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Gender Wage Transparency and the Gender Pay Gap: A Survey

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Gender Wage Transparency and The Gender Pay Gap:

A Survey¹

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Abstract:

We survey the literature on the effects of increased transparency of gender segregated wages on the pay gap between men and women in comparable jobs. Pay transparency is promoted by countries and supra-national institutions and we categorise reforms according to their content and coverage. A growing number of papers have used variations of *difference-in-difference* estimation methods to analyse the impact of reforms on the gender pay gap (GPG), and from these we extract four main findings: First, reform-based studies find that pay transparency reforms reduce the GPG in all countries but one, which finds no effect. Second, in Canada, Denmark and the UK, the reduction in the GPG from transparency reforms originate from a reduction in the growth rate of male income and less from an increase in women's pay. Third, there is fragmented evidence for the impact of transparency reforms on other labour outcomes and firm productivity. Fourth, the monetary implementation cost of transparency reforms is, in general, small both for individual firms and public administration. These findings are consistent with the notion that gender wage transparency reforms are an effective policy tool to reduce the GPG.

KEYWORDS: Wage Transparency, Gender Pay Gap, Policy Reforms

JEL Codes: J16, J31, J38

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1. Introduction

Differences in gender-based wages for comparable jobs exist in most countries around the world even if the size of such differences varies significantly across countries and estimation methods (Weichselbaumer and Winter-Ebmer (2005), Blau and Kahn 2017 and Kunze 2018).

Purely gender-based pay inequality is not fair and many governments and supranational institutions have proposed reforms to reduce or eliminate it (see e.g., surveys of reforms in EC (2015, 2020) and OECD (2021)). Central to these reforms is transparency about gender-based wages in private firms and public organizations. An underlying theme behind such initiatives is that more wage transparency in itself reduces the existing gender wage gap (GPG). In this survey, we investigate the research and policy-based literature concerning the effect of increased wage transparency on the GPG and other firm and individual level outcomes, such as wage dynamics, labour allocation, productivity and health.⁵

Government-mandated reporting of gender pay discrepancies has been a subject of many debates (EC, 2020). Governments often propose transparency as a tool to encourage firms to reduce the wage gap between men and women. Unions and employee groups representing women also seem to believe that secrecy around pay contributes significantly to unequal pay for women. Opponents of pay transparency argue that disclosing gender pay information comes as a challenge to firms as it lacks practical utility, increases administrative burdens, and violates employee privacy. It is the aim of this survey to provide a more informed platform to discuss the distributional consequences of pay transparency reforms.

Underlying the notion that wage transparency can reduce the gender wage gap is the premise that salary information, in general, is undisclosed, which is confirmed in multiple studies. For the US in 2017/2018 nearly half (48.2%) of all full-time workers, rising to 52.2% of women, 59.9% private-sector workers, and 55.7% of non-unionized workers, report that they are discouraged or banned from discussing wages and salaries. Though women are more likely than men to work under a formal pay secrecy policy (15.7% women and 10.9% men), they violate that policy more often (35.3% of women and 24.0% of men who are subject to formal pay secrecy policy). (IWPR 2021).

Academic research extracts evidence about the impact of transparency on the gender wage gap and, more generally, on wages and labour productivity through analysing country specific policy reforms or by conducting randomized controlled experiments. Our first contribution is to summarize the extension and coverage of transparency reforms across the EU and OECD

⁵⁵ There is a larger stream of literature on wage transparency and labour outcomes that borders the topic of how gender wage transparency impacts GPG. When relevant, we provide a short discussion to this broader literature in footnotes.

countries. The EU has categorized policy programs into five categories that differ in the amount of information required and to whom and under what circumstances information is given.

Our next and most important contribution is to survey 16 papers that explicitly deal with how gender wage transparency affects the GPG. We split them into two groups according to their methodology. In the first group, 10 papers analyse the introduction of transparency reforms on targeted firms using state of the art micro-econometric estimation methodology. Nine of them study national level reforms, only one uses firm level reforms. Empirically, these papers all use difference-in-difference estimation methods using variation across treated and untreated employees before and after the reforms to identify policy effects. Within this group, papers on policy reforms in Canada, Denmark, Switzerland, the UK and the US all document that transparency reforms are effective in reducing the GPG, whereas there is no evidence of this from papers analysing the Austrian reform. The second group of 6 papers adopts more heterogeneous approaches from standard multivariate estimation methodology to broader non-data driven policy discussions. However, the papers generally support the notion that transparency reduces the GPG.

We progress to discuss the channels through which transparency reduces the GPG. The evidence from Canada, Denmark and the UK all point to the GPG being reduced due to the growth rate of male wages stalling, instead of an acceleration in the growth rate of females' wages. In addition, papers have focused on institutional aspects on both the reform side (e.g., public or private information) and on the context side (e.g., degree of unionization).

Gender wage transparency may have broader positive and negative impacts beyond closing the GPG. To the extent that we can, we try to find supporting evidence for the effect of gender wage transparency on labour composition **and productivity and employee health. The evidence is, in general, fragmented, but it's interesting that one study argues that increased gender wage transparency reduces female stress levels in targeted firms (see Bennedsen et al 2022).**

Academic literature often ignores the direct and indirect monetary implementation and administration costs levied on firms, employer and employee organizations and on government institutions. Hence, even though our survey confirms that transparency reforms decrease the GPG, whether this finding can be used as policy advice without discussing the implementation costs is questionable. We summarize the types of implementation costs: most are levied on employers (firm side) but others may be levied on employees, employer organizations and administrative governmental departments. Our summary supports the notion that, in general, implementation costs are relatively small (OECD21) and should not in themselves be decisive for policy conclusions. Beyond implementation costs, there are potentially employee level costs due to unnecessary peer comparisons, conflicts with the privacy laws in certain countries or

violations of cultural norms where people are reluctant to talk about salaries (“salary taboo”), which are hard to quantify even though they exist and are prevalent.

The rest of this survey is organized as follows: We provide a brief overview of how we constructed the survey in Section 2, followed by a short introduction to the literature on how to measure the gender wage gap in Section 3. In Section 4, we describe gender wage transparency reforms within the EU and OECD countries. The main analysis in section 5 discusses research-based evidence for the impact of gender wage transparency on the GPG. We begin with analysing impacts on the GPG, followed by identification of channels and broader impacts on labour allocation, productivity and employee health. Section 6 summarizes the costs of implementing transparency reforms. Conclusions are in Section 7.

2. Survey Methodology

Our main research question is how gender wage transparency affects the GPG. To answer this question, the ideal paper will use variation in gender wage transparency to study outcomes related to employee and firm level variables. Most of the studies we survey analyse national or regional reform based variation in gender wage transparency. Thus, we begin by identify transparency reforms for 21 EU and OECD countries and the supranational EU reform that was introduced in April 2022. These reforms are described in Table 1. The waste majority of these reforms focus directly on gender wage transparency. However, the Canadian University reform is a general transparency reforms that increase the transparency of individual wages that researchers then can use to derive novel information about the GPG.⁶ Finally, variation in wage transparency can also arise from changes in a single firm’s wage information policy.

We then searched⁷ for papers that use exogenous changes in gender wage transparency to study the outcome of these changes on the GPG and other gender related variables, such as wage structures, labour allocation, firm productivity, and employee health.

This yields a core group of 16 papers from which we derive the main insights presented in Section 5. The 16 papers can be divided according to how or whether there is an exogenous variation in gender wage transparency. Our first subgroup of 10 papers studies policy reforms that introduce a variation in pay transparency.⁸ The second subgroup of 6 papers uses alternative variations in

⁶ For simplicity we include the Canadian University reform in the group of gender wage transparency reforms since it has been used by researchers to study the impact of transparency on GPG (Baker et al 2022).

⁷ We surveyed published papers in all top and leading economics and labour journals and unpublished working papers by searching, among others, scholar.google.com and ssrn.com.

