DISCUSSION PAPER SERIES

Sexual Orientation and Earnings. A Meta-Analysis 2012-2020

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ABSTRACT

Sexual Orientation and Earnings. A Meta-Analysis 2012-2020

This meta-analysis utilizes 24 papers published between 2012-2020 that focus on earnings differences by sexual orientation. The papers cover the period between 1991 and 2018, and countries in Europe, North America and Australia. The meta-analysis indicates that gay men earned less than heterosexual men. Lesbian women earned more than heterosexual women, while bisexual men earned less than heterosexual men. Bisexual women earned less than heterosexual women. According to the meta-analysis, in data sets after 2010, gay men and bisexual men and women continue to experience earnings penalties, while lesbian women continue to experience earnings premiums. The meta-regression estimates indicate relationships between study characteristics and the estimated earnings effects for sexual minorities. For instance, regions, sexual minority data set sizes, and earnings classifications influence the outcomes. The persistence of earnings penalties for gay men and bisexual men and women in the face of anti-discrimination policies represents a cause for concern and indicates the need for comprehensive legislation and workplace guidelines to guarantee that people receive fair pay and not experience any form of workplace inequality simply because of their sexual orientation.

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1. Introduction

Since the seminal work of Badgett (1995), an increasing number of studies have examined the earnings differences between sexual orientation majorities and minorities. Research has found that between 1989 and 2014, gay men tended to experience earnings penalties of 9 percent compared with heterosexual men (Drydakis, 2014). The earnings penalties varied from 16 percent in the US to 4 percent in the Netherlands (Drydakis, 2014). Studies have also found that, on average, lesbian women had higher incomes than comparable heterosexual women (Valfort, 2017). According to estimates, lesbian women, during the period 1989–2014, earned on average 12 percent more than comparable heterosexual women (Drydakis, 2014). The highest-earning premium was estimated to be 20 percent in the US, while the lowest was 3 percent in the Netherlands. Only in Australia and Greece did lesbian women receive lower earnings than comparable heterosexual women, with figures of 28 percent and 8 percent, respectively (Drydakis, 2014). Numerous studies have reached the same conclusion regarding gay men's earnings penalties and lesbian women's earnings premiums (Valfort, 2017; Köllen, 2016; Klawitter, 2015; Ozeren, 2014).

Gay men's earnings penalties underwent evaluation through theories of distastes against minorities (Becker, 1957) and/or uncertainties concerning minorities' performance (Arrow, 1973). The labor market penalties for gay men should bear a direct connection to the strength of firms' antipathy to minority populations (Drydakis, 2009; Charles and Guryan, 2008) and/or uncertainties regarding minority populations' vocational behavior (Pager and Karafin, 2009). Hypotheses posit that if gay men do not conform to traditional gender roles related to masculinity and leadership perceived to boost employees' performance, such a situation might result in unfavorable evaluations and earnings penalties (Köllen, 2016). Studies have found that, for gay men, employment penalties might stem from distastes and uncertainties regarding their credentials (Baert, 2018; Drydakis, 2012).

Arguments focusing on lesbian women's earnings premiums in relation to masculine characteristics, which stereotypically characterize lesbian women and demonstrate leadership, have been utilized to evaluate their experiences (Drydakis, 2011; Clain and Leppel, 2001). Moreover, indications suggest that if lesbian women invest more heavily in market-oriented human capital by staying in school and choosing a major that leads to higher earnings and longer working hours, such choices can influence their workplace outcomes (Jepsen, 2007; Elmslie and Tebaldi, 2007; Black et al., 2003). Furthermore, a peripheral explanation for the lesbian earnings premium may revolve around women with children earning less than women without children (Antecol and Steinberger, 2011; Waldfogel, 1998). Lesbian women might prove less likely to have children than married women, so it makes sense that they may earn more because of their commitment to the labor market (Baert, 2014; Waldfogel, 1998). Additionally, lesbian women might show more dedication to the

labor market because they are less unlikely to engage with a higher earning (male) partner who would provide for them (Antecol and Steinberger, 2011). If this is the case, lesbian women might invest more in a workplace career.

The present study aims to offer a meta-analysis of earnings differences based on sexual orientation. The study focuses on papers published between 2012 and 2020 and covers the period spanning 1991 to 2018. Meta-analyses enable an evaluation of previous research's findings and derive on a phenomenon (Klawitter, 2015; Stanley and Jarrell, 2005; Weichselbaumer and Winter-Ebmer, 2005; Hunter and Schmidt, 1990). Klawitter (2015) offers a meta-analysis on sexual orientation and earnings on papers published between 1995 and 2012. The present study contributes to the literature by providing outcomes on earnings differences for four sexual minority population groups, namely, gay men, lesbian women, bisexual men, and bisexual women. Klawitter (2015) focuses on gay men and lesbian women. Additionally, the present study covers a wider period, enabling a more thorough examination of whether the last decade, i.e., since 2010, saw a change in earnings patterns based on sexual orientation. This element improves integral because studies from the US, Britain, and Canada utilizing data sets after 2010 found that gay men can experience higher or the same earnings as comparable heterosexual men (Wang, 2018; Carpenter and Eppink, 2017; Bryson, 2017; Dilmaghani, 2018). Moreover, studies from Britain and Australia utilizing data sets after 2010 found that lesbian women can experience lower or the same earnings as comparable heterosexual women (Bryson, 2017; Sabia et al., 2017). The present study examines whether, since 2010, gay men and bisexual people have experienced lower earnings penalties, in addition to determining whether lesbian women tend to experience smaller earnings premiums.

Drydakis and Zimmermann (2020) indicate that although an improvement in gay men's earnings is welcomed, it may give erroneous signals in countries where socio-political changes still do not favor gay men. Additionally, the assigned lower earnings for lesbian women require attention. It remains puzzling to observe that lower earnings for lesbian women might have arisen in a time of social progress and changing attitudes towards sexual orientation minorities (Drydakis and Zimmermann, 2020). For lesbian women, the combined effect of sex and sexual orientation and its impact on earnings introduces new challenges. Being a woman and a sexual orientation minority can constitute double jeopardy (Drydakis and Zimmermann, 2020).

The present meta-analysis indicates that between 1991 and 2018, gay men, bisexual men, and bisexual women experienced earnings penalties. During that period, lesbian women experienced earnings premiums. Additionally, the study finds that after 2010, gay men and bisexual people continue to experience earnings penalties, while lesbian women continue to experience earnings premiums. Controlling for key heterogeneity, such as region, sample size, earnings, and sexual orientation classification, meta-regression estimates suggest that after 2010, gay men and

bisexual people face lower earnings penalties. However, the estimated patterns do not prove robust across different empirical specifications. The study concludes by indicating that persistent earnings penalties for gay men and bisexual people in the face of socio-political changes and anti-discrimination policies represent a cause for concern.

The remainder of the study is structured as follows. Section 2 presents the sample. Section 3 offers the descriptive statistics of the sample. Section 4 presents the empirical strategy. Section 5 presents the summary statistics for meta-regression samples. Section 6 offers the meta-analysis outcomes. Section 7 provides a discussion. Section 8 presents the study's limitations. Finally, Section 9 offers conclusions.

2. The sample

This study adopts a systematic literature review approach (Ozeren, 2014) and applies a multi-faceted framework comprising the planning, conducting, reporting, and dissemination of relevant research (Tranfield et al., 2003). The present study's search criteria follow that of Klawitter (2015), which represents the first meta-analysis of sexual orientation and earnings, and covers 34 studies. The initial planning involved identifying the subject matter domain, namely, earnings differences based on sexual orientation, and the primary data extraction source, Google Scholar. Aligning with Ozeren (2014), in the conducting phase of the systematic review, the study (i) identified keywords, (ii) defined selection criteria and papers to be extracted, (iii) evaluated abstracts to determine the papers' relevance, and downloaded the screened papers, and (iv) evaluated the downloaded papers.

English-language papers published between 2012 and 2020 were searched with the following keywords: 'Sexual orientation; LGB; gay; lesbian; bisexual; regression; earnings; wages; income'. The identified titles and abstracts underwent screening to assess whether the studies presented multivariate analysis on earnings differences based on sexual orientation. Given the eligible criteria, the focus remained on reported estimates for gay men's earnings versus heterosexual men's earnings, lesbian women's earnings versus heterosexual women's earnings, bisexual men's earnings versus heterosexual men's earnings, and bisexual women's earnings versus heterosexual women's earnings. Studies merging sexual minority groups and comparing them against sexual majorities, such as gay and bisexual men's earnings versus heterosexual men's earnings, did not form part of the research. Studies offering intersectional estimates, such as black lesbian women's earnings versus white heterosexual's women earnings did not feature.

The framework of Moher et al. (2009) is applied to present the searching process. A Google Scholar search enabled the identification of 1,920 papers against the keywords. The titles and abstracts underwent evaluation against the eligibility criteria, and 1,889 papers were excluded.

Thirty-one full papers were assessed against the eligibility criteria, with seven papers being excluded. At the end of the process, the meta-analysis sample comprised 24 papers.

