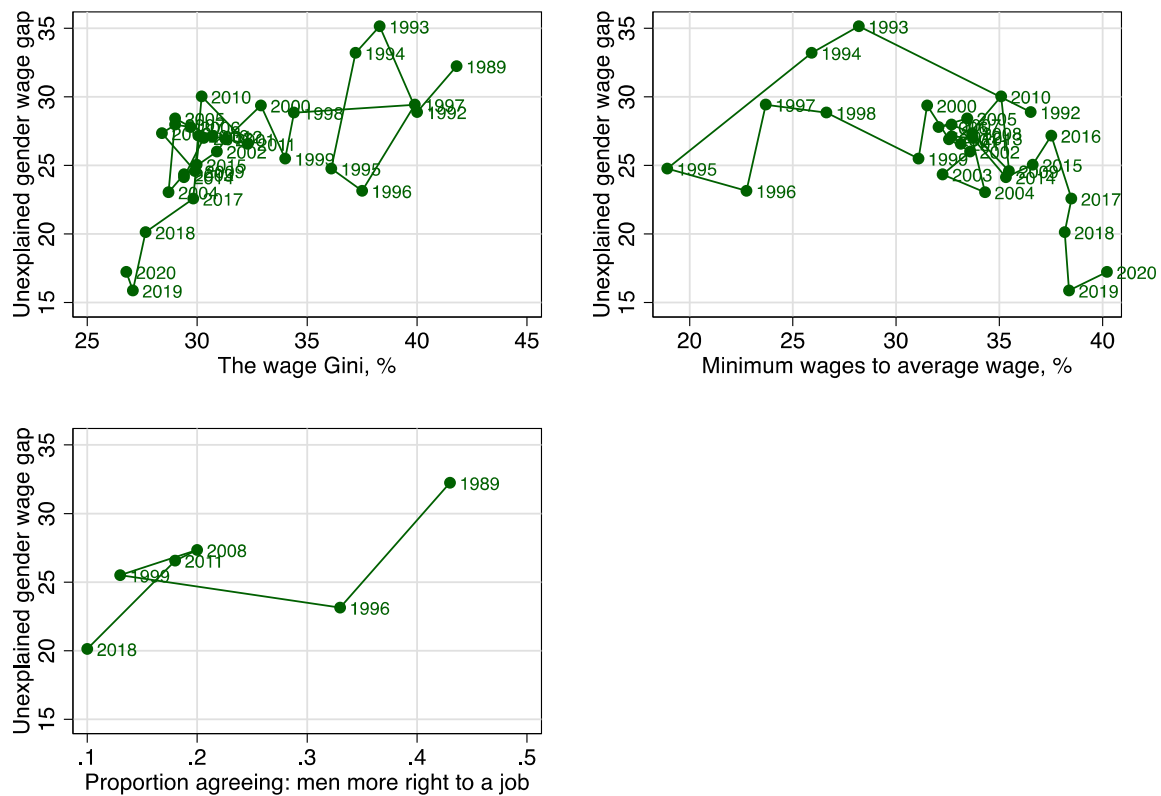


Figure 7. Correlation between institutional factors and the unexplained gender wage gap, 1989–2020

Source: Gini and unexplained gender wage gap: Authors calculations from LFS. Minimum wages: Eurostat series TPS00155 and Hinnosaar and Rõöm (2003). Gender attitudes: World Value Survey.

Another important set of institutions that shape the wage distribution and the gender wage gap is related to trade unions. The membership of trade unions was de facto 100% during the communist era in 1989 and declined sharply (Kallaste and Woolfson 2009). Kallaste and Woolfson (2009) discuss that the role of trade unions was not to empower wage negotiations during the communist era, the unions were used to enforce party politics and to deliver social benefits. They argue that as the reputation of unions was low in the Baltics, the unions were directly related to the foreign occupier regime, and as a result union density declined faster in the Baltics than in other Central and Eastern European countries. As there is no meaningful relationship between the gender gap and union density, we omit this labour market institution from our analysis.