⁸ This group consists of Baker et al. 2022, Bennedsen et al. 2022a and 2022b, Blundell 2020, Böheim and Gust 2021, Duchini et al. 2020, Gulyas 2021, Jones and Kaya 2022, Vaccaro, 2018. They study the impacts of country

data (e.g., cross-sectional) or have a broader discussion that is not limited to micro-econometric analysis.⁹ We use these papers to confirm the results extracted from the reform-focused papers.

There is a larger literature on the impacts of wage transparency on general labour outcomes. This stream of literature often differs from our selected studies in the following two dimensions: The variation in wage transparency does not have a gender focus and/or the papers do not study the impact of transparency on the GPG. When relevant, we add references to this literature in several footnotes.

3. Measuring the Gender Wage Gap

3.1 Methodological issues in measuring the GPG.

There is consensus on the existence of gender-based differences in wages in most countries around the world. In short, men earn more than women (OECD 2021, EUROFOND 2021). However, there is no consensus on how much these differences are explained by variations in jobs and personal characteristics or how much is explained by gender discrimination.

This raises the question of how to measure gender-based differences in pay? What if men and women have different jobs? And how do we properly control for important confounding factors that simultaneously correlate with wage and gender, including, but not limited to, work hours, tenure, education and the decision to have children. In this section, we provide a short introduction to the measurement of the gender wage gap based on several surveys and reports (among others Plantenga and Remery (2006)).

The gender wage gap refers to the differences between the wages earned by women and men in comparable jobs that generate equal values (OECD 2021). At first glance it seems like a clear and uncontroversial definition; however, applying this definition to data is less straight forward. We highlight three fundamental challenges here.

The first challenge is to define the appropriate wage concept. In order to take differences in working hours and the impact of the income tax system into account, most estimations use differences in gross hourly wages. The gender pay gap is then calculated as the ratio of women's average gross hourly wage to men's average gross hourly wage. **Alternatively, as the ratio between the gross hourly wages of women and men, expressing women's wages as a percentage of men's average gross hourly wage.**

level reforms in Austria, Canada, Denmark, the UK and Switzerland. We also include Castilla 2015 who studies the impact of a change in gender wage transparency within a single firm.

⁹ These 6 papers are Ahrens and Scheele, 2022; Burn and Kettler, 2019; Canales, 2018; Conley and Torbus, 2018; Maxwell and Randall, 2019; Obloj Zenger, 2022.

The second challenge is how to define comparable jobs. To make a more reasonable comparison, researchers introduce variables such as industries, occupation codes and firm size to properly adjust pay differences caused by job characteristics. Adding too many controls, however, may raise issues if gender differences in these variables are not purely productivity differences but are partly driven by discrimination itself.¹⁰ As mentioned by Oaxaca (1973: 699), the controls for occupation “eliminate some of the effects of occupational barriers as sources of discrimination. As a result, we are likely to underestimate the effects of discrimination”. On the other hand, the level of discrimination may be overestimated if not all productivity related variables are included. In summary, most studies indeed control for industry, occupation, and firm size.

Finally, the third challenge is to control for individual characteristics and individual choices that are correlated with productivity. Typical controls are education, career pathway and age. Some studies go beyond these basic individual traits and include dummies for family structure, such as having children or not and being married/divorced or not, into the analysis. The extent to which such variables are purely productivity related or whether they also reflect outcomes of cultural discrimination is still unclear. Where to draw the line between variables that should be in or out of the regression is debatable.

As a starting point, the above discussion suggests to properly measure GPG empirically, researchers need to introduce a gender dummy in a standard wage regression model and add relevant controls capturing differences at the firm level, occupational level and individual traits. The gender dummy captures both the effects of gender but also everything that has not otherwise been controlled for. In practice, the literature has developed from the influential papers of Blinder (1973) and Oaxaca (1973), where the gender gap is decomposed into an explained and an unexplained part. In this procedure, as a first step, wages are estimated separately for men and women. The total wage difference between men and women can then be decomposed into an explained part due to differences in traits and an unexplained residual, often referred to the discrimination effect, which is caused by unobservable differences plus the differences in rewards for identical characteristics. Discrimination in this approach is thus defined as the difference between the observed (‘unadjusted’) gender pay difference and the gender pay difference that would prevail if men and women were paid by the same standards, (see Rice, 1999; Rubery et al., 2002; Weichselbaumer and Winter-Ebmer, 2005).¹¹

¹⁰ One example would be if wage reforms in the public sector stated lower wages, on average, for traditional female dominated jobs, such as nursing and aged care, than for traditional male dominated jobs, such as police work or public hospital doctors, beyond what can be argued from a differential in productivity and value creation.

¹¹ Over the last 50 years, following the seminal papers of Oaxaca (1973) and Blinder (1973), the basic approach has developed in many ways. For example, sorting between jobs is an important factor to explain the gender wage

3.2 Recent trends in GPG

Given the challenges involved in estimating the explained and unexplained parts of the gender wage gap, it is not surprising that estimates of the gender pay gap differ widely depending on the data available, the specific sample, and the method used. For instance, Eurostat estimates that, in 2020, women's gross hourly earnings were, on average, 13.0 % below those of men in the EU. The largest gender wage differences are identified in Latvia, Estonia, Austria, and Germany, whereas the lowest are observed in Luxembourg, Romania, Slovenia and Italy (Eurostat, 2022).¹²

Studies have shown that there was a clear reduction in the gender wage gap from World War Two (WW2) to the 1980s in most countries. However, the reduction in the gender wage gap has stalled since then, and this is documented in several studies including the Weichselbaumer and Winter-Ebmer (2005) survey in this journal.

Blau and Kahn (2017) document that after the 1980s in the US, there was a convergence mostly due to increasing female labour participation and the reversal in the education gap. During this period, women made important progress in the two basic measures of human capital, which significantly narrowed the explained part of the GPG. The role of gender differences in occupation and industry, however, remained important in explaining the gender wage gap. A decrease in the unexplained gap played a role in narrowing the gender wage gap until the 1980s. However, since then the unexplained part of the GPG has been stable.

International evidence is provided by Kuhnze (2018). Countries, such as the US, the UK and Japan, that started with a relatively large gender wage gap in the 1970s had a convergence rate of 0.58 as compared with Australia, Germany, France, Italy and Sweden, whose convergence rate was 0.14. The Scandinavian countries had a stable gender wage gap of less than 20% over the period from 1970-2015, which has not changed significantly over time. The German speaking countries had a larger gender wage gap that decreased at a similar rate to the US.

While the precise estimate of the unexplained part of the gender wage gap differs across countries, time, data samples and research methodologies, there are some general insights that are worthy of underlining. First, the explained and unexplained GPGs exist in all countries. They varies across countries and regions, being lowest in some Eastern European countries and Scandinavia. Second, from a long run perspective, the GPG has been reduced since WW2, but the narrowing of the gender wage gap has stalled in the last decades. In particular, several studies

gap. Palladino et al. (2021) document that firm pay premiums contribute meaningfully to the gender wage gap and that this is largely driven by sorting women into lower paying firms rather than within firm gender differences in pay premiums.

¹² This measure is an overall earnings difference and not a measure of the difference in unexplained GPG.

have shown that a large part of the GPG is explained by women working fewer hours (Gallen et al., 2019). However, the GPG, and its size has been almost constant across countries since the 1980s. (Böheim et al., 2021; Gallen et al., 2019). Third, in comparison to a random sample of the total population, the GPG is lower if only a sample of new entrants in the labour market is investigated; the gender pay gap thus tends to widen with age. **Fourth, GPG varies significantly across industries and sectors. For example Lagaras et al (2022) documents a large and persistent GPG in the financial sector in UK.** Finally, personal traits matter for the size of the gender wage gap, for instance it is lower for single women than for married women.

4. Transparency Reforms

The most insightful academic research extracts evidence about the impact of transparency on the gender wage gap and, more generally, on wages and labour productivity through analysing country specific policy reforms or by conducting randomized controlled experiments. In this section we focus on reforms within the OECD and the EU area. Table 1 provides an overview with a short description of each policy reform and links to related research papers.

