Discrimination against gays and lesbians in hiring decisions: a meta-analysis

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Abstract

Purpose – The purpose of this paper is to evaluate the true level of discrimination against openly gay and lesbian applicants in hiring decisions in OECD countries as well as on its determinants.

Design/methodology/approach – The author presents an overview of all studies conducted in order to test for discrimination against homosexual applicants in the labor market by the correspondence testing method. Moreover, the author performs a meta-analysis of correspondence tests from 18 separate studies conducted in OECD countries to test sexual orientation discrimination, containing more than 70 estimates of effects and representing a total of more than 50,000 resumes sent to employers. In addition to presenting overall results, the author focus on subgroups of specific correspondence tests in order to highlight the differences across gender, type of jobs, procedure, continent and type of information provided in applications.

Findings – The author provides evidence that sexual orientation discrimination occurs in the labor market in OECD countries, such that openly homosexual applicants face similar discrimination as ethnic minority applicants. Discrimination is significantly greater in the selection process for low-skilled than for high-skilled jobs. In the selection process for low-skilled jobs, lesbian candidates face significantly lower discrimination than gays (except in jobs that are considered "women's" jobs). Discrimination is significantly higher in Europe than in North America. Moreover, the way sexual orientation is signaled may influence the level of discrimination found. Finally, discrimination against homosexual applicants is not only a matter of preferences: providing more positive information in applications significantly reduces the level of discrimination.

Originality/value – This paper offers the first quantitative analysis of sexual orientation discrimination in OECD countries through meta-analyses.

Keywords LGBT, Meta-analysis, LGBTQ, LGBTI, Hiring decisions, Correspondence test, Sexual orientation discrimination

Paper type Research paper

1. Introduction

Discrimination in the labor market against different minorities, whether ethnic or sexual, leads to many economic and social inefficiencies. Although hiring could well be the most crucial part of any employment relationship, it is arguably one of the most poorly understood aspects of it (Petersen *et al.*, 2000; Pager and Karafin, 2009). Job hunting costs more in time and resources for those applicants who are treated unequally at the time of hiring while bias in the hiring process means companies miss out on potentially talented candidates (Unit, 2009). Thus, from a socio-economic point of view, it is very important for individuals, whoever they are, to be treated equally in terms of their access to employment. Discrimination in the hiring process may arise from two sources commonly presented in the discrimination literature, i.e. taste-based discrimination and statistical discrimination. First, "taste-based" discrimination refers to discrimination which occurs due to preferences. This means that individuals who discriminate have hostile attitudes toward a foreign group (xenophobia, homophobia or also personal preferences of other kinds) or comply with the negative attitude of the group of

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individuals to which they are attached (Becker, 1957). In hiring decisions, this corresponds to the case where employers discriminate for example homosexual candidates because of their personal preferences or do not accept individuals from another sexual orientation so as not to displease their other employees or clients.

"Statistical discrimination" (Phelps, 1972; Arrow, 1973; Aigner and Cain, 1977), which is less intuitive, occurs in the presence of a lack of information regarding individual characteristics. In the absence of direct information about an individual's productivity, reliability, aptitude, work commitment, job stability, etc. an employer may substitute group averages (either real or imagined) or stereotypes to fill the information void (Schwab, 1986). For example, we know that homosexual individuals are subject to many stereotypes: about their masculinity/femininity (e.g. Blashill and Powlishta, 2009), about their presumed higher risks of mental health issues, suicide and HIV infection (e.g. Worthen, 2013; Jorm *et al.*, 2002; Saunders and Valente, 1987). Therefore, uninformed employers might base their evaluation on those and discriminate against a homosexual applicant in favor of a straight applicant, even if they are not homophobic.

To combat this discrimination, it is necessary therefore to determine the extent of discrimination in the hiring market in OECD countries as well as its sources. These are the main objectives of this paper.

After being a subject of marginal attention as if it was taboo, research into the position of lesbian and gay applicants in the labor market has recently gained momentum. These last years, a significant literature has investigated whether homosexual people face differential treatment in hiring decisions in OECD countries. These studies have often demonstrated the presence of sexual orientation discrimination against openly homosexual job-seekers. However, all these studies have their own protocols, their own ways of reporting the results and different sample sizes. It is therefore essential to carry out a meta-analysis to clarify the true level of discrimination against homosexual applicants in OECD countries and to identify the explanatory variables of that discrimination[1]. The meta-analysis method has been widely used to assess discrimination in areas such as the rental housing market (Flage, 2018; Auspurg *et al.*, 2019) and ethnic discrimination in hiring (Zschirnt and Ruedin, 2016). However, as far as we know, no study has ever performed meta-analyses to compare and examine the findings of studies on hiring discrimination toward homosexual individuals. In this paper, we therefore construct a database of correspondence tests from 18 separate studies containing more than 70 estimates of effect sizes conducted in OECD countries in order to detect discrimination against homosexual applicants in hiring decisions, representing a total of more than 50,000 resumes sent to employers. Indeed, to really compare studies, it is necessary to code their relative differences. For example, it is not relevant to give as much weight to a study with a very small sample as to a study with a very large sample, even if they were carried out in different countries.