Lastly, we test the role of gender attitudes in the unexplained gender wage gap. It has been shown that gender attitudes towards jobs can explain some part of the conditional wage gap in OECD countries (Fortin 2005). Most of the studies on the effect of gender attitudes use cross-sectional data on gender attitudes claiming that there is a large cross-sectional variation in it (Alesina et al. 2013, Gay et al. 2013). However, gender role attitudes can change substantially over a short period of time, this has been demonstrated on US (Fortin 2015) and OECD data (Fortin 2005). According to the World Value Survey, agreement with the statement “If jobs are scarce: Men should have more right to a job than women” has dropped more than four times between 1990 and 2018 in Estonia (see Figure 6). This implies that gender attitudes have become much more egalitarian in Estonia. We use this variation in gender attitudes to explain the unexplained gender wage gap. The gender attitudes variable is defined as the proportion of

respondents agreeing with the statement above. The correlation between the gender attitudes and the unexplained gender wage gap is again strong, 0.66, but the number of observations is only six and the relationship is statistically insignificant. Controlling for the persistence of the gap provides the same statistically insignificant relationship. However, the size of the effect is not small, more egalitarian gender attitudes can explain up to 2 percentage points of the unexplained gender wage gap.

There are many challenges in deriving the role of gender attitudes in the gender wage gap. First, it is not obvious whether to use the raw or unexplained gender wage gap as dependent variable. On the one hand there are arguments in favour of using the raw gap as the educational, job-related and family-related decisions depend on the gender role attitudes. On the other hand, the gender attitudes capture likely the discriminatory factors of the labour market, which should correlate the most with unexplained gap. Our data shows somewhat stronger correlation between the gender attitudes and the raw gap than between the gender attitudes and the unexplained gap, the correlations are 0.76 vs 0.66. Second, the attitudes are endogenous to the outcome variable such as female labour force participation rate (Fortin 2015) or the gender wage gap. The simplest way to address reverse causality is to include lagged gender attitudes to the right-hand side. Our data shows that the correlations become slightly higher when gender attitudes are included with a lag, but our sample size is too small to derive any conclusive evidence from it.

6. SUMMARY

The aim of this paper is to understand the long-run determinants of the gender wage gap. The gender wage gap in Estonia was at its largest during the communist era, 41%, and it was also the highest in the region and among the countries with a communist past. One quarter of it could be explained by differences in education, occupation and sector segregation during the communist era. The unexplained gender wage gap has been highly persistent; it declined slowly, from 30 to 25%, and further during the last three years. The gender wage gap in Estonia was still the largest in the region or in the EU in 2018. Women in Estonia definitely won from the transition from communism to capitalism. The mechanism behind their gains is similar to those in other formerly centrally planned economies, the education of women is even better now, they are employed in better occupations and their returns to education are higher.

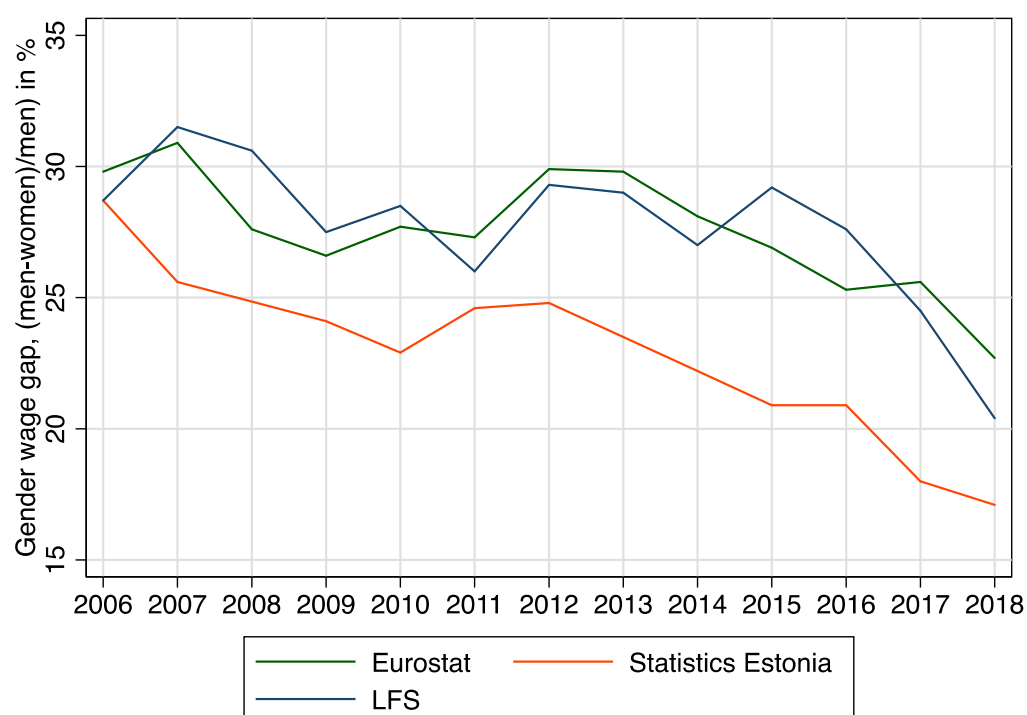
The decline in the gender wage gap is related to an overall decline in wage inequality, and minimum wages have also contributed to this. The decline in wage inequality can explain up to 6.5 percentage points of the decline in the unexplained gender wage gap. Gender attitudes are also important in explaining the decline in the gender wage gap, but their relation to the gender wage gap is weaker than the role of overall wage inequality. Gender attitudes have not been persistent in Estonia as assumed by most of the literature on culture and norms. The attitudes have become much more egalitarian. It is difficult to quantify whether gender attitudes have changed faster than the gender wage gap. However, in a cross-country comparison, Estonia ranks higher in the gender wage gap than in attitudes towards gender inequality. As it takes time for attitudes to materialise in the gender wage gap, it can be expected that the gender wage gap will continue to decline in Estonia.