We begin with the European Union, which has promoted transparency reforms since 2014 through its transparency program, and in 2022, the European Commission and Parliament adopted it as an official EU policy. The EU policy includes three categories of transparency:

- 1) **Category 1: Right of employees to obtain information on pay levels:** employees have access to the objective and gender-neutral criteria used to define their pay and career progression. In accordance with national laws and practices, workers and their representatives have the right to request and receive information on their individual pay level and the average pay levels for workers doing the same work or work of equal value, broken down by gender.
- 2) **Category 2: Reporting on pay:** employers with at least 250 employees have to provide annual information on relevant measures of the gender wage gap. Employers must make information publicly available and share it with employees and relevant national authorities.
- 3) **Category 3: Pay audits:** in cases where this reporting of pay demonstrates a difference in average pay levels between female and male workers of at least 5% and the employer has not justified this difference by objective and gender-neutral criteria, employers with at least 250 employees will have to conduct a joint pay assessment in cooperation with their workers' representatives.

These three categories were adopted by the EU in the spring of 2022.¹³ Beyond those, the EU has discussed two additional categories that have not been adopted formally:

¹³ The EU policy reform is documented at https://ec.europa.eu/info/policies/justice-and-fundamental-rights/gender-equality/equal-pay/eu-action-equal-pay_en and at [https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI\(2022\)698934](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)698934).

- 4) **Category 4: Social partners obliged to bargain over pay equality.** This means that the information is both provided and used for negotiations between employers and employees and their respective representatives.
- 5) **Category 5: Proposals that prevent gender pay gaps arising.** These are cases such as providing information at job hiring interviews about salary levels for men and women. This category has a different dimension than the other four categories, because it aims at preventing gender wage gaps developing and not at reducing or removing existing gender wage gaps.

Across the first four categories, there is increasing strength in the requirements placed on employers and their representatives. Category 1 is the weakest, because it is up to individual employees to request information. Category 2 is stronger, because employers are required to provide information on a regular basis. Category 3 is progressively even stronger as it involves a formalized (and often external) auditing process. Category 4 requires that information about GPG is not only provided systematically but it is required to be used in negotiations between employees and employers at the corporate level and potentially at more centralized bargaining levels. For each reform in Table 1, we have indicated which category the reforms belong to.

Category 5 is not directly comparable to the other categories because it can be very general and often embodied in general labour and social laws that are not specifically aimed at GPG. The application range of this Category is often limited due to privacy protection. Besides, unlike Category 3, it does not necessarily provide employees with opportunities to learn about the intrinsic reasons (ability, experience, skills, etc.) that cause real structural salary differences among peers.

The country reforms described in Table 1 share some similarities given that almost all of them focus on gender wage transparency as an instrument for reducing the gender wage gap. Most reforms have elements of Categories 1 and 2 by either giving individuals rights to get information or mandating employers to deliver this information. Reforms in Austria, Denmark, Finland, France, Germany, Italy, Spain and Switzerland, among others, include elements in Categories 1 and 2. Elements belonging to Category 3 (Auditing) can be found in, for example, Iceland, where firms have to go through a gender wage certification process. Aspects of Category 4 can be found in reforms in Denmark, France, Italy, Portugal and the Netherlands. Furthermore, all countries have additional labour and social laws that partly aim at avoiding an increase in the GPG, which categorises them in Category 5. Since all reforms have an aspect of Category 5, we exclude this category from Table 1.

Comparing the reforms in Table 1 we also identify significant differences. First, the ambition of the policy goals may vary across countries. Germany and Iceland emphasize that there shall be

equal pay for work of the same value. In Iceland, the certification process focuses on promoting equal pay in practice, whereas other countries stop at documenting whether or not a gender pay gap exists. In UK, the stated ambition is to achieve equal pay within a generation.

Second, the focus of the reforms on collective or individual rights varies. For example, the certification process in Iceland and the reforms in Denmark and the UK require all employers meet the defined standards with respect to disclosing transparency information. On the other hand, the reform in Germany is criticized for putting the responsibility on the individual employees who need to take action to receive information.

Third, the threshold number of employees required for wage disclosure differs. Threshold numbers vary across reforms. From 25 employees in Iceland to 250 employees in the UK. Arguments for a high threshold value are often that implementation costs in small firms are too high, that it is impossible to estimate relevant metrics for gender-based wage comparison in small firms and publishing gender wage averages may compromise individual data protection as required by law. Arguments for lower threshold numbers centre on having a larger share of the labour market covered by the reforms.

Fourth, whether reforms are voluntary or compulsory varies. Historically, most gender wage transparency reforms were voluntary, which has generally meant low participation rates. This is changing and most of the reforms in Table 1 are now compulsory for targeted firms.

Fifth, the definitions of comparison groups are not the same. In all types of reforms, comparing gender-based wages across groups of workers with the same type of job or jobs of the same value is challenging. For example, the Danish 2008 reform targets firms with more than 35 employees but require comparison at a very detailed job category level. Thus, many small and mid-sized firms will struggle to have enough employees within each job category.

Sixth, Category 5 prevents salary discrimination from happening from the very beginning. In some countries, taking United States as an example, the National Labor Relations Act 1935 contains a provision that gives all employees the right to "engage in concerted activities", including the right to discuss their terms and conditions of employment with each other, which is sometimes called the ban on wage secrecy act. The Equality Act 2010 in the UK also makes it unlawful to prevent employees from disclosing a difference in salary if they are trying to understand whether an equal pay issue between male and female workers exists.¹⁴

¹⁴ Since all labour laws may have an element of preventing gender wage gaps arising in the future, we have deleted Category 5 from Table 1.

5. Research Based Evidence on the Impact of Transparency on the GPG

In this Section, we survey the growing academic literature on the impact of wage transparency on the gender wage gap. We begin by identifying the geographical and institutional context and the research methods applied in the studies. We proceed to identify how and through which channels transparency impacts the gender wage gap. We then discuss additional impacts on gender wage transparency reforms on labour allocation, productivity, and employee health.

5.1 Geographic setting and data construction

Most of the literature builds upon the policy reforms we describe in Table 1 where we also list the related research papers. We briefly review the setting of these papers.

The 2006 policy reform in Denmark is studied in Bennedsen et al. (2022a and b). To analyse the effect of the reform, they construct a data set of matched employer-employee register data and combine it with accounting data from the Danish Business register. The sample is a panel of the employee-firm-years over the 2003-2008 period. This includes approximately 67,000 yearly observations of employees in 3,900 private firms.

The Canadian University wage transparency reform is studied in Baker et al. (2022). The authors use administrative data covering the majority of university faculty in Canada. The sample includes approximately 50,178 faculty members from universities across Canada. The individuals were on average 49 years old and one quarter of them are women. The Canadian sample are for public sector employees and thus complement well the Danish analysis in private firms.

The impact of the *Austrian* transparency reform is studied in two articles. Böheim and Gust (2021) use administrative data from the Austrian Social Security Database (ASSD). The data contained detailed information on employees' earnings and employment history and the sample includes 23,085 firm-year observations for the years 2009 to 2017. Gulyas et al. (2021) apply the same dataset but focus on firms that became subject to the law in 2014. In the baseline sample, all establishments with firm size between 75 to 225 were selected, which amounted to 4.9 million worker-year observations, generated by 1,204,251 workers employed across 14,303 distinct establishments.

The 2017 pay transparency reform in the *UK* implies that each year since 2018, more than 10,000 UK firms have been required to publicly disclose their gender pay gap and gender composition along the wage distribution. Blundell (2020) uses the Annual Survey of Hours and Earnings (ASHE) and focuses on full-time workers aged between 18 and 50. Duchini et al. (2020) also use ASHE for the period from 2012 to 2019. The sample is restricted to firms with +/- 50 employees

from the 250 threshold. Jones and Kaya (2022) assemble a dataset of more than 10,000 employers for their analysis of post reform changes in the GPG.