Our contribution to the field is threefold: first, we present an overview of 19 studies that have tested for discrimination against homosexual job-seekers in the labor market by the correspondence testing method, thereby aggregating all the literature we are aware of on the subject[2]. Next, the extent of discrimination on the grounds of sexual orientation is analyzed quantitatively for OECD countries using meta-analyses. As well as setting out the overall findings, we focus on subgroups of specific correspondence tests in order to highlight the differences across gender, type of jobs, procedure, continent and type of information provided in applications.

At the initial stage of the hiring process, we find that openly homosexual candidates have almost 40 percent lower odds of receiving a positive response from an employer, for equal information provided in the applications, compared to straight candidates. Thus, it seems that the level of discrimination faced by homosexual applicants is close to the level of discrimination faced by ethnic minority applicants (Zschirnt and Ruedin, 2016) in

hiring decisions. However, this result needs to be nuanced: indeed, discrimination is significantly higher in job offers for low-skilled jobs than in high-skilled jobs. Moreover, there is a significant difference in discrimination between gays and lesbians when they apply for low-skilled jobs: straight males are twice as likely to be chosen by employers as gays while lesbians have "only" 31 percent lower odds than straight women of receiving a positive response from an employer. We were able to determine that this discrimination is not only a matter of preferences (e.g. xenophobia, homophobia) but is also due to a lack of correct information about homosexual applicants. Indeed, providing more correct information in the content of the applications significantly reduced the gap between straight and homosexual applicants. Finally, discrimination is significantly higher in Europe than in North America and it seems that the way of signaling sexual orientation could influence the level of discrimination.

In the first section, we present an up to date literature overview of the 19 studies that tested for discrimination against homosexuals in the labor market by the correspondence testing method. In the second section, we present the data and method used to carry out the meta-analyses. In the third section, we set out the overall results: we present results for all openly homosexual applicants and then focus on the extent of discrimination against only gays and against only lesbians, by type of occupation. The fourth section describes a multivariate meta-regression analysis with unrestricted WLS econometric models (Stanley and Doucouliagos, 2015, 2017). This is used to investigate how explanatory variables affect the level of discrimination. The fifth section concludes the paper.

2. Literature overview
In what is widely referred to as the "correspondence testing" approach, the experimenter creates a certain number of fictitious applicants, who differ only in their sexual orientation and then sends out written applications (usually by e-mail) in response to job advertisements. To avoid detection, applications must not be strictly identical (when more than one is sent to the same employer), but all essential characteristics, such as experience and qualification, must be closely matched so that they differ only by the variable of interest. By using this method, the experimenter has the advantage of being able to work on real data while maintaining control over the variables, much as in a laboratory experiment. Moreover, this method is also easier and cheaper to implement (it dispenses with hiring and coaching actors) than face-to-face or over-the-phone interviews.

Since Adam (1981), many correspondence tests have been conducted in order to detect discrimination against homosexual applicants in hiring in OECD countries. We count 19 of them covering 11 countries. This literature is very widespread in North America, and particularly in the USA. In this country, seven field experiments have been performed while only one was made in Canada. Next to this, correspondence studies were also conducted in France, Italy, Sweden, UK, Greece, Cyprus, Germany, Austria and Belgium. We present an overview of these studies in Table I.

A total of 51,249 applications were sent to employers in OECD countries: 27,317 to test discrimination against gay candidates and 23,932 to test discrimination against lesbian candidates.

Correspondence tests can be conducted in either of two ways: in five studies, the authors used the "Single" inquiries procedure. In this type of experiment, each employer receives only one resume from a randomly selected job-seeker. This type of test allows the researcher to eliminate the probability of detection and hence revealing the purpose of the experiment. However, this method does not control the effect of unobservable fixed variables on the response rate and therefore requires more applications to obtain the same statistical significance as the "Matched" procedure, which is used in 15 studies (Weichselbaumer, 2015, used both). In "Matched" procedure, a number of resumes (often two, but sometimes more)

Treatment	Country of analysis	Study	Collection year	Resume sent	Procedure	Effect
Gays (vs straight males)	USA	Acquisti and Fong (2016)	2013	2,091	Single	0
		Bailey *et al.* (2013)	2010	2,304	Matched	0
		Berger and Kelly (1981)	1979	230	Matched	0
		Gorsuch (2015)	2014	661	Single	Sign.
		Tilcsik (2011)	2005	3,538	Matched	Sign.
		The Equal Rights Center and Freedom to Work (2012)	2012	100	Matched	Sign.
	Canada	Adam (1981)	1979	81	Single	Sign.
	France	Amadieu[a]	2014	500	Matched	Sign.
		Challe *et al.* (2018)	2017	772	Matched	0
	Italy	Patacchini *et al.* (2015)	2012	1,163	Matched	Sign.
	Sweden	Ahmed *et al.* (2013)	2010	1,975	Single	Sign.
	United Kingdom	Drydakis (2015)	2013–2015	5,628	Matched	Sign.
	Greece	Drydakis (2009)	2006–2007	3,428	Matched	Sign.
	Cyprus	Drydakis (2014)	2010–2011	4,846	Matched	Sign.
Lesbians (vs straight females)	USA	Bailey *et al.* (2013)	2010	2,304	Matched	0
		Gorsuch (2015)	2014	673	Single	0
		Mishel (2016)	2014	1,550	Matched	Sign.
		The Equal Rights Center and Freedom to Work (2012)	2012	100	Matched	Sign.
	Canada	Adam (1981)	1979	82	Single	Sign.
	France	Challe *et al.* (2018)	2017	534	Matched	0
	Germany	Weichselbaumer (2015)	2011–2012	1,339	Matched/ Single	Sign.
	Austria	Weichselbaumer (2003)	1998–2000	1,226	Matched	Sign.
	Belgium	Baert (2014)	2012–2013	1,152	Matched	0
	Italy	Patacchini *et al.* (2015)	2012	1,157	Matched	0
	Sweden	Ahmed *et al.* (2013)	2010	2,015	Single	Sign.
	United Kingdom	Drydakis (2015)	2013–2015	5,470	Matched	Sign.
	Greece	Drydakis (2011)	2007–2008	2,114	Matched	Sign.
	Cyprus	Drydakis (2014)	2010–2011	4,216	Matched	Sign.