Estimates on full-sample sizes were preferred. However, papers reporting estimates per period, per sector, and per earnings classification formed part of the sample. All estimates are informed for basic demographic characteristics, such as age and education. In line with Klawitter (2015), the present study includes estimates from regression models incorporating the largest covariates. However, the study avoided including estimates from models incorporating interaction effects. In all studies, earnings/wages/income estimates were reported and interpreted as percent effects, the standard interpretation in log earnings ordinary least squares regressions. Hence, the estimate on the coefficient of being a sexual orientation minority shows the gap in average log earnings associated with being non-heterosexual, which potentially reflects negative or positive discrimination (Badgett, 1995; Valfort, 2017; Köllen, 2016) or other differences associated with sexual orientation, such as family arrangements, number of children, and human capital decisions (Antecol and Steinberger, 2011; Jepsen, 2007; Waldfogel, 1998).

3. Descriptive statistics

Table 1 offers summary statistics of the meta-analysis sample and includes 29 estimates for gay men, 24 estimates for lesbian women, 13 estimates for bisexual men, and nine estimates for bisexual women. The findings show that gay men's earnings were 7.4 percent lower than the earnings of comparable heterosexual men. Lesbian women's incomes were 7.2 percent higher than the earnings of comparable heterosexual women. Bisexual men faced earnings 9.3 percent lower than those of comparable heterosexual men, while bisexual women experienced earnings 4.7 percent lower than heterosexual women.

[Table 1]

In terms of regions, 30 percent of the estimates were from the US, followed by 20 percent from Canada, 16.6 percent from Australia, 13.3 percent from the UK, and the remainder from European Union countries. Figures reveal that 36.6 percent of the estimates capture patterns after 2010. Moreover, in 40 percent of the cases, the earnings variable consisted of annual earnings, with the remainder being hourly or weekly earnings. In half of the cases, questions on same-sex living arrangements captured sexual orientations. The remainder used questions on sexual behavior or/and self-identification. In 46.6 percent of the cases, the sexual minority sample size was higher than a thousand observations. Heckman selection models were used in 30 percent of the cases. Meanwhile, 23.3 percent of the cases have controlled for health/mental health status. Table 1 provides information on the study's variables and variables' coding.

Table 2 offers summary statistics on earnings differences per explanatory variable. For instance, earnings differences are offered per period, region, and sample size. The findings show that, after 2010, gay men experienced earnings 3.4 percent lower than the earnings of heterosexual men. However, before 2010, gay men's earnings were 9.9 percent lower than the earnings of comparable heterosexual men. Moreover, gay men in the US earned 11.4 percent less than heterosexual men. In all the other regions, gay men's earnings proved 5.9 percent lower than the earnings of comparable heterosexual men. Klawitter (2015) also found that in more recent and non-US data sets, gay men experienced lower earnings penalties. The remaining statistics in Table 2 undergo similar interpretations.

[Table 2]

4. Empirical framework

Meta-analyses enable the assessment of estimated coefficients from independent studies of the same subject to determine overall patterns (Borenstein et al., 2009; Weichselbaumer and Winter-Ebmer, 2005; Stanley and Jarrell, 2005; Jarrell and Stanley, 2004; Hunter and Schmidt, 1990). The present study follows the guidelines of Havránek et al. (2020) on meta-analysis in economics. The Appendix presents the checklist of Havránek et al. (2020) and evaluates how the study attends to the authors' guidelines in relation to modeling issues and reporting outcomes. The present section offers insights.

The study provides a funnel plot analysis (Song et al., 2013) to assess publication bias (Figure 1). Publication bias occurs when papers with statistically significant results prove more likely to be published than studies with non-significant results (Dubben and Beck-Bornholdt, 2005). Publication bias can lead to meta-analyses that incorporate incomplete empirical evidence and generate summary results potentially biased towards favorable treatment effects (Song et al., 2013).

The study presents forest plot analyses (Schriger et al., 2010). Forest plots enable observation of the earnings differences estimates per study and estimate the combined result derived from pooling the individual estimates (Schriger et al., 2010, Cuzick, 2005). Random effects specifications are provided when gauging the forest plots because the effect size is not the same for every study (Flage, 2020; Klawitter, 2015). The consideration was confirmed by conducting x^2 heterogeneity tests (Higgins and Thompson, 2002). Due to heterogeneity in the meta-analysis sample, random effects proved preferable to fixed effects (Higgins and Thompson, 2002). Forest plots are presented for gay men (Figure 2), lesbian women (Figure 3), bisexual men (Figure 4), and bisexual women (Figure 5). Sub-sample forest plots assess the robustness of the outcomes. For instance, the study assesses patterns in recent data sets, namely, after 2010 (Figures 6 and 7).

Upon presenting the forest plots, meta-regression is offered. Forest plots focus on the value of the effect of interest, namely, earnings differences for sexual minorities, while meta-regression examines the explanatory variables that influence such an effect (Schriger et al., 2010; Borenstein et al., 2009; Harbord and Higgins, 2008). Due to the observed heterogeneity in the meta-analysis sample, it is recommended that random-effects meta-regression models be run (Borenstein et al., 2009; Harbord and Higgins, 2008). Additionally, because a publication bias was not confirmed, random-effects specifications prove more suitable than alternative empirical specifications such as unrestricted least squares (Stanley and Doucouliagos, 2015).

The following equation illustrates the general meta-regression line:

$$\textit{Sexual Orientation percent diff}_s = b_0 + bV_s + \varepsilon_s \qquad\qquad \textit{Equation 1}$$

where *Sexual Orientation percent diff$_s$* constitutes the estimate of the percentage difference in earnings between sexual orientation minorities and majorities from each study; s and b_0 is the constant term. The explanatory factors, V_s, are the study characteristics, namely, period, region, and earnings classifications. Each explanatory factor coefficient estimates the average effect on the earnings differences for sexual minorities (Borenstein et al., 2009). *Equation* 1 calculates the standard errors, ε_s with Knapp-Hartung modification, limiting the rate of false positives (Klawitter, 2015; Harbord and Higgins, 2008; Knapp and Hartung, 2003). Simulations have shown that the Knapp-Hartung modification performs better than other techniques, such as DerSimonian and Laird (1986), especially when there is heterogeneity and the number of estimates in the meta-analysis remains small (Sidik and Jondak, 2005).

Equation 1 is run separately for gay men (Table 3) and lesbian women (Table 4). A sensitivity analysis provides four specifications. The initial model controls for the period, namely, patterns after 2010. Klawitter (2015) has also offered patterns per decade (1990 Census and 2000 Census). Each subsequent model controls for additional covariates such as region and earnings classification.

Due to limited observations, data is pooled for bisexual men and women, and *Equation 1* controls for gender and estimates an interaction effect between gender and period (Table 5). For meta-regression, each model should contain at least ten studies (Borenstein et al., 2009).

To examine the robustness of the outcomes, *Equation 1* pools information for the four sexual minority groups, and interaction effects are estimated between sexual orientation groups and period (Table 6). Moreover, in order not to give more weight to studies offering numerous specifications (i.e., estimates per period, per sector, and per earnings classification) *Equation 1* is estimated by including observations only from those studies utilizing full-sample estimates (Table

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7). Furthermore, to determine the robustness of the outcomes the sample is restricted in sub-periods, namely, before 2010 versus after 2010 (Table 8).

5. Meta-analysis outcomes: Earnings differences per sexual minority

5.1 Publication bias: Funnel plot

In Figure 1, a funnel plot analysis (Sterne and Egger, 2001) is reported for the total sample of 75 estimates. The funnel plot displays the earnings differences estimates for gay men, lesbian women, bisexual men, and bisexual women (x-axis), and the standard errors of the estimates (y-axis). Each dot of the plot represents a separate estimate. The middle solid line indicates the overall effect from the meta-analysis, and the two dotted lines on either side represent the pseudo 95 percent confidence intervals. The findings show that the estimates have scattered either side of the overall effect line symmetrically. This situation indicates that publication bias may not be present (Sterne and Egger, 2001). The latter is confirmed by conducting an Egger's test (p-value=0.743) (Egger et al., 1997).

[Figure 1]

5.2 Meta-analysis: Forest plots

Figures 2 to 5 present four forest plots. In each figure, the left-hand column shows the identities of the included studies. A box represents each point effect estimate. The horizontal line in each box represents the 95 percent confidence interval of the result. Similarly, the right-hand column indicates the measure of the estimate and the confidence interval. The meta-analyzed earnings differences are represented on each figure with a dashed vertical line. The diamond at the bottom of the forest plots shows the point estimate and confidence intervals by combining and averaging all the individual estimates (Schriger et al., 2010; Cuzick, 2005).

In Figure 2, the meta-analyzed earnings differences indicate that gay men's earnings were 6.8 percent (p<0.01) lower than the earnings of comparable heterosexual men. Similarly, Figure 3 illustrates that lesbian women's earnings were 7.1 percent higher (p<0.01) than the earnings of comparable heterosexual women. Moreover, Figure 4 shows that bisexual men's earnings were 10.3 percent lower (p<0.01) than the earnings of heterosexual men. Additionally, Figure 5 shows that bisexual women experienced lower earnings by 5.1 percent (p<0.01) than the earnings of bisexual women.

[Figure 2] - [Figure 3] - [Figure 4] - [Figure 5]

To not give more weight to studies that used numerous specifications, a further specification excludes papers that offered estimates per period, per sector, and per earnings classification (Laurent and Mihoubi, 2012; Sabia, 2017; Jepsen and Jepsen, 2020; Preston et al., 2020; Waite,

2015). New forest plots indicate qualitative patterns similar to those presented in Figures 2-5. Gay men's earnings were 5.2 percent (p<0.01) lower than the earnings of comparable heterosexual men. Lesbian women's earnings were 5.3 percent higher (p<0.01) than the earnings of comparable heterosexual women. Bisexual men's earnings were 11.9 percent lower (p<0.01) than the earnings of heterosexual men. Bisexual women experienced lower earnings by 5.3 percent (p<0.01) than the earnings of heterosexual women.

