2019

The Nordic Gender Equality Paradox: The Effect of Social Expenditure on Occupational Segregation

Max Hammel
Skidmore College, mhammel@skidmore.edu

The Nordic Gender Equality Paradox:
The Effect of Social Expenditure on Occupational Segregation

by

Max Hammel

April 30, 2019

Abstract

This paper analyzes International Labor Organization data from 2000-2016 to explore what facets of the welfare state have an effect on the occupational segregation by gender of a country's workforce. Eight selected OECD countries have been used in a panel regression to determine these effects, with a special focus on the Nordic countries. Two empirical models were generated based on a review of the literature, though research concerning this specific question within the field of economics has been sparse. The only statistically significant variable found was social expenditure, with a positive correlation to occupational segregation. Contrary to previous suggestions of the literature on this subject, maternity and paternity leave were not significant explanatory variables in this model. The results suggest that occupational segregation is not merely a result of a large public sector, but rather a function of how the public sector spends.

Table of Contents

1. Introduction

Horizontal occupational segregation is the phenomenon of disparities in representation different groups of people across different professions within a labor market. This is contrasted with vertical horizontal segregation which is the same phenomenon but within different levels of management in a profession. Moving forward, the term "occupational segregation" will be used to describe the horizontal variety, unless otherwise specified. Occupational segregation can occur on the basis of any way that one desires to measure it, be it race, class, ethnicity, etc. For the purposes of this paper, occupational segregation by gender will be considered. Segregation has a host of proven disadvantages associated with it. Concerns range from gender equality to labor market rigidity, depending on the field of study within which one is operating. From an economic point of view, occupational segregation is a symptom of a variety of causes, which are to be explored within this paper, and negatively affects a countries economic performance. Remedying the problem of occupational segregation has country-wide economic benefits, such as efficiency in employment opportunities (Anker, 1997), as well as benefits toward gender equality. For example, Kuehn (2017) notes that while discrimination does play a role in the gender pay gap, the large majority of such is a result of occupational segregation, which is one of the primary reasons that this paper is focusing on horizontal segregation rather than vertical.

One of the more interesting trends that has made moderate waves in Western periodicals is that some of the most socially liberal and thus gender egalitarian countries actually exhibit *higher* rates of occupational segregation than other industrialized countries (Khazan, 2018).[1] This trend has been the focus of many journal articles within the social sciences (Borchorst, 2012) (Stoet & Geary, 2018). Much of the attention surrounding this topic has focused upon the Nordic countries of Sweden, Norway, Finland, and Denmark, frequently deemed "welfare states." These nations are championed as bastions of gender equality and social democracy within the press, even becoming a reference point for Sen. Bernie Sanders's 2016 presidential campaign. That said, there is significant debate questioning whether this trend is indeed factual. Some scholars have presented findings that posit that the Nordic countries do not exhibit any significantly higher rates of occupational segregation than other industrialized nations (Ellingsæter, 2013). Yet, others have asserted significant differences in occupational segregation between these countries (Melkas & Anker, 1997) (Sanandaji, 2016). My research and analysis contained within attempts to prove

[1] A graphic representation of this trend can be found in Figure 1

whether a causal relationship exists between some of these welfare state policies and occupational segregation.

Researchers have put forth a myriad of economic reasons for this trend to take place, ranging from family leave policies (Datta Gupta et al., 2008) to tax policy (Gelber & Mitchell, 2011) to the simple existence of a welfare state (Sanandaji, 2016). However, none of these papers have proven a link on a cross-national basis between any of these facets of the welfare state and occupational segregation. For example, Datta Gupta et al. (2008) simply illustrate that women may alter their professional habits when family leave policies are adjusted. By examining this topic on such a level, this paper hopes to determine whether a causal link exists between welfare state policies and occupational segregation. One of the primary explanatory variables used that represents the welfare state is social expenditure, which "comprises cash benefits, direct in-kind provision of goods and services, and tax breaks with social purposes," as defined by the OECD (2019), though other welfare state-related variables are used as controls. The other explanatory variable is general government expenditure, which is used asa proxy for the size of the public sector. A selected sampling eight countries from the Organization of Economic Cooperation and Development (OECD) were used in the analysis. Those countries are: Denmark, Finland, Germany, Italy, Norway, Sweden, Turkey, and the United States. I was limited to using countries from within the OECD due to the availability of sufficient labor data. Further, the selected countries should be fairly representative of the different forms of welfare state as elaborated by Lewis (1992) and which will be expounded upon in the literature review.

Necessarily, economics is not in itself sufficient for explaining the features of the labor market contained within. For instance, Anker (1997) notes that women may self-select into certain professions that allow for more flexibility with regard to child-rearing. Nielsen et al. (2004) find that women are more likely than their husbands to remove themselves from the workforce, at least part-time, upon parenthood. These trends can only be explained so far within the field of economics, with the underlying principles better left to be reasoned through fields like psychology or biology.

2. Literature Review

Many journalistic articles have cropped up in recent years regarding the apparent relationship between welfare state spending and occupational segregation. However, few scholarly studies have been published surrounding this topical issue. Further, none in recent years have touched upon the cross-national variations in occupational segregation, leaving a gap in the literature as to specifically which characteristics of a country influence its workforce's segregation. The following literature review is divided into four sections: occupational segregation and its importance, trends in occupational segregation, the Nordic welfare state model, and the two sides of the welfare state.

2.1 Occupational Segregation and Its Importance

A recent report from the General Secretariat of the Council of the European Union outlined exactly what occupational segregation is and has established this issue as a foremost objective for the European Institute for Gender Equality (EIGE, 2017). Occupational segregation is the tendency for men and women to gravitate toward different professions. However, it is entrenched in society much more than simply within occupational choice, stemming from different patterns in participation within public life, domestic work and educational choices, just to name a few. The causes for such a trend are disputed and varied, with no one theory likely to explain it fully. As such, my paper explores a handful of potential causes in an attempt to (dis)prove some as at least partially causal. Since I am approaching this subject from within the field of economics, there will naturally be some potential explanations that I simply cannot include in my analysis, ones better left to fields like psychology, biology and gender studies.

A seminal paper in the field of labor economics and gender sociology was Petersen and Morgan's 1995 paper exploring the link between occupational segregation and the gender wage gap, a primary motivation for my research. A key finding of theirs was that within-job wage differences were relatively minor, the highest industry returning a 3.1% difference between men and women, before correcting for individual-level factors (Petersen & Morgan, 1995). Thus, this within-job wage discrimination, though problematic in its own right, explains an overwhelmingly smaller portion of the gender wage gap than occupational segregation does. Occupational segregation accounts for about 80% of the gender wage gap of a country (Petersen & Morgan, 1995) which should make it a primary focus for policymakers attempting to close the wage gap. There are a couple shortcomings in these findings, namely that the focus is solely on the United

States during the time period 1974-83. Though it would be expected that similar trends would be maintained as to the portion of the wage gap explained by occupational segregation, it is not necessarily appropriate to assume that the same pattern exists at all in other countries.

These findings are important to recognize on a practical level, however occupational segregation has some theoretical disadvantages as outlined by Anker (1997). Occupational segregation is a major source of labor market rigidity and economic inefficiency. Men and women tend to be dissuaded from working in a profession heavily dominated by the opposite sex, thus reducing the potential pool employees available for hire. Further, inroads toward gender equality are hindered by a segregated workforce, which can result in a self-reinforcing cycle of stereotypes, education and occupational choice.