Table I.
Overview of correspondence studies conducted in order to test discrimination against gays and lesbians

Source: [a]www.20minutes.fr/societe/2188255-20171214-lgbt-comment-lutter-contre-discriminations-travail, "Sign." (respectively "0") indicates an overall significant discrimination (no discrimination) against homosexual applicants

are sent to the same employer. The resumes differ only by the variable of interest, here the sexual orientation. This makes it possible to detect discrimination for a sole recruiter as well as between two recruiters. Like all "within" experiments, it is not necessary to have as large a sample as in "between" experiments to obtain the same statistical power, but this may introduce some bias, as for example here a risk of detection by the employers[3].

As we can see from this table, only seven studies reported no significant discrimination against homosexuals. Gorsuch (2015) and Patacchini *et al.* (2015) find the presence of significant discrimination against gay male applicants only. It is important to note that no study has reported preferential treatment for homosexual candidates.

3. Method and data
All these correspondence tests were conducted along similar lines. Accordingly, meta-analysis was used to provide a quantitative summary of the existing literature in a systematic manner (Flage, 2018; Zschirnt and Ruedin, 2016). So as to improve comparability

among the studies, face-to-face interviews (e.g. Hebl *et al.*, 2002; Barron and Hebl, 2013) and laboratory experiments (e.g. Baert, 2018; Van Hoye and Lievens, 2003) were omitted and we concentrated instead on correspondence tests performed in OECD country labor markets[4].

We chose this method as it has been the one most commonly used over the past few years, targeting countries with similar market economies, lifestyles, living standards, levels of development and the same type of democratic governance. To search for the data, we used Google Scholar, Econlit and Elsevier's ScienceDirect, with the following keywords: "discrimination," "hiring," "labor market," "correspondence test," "sexual orientation," "field experiment," "testing," "LGBTI," "gay," "lesbian." We also drew on the reviews by Valfort (2017) and Baert (2018).

We have included all the data from the studies presented in Table I, except for the study by The Equal Rights Center and Freedom to Work (2012). We choose not to include it in the meta-analyses because this study compares response rates for homosexual applicants and straight applicants when the homosexual is more skilled than the straights. The purpose of this study was more to prove the existence of discrimination by highlighting the cases where a less-qualified straight applicant was chosen compared to a more-qualified homosexual applicant, and not to calculate the extent of the phenomenon. We thus included data from 18 studies, covering 11 OECD countries with similar levels of human and economic development.

Almost every study can be divided into subgroups, depending on the gender of applicants, type of jobs, procedure used by the experimenter, etc. As hiring decisions are taken by different recruiters and are therefore unlikely to influence each other, each subgroup can be treated to some extent as an independent experiment. Sexual orientation is the variable of prime interest here, but subgroups also allow us to evaluate discrimination by gender (discrimination against lesbians or gays), type of jobs, procedure, continent, type of signal determining sexual orientation and type of information provided in applications.

The studies all report the levels of discrimination faced by homosexual applicants in their own ways: e.g. in terms of risk ratios, odds ratios, net discrimination rates. Unfortunately, there is no established standard in the literature. Following Flage (2018) and Zschirnt and Ruedin (2016), we present the results of meta-analyses on the same basis, in terms of absolute discrimination, through the odds ratio, which "has statistical properties that often make it the best choice for a meta-analysis" (Borenstein *et al.*, 2009)[5].

The odds ratio is in our case the ratio of the following two odds: the odds of getting a positive response (receiving an invitation for an interview) for the homosexual group over the odds of getting a positive response for the straight group. Put differently, it is the probability of being chosen/favored (receiving a positive response while the other applicant does not) for a homosexual applicant over the probability of being chosen for a straight applicant.

For example, if only 5 percent of the homosexual applicants and 10 percent of the straight applicants receive a positive response from employers, we compute the odds as: 0.05/0.95 is the odds for homosexual applicants (share of applicants for whom the event occurs divided by the share of applicants for whom it does not occur) and 0.1/0.9 is the odds for straight candidates. Thus the odds ratio is $(0.05/0.95)/ (0.1/0.9) = 0.47$: homosexuals have 53 percent lower odds of receiving a positive response from an employer, compared to straight candidates. A straight candidate in this case is slightly more than twice as likely as a homosexual applicant to be chosen by an employer.