References

- Acemoglu, D.; Autor, D., H.; Lyle, D. (2004) Women, War, and Wages: The Effect of Female Labor Supply on the Wage Structure at Mid-century. *Journal of Political Economy*, 112(3), 497-551.
- Alesina, A.; Giuliano, P.; Nunn, N. (2013) Origins of gender roles: Women and the plough. *The Quarterly Journal of Economics*, 128(2), 469–530.
- Autor, D.; Dorn, D.; Katz, L., F.; Patterson, C.; Van Reenen, J. (2017) The fall of the labour share and the rise of superstar firms. NBER Working Paper no 23396.
- Bauernschuster, S.; Reiner, H. (2012) Political regimes and the family: how sex-role attitudes continue to differ in reunified Germany. *Journal of Population Economics*, 25, 5–27.
- Becker, S., O.; Mergele, L.; Woessmann, L. (2020) The Separation and Reunification of Germany: Rethinking a Natural Experiment Interpretation of the Enduring Effects of Communism. *Journal of Economic Perspectives*, 34(2), 143–171.
- Bertrand, M. (2011) New Perspectives on Gender. In Card, D.; Ashenfelter, O. (Eds) *Handbook of Labour Economics*, Vol 4, Part B, 1543-1590.
- Blau, F., D.; Kahn, L., M. (2017) The Gender Wage Gap: Extent, Trends and Explanations. *Journal of Economic Literature*, 55(3), 789-865.
- Brainerd, E. (2000) Women in Transition: Changes in Gender Wage Differential in Eastern Europe and the Former Soviet Union. *ILR Review*, 54(1), 138-162.
- Bruns, B. (2019) Changes in Workplace Heterogeneity and How They Widen the Gender Wage Gap. *American Economic Journal: Applied Economics*, 11(2), 74–113.
- Cardoso, A., R.; Guimaraes, P.; Portugal, P. (2016) What drives the gender wage gap? A look at the role of firm and job-title heterogeneity. *Oxford Economic Papers*, 68(2), 506–524.
- Campa, P.; Serafinelli, M. (2019) Politico-Economic Regimes and Attitudes: Female Workers under State Socialism. *The Review of Economics and Statistics*, May 2019, 101(2): 233–248
- Duncan, O. D.; Duncan, B. (1955) A Methodological Analysis of Segregation Indexes. *American Sociological Review*, 20(2), 210-217.
- Ferraro, S.; Meriküll J.; Staehr, K. (2018) Minimum wages and the wage distribution in Estonia. *Applied Economics* 50(49), 5253-5268.
- Firpo, S., Fortin, N. M., Lemieux, T. (2009) Unconditional Quantile Regression. *Econometrica*, 77(3), 953–973.
- Fortin, N. M. (2005) Gender Role Attitudes and the Labour-Market outcomes of Women across OECD Countries. *Oxford Review of Economic Policy*, 21(3), 416-438.
- Fortin, N. M. (2015) Gender Role Attitudes and Women's Labor Market Participation: Opting-Out, AIDS, and the Persistent Appeal of Housewifery. *Annals of Economics and Statistics*, 117/118, 379-401.
- Fortin, N., M.; Bell, B.; Böhm, M. (2017) Top earnings inequality and the gender pay gap: Canada, Sweden and the United Kingdom. *Labour Economics*, 47, 107-123.
- Fortin, N., M.; Lemieux, T.; Lloyd, N. (2018) Labour Market Institutions and the Distribution of Wages: The Role of Spillover Effects. Mimeo.
- Gallen, Y.; Lesner, R., V.; Vejlin, R. (2019) The labor market gender gap in Denmark: Sorting out the past 30 years. *Labour Economics*, 56, 58–67.
- Gay, V.; Santacreu-Vasut, E.; Shoham, A. (2013) The Grammatical Origins of Gender Roles. BEHL Working Paper Series, WP2013-03.
- Giddings, L., A. (2002) Changes in Gender Earnings Differentials in Bulgaria's Transition to a Mixed-Market Economy. *Eastern Economic Journal*, 28(4), 481-497.
- Giuliano, P. (2017) Gender: An Historical Perspective. NBER Working Paper Series no 23635.
- Gogoladze, P. (2019) Gender Income Gap over Life-Cycle: Cross-Country Analysis. University of Tartu School of Economics and Business Administration Working Papers no 117.