The literature in this section illustrates the importance of studying occupational segregation and consequently the policies that influence its pervasiveness. It lays the groundwork for the hypotheses of my analysis and motivations for doing so.

2.2 Trends in Occupational Segregation

Since the 1990s, researchers have been cognizant of the fact that occupational segregation and gender equality measures are not strongly correlated, and may even be negatively so. Charles (1992) was one of the first such researchers who had found the seemingly counterintuitive trend that the 'progressive' countries of Scandinavia exhibit higher levels of occupational segregation than more traditionally conservative countries such as Italy and Japan. She uses a measure of occupational segregation called the IP index that corrects for the amount of men and women in each occupational category, essentially giving them weight by their relative size within each country. This is a departure from the use of the more widespread function of the Duncan Segregation Index, which doesn't account for the relative size of each occupational group. Charles applies this novel measure over a labor dataset that stratifies workers based on nine broad categories based on International Labor Organization classifications. She concludes that it is likely the same forces that encourage female labor force participation that also incidentally segregates the labor force. Charles postulates several potential reasons for this trend, from structural characteristics of a service-based economy to the incorporation of traditionally female tasks into the formal economy, but her research does not establish a causal mechanism for her findings.

Whereas Charles (1992) concludes that occupational segregation is effectively a measure of gender inequality, scholars such as Blackburn et al. (2000) are more critical of this viewpoint.

They find statistically conclusive results of a positive correlation between a variety of United Nations development measures on gender equality and occupational segregation. Blackburn et al. do not specifically focus upon which countries exhibit higher or lower levels of segregation, rather their findings focus on the implications of using one statistic compared to another when evaluating gender equality. They use a somewhat flawed mechanism in determining occupational segregation, however. This statistic is a measure of how different the *most* segregated industries within a country are. This is a departure from previous indices such as Charles's (1992) weighted index of dissimilarity, the IP index, or the Duncan Segregation Index. The key finding, however, was that overall segregation is not a direct measure of inequality, as it incorporates both vertical and horizontal occupational segregation, only the former of which actually illustrates inequality.

The same researchers distinguish in a later paper the differences between the two types of segregation (Blackburn et al., 2001). Where horizontal segregation is the separation of men and women across industries, vertical segregation is the separation of men and women within an industry, most often occurring along hierarchical lines and resulting in the 'glass ceiling' characterization of some workforces. As such, they conclude that policymakers concerned with closing the gender wage gap should focus on diminishing vertical segregation. This conclusion, though, is partially ignorant of where the gender wage gap comes from. Though such a focus would make certain inroads toward changing the corporate power structure hierarchies in a labor force, it would do little to close the gender pay gap, of which 80% stems from occupational segregation, as shown by Petersen and Morgan (1995).

The results of Melkas and Anker (1997) corroborate those of Charles (1992). In their study of occupational segregation within three Nordic countries (Sweden, Norway and Finland), they found these countries to exhibit high levels of segregation both in an absolute sense as well as in a relative sense in comparison to other industrialized nations. Their methodology relied on the Duncan Segregation Index, but implemented it with regard to both horizontal and vertical segregation. In this sense, they obfuscate the source of their final measures of segregation, a common error in presentation as outlined by Blackburn et al. (2001). Further, their data was hyper-specific, incorporating census data for over a hundred occupations in each country. Analysis based on this level of specificity with the data has both advantages and disadvantages. On one hand, it may reveal more nuanced occupational segregation than broader categories would. On the other, that segregation may prove to be pedantic and random with no real implications for public policy.

While this choice may have been appropriate considering the similarity of the countries in question, it is unfeasible to do so for a broader cross-national analysis due to the disparities in occupational classification between countries. Important findings emerged from this study, though, namely the trend that occupational segregation in the Nordic countries takes place along public/private sector lines. This trend similarly extends into full-time and part-time work: women are about two-thirds more likely to work part time than men.

We see similar conclusions drawn in the context of the United States, as well. Gradín (2017) found that while occupational segregation in the United States has been declining over most of the past half-century, it is still significantly present within the labor force. This is similar to what Melkas and Anker (1997) found within Nordic labor markets during roughly the same period of time (both studies also used the Duncan Segregation Index). Furthermore, Gradín establishes that men and women are stratified into occupations with different statuses, thus corroborating the findings of Petersen and Morgan (1995) that the gender wage gap is primarily a function of occupational segregation.

Within the presented literature, the counterintuitive trend emerges that the gender-egalitarian nations of the Nordic region exhibit higher levels of occupational segregation than other industrialized countries. This development has been increasingly termed a 'paradox,' though Ellingsæter (2013) disagrees with such a characterization. She finds that the Scandinavian countries exhibit a 'moderate' level of occupational segregation. However, given the praise directed toward Scandinavian gender equality policies, one would expect their labor forces to be characterized by comparatively low levels of segregation, not moderate ones. Alongside Melkas and Anker (1997), Ellingsæter has observed the downward trend in occupational segregation within Scandinavian labor markets over the past twenty years or so. She applies the Duncan Segregation Index as well as the IP index, which is essentially a weighted version of the DSI, initially set forth by Karmel and MacLachlan (1988), to come to these conclusions. Ellingsæter's results proved the effect of family policies, such as parental leave, on occupational segregation to be inconclusive. However, in echoing the findings of Melkas and Anker (1997), she finds that much of the segregation in Scandinavia takes place along a public/private sector divide and even hints at a potential causal relationship between the two, though more researcher is likely necessary.

One of the defining features within the literature in this section is the variety of ways in which one can measure occupational segregation by gender. This makes the topic in general

particularly tricky to research in general, it makes it even harder to draw specific conclusions in relation to previous literature on the subject. That said, the prevailing metric, mainly due to its simplicity, is the Duncan Segregation Index. Thus, while other measures may be able to attain a more statistically accurate picture of occupational segregation, I will implement the DSI to better relate my findings to previously published literature. From this section, it is likely true that the Nordic countries exhibit higher levels of occupational segregation than other industrialized countries, though it is not absolutely certain. This emphasizes the need for further research into the actual trend as well as the underlying causes influencing it.

2.3 The Nordic Welfare State Model

As previously noted, the countries with some of the highest rates of occupational segregation are the Nordic countries, typically regarded as Norway, Sweden, Finland, Denmark and Iceland. These countries, along with some others with high rates of segregation, exhibit high levels of government spending and sizeable public sectors. As such, facets of the welfare state, as well as some of the policies that characterize such a state, have been used as explanations for the levels of occupational segregation in these places. However, some of the characteristics of a welfare state, specifically those of the Nordic model, should be established to better understand its potential effects on occupational segregation.

Lewis (1992) establishes a few different underlying ideologies behind the development of a welfare state in any given country, which thusly informs legislators as to how they will go about furthering their objectives. Her research builds on past research grounded in the concept that the welfare state "must incorporate the relationship between unpaid as well as paid work and welfare." Her classification of welfare states is that of either strong, moderate or weak male-breadwinner states. Strong male-breadwinner states, exhibited by countries like the United States and the United Kingdom, are characterized by placing men and women on an equal level within the labor market. As such, minimal provision is given for maternity leave and pay, as well as the right to reinstatement. A moderate male-breadwinner state, for example, in a country like France, combines the roles of women as both mothers and workers. An exemplary policy in France has been a social security scheme structured on redistribution across families with children and those without, contrasted with a redistributive scheme based on economic class. The last category, the weak male-breadwinner state, like the Nordic countries, is essentially based on maintaining dual-breadwinner households. High tax rates coupled with the institution of separate taxation for

married couples almost necessitates a family structure where both the mother and father work full-time.