The 2006 Swiss Pay transparency reform is analysed by Vaccaro (2018). She exploits the cut-off level of 50 employees. The sample consists of 20% of all small firms (less than 20 workers), 58.3% of the medium firms (from 20-49 workers) and 87% of the large firms (50 workers or more). In total, there are 223,962 firm-year observations with 9,144,508 employee-year observations, however the core analysis is done on a smaller dataset with socio economic employee data.

In the *US* context, Burn and Kettler (2019) use the *ban on pay secrecy* laws in 11 states in the US to study the effect of pay secrecy bans on labour market outcomes. Using the Current Population Survey, they construct a sample of 2,089,402 individuals, 327,787 managers and 1,761,615 non-managers. For the educational sector, Obloj and Zenger (2022) use data that is similar to the Canadian data in Baker et al. (2022) but for US academics. The authors collect twenty years of yearly employment and salary data for 97,838 individuals from 139 universities in eight states. For the specific context of US veterans, Maxwell et al. (2019) study whether gender pay gap disparities exist among surgical specialties in the Veterans Health Administration nationwide. Salaries were collated using the Enterprise Human Resources Integration-Statistical Data Mart dataset.

The empirical setting of Castilla (2015) is unique compared to other studies. The author studies the effect of wage transparency on GPG within a large (anonymous) service firm in the US that changed its transparency policy in 2004. Following the paper we denote the firm ServiCo. In the years before the 2004 reform there were on average 8,898 employees performing 312 different jobs and working in 272 different work units (these units constitute the smallest organizing entity in this company, typically with three to eight employees in each unit). After 2004 (during the 2005–2009 period), there were 9,321 employees performing the same jobs and working in the same number of work units as before the reform.

Finally, it is worth mentioning that a few studies discuss the impact of pay transparency reforms without providing a reform-focused data analysis. This is the case for Ahrens and Scheele (2022) and Coley and Torbus (2018) both of which provide a more qualitative discussion of the impact of transparency reforms on the GPG.

5.2 Methodology

A frequently applied methodology is to identify exogenous variation in pay transparency and analyse how such variation affects the gender wage gap and potentially other labour related outcomes. The main challenge in applying this method is to identify true exogenous variation

and to assemble a relevant dataset. Most of the current literature extracts variation in transparency from one of the policy reforms described above. To apply these reforms, it is a prerequisite that the policy reforms are exogenous to individual firms' pre-reform wage and labour policies (Bennedsen et al., 2022a; Baker et al., 2022).

The preferred identification strategy is a variant of *difference-in-difference* estimation methods. In the basic formulation this uses both variation in pre- and post-reform wage policies and the differences between treated firms (i.e., firms that are impacted by the policy reform) and control firms (i.e., firms that are not affected by the policy reform). As a starter, the difference in the post- minus the pre-reform differences in the gender wage gap between firms in the treated group and in the control group is a basic measure of how increased transparency impacts the GPG.

The *difference-in-difference* approach may be extended in multiple various directions. First, in the *regression discontinuity* methodology applied by papers analysing reforms in Austria, Canada, Denmark, Switzerland and the UK, differences between treated and control firms that are very similar have more weight and differences between firms that are very different have less or zero weight. *Similarity* is most often defined in employee numbers, implying emphasis is put on comparing firms where the number of employees is just above versus just below a threshold level specified in the policy reform. Second, it is sometimes possible to exploit time differences in reform implementation across different geographic areas or sectors. Such *staggered implementations* provide an additional dimension in the identification strategy, since future treated firms can be used as counterfactuals to current treated firms, which reduces the likelihood of introducing selection bias when categorizing firms into treated and control groups.¹⁵

We next provide a short overview of the methodology applied in the papers we survey. The identification strategy in Bennedsen et al. (2022a and 2022b) compares employees in the treated firms in a narrow band at and above the 35-employee threshold along with firms in a narrow band below this threshold. In this *difference in difference* model, the treatment (control) group is firms with 35-50 (20-34) employees prior to the introduction of the law. The results are validated through a *regression discontinuity design* around the 35-employee threshold level. Similar methodology is applied in the UK context by Blundell (2020) and Duchini et al. (2020) around the UK reform's threshold level of 250 employees. Similarly, the treatment status is assigned based on the number of employees in the firm before the policy is mandated to avoid the potential effect of policy on the firm size.

¹⁵ The standard staggered difference-in-difference approach has recently been criticized for the weights there are implicitly put on the different subgroups of firms (see Goodman-Backer 2021). This is also a relevant critique for the papers that use a staggered difference-in-difference approach in this survey.

To study the reform on university faculty salaries in Canada, Baker et al. (2022) exploit the within-province variation in exposure to the policy across institutions and academic departments. In addition, they extend this with a time dimension that exploits the staggered implementation of reforms across provinces.

A *difference-in-difference* approach is also applied in the Austrian and Swiss studies. Gulyas et al. (2021) focus on a narrow window around the lowest cut-off level described in the Austrian reform. Böheim and Gust (2021) use a *regression discontinuities design* for a sample that includes larger firms than Gulyas et al. (2021). To control for the systematic differences between the treated and the control groups, the authors also merge the two models into a *difference-in-discontinuities design*.

The same methodology is used in Vaccaro (2018) on the 2006 Swiss reform. This study is interesting because the government has provided firms with a regression model to estimate the unexplained GPG within the firms. Vaccaro (2018) replicates this model and thus is able to provide a direct test of how transparency impacts the unexplained part of the GPG.

The second and smaller group of papers examines the US context. In the absence of reforms that generate exogenous variation across large groups of firms, these papers use alternative identification strategies. Burn and Kettler (2019) apply an alternative *difference-in-difference* identification strategy. They identify the effect of pay secrecy bans by comparing the differences between managers and non-managers in the states that have mandated the law and the states that have not. Obloj and Zenger (2022) generate exogenous variation on pay transparency in the academic sector in the US through exploiting the staggered shocks to the accessibility of wage information about public university employees. The authors employ the *difference-in-difference* design and consider an academic as treated if he or she was employed in one of the institutions of the focal state in any of the years following the launch of the database. Castilla (2015) generates exogenous variation in pay transparency through analysing pay reforms within a single – ServiCo - company. Using ServiCo's longitudinal personnel records he tests to what extent gender, race and foreign nationality had an impact on meritbased pay growth before and after the introduction of wage transparency,

Not all papers rely on exogenous variation in pay transparency. Maxwell et al. (2019) study pay transparency among surgeons in the US Veteran Health Administration using a multivariate regression model taking salary as the dependent variable. The validity of this approach hinges on the researchers' ability to control for relevant confounding variables in the regression analysis. A similar approach is applied in Jones and Kaya (2022) when studying changes in organizational structures that shape the GPG after the UK gender wage transparency reform. Ahrens and Scheele (2022) provide a policy analysis of the German transparency reform and has no firm level

analysis. Conley and Torbus (2018) provide a more general discussion of the impact of transparency on the gender wage gap in a European setting as does Canales (2018) in a US context.

To sum up, there is a core set of papers that use the same rigorous methodological research design applied to different policy reforms. The papers from Austria, Canada, Denmark, Switzerland and the UK all use exogenous variation in transparency generated from the implementation of laws that require private firms or public organizations to report data on how men and women are paid for their work. They also base their empirical strategy on variations of *difference-in-difference* methodology in various forms that are often extended into *regression discontinuity*. The common methodological approach to test the implication of gender wage transparency laws makes it plausible that we can compare results and extract conclusive evidence on the causal relationship between transparency in gender wages and the GPG.

5.3 Evidence for the impact of wage transparency on the gender wage gap

We summarize the evidence for whether increased gender wage transparency casts influence upon the GPG. The channels and the effect on other outcomes are delegated to the following subsections. From the above we know that the majority of studies exploit reform-triggered variation in transparency and apply a version of a difference-in-difference and/or regression discontinuity identification strategy. We split these reform based papers into two groups: a majority group of papers that find transparency reduces the GPG and a minority group based on the Austrian transparency reform that find no effects of transparency on the GPG. There are no reform based papers that shows evidence for transparency increasing the GPG.