- Goldin, C.; Olivetti, C. (2013) Shocking Labor Supply: A Reassessment of the Role of World War II on Women's Labor Supply. *The American Economic Review: Papers and Proceedings*, 103(3), 257-262.
- Grosjean, P.; Khattar, R. (2019) It's Raining Men! Hallelujah? The Long-Run Consequences of Male-Biased Sex Ratios. *Review of Economic Studies*, 86, 723–754.
- Hansen, C., W.; Jensen, P., S.; Skovsgaard, C., V. (2015) Modern gender roles and agricultural history: the Neolithic inheritance. *Journal of Economic Growth*, 20, 365–404.
- Heyns, B. (2005) Emerging Inequalities in Central and Eastern Europe. *Annual Review of Sociology*, 31, 163–197.
- Hinnosaar, M.; Rõõm, T. (2003) The Impact of Minimum Wage on the Labour Market in Estonia: An Empirical Analysis. Bank of Estonia Working Papers, November 2003.
- Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online Readings in Psychology and Culture*, 2(1). <https://doi.org/10.9707/2307-0919.1014>
- Jolliffe, D.; Campos, N., F. (2005) Does market liberalisation reduce gender discrimination? Econometric evidence from Hungary, 1986–1998. *Labour Economics*, 12, 1–22.
- Kallaste, E.; Woolfson, C. (2009) The Paradox of Post-Communist Trade Unionism: “You Can’t Want What You Can’t Imagine”. *The Economic and Labour Relations Review*, 20(1), 93–110.
- Kecmanovic, M.; Barrett, G.F. (2011) The gender wage gap during Serbia’s transition. *Comparative Economic Studies*, 53(4), 695– 720.
- Klesment, M.; Sakkeus, L. (2010) Estonian household income surveys in the 1950-1980s. Feasibility study and standard tabulations. RU SERIES C No 29. Tallinn: 2010.
- Kriz, K.; Meriküll, J.; Paulus, A.; Staehr, K.; (2007) Why do Individuals Evade Payroll and Income Taxation in Estonia? *Tax Law: International & Comparative Tax eJournal*.
- Kukk, K. (2014) The road to monetary reform 1989-1992. In Lepik, I. (Eds) *A Long Transition: The Estonian Currency Board Arrangement 1992-2010*. Eesti Pank, 2014.
- Leythienne, D.; Ronkowski, P. (2018) A decomposition of the unadjusted gender pay gap using Structure of Earning Survey data: 2018 edition. Eurostat Statistical Working Papers. Luxembourg: Publications Office of the European Union, 2018.
- Lippmann, Q.; Georgieff, A.; Senik, C. (2020) Undoing Gender with Institutions: Lessons from the German Division and Reunification. *The Economic Journal*, 130, 1445-1470.
- Lippman, Q.; Senik, C. (2018) Math, girls and socialism. *Journal of Comparative Economics*, 46, 874–888.
- Nakachi, M. (2011) A Postwar Sexual Liberation? The gendered experience of the Soviet Union’s Great Patriotic War. *Cahiers du Monde russe*, 52(2/3), 423-440.
- Newell, A.; Reilly, B. (2001) The gender pay gap in the transition from communism: some empirical evidence. *Economic Systems*, 25, 287–304.
- Orazem, P., F.; Vodopivec, M. (2000) Male-female differences in labor market outcomes during the early transition to market: The cases of Estonia and Slovenia. *Journal of Population Economics*, 13, 283-303.
- Pastore, F.; Verashchagina (2011) When does transition increase the gender wage gap? An application to Belarus. *Economics of Transition*, 19(2), 333–369.
- Pulver, A.; Allik, J.; Pulkkinen, L.; Härmäläinen, M. (1995) A Big Five personality inventory in two non-Indo-European languages. *European Journal of Personality*, 9(2), 109-124.
- Semykina, A.; Linz, S., J. (2010) Analyzing the gender pay gap in transition economies: How much does personality matter? *Human Relations*, 63(4), 447–469.
- Shoham, A.; Lee, S., M. (2018) The Causal Impact of Grammatical Gender Marking on Gender Wage Inequality and Country Income Inequality. *Business & Society*, 57(6), 1216-1251.