Figure 6 offers a new forest plot analysis based on studies utilizing post-2010 data sets. Due to limited observations, information for gay men, bisexual men, and bisexual women was pooled. The analysis indicates that gay men, bisexual men, and bisexual women's earnings were 4 percent lower (p<0.01) than the earnings of comparable heterosexual people. In Figure 7, a relevant forest plot analysis indicates that after 2010, lesbian women experienced 5.5 percent higher earnings premiums than heterosexual women. The outcomes show that in recent data sets, (i) gay men, bisexual men, and bisexual women continue to experience lower earnings than heterosexual people, and (ii) lesbian women continue to receive higher earnings than heterosexual women.

[Figure 6] - [Figure 7]

5.3 Meta-regression models: The determinants of earnings differences for sexual minorities

Table 3 presents the meta-regression results for gay men. Model I presents that after 2010, gay men experienced earnings penalties 6.5 percentage points smaller (p<0.05) than pre-2010. Additionally, Model II controls for region and earnings and sexual orientation classifications. The results indicate that after 2010, the earnings penalty against gay men is lower by five percentage points (p<0.05) than before 2010. Additionally, the findings show that US studies estimated higher penalties for gay men by 5.3 percentage points (p<0.10). Moreover, the earnings penalty against gay men is higher in studies capturing sexual orientation through same-sex living arrangements (versus self-identification/sexual behavior) by 4.5 percentage points (p<0.10). Model III controls for sexual minority sample size, empirical specification, and information in relation to health/mental health status. The new estimates indicate that after 2010, the earnings penalty against gay men is 6.2 percentage points smaller (p<0.05) than before 2010. In Model III, the remainder of the covariates proves statistically insignificant.

[Table 3]

Table 4 presents the meta-regression results for lesbian women. Models I, II, and III show that period does not moderate lesbian women's earnings premium. Model II illustrates that US studies estimated higher earnings premiums for lesbian women by 6.2 percentage points (p<0.05).

[Table 4]

Table 5 presents the meta-regression estimates for bisexual men and women. Due to limited observations, information is pooled for the two demographic groups. The regression controls for gender and estimates an interaction effect between gender and data sets after 2010. In Model I, results show that bisexual men experienced a higher earnings penalty than bisexual women by 6.5 percentage points (p<0.10). Model II indicates a higher earnings penalty against bisexual people in studies that utilized annual earnings (versus hourly/weekly earnings) by 5.1 percentage points (p<0.10). Model III found that after 2010, bisexual people faced a lower earnings penalty by 13.6 percentage points (p<0.10) than before 2010. The findings show that studies with more than a thousand observations for sexual minorities estimated higher earnings penalties for bisexual people by 5.1 percentage points (p<0.10). US studies estimated lower penalties for bisexual people by 14.4 percentage points (p<0.05). The earnings penalty against bisexual people proves higher in studies that captured income through annual earnings (versus hourly or weekly earnings) by 7.2 percentage points (p<0.05). Studies incorporating information on health/mental health status estimated lower penalties for bisexual people by 20.2 percentage points (p<0.01).

[Table 5]

Table 6 pools observation data for all sexual minority groups. Lesbian women constitute the reference category. Interaction effects are estimated between gay men and data sets after 2010, bisexual men and data sets after 2010, and between bisexual women and data sets after 2010. All models found that gay men, bisexual men, and bisexual women experienced earnings penalties. In Model III, the interaction effects indicate that after 2010, gay men's earnings penalties proved to be lower by 9.4 percentage points (p<0.01), and bisexual men's earnings penalties were lower by 8.4 percentage points (p<0.10). In Model IV, the interaction effects indicate that after 2010, gay men's earnings penalties were lower by 9.4 percentage points (p<0.05). All models indicate that period does not moderate bisexual women's earnings penalties.

[Table 6]

Table 7 replicates Table 6 by restricting the sample to studies offering full sample estimates. This specification excludes 27 observations from studies that offered estimates per period, per sector, and per earnings classification. The findings indicate that the principal patterns remain the same. Gay men and bisexual men and women faced earnings penalties. Model IV found that after 2010, gay men's earnings penalties are lower by up to 17.4 percentage points (p<0.01). The findings show that period does not moderate bisexual men and bisexual women's earnings penalties.

[Table 7]

Table 8 replicates Table 6's specification by restricting the sample to studies capturing periods either pre- or post-2010. This specification excludes 18 observations from studies covering

simultaneous periods before and after 2010. The findings show that gay men and bisexual men and women faced earnings penalties. All models found that period does not moderate gay men, bisexual men, and bisexual women's earnings penalties.

[Table 8]

According to the meta-regression outcomes, estimates indicated that after 2010, gay men and bisexual men and women experienced lower earning penalties than before 2010. However, these patterns did not prove robust. Offering a variety of empirical specifications did not always verify that in more recent data sets, gay men and bisexual men and women were better off in terms of a reduction in earnings penalties. Additionally, the outcomes indicated that the period did not moderate lesbian women's earnings premiums. Furthermore, the estimates indicated relationships between study characteristics (i.e., exploratory variables) and the estimated earnings effects for sexual minorities. For instance, regions, sexual minority data set sizes, and earnings classifications influenced the outcomes. However, because these patterns did not appear in each empirical specification, they should not be treated as robust patterns.

6. Discussion

The present meta-analysis utilized 24 papers published between 2012 and 2020. The studies covered the period between 1991 and 2018. Forest plots indicated that gay men earned less than heterosexual men. Lesbian women earned higher incomes than heterosexual women. Bisexual men earned less than heterosexual men. Bisexual women earned less than heterosexual women. Forest plots suggested that after 2010, gay men and bisexual people continued to experience earnings penalties, while lesbian women continued to experience earnings premiums.

Meta-regression results indicated the existence of reduced earnings penalties for gay men after 2010. The findings also estimated a reduction in earnings penalties for bisexual men and women. However, the period patterns for gay men and bisexual people were not robust in different empirical specifications. Thus, prompt conclusions cannot be offered. A reduction in earnings premiums for lesbian women was not found. Furthermore, the study found connections between study characteristics and the estimated effects for sexual minorities. Klawitter (2015) found relevant patterns.

Recent studies attempted to determine the reasons for reduced earnings penalties for gay men and bisexual people. Carpenter and Eppink (2017) and Bryson (2017) indicate that gay men's stronger earnings records potentially stem from the rapid improvement in attitudes towards sexual orientation minorities over the past decade. These changes couple with updated public policies toward sexual minorities, such as same-sex marriage legalization and the increasing prevalence of non-discriminatory policies in employment. Aksoy et al. (2018) indicate that an effective earnings

response to legislative and attitude changes for sexual minorities proves more positive than what tends to be observed for the gender pay gap and ethnicity.

According to Drydakis and Zimmermann (2020), although a potential improvement in gay men and bisexual people's earnings is welcomed, arguments may give erroneous signals in countries where socio-political changes have not yet favored sexual minorities. According to Waite (2015), little evidence exists in Canada that gay men's earnings penalties have attenuated since 2001. In the US, Jepsen and Jepsen (2020) found that the earnings penalties for gay men narrowed between 2001 and 2008. After that, the penalties remained comparatively flat at a figure of approximately 11 percent. Moreover, Burn (2020) found that, in the US, a single standard deviation increase in the share of individuals in a state prejudiced against homosexuals correlated with a decrease in the hourly earnings of gay men by between 2.7 percent and 4 percent. In the UK, Aksoy at el. (2019) indicated that gay men faced glass ceilings. Recent review studies show that despite the passage of labor legislation against discrimination in the labor market, people who have a minority sexual orientation encounter more obstacles finding a job, lower job satisfaction, and more bullying and harassment than their heterosexual counterparts (Drydakis and Zimmermann, 2020; Drydakis, 2015).

Recent studies indicate that sexual minorities experience economic insecurity. In the US, Schneebaum and Badgett (2019) found that gay male couples were one percentage point more likely to experience poverty than heterosexual married couples. Furthermore, lesbian women were 2.4 percentage points more likely to experience poverty than heterosexual married couples. Schneebaum and Badgett (2019) highlighted that prejudice against sexual minorities among administrative agency staff and social workers can generate barriers to accessing benefits for low-earning sexual minorities. In the same region, Badgett (2018) found that bisexual men were 5.3 percentage points more likely to experience poverty than heterosexual men and that bisexual women were 5.4 percentage points more likely to be poor than heterosexual women. Moreover, in the UK, Uhrig (2015) indicated that gay and bisexual men experienced greater material disadvantage than heterosexual men. Additionally, women experienced more pronounced material disadvantages than heterosexual women.

Based on the Taste theory (Becker, 1957), negative attitudes toward gay and bisexual people constitute the source of labor market prejudices, meaning policymakers should adopt anti-discrimination legislation (Badgett, 2020; Valfort, 2017; Köllen, 2016; Klawitter, 2015; Ozeren, 2014). Such policies raise the cost of discrimination by setting fines against homophobic organizations. Thus, at the margin, this approach could discourage such organizations from practicing unequal treatments and might raise the sexual minorities-majorities wage ratio (Schwab, 2000; Becker, 1957). The statistical theory of discrimination (Phelps, 1972; Arrow, 1973) indicates

that biases could exist if organizations use sexual orientation to infer job-related characteristics, productivity, and commitment (Arrow, 1973). The statistical theory of discrimination suggests that unequal treatments can lessen if organizations receive reliable information about employees. Thus, organizations should dedicate more resources to ascertaining employees' credentials (Schwab, 2000).