4. Meta-analysis results

We begin by setting out the overall results of a meta-analysis that takes into account the discrimination reported against homosexuals in all studies. To present the overall results, we use a random effect model, as it seems reasonable enough to assume that the real effect

size is not exactly the same for every study (presence of between-studies heterogeneity[6]). Figure 1 is a forest plot and presents the overall results.

The left-hand column lists the names of the authors in chronological order of their studies from top to bottom. The right-hand side of the forest plot indicates the odds ratio of each study and their 95% confidence interval. The weight given to each study is represented by the size of the boxes. The dotted vertical line (y-axis) indicates equal treatment (no discrimination). The lozenge indicates the global effect size.

Discrimination against homosexuals in hiring decisions in OECD countries is significant (p-value = 0.002) and the odds ratio is 0.64: homosexual applicants have 36 percent lower odds of receiving a positive response from an employer, for equal information provided in the resumes, compared to straight candidates. If we take into account only the studies that have been carried out in the last decade (more representative of the current level of discrimination), we find an odds ratio of 0.65 (n = 13), which is of the same order of magnitude. Thus, homosexual applicants face substantial discrimination in OECD countries. It is worth noting that these findings are similar to the results reported by Zschirnt and Ruedin (2016) for discrimination on ethnic grounds when hiring. This suggests that openly homosexual applicants face a level of discrimination similar to ethnic minorities in hiring decisions.

As often in the literature (e.g. Drydakis, 2014, 2015; Bailey et al., 2013; Patacchini et al., 2015; Ahmed et al., 2013), we can separate responses provided by employers according to
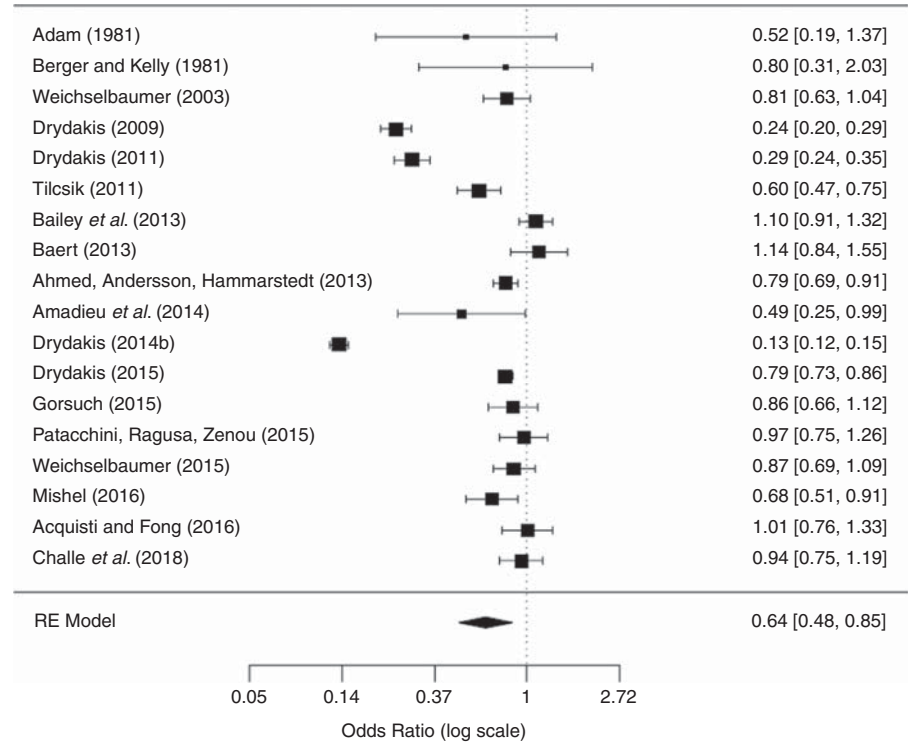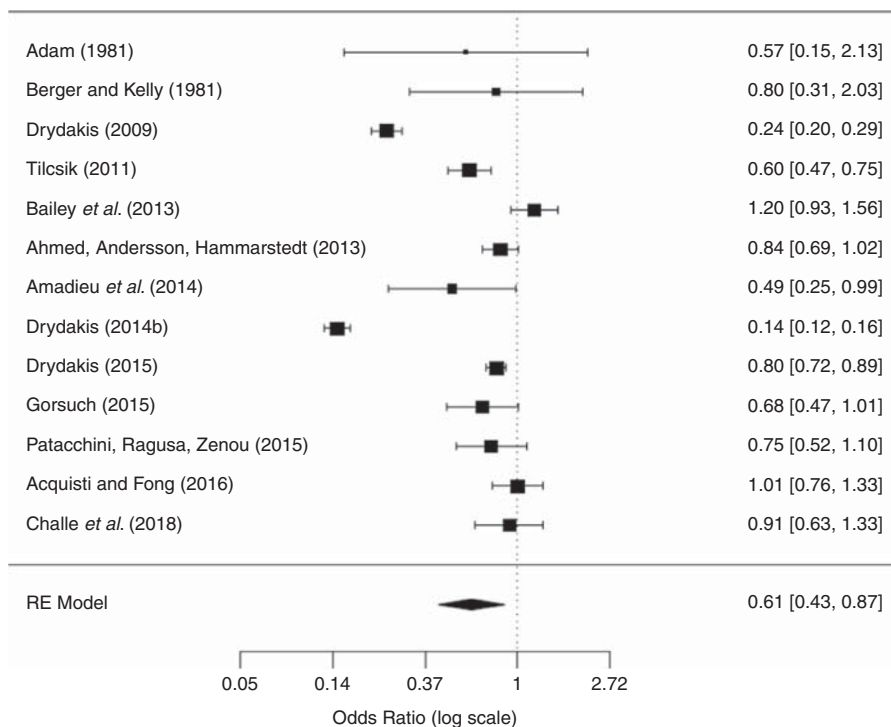