Borchorst (2012) has suggested that this particular manifestation of the welfare state within the Nordic countries is grounded in the ideological foundations within these countries. The logic begins with encouraging a larger representation of women within the political system, i.e. parliaments, ministries, local governments, etc. It should follow then that these women can then legislate and govern in a more equitable manner. Borchorst terms this phenomenon 'state feminism,' which is characterized by both the content of the policies enacted as well as the "feminization of welfare state professions." Kantola and Squires (2012) elaborate on this position with the argument that the state feminist method of governance uses public institutions to find and create methods to monetarily account for disparities in household work and childcare between the genders. They contrast this with the term 'market feminism,' a variety exhibited more by countries that Lewis (1992) would characterize as a strong male-breadwinner state, such as the United States. Market feminist states are wont to utilize governmental institutions to promote women's entrepreneurialism and self-sufficiency within the labor force, resulting in more women-owned businesses and women in managerial roles.

These positions are in line with Lewis's (1992) characterization of the role of the welfare state and are supported by the Melkas and Anker (1997). They note that government policies that have diminished overall pay differentials have markedly decreased the ability of the husband being the sole breadwinner in a family, almost necessitating a woman's gainful employment. Similarly with regard to social services, legislation is frequently termed in gender-neutral language, most notably in reference to *parental* leave instead of *maternal* leave. Additionally, not only are the Nordic welfare states grounded in different ideological frameworks, but they are also much larger than the other types of welfare states outlined by Lewis (1992), with tax wedge rates averaging around 40% (Sanandaji, 2018).

2.4 Two Sides of the Welfare State

As hypothesized, there are two dimensions by which the welfare state, particularly the Nordic model, can influence the labor force. The first and significantly more studied dimension, especially with regard to occupational segregation, is the implementation of social policies, of which family leave and public childcare are at the forefront. These policies are enacted under a system

characterized by a large public sector. This raises the second dimension of whether tax policy affects occupational segregation.

Welfare Policies

One of the prevailing theories with regard to women's career advancement is the 'family gap,' defined as the difference in pay and career opportunities between women who choose to have children and those who do not. Datta Gupta and Smith (2002) find that the public sectors in the Nordic countries are the only employer for workers in many industries including the traditionally female-dominated professions in healthcare, schooling and social work, and therefore hold monopsonistic wage setting power. Additionally, they find that labor unions, particularly those in the public sector, in Nordic countries tend to advocate for improved working conditions, which includes generous family leave schemes. Thus, Datta Gupta and Smith conclude that, either because of the industry in which they work or the additional benefits afforded, women are more likely to self-select into professions within the public sector. Their findings, however, are based on data from 1980-95 in Denmark. As such, the findings cannot necessarily be extrapolated to other countries during different times due to shifting social dynamics and different welfare policies. A nonetheless interesting trend to note, though, is that *all* women's wages may be negatively affected due to the comprehensive guarantee of paid leave.

Datta Gupta and Smith's findings fit with the first of two economic theories of occupational segregation as outlined by Anker (1997). The first model he posits is the neoclassical model, which uses differences in women's education and levels of human capital to explain segregation. According to the model, if men and women are educated in different subjects then they will naturally select different occupations. Further, if women are more likely to take time off from market work (for childcare, motherhood, etc.), then they will be perceived as having less human capital than men by employers and thusly select more accommodating professions. The other theory is that of the segmented labor market, which divides the labor market into a 'primary' and 'secondary' sector. The distinction is that jobs in the primary sector are above average in pay, security and advancement opportunities while secondary sector jobs are not. Anker (1997) suggests that men are more likely to work primary sector jobs due to their more continuous work experience and higher job security within this sector. A downside of his paper is that it is purely theoretical, thus lending no empirical credence to either of these theories. That said, it has been highly influential in positing methods by which occupational segregation occurs.

Whereas Datta Gupta and Smith (2002) adopt the neoclassical model in the discussion of their findings, Nielsen et al. (2004) adopt the labor market segmentation theory. In using a representative sample of Danish working mothers stratified by the sector in which they work, they found that the negative wage effects of childbirth and childcare-related career interruptions significantly differ across sectors. Nielsen et al. (2004) characterize this public/private sector dichotomy as family friendly and non-family friendly, respectively. This study, however, is restricted to Danish workers and thus is a trend that cannot necessarily be extrapolated to other countries, even other Nordic countries, with certainty. That said, they conclude that there are child-related wage penalties within the Danish private sector, though they are infrequently realized as most women with many children select professions within the public sector, unintentionally driving occupational segregation.

A peculiar feature of the Nordic welfare state is the inclusion of fathers into the state-mandated parental leave scheme. Haas and Rostgaard (2011) examine the differences between paternal leave schemes in the five Nordic countries to determine which incentives are actually effectual in achieving a gender equal use of leave. They identify a few features of paternal leave in the Nordic countries that increase fathers' use of leave, namely universal coverage, high compensation levels and flexibility. However, by far the starkest variable is the presence of a father's quota, a use-it-or-lose-it scheme in which the days prescribed to be used by the father *cannot* be used by the mother if he does not. This is different from the schemes in some of the Nordic countries where each individual family decides how much leave that each parent will use. This follows with Nielsen et al.'s (2004) hypothesis of negative signaling. That is, fathers who take more leave than are legally allotted are seen as less committed to their employer. Thus in countries with a father's quota, this negative signaling effect would play a lesser role in men's occupational standing. While they cross-examined all of the Nordic countries, a key downside of Haas and Rostgaard's study, though, was that the types of data they used necessitated the use of correlation coefficients to come to their conclusions. That said, the sharp increase in fathers' use of leave in Iceland following the implementation of the father's quota gives weight to their central finding.

The final key piece in Nordic welfare is the public provision of childcare. Datta Gupta et al. (2008) posit that the presence of childcare, which is generally provided until they reach elementary school, has a potentially detrimental effect on women's work choices. Public childcare has been shown to have direct positive effect with regard to women's labor force participation:

more women are able to hold jobs as a result of this childcare. However, Nordic childcare facilities are notoriously inflexible in their hours. These facilities, being publicly run, mostly employ women (termed 'public mothers') and as a result are subject to the accommodations of the public sector. For example, extensive and generous leave can result in a smaller staff and/or shorter hours for the childcare facilities, which contributes to their rigidity. So, though more women can enter the workforce because of this public childcare, they often work part-time to account for the inflexibilities in the system, which aligns with Melkas and Anker's (1997) conclusion of women being two-thirds as likely as men to work part-time.

The literature presented in this subsection establishes a variety facets, such as family leave, father's quotas and public childcare, as having an effect on the occupational choices of mothers, which can influence occupational segregation. While many of these studies do not specifically examine segregation, they establish wage and other factors as aspects of women's choice of occupation, which can be extrapolated to examine segregation since many of these same factors do not apply to men. A downfall of some of these studies, though, is that they rely on correlation coefficients to make their claims. These downsides necessitate further studying of these welfare state policies, particularly with regard to occupational segregation.