Developing inclusive recruitment policies should prove beneficial for employers. In the US, Delhommer (2020) found that anti-discrimination laws can reduce by 11 percent the hourly earnings penalty for gay men relative to heterosexual men. In Britain, Wang et al. (2018) found that working in an organization with a diversity and equity management policy had positively affected the earnings of gay men. Hossain et al. (2020) found that US anti-discriminatory laws prohibiting discrimination in the workplace based on sexual orientation could spur innovation, resulting in improved firm performance. The authors indicated that organizations with workplace diversity policies often demonstrated higher innovation and performed better than those without such policies. In the same region, Patel and Feng (2020) found positive relationships between LGBT workplace equality, firm performance, and marketing capability. Shan et al. (2016) found that US organizations with a higher degree of corporate sexual equality experienced higher stock returns and market valuations. Similarly, Johnson and Cooper (2015) found that acceptance of secluded employees can result in higher productivity and employee retention.

Studies evaluated that firms with formal written statements barring biases based on sexual orientation and gender identity, inclusive HR practices in relation to recruiting and retaining LGBT people, and a framework to provide trans-inclusive health-oriented benefits could prompt positive outcomes concerning LGBT employees' mental health, interaction with colleagues, and job satisfaction (Drydakis, 2020; 2017; Webster et al., 2018). Moreover, Badgett et al. (2020) estimated that LGBT inclusion and Gross Domestic Product per capita mutually reinforce one another. The exclusion of LGBT people can harm the economy, while legal rights for LGBT people can improve economic development (Badgett et al., 2020).

The outcomes of the presented studies indicate that positive workplace practices can reduce biases against LGBT people and foster positive payoffs in the labor market (Patel and Feng, 2020; Badgett et al., 2020; Webster et al., 2018; Wang et al., 2018; Johnson and Cooper, 2015). Policymakers should enact policies to counteract employment discrimination against the LGBT workforce. Comprehensive legislation and workplace guidelines should guarantee that people receive the same pay and not experience any form of workplace bias simply because of their sexual orientation or/and gender identity status. Inclusive or positive actions or/and affirmative policies ensure fair and equal treatment of LGBT employees in workplaces. Policies should embrace diversity by encouraging under-represented groups to apply for jobs or promotions and providing

support to LGBT employees to raise concerns and receive fair treatment. Standing against discrimination and celebrating and supporting LGBT diversity should form a part of HR policies (Bozani et al., 2020).

Eliminating earnings penalties based on sexual orientation requires not only a fundamental change in attitudes and behaviors but also effective workplace policies and procedures (Badgett, 2020). This situation implies a critical role for constructive and informed social dialogue between policymakers, unions, employees, and employers in improving the workplace experiences of sexual minorities (Drydakis and Zimmermann, 2020). The social dialogue should form an integral part of changing attitudes and establishing more inclusive workplaces, as it creates the opportunity to raise issues and determine solutions. A cooperative social dialogue can also provide opportunities to develop HR policies to confront and minimize earnings penalties based on sexual orientation.

7. Limitations and future research

Havránek et al. (2020) evaluated that not all meta-analyses in economics align with the proposed meta-analysis protocol. The present study did not control for either industry, such as white-collar or blue-collar jobs, or the public and private sectors. Although many utilized studies controlled for job characteristics, industry and sector classification was not possible. Either information was unavailable, or there was significant heterogeneity among the studies on how they had classified industries and sectors. Such an occurrence did not allow for any meaningful grouping. Similar arguments hold for not controlling for personal or household earnings, household arrangements, number of children, cohabiting or marital status and full-time employment. Although the present study included hourly, weekly, and annual earnings, the sample did not include other earnings classifications. Additionally, given the research questions, the present study did not utilize estimates on intersectionality, such as black gay men's earnings against white heterosexual men's earnings (del Rio and Alonso-Villar, 2019; Douglas and Steinberger, 2015). Furthermore, this study did not consider estimates on pooled sexual orientation groups, such as lesbian women's earnings versus heterosexual men's earnings (Preston et al., 2019).

In the present meta-analysis, the sample comprised studies utilizing either time-series or cross-sectional data. Due to limited observations and collinearity issues, the study featured no control for data types. Similar arguments hold for not controlling for decomposition approaches. Furthermore, the data extraction period featured only one working paper out of the 24 studies (Jepsen and Jepsen, 2020). This study introduced a dummy variable to control for journal articles against working papers. This action introduced collinearity problems. According to Klawitter (2015), excluding working papers might introduce biases. Similarly, in the present study, observations were based on sub-sample estimates (Laurent and Mihoubi, 2012; Jepsen and Jepsen,

2020; Preston et al., 2020; Waite, 2015). The introduction of a dummy variable to control for full-sample estimates against sub-sample estimates introduced collinearity problems.

The present meta-analysis focused on 24 studies published between 2012 and 2020. The sample did not reutilize the studies formed by Klawitter's (2015) meta-analysis. Klawitter (2015) has focused on papers published up to 2012. The present study focused on papers published between 2012-2020. Thus, by default, studies conducted prior to 2012, and the corresponding time period patterns within these studies, were not included in the meta-analysis sample. Given the fact that the present sample covered a 27-year period (between 1991 and 2018) and incorporated studies that utilized sub-samples of the data sets in Klawitter (2015), any bias arising from not reutilizing Klawitter's (2015) sample might not change the direction of the relationships. In Klawitter (2015), as well as in the present study, the main patterns indicate that (i) gay men received lower earnings than heterosexual men, and (ii) lesbian women faced higher earnings than heterosexual women. In addition, in both Klawitter (2015) and in the present study, it seems that in more recent data sets, gay men experienced lower earning penalties. For instance, in Klawitter (2015) it is observed that the earnings penalties for gay men in 2000 are smaller by about 4 and 7 percentage points than for studies in 1990.

The present study, followed Klawitter (2015), where the author controlled for the period before 1990, between 1990 and 2000, and after 2000. The present study, followed a relevant approach and offered an evaluation before and after 2010. In the present study, it was decided to control for the period after 2010. In the present paper, the data extraction took place in 2020, and there was an interest to consider whether in the last decade a change was realized. One might replicate the process and choose a broader or a shorter period. In the present research, it was attempted to include additional time dummies, i.e., to control for 1995-2000, 2000-2005, 2005-2010, 2010-2015, and 2015-2020. However, because there were few observations, there is overfitting, and the estimates become blurred.

Furthermore, the limited number of studies utilized in the present meta-analysis means that the magnitude of the estimates might not be representative. In terms of firm evaluation, a meta-analysis of meta-analyses is required (Sigman, 2011). However, such a study requires published meta-analyses of the subject matter. This situation is not currently the case, especially for bisexual people. New studies employing current data sets shall examine whether, within the last decade, statistically significant reductions in earnings penalties for gay men and bisexual people have occurred. Additionally, the studies will evaluate contemporary earnings differences based on sexual orientation. There is also a requirement for representative longitudinal data on sexual orientation to facilitate an assessment of whether anti-discrimination legislation and positive social and workplace actions reduce societal and employment bias. This research indicated that studies with more than a

thousand observations for sexual minorities estimated higher earnings penalties for bisexual people. The number of observations in a data set mediating the patterns represents an additional indicator to advocate for more representative data sets.

The present study found that in the US, studies estimated higher penalties for gay men. Further research would identify which factors might boost earnings penalties in certain regions, as well as which factors might reduce earnings differences. Additionally, the way studies capture income (via annual earnings or hourly or/and weekly earnings) potentially matters. Studies should provide robustness tests and report estimates on at least annual earnings and hourly earnings to arrive at firm conclusions. Furthermore, the present study found that studies incorporating information on health/mental health status estimated lower penalties for bisexual people. Such information might capture critical unobserved heterogeneity. Thus, new data sets should collect information on health indicators and offer a sensitivity analysis.

8. Conclusions

The present meta-analysis utilized 24 papers, published between 2012 and 2020, examining earning differences based on sexual orientation minorities. The data sets covered between 1991 and 2018. The outcomes indicated that gay men, bisexual men, and bisexual women experienced lower earnings than comparable heterosexual people. On the other hand, lesbian women's earnings were higher compared to the earnings of heterosexual women. The study found that after 2010, gay men and bisexual men and women continue to experience earnings penalties, while lesbian women continue to experience earnings premiums. The outcomes indicated that after 2010, a reduction in earnings penalties for gay men and bisexual people might be present. However, the pattern should not represent a robust outcome because it was not proven in alternative empirical specifications. The study concludes by indicating that the persistence of earnings penalties for gay men and bisexual men and women in the face of anti-discrimination policies represents a cause for concern.