Figure 1.
Sexual orientation discrimination in hiring decisions

Notes: This forest plot (Figure 1) displays the odds ratios in log scale of each study (point estimate as square, two standard errors as lines). The lozenge at the bottom indicates the effect size across studies (n=18: study level; 51.049 applications, I^2=61 percent)

the applicant's gender to investigate if there is differential treatment between gay and lesbian applicants. Indeed, there are many reasons to believe that discrimination against homosexual applicants varies by gender. For example, research on beliefs, perceptions and stereotypes about male and female characteristics shows that men are considered to be more ambitious, independent, assertive, competitive and therefore are perceived as more productive compared to women, who are seen as more generous, affectionate, and sensitive, which are characteristics not linked to labor market success (Broverman *et al*, 1972; Deaux and Lewis, 1984; Heilman, 2001; Connell, 1995; Ellemers, 2018)[7]. Conversely, it seems that gays and lesbians are perceived to have the stereotypical characteristics of the opposite sex (Haddock *et al*, 1993; Kite and Deaux, 1987; Jackson and Sullivan, 1989; Blashill and Powlishta, 2009; Niedlich *et al.*, 2015). Therefore, we might expect for gay men to be more discriminated, compared to lesbian women.

First, we present in Figure 2 the results of a meta-analysis that takes into account the discrimination reported in all studies against gay applicants. Results are also reported in terms of odds ratio, the ratio of two odds: the odds of getting a positive response for the gay group over the odds of getting a positive response for the straight male group.

Discrimination against gay applicants in hiring decisions in OECD countries is significant (p-value = 0.006). We can see that the effect size is 0.61: for equal information provided in the resumes, gay applicants have 39 percent lower odds of receiving a response from an employer than straight males.

Notes: This forest plot (Figure 2) displays the odds ratios in log scale of each study deferring discrimination against gay applicants (point estimate as square, two standard errors as lines). The lozenge at the bottom indicates the effect size across studies (n=13: study level, 27.317 applications, I^2=61 percent)

Figure 2. Discrimination against gays in hiring decisions

Lastly, Figure 3 shows the results for women applicants, again as a forest plot. Here too we present the results in terms of odds ratio, the ratio of two odds: the odds of getting a positive response for the lesbian group over the odds of getting a positive response for the straight female group.

The effect size across studies noted by positive responses is 0.68 (p-value = 0.045): lesbian applicants have 32 percent lower odds than straight women of receiving a positive response from an employer. From these last forest plots, it seems that there is an interaction between sexual orientation discrimination and the gender of the applicants. Sexual orientation discrimination seems slightly greater for male than for female applicants.

However, these results need to be nuanced. Indeed, there are many reasons to believe that discrimination against homosexual applicants varies by the type of occupation. For example, due to stereotypes about homosexual men and women's femininity/masculinity (Haddock *et al.*, 1993; Kite and Deaux, 1987; Jackson and Sullivan, 1989; Blashill and Powlishta, 2009; Mize and Manago, 2018), we can expect that the degree of discrimination depends on whether an occupation is predominantly female or predominantly male. Moreover, there are reasons to believe that discrimination against minority applicants (whether by ethnic origin, gender, sexual orientation, etc.) also depends on whether applications are sent for high-skilled or for low-skilled jobs. Indeed, among other reasons, employers focus more on participants' skills for
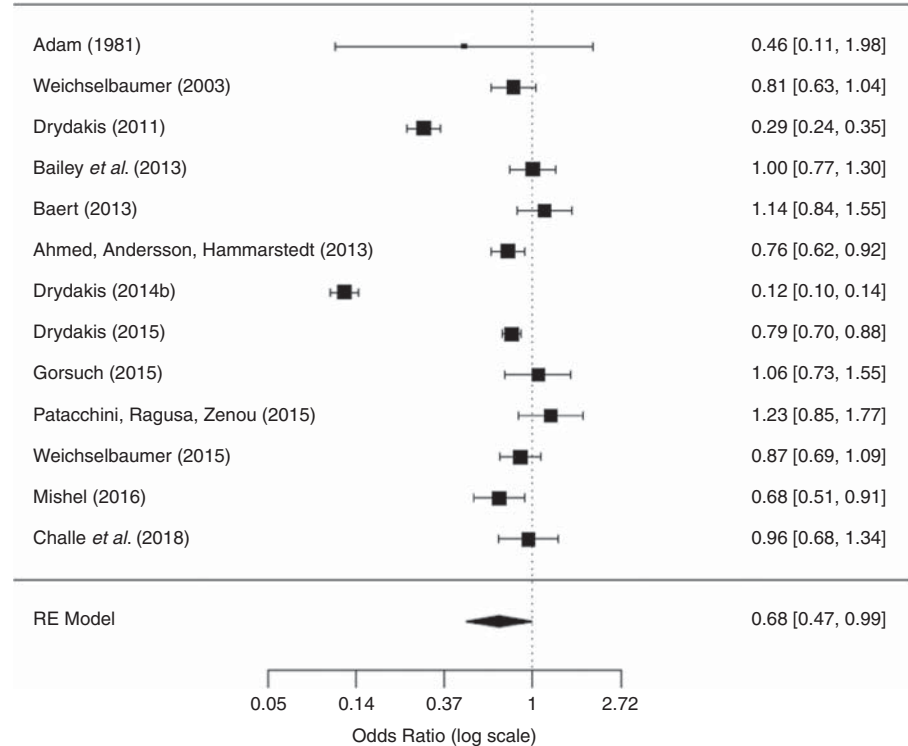
Adam (1981)		0.46 [0.11, 1.98]
Weichselbaumer (2003)		0.81 [0.63, 1.04]
Drydakis (2011)		0.29 [0.24, 0.35]
Bailey *et al.* (2013)		1.00 [0.77, 1.30]
Baert (2013)		1.14 [0.84, 1.55]
Ahmed, Andersson, Hammarstedt (2013)		0.76 [0.62, 0.92]
Drydakis (2014b)		0.12 [0.10, 0.14]
Drydakis (2015)		0.79 [0.70, 0.88]
Gorsuch (2015)		1.06 [0.73, 1.55]
Patacchini, Ragusa, Zenou (2015)		1.23 [0.85, 1.77]
Weichselbaumer (2015)		0.87 [0.69, 1.09]
Mishel (2016)		0.68 [0.51, 0.91]
Challe *et al.* (2018)		0.96 [0.68, 1.34]
RE Model		0.68 [0.47, 0.99]