Tax Policy and Individual Choice

While much of the literature surrounding occupational segregation and the Nordic model has focused on the policies themselves and their implementation, I think a somewhat neglected portion of the research has focused on the tax structure. The research in this area is much less targeted toward Nordic tax systems and more toward the different motivations that men and women see based on taxation. The findings of Gelber and Mitchell (2011) extend credence to this notion. In a study of single American men and women, they examined the effect that taxation has upon the allocation of time. For single women, they found that an increase in the tax rate corresponds with a decrease in time spent dedicated to market work and an increase in household work. They found no such tendency for single men. While the data of their study is fairly comprehensive, the ability to extrapolate these conclusions to married men and women is unclear. Much of the previously reviewed literature views women's occupational choice through the lens of motherhood, thus making data for married people of particular importance.

That said, Jiao (2016) suggests that a similar trend may hold true in married couples, as well. In following with Anker's (1997) neoclassical segregation theory, he shows that women with

children accumulate work experience at a slower rate than those without. He raises the point that this may be due to hypergamy in that, on an individual level, women tend to make less than their husband. From a family perspective, women may be more likely to use a larger share of their allotted parental leave or take time off for child-related duties than their husband as the opportunity cost for doing so is lower. However, Jiao's study takes place in China where hypergamous relationships are much more prevalent and frequently the expectation. Still, this same dynamic exists in Western countries, albeit to a lesser extent, which makes his findings applicable in some situations for the purposes of this paper.

Sanandaji (2018) theorizes that Gelber and Mitchell's (2011) findings that a high tax rate reduces market work may also hold true for married couples, though for a different reason than Jiao (2016). He hypothesizes that high tax rates diminish a woman's ability to "purchase substitutable services," meaning services that are able to replace household work. It would likely be a more economically sound decision to take care of household duties herself than to turn to the market to fulfill these needs. He notes that this situation is perpetuated by traditional gender roles as well as the likelihood for husbands to be slightly older and higher earners than their wives. Further, Sanandaji suggests that this effect may be exacerbated by the widespread availability of publicly-provided domestic services like childcare. Their prevalence makes it that much more expensive to purchase these service in the market, which makes this trend more likely to take place along class lines as well. However, a downfall of Sanandaji's research is that he relies primarily on economic theory rather than empirical data.

The topics discussed in this subsection are seldom focused upon much less in their effects on occupational segregation than the topics in the previous subsection. That said, I believe these are overlooked and as such include them in my empirical research.

3. Research Question and Analytical Framework

This paper investigates the potential effects of the welfare state on occupational segregation. As hypothesized, it seeks to establish whether the amount of government expenditure of a sampling of OECD countries affects the levels of occupational segregation within these countries. Since the 'welfare state' is not an exact term, using a single statistic to represent it will never be fully accurate. That said, this study makes use of two different metrics, social expenditure and general government spending, across two different panel regressions to come to a conclusion about the welfare state's effect on occupational segregation.

The principal statistical indicator used for calculating occupational segregation is the Duncan Segregation Index (DSI), a form of index of dissimilarity. This is the indicator used by such scholars as Melkas and Anker (1997) and Sanandaji (2016). Other statistical indicators may be more robust in determining the actual segregation of a workforce, however for the sake of simplicity (coupled with the extent of my dataset) as well as the ability to compare with other literature on the subject, the DSI is used. The index itself is:

$$D = \frac{1}{2} \cdot \sum_{i=1}^{N} \left| \frac{m_i}{M} - \frac{f_i}{F} \right|$$

where m_i is the male population of the i^{th} occupation, M is the total male population of the labor force, f_i is the male population of the i^{th} occupation, and F is the total female population of the labor force. This statistic ranges from 0 to 1, with 0 being a perfectly integrated workforce (50% men and 50% women in each profession) and 1 being a perfectly segregated workforce (no women and men working together).

3.1 Data

The study uses a selected sampling of eight OECD countries during the years 2000-2016 to obtain the data for the analysis contained within. The countries are: Denmark, Finland, Germany, Italy, Norway, Sweden, Turkey and the United States. Four of the five Nordic countries were chosen as this paper identifies that they represent a paradoxical relationship between gender equality and occupational segregation. The other four countries represent a sampling of the other categories of welfare states as outlined by Lewis (1992). While robust in itself, the limited sampling means that there is room for further research using a more comprehensive dataset.

Labor classification data was obtained from the International Labor Organization (ILO). The ILO reports labor data across countries in eight broad categories: 1) managers, 2) professionals, 3) technicians and associate professionals, 4) clerical support workers, 5) service and sales workers, 69) elementary occupations and agriculture,[2] 7) craftsmen, and 8) factory workers. While other researchers have used more specific workforce data, such as that from censuses (Melkas & Anker, 1997), using broader labor classifications allows for workforces to be compared across a wider array of countries. The most segregated categories averaged across all the countries analyzed, in order, are: service and sales, factory workers, and elementary

[2] Though these two labor classifications are officially classified separately, country data for them are counted together by the ILO

occupations/agriculture. The first has a greater percentage of women, while the latter two have a greater percentage of men.

The data for social expenditure, general government expenditure, maternity leave, paternity leave and tax wedges was all obtained from the OECD. Part of the reason that these eight countries were chosen was that they are all members of the OECD, thus making similar data available for each of them. Further, classification for the labor statistics was made easier by restricting my data to the OECD.

3.2 Variables

Included in the panel regressions are a handful of independent variables that may explain changes in the level of occupational segregation of any given nation. The inclusion of these variables stems from past literature in attempt to review a phenomenon that only began to receive intensive scholarly attention in the last few decades. The focus is on two variables, social expenditure and general government expenditure, to represent the welfare state and primarily explain the level of occupational segregation. The other explanatory variables included attempt to isolate the unique effect that each of these two variables have on segregation. A summary of all the variables within this analysis can be found in Figure 2. Those variables, the reason for including them, and the expected sign of their results are listed below:

$lnDSI_{it}$ - The Duncan Segregation Index (DSI) for each country in the sampling, calculated for each year of the dataset. The DSI is an adapted form of the demographic index of dissimilarity, applied to the labor force of a country. This index effectively measures the occupational segregation of a country. There are, however, other statistics that may more robustly capture the segregation of a country, such as the IP index, a weighted version of the DSI proposed by Karmel and MacLachlan (1988) and used by scholars such as Charles (1992). However, in attempt to better compare my results with the relevant reviewed literature, such as the studies by Melkas and Anker (1997), Gradín (2017) and Ellingsæter (2013), I have chosen to use the DSI. The index ranges from 0 to 1, with 1 being a completely segregated workforce. The natural log of the variable was taken to better interpret the index in percentage terms

$SOCEXP_{it}$ - The yearly social expenditure of each country measured in percentage of GDP. Per the OECD, social expenditure "comprises cash benefits, direct in-kind provision of goods and services and tax breaks with social purposes" (2019). This encompasses most transfer payments issued by governments as well as any unrequited payments to its citizens at the national, regional

and local levels. This is the first of two variables that are used as proxies for estimation of the size of a welfare state. Compared to the next variable, social expenditure captures more redistributive governmental behavior and thus will be used accordingly in the discussion. Choice of this variable is influenced by studies such as those by Sanandaji (2016) as well as Datta Gupta et al. (2008). This is the primary explanatory variable for the first panel regression. As such, I expect a positive relationship between social expenditure and occupational segregation.