In the first group, Bennedsen et al. (2022a) concludes that the Danish transparency law reduced the gender wage gap by approximately 2 percentage points from a base level of women earning 17 percent less than men in comparable jobs. Thus, the increased transparency reduced the gender wage gap by 13 percent relative to pre-legislation levels. They further examine the effect of the legislation at different points of the firm-level wage distribution. First, the firm-level gender wage gap decreases more at the bottom and the middle of the pre-treatment firm gender pay gap distribution, whereas the impact at the top is less pronounced. Second, the firms that have relatively larger pre-treatment gender wage gaps are also the firms that experience the most drastic decline in the gender wage gap.

Baker et al. (2022) derived very similar results for public employees in the Canadian university setting. Disclosing the wages of university faculty in Canada reduced the gender pay gap between men and women by approximately 30-50 percent. The reduction in the gender pay gap primarily occurred in universities in which the faculty is unionized. The paper describes two ways to

analyse this effect size. The first way is to evaluate it relative to the gender gap that prevails at the time of first-time introduction of the law in the mid-1990s, which was around 6-7 percent. Using this as a benchmark would lead to an effect size of 30 percent. The second way is to evaluate the effect size relative to the change in the overall gender gap after the first reforms were introduced. This method estimates a reduction close to 50 percent. It is worth remarking that the Canadian evidence suggests a relatively larger reduction in the gender wage gap than for the private firms in Denmark. However, the absolute value of the reduction in Denmark is larger than in Canada because the pre-treatment gap in private Danish firms was around three times larger than for public employees in Canada.

Comparing the Danish and Canadian experience with the analysis of the UK policy reforms, we find supporting evidence based on similar causal identification strategies. Blundell (2020) reports a 1.6 percentage point narrowing of the gender pay gap at the policy-affected employers and firms. Parallel to this, Duchini et al. (2020) validate the results by declaring a 15 percent reduction in the gender pay gap relative to an unconditional pre-policy level of 18 percent - a result almost identical to the Danish evidence. In multivariate regression analysis, Jones and Kaya (2022) also find that the GPG is reduced after the implementation of the UK reform, and the reduction is even greater for organizations that have a higher pre-reform GPG, again, this is identical to the Danish experience.

Vaccaro (2018) documents that the 2006 Swiss reform reduced the unexplained gender wage gap by 3.5 percentage points in firms with 50 or more employees after 2006. However, the effects on the raw wage gap that accounts for about a 1.5 percentage point decrease is smaller than on the unexplained wage gap. Hence, the policy is successful in reducing the wage discrimination as measured by the unexplained GPG according to the Swiss formula. Decomposition shows that the results were driven by workers with characteristics including upper secondary education, independent working, and have less than 1 year of tenure. Thus, it is consistent with employers focusing on eliminating the unexplained GPG for new hires only.

The transparency induced reduction in the gender wage gap is also supported by evidence based on a broader set of identification strategies. Obloj and Zenger (2022), in the US academic context, show pay transparency's sizeable effect on improving pay equality and reducing pay variance within departments and institutions by nearly 20 percent. In the within firm analysis of Castilla (2015), it is also documented that increased pay transparency and accountability was associated with a reduction in the observed pay gap by gender, race and foreign nationality when allocated pay rewards based on performance evaluations.

Finally, additional evidence is found in more qualitative analysis. In the special setting of veterans in the US, Maxwell et al. (2019) conclude that pay transparency in the Veteran Health

Administration, along with an effort to use rational and objective criteria to establish and adjust salaries, can reduce and potentially eliminate gender pay disparity. Conley and Torbus (2018) discuss pay transparency laws in 3 countries, namely the UK, Poland and Italy. Ahrens and Scheele (2022) discuss the German experience, and Canales (2018) discusses the US experience. All three papers argue that transparency is an effective tool for narrowing the GPG.

Even though most studies find that gender wage transparency reforms causally reduce the GPG, the findings are not universal. In the context of the Austrian transparency reforms, two simultaneous studies find that the reform had no effect on the GPG. Using a regression discontinuity research design, Böheim and Gust (2021) find no evidence that the Austrian transparency reform had significant impacts on either male or female wages and thus lead to no reduction in the Gender Pay Gap. Gulyas et al. (2021) focused on smaller firms than Böheim and Gust (2021) and they estimate that the reform cannot narrow the gender wage gap by more than 0.4 percentage points.

Naturally, there are many reasons why some studies find no-results even if the majority of other studies find that transparency causally reduces the GPG. We documented that most of the studies use the same methodology (difference-in-difference and regression discontinuity design), hence methodology is not likely to be the explanation. However, as we have seen in the previous section, reforms differ in structures and coverage.

Böheim and Gust (2021) and Gulyas et al. (2021) suggest that one possible reason is that the employees do not know about the law. The Austrian reform does not require firms to publish the gender wage statistics publicly. Contrary to this, the UK reform makes the data public for everyone to see. However, this argument is not valid when compared to the Danish reform, which was similar to the Austrian reform in that the data was directed to be used inside the firms. The Austrian and Danish firms are also very similar in size, whereas the UK firms are, in general, significantly larger.

Finally, further ‘no-effects’ are documented by Burn and Kettler (2019). They find that prohibition of pay secrecy bans have no effects on the gender wage gap in the setting of 11 states in the US. Obviously, their methodology is different from the others mentioned above.

To sum up, literature concerning the impact of pay transparency on the gender wage gap is currently small but growing rapidly.¹⁶ Accumulating evidence, both quantitatively and

¹⁶ As mentioned in footnote 5, there is a larger related literature on the effect of wage transparency on remuneration that goes beyond the GPG. Gomez and Wald (2010) evaluate the impact of the Public Sector Salary Disclosure Act in the province of Ontario. They find that salaries of university presidents in the province increased 2.5 percent after disclosure relative to the average public-sector salary. The disclosure also led to higher growth in average

qualitatively, has shown that transparency reforms do indeed lead to reductions in the pay gap between men and women for same value jobs. It is also worth noting that the recent papers use state of the art identification strategies and exploit different policy reforms to generate exogenous variation in pay transparency. Thus, the literature has provided strong evidence supporting the causal effects of reforms' on the relevant GPGs.

Not surprisingly, there are variations in the evidence across countries. It is worth highlighting that papers based on the same policy reforms tend to find similar results. For example, the three papers on the UK reform all find that the reform has reduced the GPG in the UK. Similarly, the two papers on the Austrian transparency reforms both find that there has been no impact on the GPG in Austria. This supports the argument that the structure, coverage and institutional context of the reforms are more important elements in understanding the impact on the GPG than the applied empirical strategies, which, in general, are similar and of high quality.

We have already mentioned one way that reforms can differ, i.e., whether the reform requires data to be publicly observable or is only meant to be used within a firm. Coverage is another important element of reforms. Gulyas et al. (2021) highlight that a large part of the Austrian gender pay gap is due to the wage gap between the firms and between industries that have not yet been targeted by the Austrian reform.

Another reform difference that may contribute to differences in impacts on the GPG is the penalties on firms that do not comply with a reform. For instance, in Denmark, the penalty is weak and not a real threat for firms. In the UK, the firms that do not comply are publicly shamed by being on government lists. In Switzerland (2006 reform), the penalty is a ban on participation in public sector procurement programs. The potential penalty will obviously impact the employees' internal bargaining power and the pressure on firms from outside. The UK study finds evidence for the importance of public shaming, i.e., that UK firms publishing low gender equality indicators are ranked low in the YouGov Women's Ranking. As a result, publicly listed

professorial salaries in Ontario relative to other provinces. The effect of transparency on pay equity is studied in Mas (2017). This paper exploits a law change in California that required online disclosure of municipal salaries. Mas finds that the increased transparency induces a significant compression in salaries. Among top managers, disclosure led to approximately a 7 percent average decline in compensation. Cullen and Pakzad-Hurson (2019) develop a dynamic bargaining model and test the equilibrium predictions regarding the introduction of pay transparency using data from an online labour market. They find that higher transparency lowers wages on average but leads to less wage dispersion across workers.

firms experience a 35-basis-point average fall in cumulative abnormal returns in the days following publication of this gender equality ranking data.