0.05   0.14   0.37   1   2.72

Odds Ratio (log scale)

Notes: This forest plot (Figure 3) displays the odds ratios in log scale of each study deferring discrimination against lesbian applicants (point estimate as square, two standard errors as lines). The lozenge at the bottom indicates the effect size across studies (n = 13: study level, 23.832 applications, I^2 = 70 percent)

positions of responsibility and/or occupations where special skills are required (e.g. banker, manager) while for low-skilled jobs (e.g. waiter in a cafe, salesperson in a shop), employer selection criteria are less related to skills (e.g. physical criteria, sexual orientation). Moreover, it might be that a job offer for a position as a mechanic, a waiter in a café, or a sales assistant in a shop will receive on average more applications than for a commercial director or managerial position. An employer can more easily express discriminatory preferences when the number of candidates is high. Moreover, the employer is less likely to be caught in the act of discrimination. Thus, low-skilled jobs can be expected to be more at risk in terms of sexual orientation discrimination (Badgett *et al.*, 2007; Eurobarometer, 2007; Drydakis, 2012).

Therefore, we implemented ten additional meta-analyses that determine the level of discrimination according to the type of occupation[8]. Discrimination in office jobs has been the most tested in the literature with almost 15,000 applications sent to employers. The detail of jobs used by authors are provided in Appendix (Table AI). Table II presents the results of these meta-analyses by controlling for the applicant's gender.

Once again, results are presented in terms of odd ratios. For example, the coefficient 0.50 for gay candidates in low-skilled jobs suggests that straight males are twice as likely to be chosen by employers as gays in the selection process for low-skilled jobs and the coefficient 0.69 for lesbians in low-skilled jobs suggests that they have 31 percent lower odds than straight women of receiving a positive response from an employer.

First of all, we can see that lesbians seem to face less discrimination than gays (except in jobs considered as "feminine," which is consistent with the literature on stereotypes about homosexual men and women's femininity/masculinity). Clustering standard errors at the study level, we only find a significant difference in discrimination between gays and lesbians at the 5 percent level for the low-skilled jobs category (*t*-test, *p*-value: 0.033)[9].

Consistent with our expectations, discrimination in the selection process for low-skilled jobs is significantly higher than discrimination in the selection process for high-skilled jobs (*t*-test, *p*-value: 0.049).

Therefore, in job offers for low-skilled jobs, homosexual applicants face substantial discrimination, and there is a significant difference in discrimination between women and men, while in job offers for high-skilled jobs, discrimination is significantly lower, and there is no difference between men and women.

Finally, we can note that the odds ratios are always below 1. Therefore, lesbians are on average not preferred to straight women, even in "masculine" jobs, and gay men are not preferred to straight men, even in "feminine" jobs. This would suggest the presence of

Type of jobs	n (study level)	Resumes sent	Gays (1)	Lesbians (2)	Total	p-value t-test (1) = (2)
Low-skilled	13	31,288	0.50	0.69	0.61	0.03
High-skilled	7	19,531	0.80	0.79	0.80	0.98
Masculine	9	15,533	0.45	0.55	0.50	0.17
Feminine	5	9,372.	0.90	0.78	0.83	0.12
Office	9	14,293	0.36	0.59	0.52	0.25
Industrial	5	4,507	0.28	0.48	0.41	0.74
Shop sales	5	5,612	0.37	0.41	0.38	0.56
Social care, social services, nurses	5	8,892	0.86	0.78	0.81	0.15
Restaurant and café services	4	3,778	0.29	0.32	0.31	0.80
Accountancy, banking, finance and management	4	7,359	0.83	0.85	0.84	0.60
Others	4	6,378	na	na	na	na

Notes: The last column reported the *p*-value of a *t*-test of the null hypothesis that discrimination faced by gays equals discrimination faced by lesbians

Table II.
Meta-analyses of
sexual orientation
discrimination by type
of jobs and gender
(random effect model)

discrimination from pure homophobia (taste-based) and/or the presence of statistical discrimination not based on feminine/masculine traits, such as discrimination due to the perception of higher level of health issues from homosexual individuals (e.g. Worthen, 2013; Jorm *et al.*, 2002; Saunders and Valente, 1987).