$PUBSECT_{it}$ - The size of the public sector of each country's economy by year, measured in general government spending at the national, regional and local levels as a percentage of total GDP. There are many methods calculating the size of a country's public sector, however general government expenditure is the most widespread and thus most useful for comparing against existing literature. The multicollinearity between this variable and social expenditure necessitated conducting two separate panel regressions. The results of this regression will focus more upon the effects of total government size on occupational segregation, whereas the other regression will focus more on the effects of redistributive policies and transfer payments. Though I don't expect the result of this regression to be as stark as the other one, I similarly expect a positive relationship between public sector size and occupational segregation.

$MATERN_{it}$ - The amount of state-mandated maternity leave for each country measured in weeks. The results of some researchers like Datta Gupta and Smith (2002) Nielsen et al. (2004) suggest that the provision of maternity leave incidentally encourages women to self-select into professions that are more accommodating of extended leave and irregular availability. Thus, I anticipate a negative relationship between maternity leave and segregation.

$PATERN_{it}$ - The amount of state-mandated paternity leave for each country measure in weeks. Not all of the countries examined provide paternity leave to new fathers, so the value was zero for some of the dataset. Research such as that by Haas and Rostgaard (2011) suggests that allotting a specific portion of total parental leave to the father will positively improve household division of labor. This variable is included to test if these same effects will present themselves within the labor force. As such, the expected relationship between segregation and paternity leave is negative.

$TAXW_{it}$ - The tax wedge for the average citizen, defined as the difference between before-tax and after-tax income. This encompasses taxes paid not only on income but also in the marketplace such as sales tax and VAT, as well as capital gains taxes among others. The results of

Gelber and Mitchell (2011) indicate that men and women may behave differently to different tax rates and those of Sanandaji (2018) suggest that high taxes may be prohibitive of the consumption of household goods in the market. The inclusion of this variable stems from research such as this. The expected relationship with segregation is thusly predicted to be positive.

$TAXWsq_{it}$ - The square of the tax wedge variable. Some researchers (Milasi & Waldmann, 2018) have suggested that tax rates exhibit a quadratic relationship with economic growth. That is, high taxes only become prohibitive after they reach a certain level and/or the marginal growth diminishes as the tax rate increases. This term was included to determine if this same relationship was exhibited within labor market segregation. Due to the disparities in findings in the relationship between economic growth and tax rate, no sign is predicted for this variable.

4. Methodology

My empirical models are primarily based around the analysis used by Melkas and Anker (1997), however the inclusion of the rest of the independent variables is based on an aggregate review of the literature surrounding the topic of occupational segregation. Both models are essentially testing for the same thing, the only difference being the choice of variable used to represent the welfare state. Multicollinearity between the two variables necessitates the implementation of two separate panel regressions. The first uses social expenditure as a proxy for the welfare state while the second uses general government expenditure. The results are expected to be roughly the same, however the effects of redistributive policies and unrequited payments will be able to be better interpreted using the first regression. The two models are as follows:

Model One:

$$lnDSI_{it} = \beta_0 + \beta_1 SOCEXP_{it} + \beta_2 MATERN_{it} + \beta_3 PATERN_{it} + \beta_4 TAXW_{it} + \beta_4 TAXWsq_{it} + \varepsilon_{it}$$

Model Two:

$$lnDSI_{it} = \beta_0 + \beta_1 PUBSECT_{it} + \beta_2 MATERN_{it} + \beta_3 PATERN_{it} + \beta_4 TAXW_{it} + \beta_4 TAXWsq_{it} + \varepsilon_{it}$$

5. Results

For both panel regressions, a Hausman test was conducted to determine if a fixed-effects model or a random-effects model would be more appropriate for each. For these test, the null hypothesis was that the difference in coefficients is not systematic (i.e. no difference between fixed effects and random effects) while the alternative hypothesis was that the difference in coefficients is systematic. For the first regression, the p-value was 0.0001. The second regression yielded a p-

value of 0.0003. Thus for both, we can reject the null hypothesis and consequently use a fixed-effects model for both panel regressions.[3] The variance inflation factors for each variable were also calculated for each regression to ensure that multicollinearity was not present amongst the explanatory variables.[4]

5.1 Model One: Social Expenditure

Findings from the first multivariate panel regression, incorporating social expenditure as the main explanatory variable, show that changes in levels of social expenditure significantly affect occupational segregation.[5] Increases in social expenditure as a percent of GDP can be estimated to have about a 0.9% increase in occupational segregation. At the 1% significance level, these results support the primary hypothesis of this study that social expenditure has a positive relationship with occupational segregation.

For the parental leave statistics, the results aren't as conclusive. The original hypothesis stemmed from researchers such as Datta Gupta et al. (2008), Nielsen et al. (2004) and Sanandaji (2016) which suggested that the state-mandated maternal leave may incidentally incentivize women to take more time off from market work. According to Anker's (1997) segmented labor market theory, this would result in women choosing to work in professions more accommodating of motherhood, termed the family friendly sector by Nielsen et al. (2004). However, the regression shows that the number of maternal leave weeks offered has a statistically insignificant effect on occupational segregation. The same is true for the effect of paternal leave. Based on Haas and Rostgaard's (2011) findings, paternal leave was expected to have a negative relationship with segregation based on the supposed increase in sharing of household duties. The results for both the maternity and paternity leave terms returned signs opposite from the hypothesized coefficients. The regression results yield statistically insignificant findings for these two terms meaning that no conclusion can be made as to the effects of parental leave on occupational segregation, at least from this model and dataset.

Similarly for the tax wedge data, both the tax wedge term and the tax wedge squared term were found to be statistically insignificant. The tax wedge squared variable was included in this model because of the findings of some scholars indicating a quadratic or diminishing relationship

[3] Results for the Hausman tests for both regressions can be found in Figure 4
[4] Variance inflations factors (VIF) can be found in Figure 5
[5] Coefficients, standard errors and significance levels can be found in Figure 3

between some statistics, such as economic growth, and high tax rates (Milasi & Waldmann, 2018). I questioned if this trend would present itself in segregation within labor markets. Both the tax wedge and tax wedge squared terms returned coefficients with the hypothesized sign, that is, positive and negative, respectively. However, both terms yielded p-values that were statistically insignificant. Thus, I cannot make a conclusion as to whether tax wedges have a significant effect on occupational segregation from this model.

5.2 Model Two: Public Sector Size

Findings from the second multivariate analysis, incorporating the size of the public sector, specifically the statistic of general government expenditure, as the primary explanatory variable, show that changes in the size of the public sector have a statistically insignificant effect on occupational segregation, at least for this specific way of measuring the size of the public sector.[6] Researchers like Sanandaji (2016) and Ellingsæter (2013) have suggested that the size of the public sector, and more specifically into which sectors the government extends its monopolies, may have an adverse effect on the occupational segregation of that country. However, the results from this panel regression do not support this notion. This variable, as it is the measure of total government expenditure at all levels, necessarily includes the measurements of the social expenditure variable from the previous panel regression. Sizeable disparities in the significance of these two variables *ceteris paribus* indicates that overall public sector size doesn't influence occupational segregation, rather simply the portion that includes transfers and other forms of unrequited payments.

The results for maternity leave, paternity leave, tax wedge and tax wedge squared all returned statistically insignificant results. By themselves, these results would likely not be conclusive. Though they do not remain entirely conclusive, as no study can be *completely* certain, the fact that these variables returned insignificant effects on occupational segregation for both panel regression models bolsters the claim that they have little effect.