On the institutional context side, it is possible that the degree of collective bargaining is important. It may be that, if a large share of employees is under collective bargaining, the firm level transparency is less powerful in impacting the firm level GPG. However, empirically the Danish labour market is highly dominated by collective bargaining and Baker et al. (2022) also document that the more unionized the universities in Canada are, the greater the effect the Canadian reform had on reducing the GPG.

An open research question is what part of the GPG transparency is reduced by more transparency. Studies vary significantly in how they measure the GPG and only Vaccaro (2018) explicitly analyses the impact on the unexplained part of the GPG which is the target of the 2006 Swiss reform.

5.4 The Channels: How is the gender wage gap reduced?

To put the following discussion into perspective we begin with a simplified description. Assume a firm consists of male and female employees and that productivity and labour allocation are constant. At the very basic level, the GPG is reduced either because women's wages increase more than men's or because men's wages stall relative to women's wages. This can happen because the female wage trend accelerates and/or because the male wage trend slows down. From a stakeholder perspective, the actual channel is important. If women's wages increase more than those of men, and men's wage trend is unchanged, profit will fall under the assumption of constant productivity. On the other hand, if men's wages fall and women's wages are unchanged, profits would increase in this simple setting. Furthermore, there are distributional consequences for stakeholder groups such as male dominated unions, female dominated unions, employer organizations, politicians and gender focused NGOs. They will all have vested interests in how the GPG is reduced.

The assumptions of constant productivity and labour allocation highlight the basic distribution argument. In reality, however, changes in relative wages affect more than wages and profit. In particular, the reduction in the gender wage gap may impact labour allocation through entry (hiring), exit (firing or voluntary exit) and promotion, all of which will have an effect on labour productivity. We leave the issue of how transparency reforms impact labour allocation, productivity and employee health to the following subsections.

Several studies have documented that wage transparency reduces the gender wage gap through a reduction in the growth rate of male employees' wages, while the growth rate of female employees' wages remains unchanged or has a small increase.

In Bennedsen et al. (2022a), wages of male employees in treated firms grew 1.7 percentage points slower than the wages of male employees in control firms. The effect is statistically significant at the 1 percent level and economically important. In contrast, the female wages in the treated firms only increased by 0.3 percentage points more than female wages in control firms. There was a sharp drop in male wages in treated firms from the first year of the Danish reform in 2006, which continued until 2008.

The analysis of the UK pay transparency reform supports the evidence above. Blundell (2020) reports that the decline in the gender wage gap is due to a decline in the male wages in the affected firms and is not due to a change in the workforce composition. Duchini et al. (2020) document a reduction in male's real hourly wage by 2.8 percent but did not find significant changes in women's wages.

Not all papers support the notion that the main channel is through stalling the growth in male wages. Baker et al. (2022) show an increase in female wages among university employees in Canada, but argues that it is imprecisely estimated in the models that include individual fixed effects. Burn and Kettler (2019) highlight that the pay secrecy ban in the US increases the salaries of the managers by 3.5 percent. Below the median wage, the females experienced a 2.9 percent increase in their wages relative to the men. Above the median wage, male workers experienced a 2.7 percent increase in their wages relative to the female workers. These wage gains were concentrated among managers employed at firms with less than 500 employees. As discussed above, this study does not use the same type of exogenous variation that the UK, Canadian and Danish studies use.

The evidence above focuses directly on how transparency impacts relative wages. There is a growing body of evidence and discussion about what triggers these changes. The Danish study shows that CEOs' social preferences may be an important factor: The improvement in the pay gap was most prevalent in firms where male managers had more daughters than sons. In these companies, female wages rose 5 percent more than the rest of the mandatory reporting group, closing the gender pay gap by a further 2.4 percent. This is consistent with the notion that men with diverse home lives are more progressive about bringing diversity and equality into the workplace.

Baker et al. (2022) discuss a broader set of arguments, including that firms may respond to wider public attention to pay disparities brought about by the transparency laws. Therefore, adjustments in salaries may take place to maintain public relations. This is consistent with their finding that the effect of salary disclosure laws is more pronounced in unionized workplaces. It is also consistent with the reputation channel discussed above in the case of the UK public shaming of firms with a high GPG. Thus, transparency makes managers more accountable for the individual

bargain, which leads to more focus on observable measures when bargaining over wages, and this may bias towards more equitable wage allocation (see the discussion in Castilla, 2015).

These arguments are consistent with findings in, Obloj and Zenger (2022). In the US context, they provide evidence that pay transparency can result in significant reductions in the performance basis of pay. The financial rewards linked to the observable performance metrics as well as rank advancement decline substantially. They argue that more transparency may induce institutions to focus on adjusting wages of those who, on the basis of equality, are underpaid or overpaid.

Further arguments are found Ahrens and Scheele (2022). They suggest that the implementation of the transparency laws in Germany initiated a public and political debate that may have positive effects in the long run. They argue that after the law took effect, 45 percent of the surveyed firms with more than 500 employees and 43 percent of the firms with between 200 and 500 employees voluntarily reviewed their company's pay structures.

To sum up, whereas the literature is converging around the notion that transparency reforms are an effective tool for reducing the GPG, it has not yet converged around the channel. The first published papers have documented that transparency may reduce the growth of male wages more than it increases the growth of female wages. However, the underlying mechanisms are less clear. Papers have shown the importance of social preferences, the impact on relative bargaining power, degree of unionization, the increased managerial accountability, the pressure from public shaming and the pressure to focus more on equity and less on pay performance sensitivity.

5.5 Effects on labour hiring, separation and promotion

Standard microeconomic theory in its least nuanced form will predict that when female labour becomes more expensive relative to male labour, demand for female labour will fall. However, this partial argument may be counterbalanced by both female employees' strong preference for gender equality in pay and firms reacting to government and public pressure by investing in hiring more women.

Bennedsen et al. (2022a) find evidence that the transparency reform induced firms to hire more women. Mandatory reporting companies hired 5 percent more women in the intermediate and lower hierarchy levels than the control firms, suggesting firms are able to attract more female employees in positions where they offer fairer compensation. This is consistent with the relative supply pool of female employees increasing as gender pay transparency improves. Blundell (2020) supports this argument by arguing that the impact of transparency is induced through female employees' preferences for a low pay gap upon information revelation. A woman would

accept a 2.5 percent lower salary to avoid the employer with a high gender wage gap. Thus, the Danish evidence of an increase in female labour supply is consistent with the UK evidence that women put a premium on gender wage quality. Duchini et al. (2020) investigate this more deeply by combining the register data with textual analysis of job listings. This provides suggestive evidence that treated firms adopt female-friendly hiring practices in advertisements for high GPG occupations as a way to mitigate the effect of public shaming.

In the Danish setting there is no effect of transparency on employees departing the firms, either for men or for women. Transparency increases the number of female employees being promoted from the bottom of the hierarchy to more senior positions. Low-level female employees in firms that reported their gender pay gap were also more likely to get promoted to higher levels after the passage of the law.

Contrary to the European evidence, Obloj and Zenger (2022) argue that pay transparency in the US enhances mobility, i.e., entry and exit of employees. Those who feel they are unfairly paid may leave these institutions to go to the ones that pay them more fairly. Supporting evidence for managers in the US is found in Burn and Kettler (2019) studying the impact of the law banning pay secrecy. They show that male managers below the medium wages are more likely to exit after the ban on pay secrecy, whereas the tenure of female managers increases.

5.6 Productivity

Given the variety of arguments and heterogeneity of the impact of transparency on labour hiring, promotion and exit, it is not surprising that it has been difficult to establish consensus on productivity results. Whereas the more general literature on wage transparency and labour outcomes does focus on labour productivity,¹⁷ the specific literature on wage transparency and GPG has not.

In fact, the only evidence we found is in Bennedsen et al (2022a) for the Danish transparency laws. Mandatory reporting firms experienced a significant 2.5 percent decline in productivity relative to the control group. However, by the end of the analysed time window, the mandatory reporting firms' overall wage bills were 2.8 percent lower than those of the control firms. Thus, the decline in productivity is fully offset by the saved wage costs, i.e., the increased transparency did not impact firms' net income.