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Table 1. Summary statistics for meta-analysis sample

Variables	Means (standard deviations)
Earnings differences estimates for gay men[a]	-0.074 (0.083)
Earnings differences estimates for lesbian women[b]	0.072 (0.059)
Earnings differences estimates for bisexual men[c]	-0.093 (0.059)
Earnings differences estimates for bisexual women[d]	-0.047 (0.026)
Data sets after 2010[e]	36.66% (0.49)
Region: US	30.0% (0.466)
Region: Canada	20.0% (0.406)
Region: UK	13.33% (0.345)
Region: Germany	3.33% (0.182)
Region: France	6.66% (0.253)
Region: Greece	3.33% (0.182)
Region: Sweden	6.66% (0.253)
Region: Australia	16.66% (0.379)
Dependent variable: Annual earnings[f]	40.0% (0.498)
Minority sexual orientation classification: Same sex living arrangements[g]	50.0% (0.508)
Sample size: More than a thousand observations for sexual minorities[h]	46.66% (0.507)
Selection (Heckman) controls[i]	30.0% (0.46)
Health/mental health controls[j]	23.33% (0.430)

Notes: N=24 utilized studies. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. Studies in meta-analysis: Ahmed et al., (2013), Aksoy at el. (2018), Bridges and Mann (2019), Bryson (2017), Carpenter and Eppink (2017), Cerf (2016), Chai and Maroto (2020), Dilmaghani (2018), Drydakis (2012), Hammarstedt et al. (2015), Humpert (2016), Jepsen and Jepsen (2017), Jepsen and Jepsen (2020), La Nauze (2015), Laurent and Mihoubi (2012), Martell (2013), Mize (2016), Preston et al., (2020), Sabia (2014), Sabia (2015), Sabia et al. (2017), Waite (2015), Waite et al. (2020), Wang et al. (2018).
([a]) Continuous variable. Reference heterosexual men.
([b]) Continuous variable. Reference heterosexual women.
([c]) Continuous variable. Reference heterosexual men.
([d]) Continuous variable. Reference heterosexual women.
([e]) Period classification; 1=Data sets covering periods after 2010 (i.e., 2011-2014); 0= In all the other cases, that is, data sets covering periods before 2010 (i.e., 1991-2000), and/or data sets covering simultaneous periods before and after 2010 (i.e., 2008-2012).
([f]) Earnings classification; 1=Annual earnings; 0=Hourly, or weekly earnings.
([g]) Sexual orientation classification; 1=Same sex living arrangement; 0=Self-identification and/or sexual behaviour.
([h]) Sexual minority data set's size; 1=More than a thousand observations for sexual minority; 0=In all the other cases.
([i]) Sample selection; 1= Existence of Heckman-type selection correction; 0= In all the other cases.
([j]) Health/mental health status; 1= Information on health/mental health; 0=In all the other cases.

Table 2. Summary statistics for meta-analysis samples

	Earnings differences estimates for gay men	Earnings differences estimates for lesbian women	Earnings differences estimates for bisexual men	Earnings differences estimates for bisexual women
Data sets after 2010	-0.034 (0.078)	0.061 (0.062)	-0.070 (0.061)	-0.041 (0.024)
Data sets before 2010	-0.099 (0.078)	0.079 (0.059)	-0.121 (0.061)	-0.056 (0.032)
US data	-0.114 (0.119)	0.110 (0.065)	-0.101 (0.050)	-0.043 (0.028)
All other regions	-0.059 (0.062)	0.060 (0.053)	-0.088 (0.067)	-0.051 (0.029)
Dependent variable: Annual earnings	-0.082 (0.090)	0.100 (0.062)	-0.115 (0.071)	-0.053 (0.026)
Dependent variable: Weekly or hourly earnings	-0.068 (0.080)	0.049 (0.047)	-0.084 (0.055)	-0.045 (0.030)
Minority sexual orientation classification: Same sex living arrangements	-0.085 (0.063)	0.081 (0.056)	-0.149 (^)	-0.036 (^)
Minority sexual orientation classification: Self-identification and/or sexual behaviour	-0.063 (0.102)	0.057 (0.065)	-0.089 (0.059)	-0.049 (0.029)
Sample size: More than a thousand observations for sexual minorities	-0.079 (0.075)	0.080 (0.053)	-0.122 (0.061)	-0.056 (0.022)
Sample size: Less than a thousand observations for sexual minorities	-0.070 (0.092)	0.063 (0.068)	-0.076 (0.054)	-0.037 (0.033)
Selection models: Yes	-0.053 (0.019)	0.039 (0.050)	-0.124 (0.056)	-0.077 (0.006)
Selection models: No	-0.082 (0.097)	0.086 (0.059)	-0.080 (0.058)	-0.033 (0.020)
Health/mental health controls: Yes	-0.074 (0.063)	0.097 (0.046)	-0.119 (0.095)	-0.082 (^)
Health/mental health controls: No	-0.074 (0.090)	0.064 (0.062)	-0.089 (0.056)	-0.043 (0.026)

Notes: N=24 utilized studies. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. (^) No available standard deviation due to one observation. Standard deviations are in the parentheses.

Table 3. Meta-regression outcomes of earnings differences estimates for gay men

	Model I	Model II	Model III
Data sets after 2010	0.065 **	0.050**	0.062**
	(0.025)	(0.024)	(0.030)
US data	-	-0.053*	-0.042
		(0.030)	(0.034)
Earnings classification: Annual earnings	-	0.002	0.020
		(0.027)	(0.035)
Sexual orientation classification: Same sex living arrangements	-	-0.045*	-0.037
		(0.023)	(0.030)
More than a thousand observations for sexual minorities	-	-	-0.011
			(0.031)
Controlling for sample selection	-	-	0.027
			(0.032)
Contolling for health/mental health	-	-	-0.007
			(0.029)
Constant	-0.092***	-0.046*	-0.067*
	(0.015)	(0.024)	(0.036)
Adj R^2	24.11%	55.53%	41.69%
N.	29	29	29

Notes: Random effects meta-regression results. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. Standard errors are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 4. Meta-regression outcomes of earnings differences estimates for lesbian women

	Model I	Model II	Model III
Data sets after 2010	-0.023	-0.011	-0.020
	(0.027)	(0.024)	(0.029)
US data	-	0.062 **	0.052
		(0.029)	(0.033)
Earnings classification: Annual earnings	-	0.028	0.014
		(0.026)	(0.035)
Sexual orientation classification: Same sex living arrangements	-	-	0.021
			(0.030)
More than a thousand observations for sexual minorities	-	-	0.012
			(0.028)
Controlling for sample selection	-	-	-0.022
			(0.030)
Contolling for health/mental health	-	-	0.005
			(0.030)
Constant	0.079***	0.025	0.042
	(0.016)	(0.030)	(0.041)
Adj R^2	-0.34%	40.49%	31.94%
N.	24	24	24

*Notes: Random effects meta-regression results. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. Standard errors are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$*

Table 5. Meta-regression outcomes of earnings differences estimates for bisexual men and women

	Model I	Model II	Model III
Bisexual men	-0.065*	-0.056*	-0.079***
	(0.031)	(0.029)	(0.024)
Data sets after 2010	0.015	0.031	0.136*
	(0.037)	(0.042)	(0.064)
Bisexual men × Data sets after 2010	0.028	0.013	0.024
	(0.051)	(0.048)	(0.041)
US data	-	0.001	0.144**
		(0.027)	(0.064)
Earnings classification: Annual earnings	-	-0.051*	-0.072**
		(0.027)	(0.025)
Sexual orientation classification: Same sex living arrangements	-	-0.050	0.004
		(0.041)	(0.045)
More than a thousand observations for sexual minorities	-	-	-0.051*
			(0.024)
Controlling for sample selection	-	-	-0.032
			(0.030)
Contolling for health/mental health	-	-	0.202***
			(0.072)
Constant	-0.055**	-0.045	-0.145**
	(0.024)	(0.031)	(0.065)
Adj R^2	28.42%	37.64%	60.06%
N.	22	22	22

Notes: *Random effects meta-regression results. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. Standard errors are in parentheses. *** p < 0.01; ** p < 0.05; * p < 0.1*

Table 6. Meta-regression outcomes of earnings differences for gay men, lesbian women, bisexual men and women

	Model I	Model II	Model III	Model IV
Gay men^	-0.172***	-0.172***	-0.174***	-0.175***
	(0.021)	(0.021)	(0.021)	(0.022)
Bisexual men^	-0.201***	-0.203***	-0.215***	-0.213***
	(0.030)	(0.030)	(0.034)	(0.036)
Bisexual women^	-0.135***	-0.140***	-0.151***	-0.145***
	(0.034)	(0.035)	(0.039)	(0.041)
Data sets after 2010	-0.027	-0.027	-0.031	-0.030
	(0.025)	(0.025)	(0.026)	(0.028)
Gay men × Data sets after 2010	0.092***	0.093***	0.094***	0.094**
	(0.034)	(0.034)	(0.034)	(0.035)
Bisexual men × Data sets after 2010	0.073	0.077	0.084*	0.081
	(0.048)	(0.049)	(0.050)	(0.052)
Bisexual women × Data sets after 2010	0.041	0.048	0.057	0.050
	(0.054)	(0.056)	(0.057)	(0.060)
US data	-	0.008	0.008	0.008
		(0.017)	(0.018)	(0.021)
Earnings classification: Annual earnings	-	-	-0.001	-0.003
			(0.016)	(0.021)
Sexual orientation classification: Same sex living arrangements	-	-	-0.014	-0.008
			(0.017)	(0.021)
More than a thousand observations for sexual minorities	-	-	-	-0.009
				(0.019)
Controlling for sample selection	-	-	-	-0.007
				(0.020)
Contolling for health/mental health	-	-	-	0.010
				(0.020)
Constant	0.079***	0.077***	0.089***	0.092***
	(0.015)	(0.016)	(0.023)	(0.028)
Adj R^2	63.93%	63.48%	63.13%	60.96%
N.	75	75	75	75