5.3 Limitations

Though there are many different limitations within this study, the results do prove to be promising and grounds for future, more comprehensive research. The most obvious limitation to this study is the sampling. The scale of this endeavor restricted my analysis to eight OECD countries. In so doing, I attempted to select countries that would be representative of different structures of governance and societal expectations. This raises another limitation in that the classification of

[6] Coefficients, standard errors and significance levels can be found in Figure 3

professions, although aided by the OECD and International Labor Organization, will always be an imperfect measure as the labor market structure of different countries does not always translate into a system that is comparable cross-nationally. Thus, using worldwide data might be a more effective way of determining the effects on occupational segregation of a variety of variables, however the classification of professions in lesser developed countries may play an issue in obtaining relevant results. Further, since this research so heavily depends on gender equality ideals, which vary greatly across the globe, it can't be said for certain whether the same model could be applied across countries with radically different gender norms. Additionally, the time period taken into account in this paper only encompasses the years 2000-2016. The incorporation of a longer time series may bolster the validity of any claims, but labor data may be difficult to obtain for other time periods.

Another limitation was inherent in my use of the Duncan Segregation Index. Charles (1992) noted marked drawbacks to using this index and as such used the IP index. Ellingsæter (2013) used both the DSI and IP indices in her analysis to provide transparency across any discrepancy in choice of statistics. While the DSI does not account for the relative size of any category of occupation (like the IP index does), I think that the sizes of the ILO classifications were large enough to make the impact of any absence of weighting minimal. Future research might incorporate the use of multiple statistics of occupational segregation to analyze trends similar to those explored within this paper.

For the second panel regression, I used the OECD category of general government expenditure as a proxy for the size of the public sector. While the OECD does list this measurement under public sector, there is no single definition as to what size of the public sector means without any additional clarification. Another variable that may not capture the entire picture is the tax wedge term. The tax wedge is reported as the difference between before-tax wages and after-tax wages for the average *single* worker. As my analysis pertains to gendered divisions stemming from the presence of a family, the exclusion of married workers from the tax wedge statistic makes the findings presented within incomplete.

6. Discussion

The findings from the two multivariate panel regressions conducted within suggest that rising levels of social expenditure (e.g. Social Security, food stamps and certain tax breaks) maintain a positive relationship with occupational segregation. In other words, the more that a government spends on transfer payments, the more a country exhibits occupational segregation within its workforce. This is consistent with the theories posited by Sanandaji (2016) and builds on hypotheses from Melkas and Anker (1997) and Ellingsæter (2013). They suggested a relationship wherein increasing levels of government within the economy exacerbates the levels occupational segregation that are exhibited. Sanandaji suggested that the economic sectors into which a government is likely to expand are those that are traditionally female dominated and that doing so unintentionally entrenches these gender norms and career path expectations. The causal mechanism in this theory is that governments, particularly those characterized as welfare states, typically maintain monopolies over the industries in which they work, making the workers in these fields susceptible to monopsony and thus reductions in entrepreneurship. He does note that public sector expansion has proven benefits to women's labor force participation. The other researchers theorized that the public sector in larger welfare states is more accommodating of motherhood and thus women tend to 'self-select' into professions in these fields. However, the results from my second panel regression disagree with the blanket nature of these claims. These theories are based on broad categorization of the public sector, which was found to have an insignificant effect on occupational segregation. Rather, the subcategory of social expenditure *did* exhibit a significant effect, and in fact showed the highest correlation of any term in both of my models.

Though I would not characterize my findings as consistent with those of Charles (1992), I would not categorize them as inconsistent, either. Charles looked at a much wider array of countries within the OECD and found the highest occupational segregation levels within northern continental European nations such as Luxembourg and the Netherlands. These findings are consistent with those of Ellingsæter (2013) in the characterization of the Nordic countries as 'moderately segregated.' This is a departure from my findings as, of the countries included in my analysis, though limited in number, the Nordic countries exhibited the highest levels of segregation. Perhaps one reason for the inconsistency in the findings is the use of two different methods of calculating occupational segregation. Where my analysis used the Duncan Segregation Index, Charles (1992) uses the IP index, which is essentially a weighted version of the DSI set

forth by Karmel and MacLachlan (1988), to measure segregation. Charles's study was conducted about thirty years prior to this one making it unlikely that overall segregation levels are higher now than they were in 1992, based on findings of overall decreasing occupational segregation from Melkas and Anker (1997) and Borchorst (2012). A facet of Charles's paper, though, that mine did not include, was the inclusion of the size of the service industry in the regression model. Similarly with the ideas exhibited by Sanandaji (2018) and Datta Gupta and Smith (2002), Charles posits that large service sectors, which are characteristic of welfare states, are associated with high numbers of women in the service and sales sectors.

To my knowledge, no study has examined the effects of the length of state-provisioned maternity leave on occupational segregation. Rather, studies have used parental leave mandates as explanations for the levels of occupational segregation that they find within countries that provision lengthy parental leave. Datta Gupta and Smith (2002) find that the presence of children does not affect a women's wages, though it does have a temporary effect on their earnings capacity for a short period of time. Ellingsæter (2013) notes that this effect really only seems to occur when the mother takes leave in excess of the Nordic average of about twelve months, which is quite substantial. She concludes that the conflicting priorities of a demanding work experience as well as the desire to maintain a family lead women to self-select into professions that she deems 'family friendly.' This theory follows the labor market segmentation model that was posited by Anker (1997) wherein the labor market is classified into 'primary' and 'secondary' sectors. The secondary sector is lower in pay and advancement opportunities, but is characterized as family friendly by Nielsen et al. (2004). My findings do not present similar results, however. My analysis incorporated maternity leave as a continuous variable which suggests that larger provisions of leave result in higher levels of occupational segregation. Perhaps a discrete variable, maybe stratified into multiple categories (e.g. low, mid, high), would yield results more in line with these presented above.

Similarly to maternity leave, my results with regard to paternity leave were found to be insignificant. Datta Gupta et al. (2008) indicate that the presence of parental leave is one of the sources of occupational segregation. The primary caregiver, which is most frequently the mother, faces detriments to their career such as the depreciation of human capital when they take time off from market work for childcare. This theory aligns with the neoclassical model as outlined by Anker (1997). The neoclassical model implies that the absence of accumulating, or perhaps a

depreciation of, human capital during parental leave incentivizes workers to select professions where this effect is less pronounced. Further, Haas and Rostgaard (2011) suggest that employers view employees who take long lengths of leave as less career-oriented than those who do not. This is evidenced by their finding that fathers in countries where a father's quota is present take longer paternity leaves than fathers in countries without the quota. That said, neither of my two regressions yielded results that would agree with the above findings. Perhaps an issue exists with my paternity leave variable, similarly to the one for maternity leave, wherein a discrete variable may have provided a more accurate representation of effect that paternity leave has on occupational segregation.