¹⁷ In a field experiment paper, Cullen and Perez-Truglia (2018) studied a multibillion-dollar corporation with 2,060 employees which reports salaries of peers and managers. They find a strong incentive effect on labour effort: higher perceived peer salary lowers employee effort. However, higher perceived manager salary increases employee effort. Similar results are found in Breza et al. (2018). They find that the ability of Indian manufacturing workers to learn about their peers' salaries led to lower productivity.

5.7 Health

We have seen that transparency about gender differentials in wages reduces the gender wage gap and has impact on labour allocation. Through these channels, it is likely that gender wage transparency impacts job satisfaction and employee health.¹⁸

Bennedsen et al. (2022b) investigate the impact of the 2006 Danish transparency law on employee health. To circumvent the challenge of finding a reliable measure for employee health, they use administrative data from the Ministry of Health on mental health prescription drug use. Their analysis is built upon the premise that an increase (decrease) in prescriptions for mental-health medications is in response to a worsening (improvement) of employee (mental) health. Again, the authors apply difference-in-difference and regression discontinuity designs as described above but now with the use of mental-health drugs as the endogenous variable.

The authors find evidence that mental health prescription drug use was reduced after the implementation of the Danish reform for women in treated firms relative to women in control firms. Furthermore, they did not find statistically significant changes in the prescription drug use of men after the reform when comparing men in treated versus control groups. They also find supporting evidence using regression discontinuity methods, which do not rely, to the same extent, on the control groups and treatment groups being similar on average.

There can be several reasons a gender wage transparency reform improves employee health; however, the authors provide two types of evidence that link it to the reduction in the gender wage gap. The first is that the transparency reform did reduce the gender wage gap. As discussed above, this happened through an unchanged path in female wage growth, which supports the notion that it is the reduction in the gender wage gap (and not an increase in female wages) that improves women's mental health in the treated firms. Second, the authors document that the largest reduction in consumption of prescription mental health medication happens for women in firms that had the highest gender wage gap before the reform. The reform reduces the GPG most in these firms, which provides evidence that the improvement in the mental health is linked to the reduction in the gender wage gap.

¹⁸ The connection between wage transparency and job satisfaction is established in several papers. Card et al. (2012) use a randomized information experiment to show that pay transparency reduced the well-being of university faculty in departments where they earned below median pay in California. For staff or faculty whose salaries are lower than the median for their unit and occupation, the point estimate for their happiness index is -6.3, which implies a 1/10 of a standard deviation shift in the index relative to control groups. Similarly, Perez-Truglia (2020) finds a reduction in well-being following a reform in Norway that made the entire population's tax records publicly accessible online.

6. Implementation costs of pay transparency policy reforms

Academic research generally ignores the cost of implementing pay transparency reforms. Costs can take a variety of forms for example the cost of setting up administrative systems to measuring wages, making reports and arranging informational and/or formal meetings with employees and their representatives. Costs can be levied on firms, employees, and institutions such as employer organizations. In this Section, we briefly discuss implementation costs related to the different EU pay transparency categories. We focus on the direct costs of implementation of reforms of Category 1-4 as defined in Section 4.

Generally, EU pay transparency policy mainly triggers the following direct costs including, but not limited to, (1) extra salary paid to administrative staff to collect and collate salary data; (2) compliance costs, such as initiating equality plans, keeping salary records, undertaking pay audits; (3) cost of hiring external experts for analysing data and writing reports; (4) cost of developing and upgrading software for evaluating the gender pay gap; (5) cost of training, etc.

As academic research that provides quantitative estimates of the costs of pay transparency policies have yet to be undertaken, our only source of data comes from country level survey data. Several European countries, including Cyprus, Germany, Hungary, the UK and Spain, under EU pay transparency reforms (though different specific categories) have experienced direct administrative costs (Veldman, 2017).

In terms of administrative costs, the Swedish Agency for Public Management (the Government's organization for analysis and evaluation of state and state-funded activities) estimated the yearly cost for pay audits to be 80 euro per employee in 2011. Similarly, Germany estimated firms that comply with 2017 reform spend around 100,000 EUR on hiring external experts (EPSCF). Other than monetary costs, Austrian firms are estimated to spend 90 minutes on information gathering, 180 minutes on calculation, 120 minutes on preparing reports, and 20 minutes on sending reports to working councils or making them accessible to all employees, which adds up to 7 hours per company (EC, 2019-21).

Apart from that, high legal costs also prevent employees from pursuing legal action to enforce equal pay laws. In some countries, (Denmark is an example), governments make it free of charge for employees to bring a complaint before the Equal Treatment Board. However, there are still many countries that charge the party who loses the case. In summary, taking legal action on equal pay claims tends to be expensive, complex, and time-consuming (10+ years to resolution in several cases), indicating that even better-off individuals may be unable to pursue litigation. (EPSCF).

Another cost-inducing challenge is to properly define “equal work”. Equal value work refers to “employees who perform substantially the same kind of work that requires the same kinds of skills, effort and responsibilities in the same establishment under the same working conditions.” (Equality and Human Rights Commission, 2010). In Section 3 we discussed how this is defined in the academic literature, but it is indeed even more challenging to undertake in practice in firms, especially for small ones. Often, firms are guided to use some form of ISCO code categorisation. Another issue is that small firms may lack enough employees of both genders if categories are defined too narrowly, making the comparison invalid. On the other hand when job categories are defined too broadly, the estimated gender wage differences are not necessarily based on comparable jobs.

National administration, employers, firms and social partners (workers’ representatives or unions) are the key stakeholders that bear these costs. Based on EuroFound Survey (2021), regardless of whether costs fall on employees or firms, the ex-ante costs of implementing these policy measures are quite small compared to their potential gains. Overall, Germany claimed it would cost 2.9 million euros annually to cover the costs of all businesses effected under pay transparency legislation. That figure for Austria is 369,600 euros in 2010, 85,000 euros for Denmark in 2005, and 4.5 million euros for UK in 2017 (EPSCF).

It is hard to disentangle how much of the cost is borne by each stakeholder, what the marginal benefits of improvements or cost reductions of the new policy are, or what the gain/loss ratio for individual employees are under pay transparency policy without structural estimations or other empirical testing, which leaves a void for further academic research to fill.

7. Conclusion

The existence of the gender pay gap has generated an important debate both in academic studies and in political circles. Recently, governments around the world have proposed gender wage transparency as a tool for nudging firms to reduce the wage gap between men and women. As we have shown, this is a key focus of the EU gender wage policy and many policy reforms aimed at increasing gender wage transparency have been implemented both within EU countries and in OECD countries outside EU.

Empirically investigating the effect of gender pay transparency as a measure to reduce gender pay discrimination within firms is challenging because it requires finding both exogenous variation in transparency and detailed information on employee wages. A number of studies have focused on policy reforms in Austria, Canada, Switzerland, the UK and the US. These studies derive causal evidence using regression discontinuity and/or difference in differences estimation comparing firms covered by a reform with firms not covered.

Our main insight is that several recent studies show that increased transparency causally reduces the gender wage gap. It is documented for Canada, Denmark, Switzerland and the UK that policy reforms providing more wage transparency have caused the gender pay gap to decrease. In addition, these studies also have provided some evidence for that effect is mostly through a stagnation in men's wage increases than because women are paid higher wages.

Pay transparency reforms increase the administrative cost burden on employers, reduce working efficiencies or well-being levels of some employees due to unnecessary peer comparisons, comes into conflict with privacy laws in certain countries or violates cultural norms where people are reluctant to talk about salaries ("salary taboo"). The existing evidence on implementation costs is consistent with the notion that implementation costs are relatively small.