5. Meta-regression analysis

In this section, we present a multivariate regression analysis in order to examine the determinants of the level of discrimination (in log odds ratio) against gay and lesbian applicants with the most recent and conservative econometric model: unrestricted weighted least squares (WLS). Meta-analysis focuses on the value of the variable of interest while meta-regression focuses on the variables that influence this variable.

We now present all the explanatory variables that we have chosen to use for our regression and explain the way in which we code variables.

Explanatory variables
In order to fight discrimination, it is essential to know its origins. As mentioned before, this discrimination may be preference-based or statistical. Following Drydakis (2014), and as statistical discrimination is mainly due to a lack of information about the job candidates, a method of testing the source of discrimination consists in the following: comparing the level of discrimination between straight and homosexual applicants when little information is sent to the employers vs the level of discrimination when more positive information is sent to employers. Therefore, this allows to study whether discrimination against homosexuals can be reduced by increasing the information given about them. We code the dummy variable as follows: "Detailed information" takes the value "1" when the application sent to employers consisted of more than a resume (such as a detailed cover letter, a reference letter, etc.) and "0" when just a resume and a statement of interest were sent (Standard information)[10].

We assume that providing more correct information about the candidates should not affect the level of discrimination against homosexuals if discrimination is taste-based, but it should reduce the discrimination if part of the discrimination is statistical.

As indicated, correspondence testing can be done in either of two ways: five studies used the single inquiries procedure and 14 used the matched procedure (Weichselbaumer, 2015, used both). We took the single inquiries procedure as our reference.

The countries in the database were grouped by continents and a dummy variable used to distinguish applications made in Europe from those made in North America (reference).

Low-skilled jobs is a dummy variable which takes the value "1" if applications are sent in response to ads for low-skilled jobs and "0" if applications are sent in response to ads for high-skilled jobs.

Feminine jobs is a dummy variable which takes the value "1" if applications are sent in response to ads for "feminine" jobs and "0" if applications are sent in response to ads for "masculine" jobs.

Female is a dummy variable which takes the value "1" if applicants are women and "0" when applicants are men (reference).

The last variable is how the sexual orientation is signaled. The different signals are partner (i.e. mention of the partner's gender), online social networks (i.e. mention of the sexual orientation on social media), and finally a reference to involvement in a LGBT association. We chose the latter as our reference. The detail of signals used by authors are provided in Appendix (Table AI).

Our baseline model for the MRA is specified as follows:

$$y_j = \beta_0 + \beta_1 x_{1j} + \beta_2 x_{2j} + \ldots + \varepsilon_j.$$

where y_j is the odds ratio (in log) on the correspondence test (a subgroup of a study) j and β_0 is the intercept. The variables x_i specify different characteristics of the correspondence test, such as type of jobs, detailed information provided in the applications, gender of applicants. ε_j in this baseline model specifies the between-subgroup variation.

Stanley and Doucouliagos (2015, 2017) propose estimating this baseline using an unrestricted least squares (WLS) model, which consists in estimating this equation using WLS with $1/se^2(y_j)$ (where SE is the standard error of log odds ratio) as the weights. When there is publication selection bias, the WLS-MRA estimates are more suitable than random effects estimates[11].

In the interest of thoroughness, standard errors were grouped at the study level in all specifications, to make them robust to intra-study dependence.

Finally, it is important to pay attention to multicollinearity in our regressions because a meta-regression analysis is more subject to this problem than classical econometrics. Indeed, most explanatories are dummy variables. In our case, all explanatory variables present a variance inflation factor less than 3 which indicate low correlation among them[12].

In this meta-regression, we have only taken into account the subgroups for which all information was provided (e.g. details of information in the e-mail are specified, gender is specified, type of jobs is specified). Descriptive statistics of variables used in the MRA are provided in Appendix (Table AII).

The results are reported in Table III in terms of the log odds ratio. Once again, the odds ratio is the ratio of the following two odds: the odds of getting a positive response for the homosexual group over the odds of getting a positive response for the straight group.

First, we test three interactions with the gender variable "Female" to investigate: whether discrimination against gay applicants in the selection process for low-skilled jobs appear to be higher than discrimination against lesbian applicants; whether discrimination against gays/lesbians appear to be lower in the selection process for feminine/masculine jobs; and finally if the effect of adding positive information in applications is different between gay and lesbian applicants. Then, we add control variables (type of procedure, continent, type of information provided in applications).

Positive values indicate a lower level of discrimination (less differential treatment) between homosexual and straight applicants and negative values denote a higher level of discrimination between homosexual and straight applicants.