The inclusion of the tax wedge variable stems from research by Gelber and Mitchell (2011) which holds that higher tax rates incentivize single women to spend more of their time doing household work over market work, while high taxes do not have the same effect for single men. The logic in their explanation is that women are more likely to be able to afford purchasing household services within the marketplace when their after-tax income is higher. These findings and theories are supported by Sanandaji (2018), who adds that this effect may be exacerbated in the Nordic nations where many of the welfare state's policies are directed at publicly provisioning household services, making it that much harder to afford these services in the market. However, my results for the effect that tax wedge has on occupational segregation are insignificant. Though Sanandaji (2018) does not explicitly state whether he refers to horizontal or vertical occupational segregation, it is likely he is referring to vertical segregation due to the class component of his argument. The need to distinguish between the two varieties of occupational segregation was outlined by Blackburn et al. (2001). This discrepancy may account for the lack of findings within my results, though further research could aid in determining whether tax wedge rate does indeed affect occupational segregation levels.

To my knowledge, no study currently examines that effects that high levels of social expenditure have on occupational segregation. The decision to include this variable stemmed from Sanandaji's (2016) book, through the myriad of facets he explored with regard to the Nordic welfare state. After returning the results from the rest of my variables, I was surprised to find the social expenditure variable to be the only significant one, and comparatively very significant, at that. This raises the question as to what the causal mechanism could be between social expenditure and occupational segregation. I theorize that the increase of social expenditure diminishes the need

for individual families to seek high-paying employment, particularly for the secondary financial provider. This is typically the mother, who is also frequently the primary caregiver. As Sanandaji (2018) and Datta Gupta and Smith (2002) outline, the public sector is lower paying than the private sector and offers more substantial benefits packages, especially for those seeking to maintain a family. This is especially true within the Nordic countries. Thus, my theory suggests that in countries that financially take care of a larger portion of a family's household duties (i.e. social expenditure), women will be more likely to select professions that are accomodating of motherhood because there is a diminished focus on earning enough money to pay for household goods (e.g. childcare, food, etc.). This follows with the neoclassical and labor market segmentation theories as set forth by Anker (1997) as well as basic economic theory surrounding the substitution effect of work and leisure. Of course, as with much of the literature reviewed in this paper, this theory is underscored by traditional gender roles. Nonetheless, these are the norms that currently exist and the field of economics can only explain these trends to a certain extent.

7. Policy Implications

The first implication this research has on public policy furthers a concern outlined by Blackburn et al. (2001). They raised the question of whether horizontal segregation is even a measure that we should be concerned with, indicating that vertical segregation is a more direct measure of inequality, when taken at face value. Melkas and Anker (1997) and Ellingsæter (2013) would likely disagree with this conclusion, citing the reduction in job choices between the two genders as the source of inequality. Petersen and Morgan (1995) would likely further support this pushback as they point out that the overwhelming majority of the gender pay gap is comprised from occupational segregation. This cements the need for policymakers to determine whether horizontal occupational segregation is indeed an indicator of gender inequality and thus whether it should be the focus of policy decisions.

The second implication in this research, which necessarily hinges on the first implication, is the effect that social expenditure has on occupational segregation. While this study is by no means conclusive, it does invite future research to either confirm or disprove the findings presented here. Should the findings of this paper prove to hold water, policymakers will need to decide whether increasing the occupational segregation of the workforce is a valid unintended consequence to accept in the greater provision of public services categorized under social expenditure. Conversely, policymakers will need to decide whether cutting social expenditure

(perhaps replacing it with some other form of public provision) would be beneficial in reducing occupational segregation.

8. Conclusion

This study analyzed the effect that the welfare state has on horizontal occupational segregation by gender through two panel regressions utilizing labor data from the OECD and ILO during the time period 2000-2016. The first regression used the metric of social expenditure to represent the effects of the welfare state, while the second regression used general government expenditure. The models implemented the control variables of maternity leave, paternity leave and tax wedge. The only term for which the results were statistically significant was social expenditure, at the 1% level. Based on the model, it can be estimated that for every 1% increase of social expenditure as a percent of GDP, occupational segregation increases by about 0.9%. The model using general government expenditure yielded no statistically significant results. These findings indicate that merely a large public sector does not produce high levels of occupational segregation, but rather that a public sector that spends a lot on transfers and other types of unrequited payments does.

From this research, there are a number of opportunities for future studies. Namely, the inclusion of more countries, perhaps starting with the rest of the OECD, will provide a fuller picture to the trends exhibited herein. Further, the number of variables included in this analysis could be expanded. This paper only implements parental leave and tax wedges as control variables. Other researchers have suggested that characteristics of the labor market itself, not necessarily just the public sector, such as the size of the service sector (Charles, 1992), may influence occupational segregation. These are but a few suggestions for future research concerning the relationship between the welfare state and occupational segregation.

9. Figures

Figure 1: Graph of occupational segregation

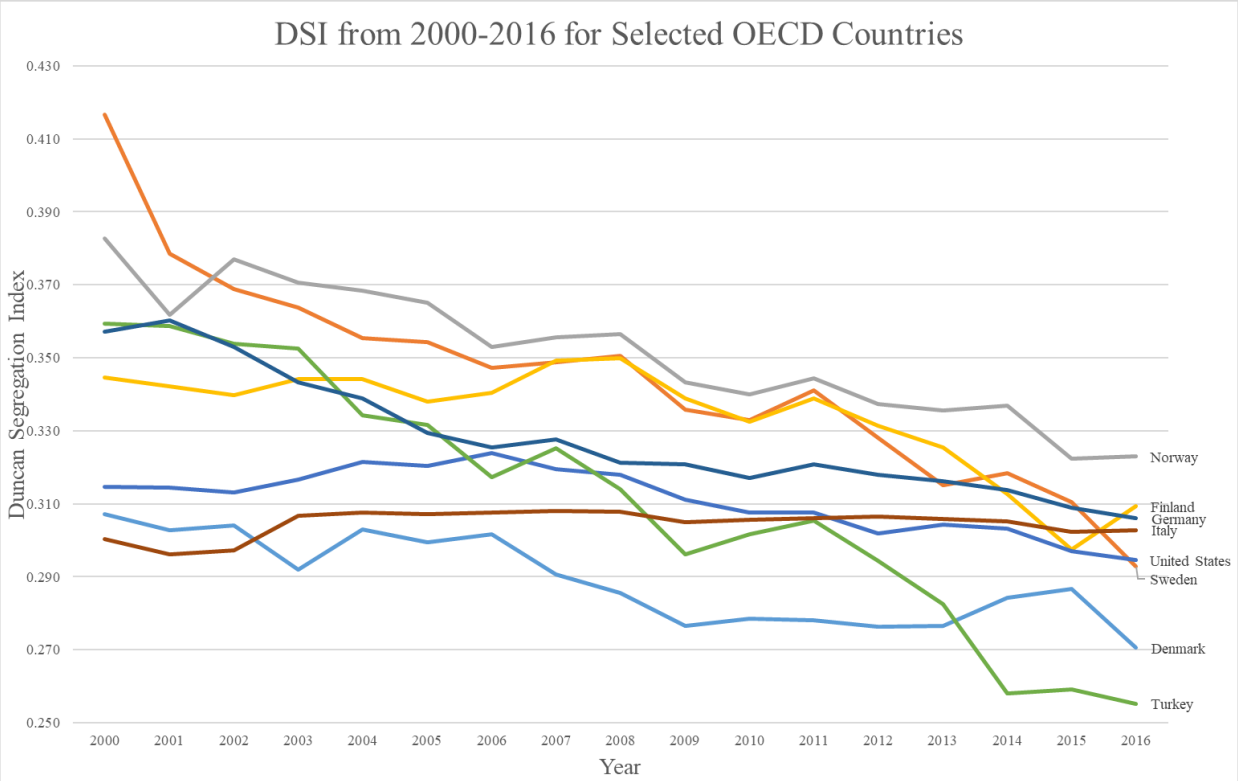

Figure 2: Summary of statistics

VARIABLES	Obs	Mean	Std. Dev.	Min	Max
lnDSI	136	1.137	0.086	0.875	1.365
Year	136	2008	5	2000	2016
SOCEXP	136	22.504	5.677	7.549	30.392
MATERN	136	60.4	46.0	0	161
PATERN	136	3.4	4.4	0	17
TAXW	136	41.736	6.226	29.843	53.196
TAXWsq	136	1780.356	513.819	890.595	2829.862
PUBSECT	136	46.103	6.851	31.950	58.109