*Notes: Random effects meta-regression results. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. (^) The reference category is lesbian women. Standard errors are in parentheses. *** p < 0.01; ** p < 0.05; * p < 0.1*

Table 7. Meta-regression outcomes of earnings differences estimates for gay men, lesbian women and bisexual men and women, restricted sample, studies reporting overall patterns

	Model I	Model II	Model III	Model IV
Gay men^	-0.190***	-0.191***	-0.192***	-0.195 ***
	(0.029)	(0.029)	(0.030)	(0.030)
Bisexual men^	-0.207***	-0.212***	-0.216***	-0.211***
	(0.036)	(0.037)	(0.042)	(0.042)
Bisexual women^	-0.141***	-0.148***	-0.152***	-0.133***
	(0.044)	(0.045)	(0.049)	(0.051)
Data sets after 2010	-0.051	-0.050	-0.050	-0.015
	(0.035)	(0.035)	(0.039)	(0.044)
Gay men × Data sets after 2010	0.166***	0.169***	0.170***	0.174***
	(0.048)	(0.048)	(0.049)	(0.049)
Bisexual men × Data sets after 2010	0.082	0.086	0.091	0.084
	(0.062)	(0.065)	(0.065)	(0.065)
Bisexual women × Data sets after 2010	0.049	0.060	0.066	0.053
	(0.071)	(0.072)	(0.076)	(0.076)
US data	-	0.016	0.013	0.014
		(0.023)	(0.024)	(0.026)
Earnings classification: Annual earnings	-	-	0.004	0.014
			(0.024)	(0.036)
Sexual orientation classification: Same sex living arrangements	-	-	-0.011	-0.032
			(0.023)	(0.026)
More than a thousand observations for sexual minorities	-	-	-	-0.013
				(0.035)
Controlling for sample selection	-	-	-	0.054
				(0.034)
Contolling for health/mental health	-	-	-	0.056
				(0.047)
Constant	0.088***	0.084***	0.088***	0.056
	(0.021)	(0.022)	(0.034)	(0.047)
Adj R^2	61.58%	62.63%	60.61%	61.58%
N.	48	48	48	48

Notes: Random effects meta-regression results. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. (^) The reference category is lesbian women. Standard errors are in parentheses.
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 8. Meta-regression outcomes of earnings differences estimates for gay men, lesbian women and bisexual men and women, restricted sample, of studies covering periods before 2010 and after 2010

	Model I	Model II	Model III	Model IV
Gay men^	-0.132***	-0.131***	-0.131***	-0.132 ***
	(0.023)	(0.024)	(0.024)	(0.025)
Bisexual men^	-0.123***	-0.118***	-0.121***	-0.115**
	(0.035)	(0.037)	(0.041)	(0.052)
Bisexual women^	-0.079*	-0.070	-0.067	-0.063
	(0.039)	(0.044)	(0.048)	(0.052)
Data sets after 2010	-0.014	0.016	0.017	0.023
	(0.024)	(0.025)	(0.025)	(0.028)
Gay men × Data sets after 2010	0.049	0.048	0.046	0.047
	(0.033)	(0.033)	(0.033)	(0.034)
Bisexual men × Data sets after 2010	-0.008	-0.013	-0.020	-0.027
	(0.049)	(0.050)	(0.053)	(0.057)
Bisexual women × Data sets after 2010	-0.016	-0.026	-0.038	-0.043
	(0.052)	(0.057)	(0.061)	(0.065)
US data	-	-0.009	-0.021	-0.014
		(0.020)	(0.022)	(0.025)
Earnings classification: Annual earnings	-	-	0.018	0.020
			(0.018)	(0.021)
Sexual orientation classification: Same sex living arrangements	-	-	-0.020	-0.010
			(0.016)	(0.022)
More than a thousand observations for sexual minorities	-	-	-	-0.015
				(0.023)
Controlling for sample selection	-	-	-	-0.004
				(0.020)
Contolling for health/mental health	-	-	-	-0.002
				(0.022)
Constant	0.040**	0.040**	0.049**	0.047
	(0.017)	(0.017)	(0.024)	(0.100)
Adj R^2	62.88%	62.21%	63.20%	58.66%
N.	57	57	57	57

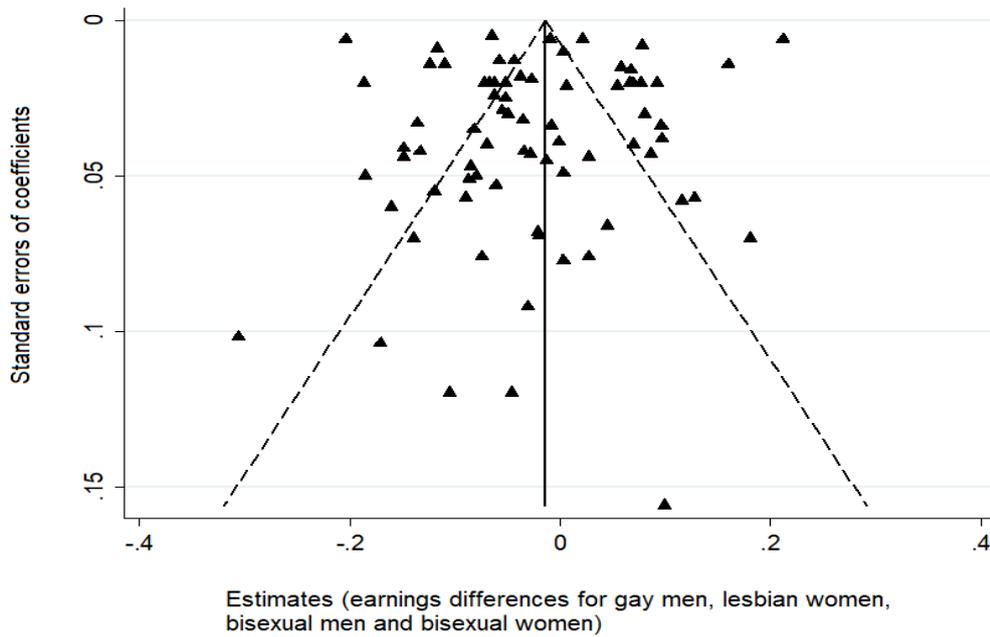*Notes: Random effects meta-regression results. The sample consists of papers published between 2012 and 2020, capturing the period before 2010 and after 2010. (^) The reference category is lesbian women. Standard errors are in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$*

Figure 1. Publication bias funnel plot

Estimates (earnings differences for gay men, lesbian women, bisexual men and bisexual women)

Notes: Funnel-plot with pseudo 95% confidence intervals. N=24 utilized studies; 75 coefficients. The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. Studies in meta-analysis: Ahmed et al., (2013), Aksoy at el. (2018), Bridges and Mann (2019), Bryson (2017), Carpenter and Eppink (2017), Cerf (2016), Chai and Maroto (2020), Dilmaghani (2018), Drydakis (2012), Hammarstedt et al. (2015), Humpert (2016), Jepsen and Jepsen (2017), Jepsen and Jepsen (2020), La Nauze (2015), Laurent and Mihoubi (2012), Martell (2013), Mize (2016), Preston et al., (2020), Sabia (2014), Sabia (2015), Sabia et al. (2017), Waite (2015), Waite et al. (2020), Wang et al. (2018).

Figure 2. Meta-analysis forest-plot of earnings differences for gay men
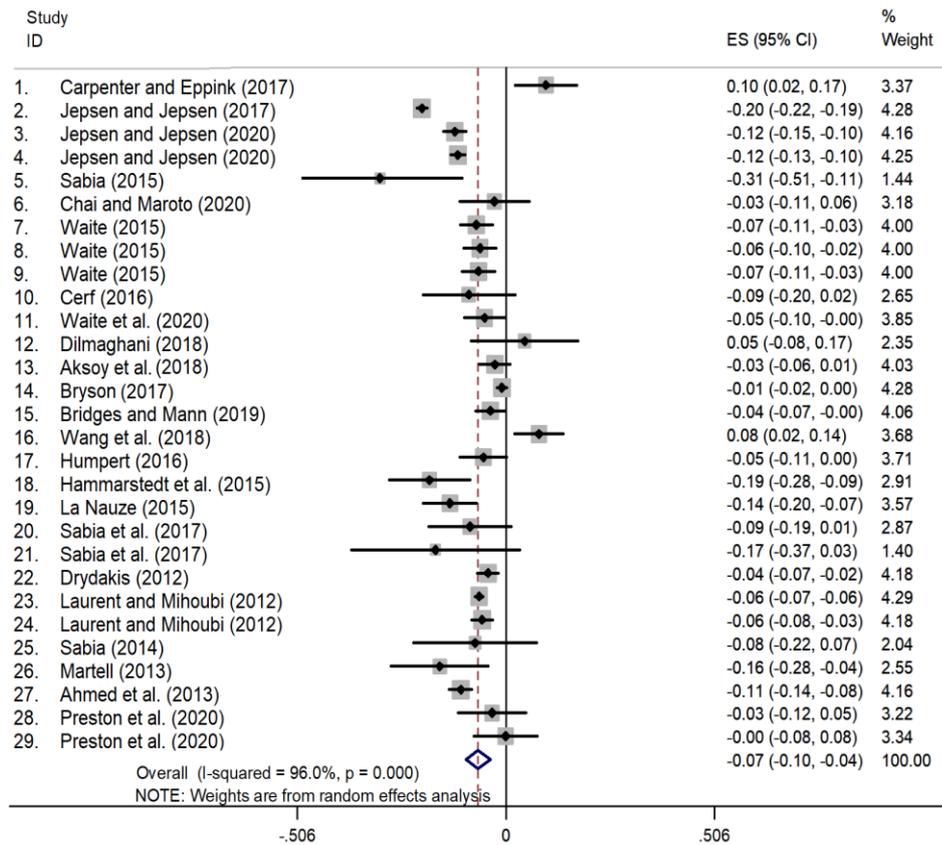
Notes: The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. The reference category is heterosexual men. The diamond at the bottom indicates the pooled estimate; coef.= -0.068 (p<0.01).