- Tang, L.; Koveos, P., E. (2007) A framework to update Hofstede's cultural value indices: economic dynamics and institutional stability. *Journal of International Business Studies*, 39, 1045–1063.
- Teso, E. (2019) The long-term effect of demographic shocks on the evolution of gender roles: Evidence from the transatlantic slave trade. *Journal of the European Economic Association*, 17(2), 497–534.
- Trapido, D. (2007) Gendered Transition: Post-Soviet Trends in Gender Wage Inequality among Young Full-Time Workers. *European Sociological Review*, 23(2), 223–237.
- Van Reenen, J. (2018) Increasing Differences Between Firms: Market Power and the Macro-Economy. CEP Discussion Paper no 1576.

Appendix 1. Gender wage gap according to various sources**Figure 1.** Gender wage gap according to various sources, 2016–2018

Sources: Please refer to Table 1 for details about sources.

Appendix 2. Wage regressions for mean wages and the mean values of explanatory variables in 1989, 1992 and 2020

Table 1. Wage regressions for the mean wages of men and women in 1989, 1992 and 2020

	1989		1992		2020	
	Men	Women	Men	Women	Men	Women
Estonian (base not)	0.077**	0.052*	0.049	0.037	0.143***	0.122***
Age	0.017**	0.036***	0.011	-0.006	0.046***	0.016***
Age ²	-0.025	-0.041***	-0.015	0.009	-0.057***	-0.020***
Secondary education, base primary	0.051	0.077*	0.078*	0.152***	0.074***	-0.001
Tertiary education, base primary	0.053	0.112*	0.184***	0.340***	0.181***	0.153***
Field of education, base general						
Teachers	0.029	-0.133	0.212	-0.030	-0.277***	-0.023
Humanitarians	0.539***	0.102	0.010	0.316**	-0.137***	0.015
Social sciences	-0.062	-0.039	0.271**	0.109**	0.014	0.026
Natural sciences	-0.251	-0.343*	0.454*	0.029	0.025	0.037
Medicine	-0.071	-0.060	0.377	0.228*	-0.028	-0.047**
Engineers	0.002	-0.034	0.102**	0.086*	-0.048	-0.096***
Agriculture	0.019	0.054	-0.043	-0.020	0.107	0.091***
Services	0.035	-0.059	0.056	0.085	0.028	-0.047*
Size of enterprise, base <=10						
11-19 employees	-0.214	-0.204*	-0.044	-0.030	0.116***	0.027
20-49 employees	-0.229*	-0.152*	-0.086	-0.044	0.125***	0.072***
50-99 employees	-0.365***	-0.108	-0.062	0.056	0.203***	0.103***
100-199 employees	-0.359***	-0.138	-0.132*	0.073	0.171***	0.120***
200-499 employees	-0.335***	-0.151*	-0.221***	-0.047	0.184***	0.205***
500 and more employees	-0.243**	-0.108	-0.023	-0.082	0.200***	0.247***
Tenure in enterprise	0.005***	-0.002	-0.001	-0.001	0.002*	0.001
Foreign owned, base domestically	0.082	0.140	0.531***	0.229***	0.146***	0.064***
Occupation, base elementary						
Managers	0.300***	0.411***	0.311***	0.398***	0.497***	0.603***
Top specialists	0.095	0.401***	0.186**	0.364***	0.416***	0.449***
Specialists	0.190*	0.195***	0.370***	0.243***	0.283***	0.331***
Clerks	0.119	0.078	0.119	0.201***	0.100**	0.193***
Sales workers	-0.093	0.163**	0.279**	0.220***	0.094**	0.140***
Agricultural skilled	0.201**	0.562***	0.074	0.321***	0.030	0.323***
Craft workers	0.146**	0.370***	0.168***	0.082	0.196***	0.183***
Machine operators	0.160**	0.302***	0.142**	0.196**	0.097***	0.134***
Sector, base public						
Agriculture	-0.022	0.069	-0.071	-0.472***	0.017	-0.139**
Fishery	0.338**	0.111	0.390**	-0.209	NA	NA
Mining	0.103	0.103	0.359*	-0.346	0.193***	0.156
Manufacturing	0.051	0.117	0.188	-0.228	-0.067**	-0.112***
Electricity	0.076	0.060	0.237	-0.152	0.029	0.045
Construction	0.253	0.010	0.436***	-0.134	0.021	-0.017
Trade	0.085	0.051	0.143	-0.371**	-0.043	-0.104***
Hotels and restaurants	0.067	0.020	0.069	-0.378**	-0.323***	-0.172***
Transport	0.089	0.082	0.393**	-0.200	0.076**	0.023