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Country	Categories				Transparency Law, Reform or Advice with year of implementation in brackets.	Content	Published articles and Research Papers on the impact of transparency on the Gender Wage Gap included in this survey.
	1	2	3	4			
Austria		X			Equal Treatment Act and Federal Equal Treatment Act, 2011 amendments. Private and Public Sector.	(1) to state the minimum wage in job vacancy advertisements and (2) to present bi-annual income reports for companies with more than 150 employees, that include as a minimum the number of men and women in each remuneration group and their mean and median wages.	Gulyas et al. (2021) Böheim and Gust (2021)
Australia		X			Workplace Gender Equality Act, 2012.	Firms with more than 100 employees shall annually report gender-based wage statistics.	
Belgium		X	X		Gender Pay Gap Act 2012	Firms with more than 50 employees shall every two years provide a social balance sheet that includes gender-based wage data.	

Canada		X		Pay Transparency Reform (2018), Employment Equity Act, 2019 (first reports due 1 June 2022); Employment Equity Regulations, 2021; Pay Equity Act, 2021	From 2022 there will be a published pay report on the national level broken down to company levels for firms with more than 100 employees. For the entire labour market, there is a Pay Transparency Act recently introduced in Ontario that: (a) requires all publicly advertised job postings to include a salary range, (b) prohibits employers from asking about past compensation, and (c) mandates that employers report gender earning gaps to the province.	Baker et al. (2022)
				University Reforms Rolled out Since 1996.	On regional levels pay transparency reforms for university employees have been rolled out. In 1996, British Columbia, Manitoba and Ontario implemented the first reforms. In each case, the government mandated disclosure of all university salaries exceeding a certain threshold—\$50,000 in British Columbia, \$50,000 in Manitoba, and \$100,000 in Ontario.	
Denmark		X	X	Equal Pay Act, section 5a, since 2006. Amended in 2014 and 2016	Employers with at least 35 employees should provide gender-disaggregated pay statistics for groups of minimum 10 persons of each gender with the same function to the employee representative. Alternatively, employers can agree with employees to draw up a report on equal pay, describing factors and initiatives (for a period of 1-3 years). Lack of compliance may	Bennedsen et al (2022 a) Bennedsen et al (2022 b)

						result in fines. Reports may be substituted with a pay audit.	
Estonia		X			Changes to Gender Equality Act – not passed yet	Monitoring and reporting of GPG in government intuitions. At the time of writing, the law had not been implemented and the private sector had been excluded after lobbying.	
EU	X	X	X		EU proposal on Equal Pay Agreed Upon Dec 21 (Commission) and April 22 (Parliament). EU Pay Transparency Program launched in 2014: “equal pay to equal value work” (Article 4 of the Directive 2006/54/EC) and Commission Recommendation directive 2014/124/EU.	Employees have access to the objective and gender-neutral criteria used to define their pay and career progression. Employers with at least 250 employees have to provide, on an annual basis, information such as the pay gap between female and male workers in their organisation. If pay reporting demonstrates a difference in average pay levels of at least 5%, employers with at least 250 workers will have to conduct a pay audit.	
Finland	X		X		Act on Equality between Women and Men (1986/609) 2014 Public sector: Nimikirjalaki (1989/1010)	Finish rights to obtain information date back to 1989. An individual can (potentially through a trade union) require information if the person suspects pay discrimination. Pay in the public sector is in principle public. Pay audits are compulsory for all firms and	

						public organization with more than 30 employees either every two or three years.	
France			X	X	First law in 2012.	France has written GPG issues into the general labour law. Since 2016, publication of data in the Economic and Social Database (Base de données économiques et sociales, BDES) Since 2017, GPG is part of an annual negotiation for companies with more than 50 employees.	
					Law on Gender Equality Index 2018: Loi n° 2018-771 du 5 septembre 2018		
Germany	X	X	X		2017: Pay Transparency Act (Entgelttransparenzgesetz, EntgTranspG)	Employees in workplaces with more than 200 employees have the right to receive specific wage information for a group of colleagues with opposite gender and same type of work or who work with the same value. It is estimated that 40 pct of the female labour force has this right. Companies with 500 and more employees must report the gender pay gap and measures on equality between men and women and to tackle gender discrimination. Finally, the law includes an optional clause for companies with 500 and more employees to carry out a pay audit, setting out some minimum procedures in the case that it is carried out.	Ahrens and Scheele (2022)

Iceland		X	X	Gender Wage Audit Reform (2015 and 2018)	Workplaces with at least 25 employees are obliged to achieve a wage equality certification every three years. This certification documents that they pay the same wage for the same kind of work and for work of the same value. Work of same type and value is determined through employers, and they are obliged to classify all work tasks against each other. Around 2/3 of the labour market is covered by this law.	
Israel		X		Male and Female Workers (Equal Pay) Law 5724-1964, 2022	Public and private companies with more than 518 employees must report gender segregated wage statistics.	
Italy		X		Article 46 of Code of Equal Opportunities (Legislative Decree no. 198 of 11 April 2006), previously Article 9 of Law no. 125 of 10 April 1991	Companies with more than 100 employees must produce a biannual report including information disaggregated by gender.	Conley and Torbus (2018)
Lithuania		X		Labour Code of the Republic of Lithuania (LC), approved by Law No XII-2603 of 14 September 2016 of the Republic of Lithuania (Art. 23, par. 2, part 1)	Companies with more than 20 employees must provide information on gender wage statistics at least once a year upon the request of a work council or a trade union.	
Luxembourg		X		Chapter V of the law of 15 December 2016, Articles L. 243-1 – L. 243-5 on equal pay for men	Companies of all sizes and in all sectors must inform employee representatives of the gender pay situation.	

				and women and the obligations of the company	There is also a general workplace affirmative action policy implemented.	
				Chapter VI of the law of 15 December, Article L. 414-1, L. 414-2(3) and L. 414-4(2) on the attributes of staff representative.		
Norway		X	X	Equality and Anti-Discrimination Act, 2020	All public employers and private firms with more than 50 employees must annually provide an audit that contains average wages according to gender reported per same type of work.	
Portugal		X	X	Regulated by Ordinance No. 55/2010, 2011 and Law no. 60/2018	Companies have to provide a yearly report about social activities which include the signing and termination of contracts, overtime, training, income and gender issues. Companies also have to provide wage data which is collected and published.	
Spain	X	X	X	Article 28.2 of the Workers Statute and Articles 5 and 6 of Royal Decree 902/2020, of 13 October 2019	Companies with more than 250 shall provide gender wage reports and yearly audits. Since 2019 companies with more than 50 employees shall provide gender wage data.	
Sweden			X	Swedish Discrimination Act (2008:567) and 2014.	1994: The requirement of annual pay audits is introduced. 2001: The unions gain greater influence and achieve greater transparency in the pay auditing process. 2003: And discrimination act induced.	

Switzerland		X		<p>Swiss Logib 2006</p> <p>Swiss Federal Act on Gender Equality, 2020</p>	<p>A regression framework that firms can use to monitor their wage policies. The regression includes observable measures of productivity related characteristics and a gender dummy. According to the policy, targeted firms should look at the magnitude and statistical significance of their estimated gender coefficient to test whether their wage policy is discriminatory. Firms with more than 50 employees are subject to random controls, but sanctions may lead to exclusion from public procurement.</p> <p>Private and public sector firms with more than 100 employees. Employers shall conduct an equal pay analysis looking at gender pay differentials and have said audit approved by auditors. Employers are exempt from future audits if no gender wage gap is found.</p>	Vaccaro (2018)
United Kingdom		x		Equality Act 2010 (Gender Pay Gap Information) Regulations 2017 (private and not-for-profit sectors)	UK (2017): Employers with more than 250 employees must publicise statistics on how men and women are paid on average. Specifically, employers must report the gender-based difference in average and median hourly wages and average and median bonuses. This reform covers 41 pct of all employees in the labour market.	Blundell (2020)
				Equality Act 2010 (Specific Duties and Public Authorities) Regulations 2017 (public sector)		Duchini et al. (2020)
				Conley and Torbus (2018)		

USA				National Labor Rights Act (NLRA) and State level reforms.	Laws that ban corporate pay secrecy.	Burn and Kettler (2019)
						Obloj and Zenger (2022)
						Maxwell et al. (2019)
						Castilla (2015)