Figure 3. Meta-analysis forest-plot of the earnings differences for lesbian women

Study ID		ES (95% CI)	% Weight
1.	Carpenter and Eppink (2017)	0.09 (0.00, 0.17)	3.93
2.	Jepsen and Jepsen (2017)	0.21 (0.20, 0.22)	4.94
3.	Jepsen and Jepsen (2020)	0.16 (0.13, 0.19)	4.83
4.	Jepsen and Jepsen (2020)	0.08 (0.06, 0.09)	4.92
5.	Sabia (2015)	0.10 (-0.21, 0.40)	1.12
6.	Waite (2015)	0.07 (0.03, 0.11)	4.70
7.	Waite (2015)	0.09 (0.05, 0.13)	4.70
8.	Waite (2015)	0.07 (0.03, 0.11)	4.70
9.	Cerf (2016)	0.03 (-0.06, 0.11)	3.89
10.	Waite et al. (2020)	0.08 (0.04, 0.12)	4.70
11.	Dilmaghani (2018)	0.12 (0.00, 0.23)	3.36
12.	Aksoy et al. (2018)	0.05 (0.01, 0.10)	4.67
13.	Bryson (2017)	-0.05 (-0.11, 0.01)	4.40
14.	Bridges and Mann (2019)	0.06 (0.03, 0.09)	4.81
15.	Wang et al. (2018)	0.07 (-0.01, 0.15)	4.05
16.	Humpert (2016)	0.10 (0.03, 0.16)	4.26
17.	Hammarstedt et al. (2015)	0.01 (-0.04, 0.05)	4.67
18.	La Nauze (2015)	0.13 (0.02, 0.24)	3.40
19.	Sabia et al. (2017)	0.00 (-0.09, 0.10)	3.70
20.	Sabia et al. (2017)	0.18 (0.04, 0.32)	2.93
21.	Laurent and Mihoubi (2012)	0.02 (0.01, 0.03)	4.94
22.	Laurent and Mihoubi (2012)	0.00 (-0.02, 0.02)	4.89
23.	Sabia (2014)	0.03 (-0.12, 0.18)	2.73
24.	Ahmed et al. (2013)	0.07 (0.04, 0.10)	4.79
	Overall (I-squared = 96.7%, p = 0.000)	0.07 (0.03, 0.11)	100.00

NOTE: Weights are from random effects analysis

Notes: The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. The reference category is heterosexual women. The diamond at the bottom indicates the pooled estimate; coef.= 0.071 (p<0.01).

Figure 4. Meta-analysis forest-plot of earnings differences for bisexual men

Study ID		ES (95% CI)	% Weight
1.	Carpenter and Eppink (2017)	-0.02 (-0.15, 0.11)	5.63
2.	Sabia (2015)	-0.09 (-0.18, 0.01)	8.33
3.	Chai and Maroto (2020)	-0.15 (-0.23, -0.07)	9.30
4.	Mize (2016)	-0.12 (-0.23, -0.01)	7.17
5.	Waite et al. (2020)	-0.19 (-0.23, -0.15)	12.98
6.	Aksoy et al. (2018)	-0.15 (-0.24, -0.06)	8.81
7.	Bryson (2017)	-0.14 (-0.28, -0.00)	5.43
8.	Sabia et al. (2017)	-0.02 (-0.16, 0.12)	5.53
9.	Sabia et al. (2017)	-0.10 (-0.34, 0.13)	2.44
10.	Drydakis (2012)	-0.05 (-0.09, -0.01)	12.98
11.	Sabia (2014)	-0.13 (-0.22, -0.05)	9.14
12.	Preston et al. (2020)	0.00 (-0.15, 0.15)	4.80
13.	Preston et al. (2020)	-0.06 (-0.16, 0.04)	7.45
	Overall (I-squared = 62.6%, p = 0.001)	-0.10 (-0.14, -0.06)	100.00

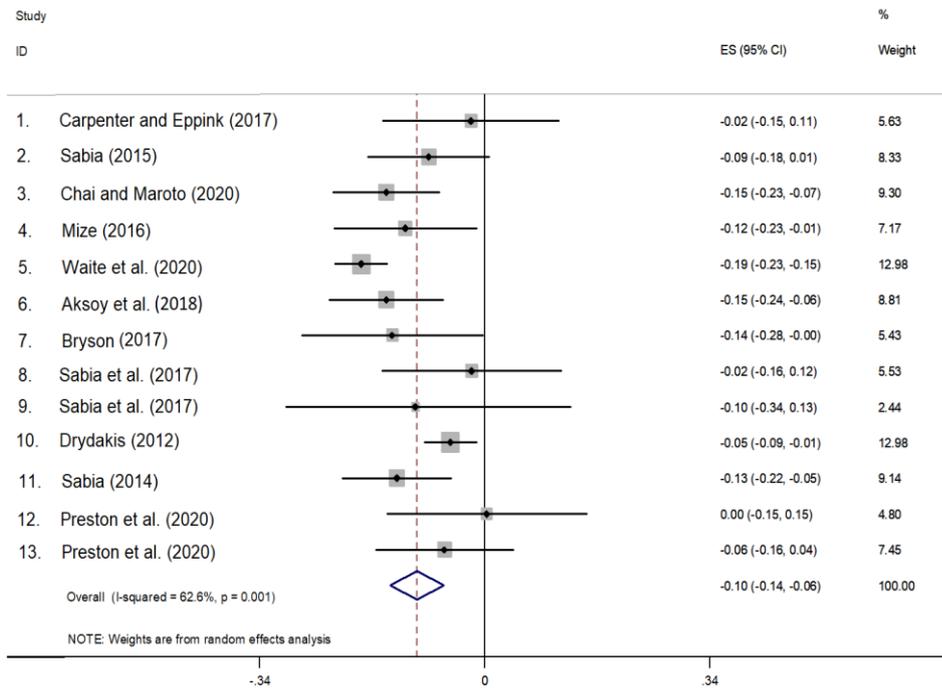NOTE: Weights are from random effects analysis

-.34   0   .34

Notes: The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. The reference category is heterosexual men. The diamond at the bottom indicates the pooled estimate; coef.=-0.103 (p<0.01).