Financial						
intermediation	-0.35	0.035	0.355	0.068	0.0548	0.081*
Real estate	0.109	0.140	0.161	-0.315*	-0.088**	-0.062**
Education	0.029	-0.179	-0.064	-0.327	-0.177***	-0.162***
Health	-0.688*	-0.270*	0.114	-0.403**	-0.238***	-0.157***
Other services	-0.184	0.006	0.032	-0.441**	-0.135***	-0.199***
Obs	2214	1811	2258	1624	4376	4334
Adj R2	0.056	0.108	0.163	0.107	0.308	0.403

Source: Authors calculations from LFS.

Table 2. Mean values of explanatory variables for men and women in 1989, 1992 and 2020

	1989		1992		2020	
	Men	Women	Men	Women	Men	Women
Log(wage)	5.8	5.3	3.6	3.3	7.061	6.846
wage	439.2	260.2	48.5	35.8	1318.3	1049.6
Estonian	0.655	0.634	0.659	0.644	0.680	0.684
age	40.3	41.3	40.3	41.3	42.84	45.79
Primary	0.221	0.200	0.218	0.189	0.107	0.0436
Secondary	0.633	0.640	0.643	0.656	0.599	0.510
Tertiary	0.146	0.159	0.139	0.156	0.295	0.447
General education	0.140	0.250	0.202	0.295	0.285	0.187
Teaching	0.012	0.075	0.010	0.069	0.00804	0.0865
Humanitarian	0.009	0.027	0.009	0.024	0.0309	0.0553
Social sciences	0.031	0.211	0.027	0.204	0.0898	0.272
Natural sciences	0.005	0.009	0.005	0.007	0.0671	0.0423
Medicine	0.008	0.059	0.008	0.054	0.373	0.174
Engineering	0.480	0.204	0.446	0.191	0.0633	0.0404
Agriculture	0.140	0.074	0.130	0.068	0.00759	0.0765
Services	0.174	0.090	0.164	0.087	0.0750	0.0661
Up to 10 employees	0.023	0.051	0.095	0.084	0.267	0.214
10-19 employees	0.019	0.056	0.061	0.075	0.157	0.115
20-49 employees	0.060	0.106	0.100	0.130	0.184	0.210
50-99 employees	0.067	0.108	0.089	0.120	0.128	0.157
100-199 employees	0.116	0.105	0.107	0.107	0.106	0.104
200-499 employees	0.273	0.211	0.209	0.186	0.0818	0.105
500 and more	0.442	0.365	0.339	0.297	0.0769	0.0948
Tenure	9.892	10.188	8.563	9.211	7.926	9.428
Foreign owned	0.014	0.023	0.048	0.048	0.217	0.201
Managers	0.129	0.091	0.127	0.090	0.133	0.0899
Professionals	0.090	0.179	0.073	0.158	0.153	0.292
Technicians	0.048	0.167	0.059	0.159	0.140	0.174
Clerks	0.014	0.111	0.012	0.111	0.0372	0.0797
Sales	0.019	0.121	0.035	0.142	0.0616	0.184
Skilled agricultural	0.034	0.055	0.045	0.064	0.0141	0.00637
Craft	0.324	0.114	0.320	0.114	0.221	0.0290
Plant operators	0.299	0.058	0.266	0.051	0.180	0.0666
Elementary occupations	0.044	0.106	0.064	0.110	0.0597	0.0784
Agric	0.224	0.122	0.184	0.121	0.0396	0.0156
Fishery	0.049	0.016	0.039	0.014	0.000	0.000
Mining	0.022	0.008	0.024	0.008	0.00994	0.00221
Manufacturing	0.251	0.271	0.235	0.250	0.228	0.166
Construction	0.029	0.015	0.032	0.014	0.0201	0.00795
Retail	0.126	0.030	0.129	0.027	0.175	0.0113
Hotels & restaurants	0.037	0.113	0.077	0.130	0.103	0.145
Transp & communic	0.011	0.036	0.014	0.039	0.0188	0.0528
Finance	0.111	0.048	0.109	0.050	0.166	0.0765
Real estate	0.001	0.009	0.005	0.013	0.0146	0.0247
Public admin	0.038	0.046	0.036	0.036	0.0752	0.0930
Education	0.038	0.044	0.046	0.043	0.0682	0.0851
Health	0.027	0.089	0.027	0.094	0.0358	0.157
Services	0.012	0.109	0.013	0.115	0.0134	0.101
Home prod	0.026	0.046	0.029	0.045	0.0301	0.0609