Figure 3: Results for social expenditure/general government expenditure on occupational segregation

VARIABLES	Dissimilarity
SOCEXP	0.0095***
	(0.0022)
MATERN	-0.0002
	(0.0008)
PATERN	0.0012
	(0.0012)
TAXW	0.0150
	(0.0248)
TAXWsq	-0.0004
	(0.0002)
Constant	1.0661*
	(0.5634)
Observations	136
Number of Countries	8
R-squared	0.1068

Standard errors in parentheses
* p < 0.10, *** p < 0.01

VARIABLES	Dissimilarity
PUBSECT	-0.0010
	(0.0015)
MATERN	-0.0001
	(0.0009)
PATERN	0.0017
	(0.0012)
TAXW	-0.0279
	(0.0251)
TAXWsq	0.0000
	(0.0003)
Constant	2.2857***
	(0.5656)
Observations	136
Number of Countries	8
R-squared	0.0786

Standard errors in parentheses
*** p < 0.01

Figure 4: Hausman tests

	Coefficients		
VARIABLES	FE	RE	Difference
SOCEXP	0.0095	0.0105	-0.0010
MATERN	-0.0002	-0.0006	0.0004
PATERN	0.0011	0.0006	0.0004
TAXW	0.0150	0.0279	-0.0130
TAXWsq	-0.0004	-0.0005	0.0001
	X^2	25.27	
	Prob > X^2	0.0001	

Coefficients

VARIABLES	FE	RE	Difference
PUBSECT	-0.0009	0.0000	-0.0010
MATERN	-0.0001	0.0000	-0.0002
PATERN	0.0017	0.0011	0.0006
TAXW	-0.0279	-0.0010	-0.0270
TAXWsq	0.0000	-0.0002	0.0003
	X^2	23.49	
	Prob > X^2	0.0003	

Figure 5: Variance inflation factors

VARIABLES	VIF	1/VIF
SOCEXP	1.56	0.6415
MATERN	1.81	0.5525
PATERN	1.43	0.6989
TAXW	1.31	0.7651
Mean VIF	1.53	

VARIABLES	VIF	1/VIF
PUBSECT	1.53	0.6528
MATERN	1.92	0.5201
PATERN	1.43	0.7011
TAXW	1.22	0.8224
Mean VIF	1.52	

10. References

Anker, R. (1997). Theories of Occupational Segregation by Sex: An Overview. *International Labour Review, 136*(3), 315-39.

Blackburn, R. M., Brooks, B., & Jarman, J. (2001). Occupational Stratification: The Vertical Dimension of Occupational Segregation. *Work, Employment & Society, 15*(3), 511-38.

Blackburn, R. M., Jarman, J., & Brooks, B. (2000). The Puzzle of Gender Segregation and Inequality: A Cross-National Analysis. *European Sociological Review, 16*(2), 119-35.

Borchorst, A. (2012). Reassessing Woman-Friendliness and the Gender System. In A. Anttonen, L. Häikiö, & K. Stefánsson, *Welfare State, Universalism and Diversity* (pp. 106-20). Cheltenham, UK: Edward Elger.

Charles, M. (1992). Cross-National Variation in Occupational Sex Segregation. *American Sociological Review, 57*(4), 483-502.

Datta Gupta, N., & Smith, N. (2002). Children and Career Interruptions: The Family Gap in Denmark. *Economica, 69*(276), 609-29.

Datta Gupta, N., Smith, N., & Verner, M. (2008). The Impact of Nordic Countries' Family Friendly Policies on Employment, Wages, and Children. *Review of Economics of the Household, 6*(1), 65-89.

Doeringer, P., & Piore, M. (1971). *Internal Labor Markets and Manpower Analysis.* Lexington, MA: D.C. Heath and Co.

Ellingsæter, A. L. (2013). Scandinavian Welfare States and Gender (De)segregation: Recent Trends and Processes. *Economic and Industrial Democracy, 34*(3), 501-18.

European Institute for Gender Equality. (2017). *Gender Segregation in Education, Training and the Labour Market.* Brussels: Council of the European Union.

Gelber, A., & Mitchell, J. (2011). Taxes and Time Allocation: Evidence from Single Women and Men. *Review of Economic Studies, 79*(3), 863-97.

Gradín, C. (2017). *Segregation of Women into Low-Paying Occupations in the United States.* Helsinki: United Nations University WIDER.

Haas, L., & Rostgaard, T. (2011). Fathers' Rights to Paid Parental Leave in the Nordic Countries: Consequences for the Gendered Division of Leave. *Community, Work & Family, 14*(2), 177-95.

Jiao, Y. (2016). *Essays on Household and Family Economics.* Manhattan, KS: Kansas State University.

Kantola, J., & Squires, J. (2012). From State Feminism to Market Feminism? *International Political Science Review, 33*(4), 382-400.

Karmel, T., & MacLachlan, M. (1988). Occupational Sex Segregation -- Increasing or Decreasing. *Economic Record, 64*, 187-95.

Khazan, O. (2018, February 18). The More Gender Equality, the Fewer Women in STEM. *The Atlantic*.

Kuehn, D. (2017, April 4). You Can't Understand the Gender Pay Gap Without Understanding Occupational Segregation. *The Urban Institute*.

Lewis, J. (1992). Gender and the Development of Welfare Regimes. *Journal of European Social Policy, 2*(3), 159-73.

Melkas, H., & Anker, R. (1997). Occupational Segregation by Sex in Nordic Countries: An Empirical Investigation. *International Labor Review, 136*(3), 341-63.

Milasi, S., & Waldmann, R. J. (2018). Top Marginal Taxation and Economic Growth. *Applied Economics, 50*(19), 2156-70.

Nielsen, H. S., Simonsen, M., & Verner, M. (2004). Does the Gap in Family-Friendly Policies Drive the Family Gap? *The Scandinavian Journal of Economics, 106*(4), 721-44.

OECD. (2019). *Social Protection - Social Spending.* Paris: OECD Data.

Pendleton, A. (1997). What Impact Has Privatization Had on Pay and Employment? A Review of the UK Experience. *Relations Industrielles / Industrial Relations, 52*(3), 554-82.

Petersen, T., & Morgan, L. A. (1995). Separate and Unequal: Occupation-Establishment Sex Segregation and the Gender Wage Gap. *American Journal of Sociology, 101*(2), 329-65.

Sanandaji, N. (2016). *The Nordic Gender Equality Paradox.* Stockholm: Timbro.

Sanandaji, N. (2018). *The Nordic Glass Ceiling.* Washington, D.C.: Cato Institute.

Stoet, G., & Geary, D. C. (2018). The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics. *Psychological Science, 29*(4), 581-93.