Figure 5. Meta-analysis forest-plot of earnings differences for bisexual women
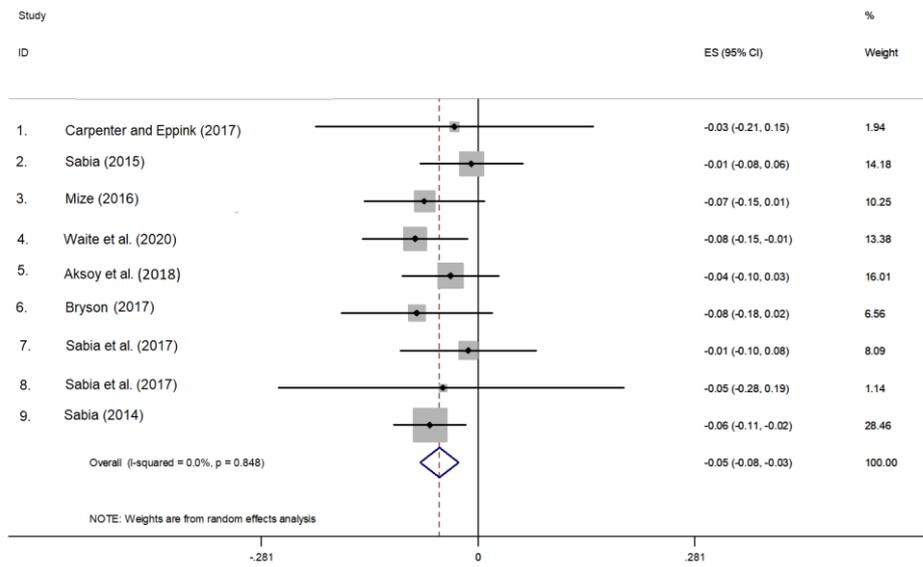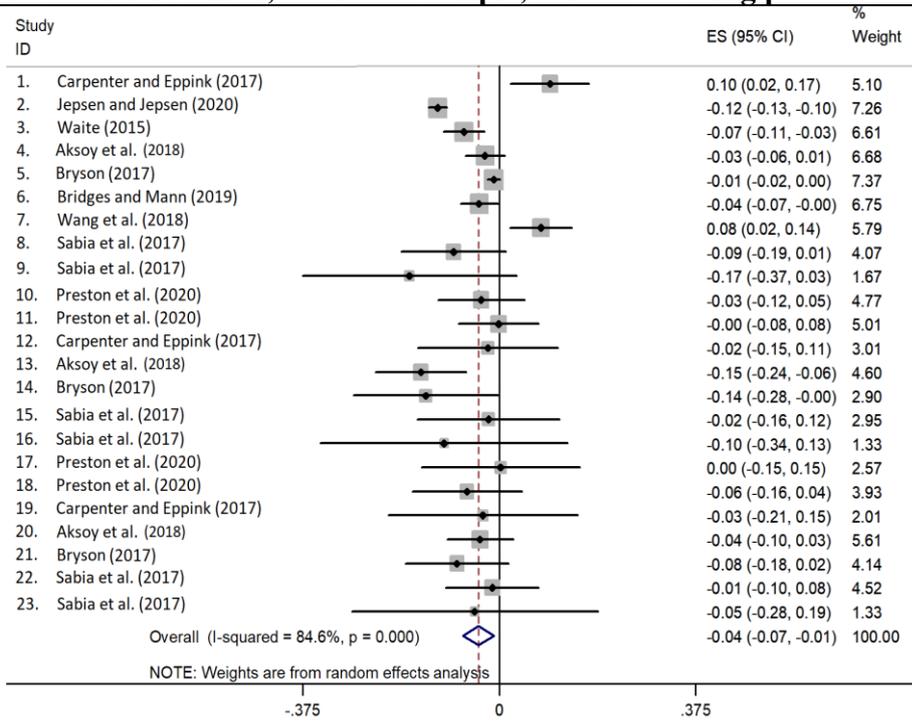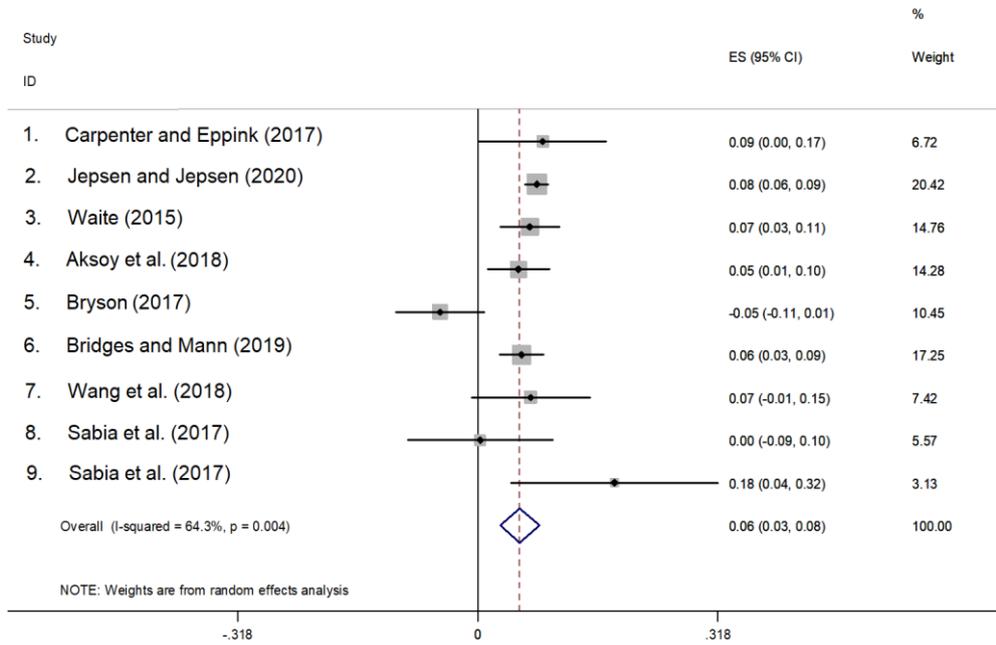

Notes: The sample consists of papers published between 2012 and 2020, capturing the period 1991-2018. The reference category is heterosexual women. The diamond at the bottom indicates the pooled estimate; coef.=-0.051 (p<0.01).

Figure 6. Meta-analysis forest-plot of earnings differences for gay men, bisexual men and bisexual women, restricted sample, studies covering periods after 2010

Study ID		ES (95% CI)	% Weight
1.	Carpenter and Eppink (2017)	0.10 (0.02, 0.17)	5.10
2.	Jepsen and Jepsen (2020)	-0.12 (-0.13, -0.10)	7.26
3.	Waite (2015)	-0.07 (-0.11, -0.03)	6.61
4.	Aksoy et al. (2018)	-0.03 (-0.06, 0.01)	6.68
5.	Bryson (2017)	-0.01 (-0.02, 0.00)	7.37
6.	Bridges and Mann (2019)	-0.04 (-0.07, -0.00)	6.75
7.	Wang et al. (2018)	0.08 (0.02, 0.14)	5.79
8.	Sabia et al. (2017)	-0.09 (-0.19, 0.01)	4.07
9.	Sabia et al. (2017)	-0.17 (-0.37, 0.03)	1.67
10.	Preston et al. (2020)	-0.03 (-0.12, 0.05)	4.77
11.	Preston et al. (2020)	-0.00 (-0.08, 0.08)	5.01
12.	Carpenter and Eppink (2017)	-0.02 (-0.15, 0.11)	3.01
13.	Aksoy et al. (2018)	-0.15 (-0.24, -0.06)	4.60
14.	Bryson (2017)	-0.14 (-0.28, -0.00)	2.90
15.	Sabia et al. (2017)	-0.02 (-0.16, 0.12)	2.95
16.	Sabia et al. (2017)	-0.10 (-0.34, 0.13)	1.33
17.	Preston et al. (2020)	0.00 (-0.15, 0.15)	2.57
18.	Preston et al. (2020)	-0.06 (-0.16, 0.04)	3.93
19.	Carpenter and Eppink (2017)	-0.03 (-0.21, 0.15)	2.01
20.	Aksoy et al. (2018)	-0.04 (-0.10, 0.03)	5.61
21.	Bryson (2017)	-0.08 (-0.18, 0.02)	4.14
22.	Sabia et al. (2017)	-0.01 (-0.10, 0.08)	4.52
23.	Sabia et al. (2017)	-0.05 (-0.28, 0.19)	1.33
	Overall (I-squared = 84.6%, p = 0.000)	-0.04 (-0.07, -0.01)	100.00

NOTE: Weights are from random effects analysis

-.375   0   .375

Notes: The sample consists of papers published between 2012 and 2020, capturing the period 2010-2018. The reference category is heterosexual people. The diamond at the bottom indicates the pooled estimate; coef.= -0.040 (p<0.01).

Figure 7. Meta-analysis forest-plot of earnings differences for lesbian women, restricted sample, studies covering periods after 2010

Notes: The sample consists of papers published between 2012 and 2020, capturing the period 2010-2018. The reference category is heterosexual women. The diamond at the bottom indicates the pooled estimate; coef.= 0.055 (p<0.01).

Appendix. Havránek et al. (2020) meta-analysis in economics checklist

Research questions - A clear statement of the specific economic theories, etc. - A precise definition of how effects are measured, etc.	The present study utilised papers examining labour market discrimination against sexual minorities using Mincer OLS-earnings regression equations (Mincer, 1974). The identified papers adopted Becker's (1957) theory of distastes against minority population groups and Arrow's (1973) theory of statistical bias against minority population groups. In each study, the effect size is earnings differences against sexual minorities. Measured effects are comparable as they represent percentage earnings differences between sexual majorities and minorities.
Literature searching - How the research literature was searched, etc. - The date that the search was completed, etc. - A statement addressing who searched and coded the research literature, etc. - A complete list of the information coded for each study, etc.	The sample included English-language papers published between 2012 and 2020. The use of Google Scholar identified studies that addressed 'Sexual orientation; LGB; gay; lesbian; bisexual; regression; earnings; wages; income'. The data extraction was completed in September 2020. Given the research questions of the present study, the inclusion criteria were studies providing earnings comparisons between (i) gay men and heterosexual men, (ii) lesbian women and heterosexual women, (iii) bisexual men and heterosexual men and (iv) bisexual women and heterosexual women. Studies offering alternative comparisons were not included, such as lesbian women against heterosexual men. Studies merging sexual minority groups and comparing them against sexual majorities were not included. Studies offering intersectional estimates were not included. Credit author statement. Single author study. Table I provides information on the studies' controls.
Modelling issues - A table displaying definitions of all the coded variables along with their descriptive statistics, etc. - A fully reported meta-regression analysis, etc.	Tables 1-2 display definitions of all the coded variables along with their descriptive statistics. The study incorporates random-effects meta-regression models (Harbord and Higgins, 2008). The standard errors are calculated with Knapp-Hartung modification (Knapp and Hartung, 2003). Section 3 provides information on the empirical strategy. Meta-regressions control for time, region, effects classification, sexual orientation classification, the sample size of sexual minorities, empirical specification (selection models), information on health/mental health. Section 7 provides information on the study's limitations.
Reporting - Graph(s) of the effect sizes, etc. - Robustness checks, etc. - A discussion of the main findings, etc. - A statement about sharing the data, etc.	Figure 1 offers a publication bias analysis (Song et al., 2013; Dubben and Beck-Bornholdt, 2005). Figures 2-6 provide Forest-Plots (Schriger et al., 2010, Cuzick, 2005). Tables 3-8 offer sensitivity analysis and robustness specifications. Section 6 offers a discussion of the economic and practical significance of the primary findings.

Notes: Source: Havránek, T. Stanley, T. D. Doucouliagos, H. Bom, P. Geyer-Klingeberg, J. Iwasaki, I. Reed, R. W. and Rost, K. (2020). Reporting Guidelines for Meta-Analysis in Economics. *Journal of Economic Surveys*, 34(3): 469–475.