Source: Authors calculations from LFS.

KOKKUVÕTE

Pika habemega lugu: Sooline palgalõhe Eestis läbi kolme kümnendi

Uuringu eesmärk on mõista pikaajalisi arenguid soolises palgalõhes läbi üleminekuperioodi kommunismist kapitalismi ja majandusliku konvergentsi. Uuringus kasutatakse Eesti tööjõu-uuringu isiku tasandil andmeid perioodist 1989-2020 ning leitakse nii esialgne kui selgitamata soolise palgalõhe aegrida kasutades Oaxaca-Blinder dekomponeerimist. Kommunistlikke riike iseloomustas palkade tsentraalselt reguleerimine ning naiste kõrge tööturul osalemise määr ja kõrge haridustase. Vaatamata formaalsele soolisele võrdsusele ühiskonnas, oli sooline palgalõhe kommunistliku perioodi lõpus 1989. aastal kõrge, 41%. Suur sooline palgalõhe vähenes kiiresti peale üleminekut kapitalismile, seda peamiselt tänu palgaregulatsioonide kadumisele, mis tähendas näiteks palkade langust põllumajanduses ja kõrghariduse tasuvuse kasvu.

Uuringul on kaks põhitulemust. Esiteks, Eesti naiste olukord tööturul on paranenud viimase 30 aasta jooksul. Eesti naised võitsid üleminekust kapitalismile sarnaselt enamikele postsotsialistlikele riikidele. Naiste haridustase on kasvanud, nad on järjest enam hõivatud kõrgepalgalistel ametikohtadel ja nende hariduse tasuvus on kasvanud. Teiseks, Eesti sooline palgalõhe oli kõrge juba kommunismi perioodil, olles kõrgeim teiste Euroopa kommunistlike riikidega võrreldes. Seega ei tekkinud praegune kõrge palgalõhe mitte üleminekuprotsessi käigus vaid oli olemas juba enne seda. Palgalõhe selgitamata osa on vähenenud visalt, olles pea muutumatuna 25-30% vahel valdaval osal vaadeldud perioodist. Palgalõhe selgitamata osa on langenud alla 20% alles viimastel aastatel. See viitab palgalõhe suurele inertsusele ja pikaajaliste kultuuriliste tegurite olulisusele palgalõhe kujunemisel. Eesti palgalõhe langus on seotud palkade ebavõrdsuse langusega, millesse on panustanud ka alampalga tõus. Kultuurilised tegurid nagu soorollid on muutunud oluliselt viimase 30 aasta jooksul, kuid nende panust palgalõhe vähenemisse on keeruline empiiriliselt tõestada.