For example, and consistently with meta-analysis results, the negative value for "Low-skilled jobs" suggests that the gap between homosexual and straight applicants is broader when candidates apply for low-skilled jobs rather than "High-skilled jobs." On the other hand, the positive value for "Female × Low-skilled jobs" suggest that discrimination in job offers for low-skilled jobs is significantly lower when applicants are women rather than men.

We draw from this meta-regression four new interesting results.

When the information provided in applications is high and likely to reassure the employer about the candidate (such as a reference letter attesting to the candidate's skill, a detailed cover letter that shows strong motivation and determination of the candidate), the differential treatment between homosexual and straight candidates is significantly lower than when just a resume and a statement of interest are sent[13]. This means that employers need more reassurance about the homosexual candidate than about the heterosexual candidate and that discrimination does not come from preferences only[14] (due to a lack of information provided by the candidates). Note that the positive effect of information on the level of discrimination is not significantly higher for women than for men.

We can legitimately ask why employers need to be reassured more about homosexual candidates. There is however some research track: employers' uncertainty regarding sexual orientation minorities' average productivity, work commitment, etc. could simply be really high (Drydakis, 2014; Altonji and Pierret, 2001). Moreover, it is possible that there is a lack of

Intercept[a]	−0.732** (0.33)	−0.240*** (0.03)	−0.239*** (0.05)	−0.614** (0.26)	−1.074*** (0.35)	−1.173*** (0.37)	−0.781** (0.33)	−0.289 (0.39)	−0.146 (0.43)
Female[a]	0.121 (0.15)		0.001 (0.06)	0.056 (0.25)		0.204 (0.19)	0.200 (0.19)	0.061 (0.12)	0.048 (0.13)
Low-skilled jobs[b]		−0.760** (0.38)	−0.972** (0.38)						
Female × Low-skilled jobs			0.378** (0.17)						
Feminine jobs[c]				0.456* (0.28)					
Female × Feminine jobs				−0.085 (0.23)					
Detailed information[d]					0.595** (0.28)	0.660*** (0.32)	0.608* (0.35)	0.723** (0.33)	0.765** (0.34)
Female × Detailed information						−0.136 (0.22)	−0.142 (0.21)	0.174 (0.24)	0.113 (0.2)
Matched[e]							−0.429 (0.36)	−0.219 (0.31)	−0.310 (0.32)
Europe[f]								−0.947** (0.38)	−1.028** (0.43)
Partner[g]									0.688* (0.36)
Online social networks[g]									−0.613 (0.38)
Number of subgroups	71	71	71	32[h]	71	71	71	71	71
R^2	0.01	0.23	0.28	0.15	0.13	0.13	0.18	0.42	0.48
F/Wald test	0.65	3.96**	3.04**	1.71	4.35**	2.19*	1.77	19.6***	5.33***

Notes: Robust standard errors in parentheses. [a]Male; [b]high-skilled; [c]masculine; [d]standard; [e]single inquiries; [f]North America; [g]member of LGBT association; [h]in this case, we focus our analysis on feminine and masculine jobs only to avoid additional interaction terms. $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Table III.
Results of the unrestricted weighted least squares meta-regression

information not only on the average productivity but also on the whole productivity distribution. Indeed, as (mostly heterosexual) employers are less used to work with homosexual workers, perceived variance of their productivity-related characteristics could potentially be higher than among heterosexual workers. Therefore, risk-averse employers might be reluctant to hire homosexuals because of their allegedly higher productivity variance, although their average productivity might not differ from their heterosexual counterparts. (see Baert, 2018 for a good discussion about second order statistical discrimination against homosexual workers). Finally, we know that homosexual individuals are subject to many stereotypes (e.g. Blashill and Powlishta; 2009, Worthen, 2013). Individuals therefore have sometimes misinformation about the true characteristics of homosexuals. So, when employers receive applications from homosexual job seekers, they may base their evaluation not only on the (limited) information provided by the candidate, but also on stereotypes that exist about homosexuality. For example, with equal qualifications, a homosexual may be considered as in poorer health condition (whether physical or mental), and a fortiori considered as a less productive candidate than a heterosexual, and even by a recruiter who is not homophobic.

Thus, providing more information on the real characteristics of gays and lesbians could reduce employers' uncertainty and mitigate the impact of such negative stereotypes.

However, even when higher information is provided in applications, discrimination remains significant (coefficient for "Intercept + Detailed information" $= -0.479^*$), suggesting the presence of pure preference-based discrimination. This type of discrimination is harder to counter because it does not stem from lack of information but from deep-seated individual preferences. Such a mindset cannot be changed overnight.

Interestingly, and as the overview might suggest, it seems that discrimination against openly homosexual applicants in hiring decisions is significantly higher in studies made in Europe than in North America.

Moreover, the variable "Feminine jobs" is positive and significant at 10 percent. So, gay men seem less discriminated against in feminine than in masculine jobs, which is consistent with the literature on stereotypes about homosexual men 'femininity. However, there is no significant effect for lesbians (coefficient for "Feminine jobs + Female × Feminine jobs" is not significant).

Finally, it seems that the way of signaling sexual orientation influences the level of discrimination. Indeed, discrimination against homosexual applicants is lower when they indicate their sexual orientation by registering the gender of their partner rather than being a member of an LGBT association[15]. However, we must be very careful with this result and especially its causes. Indeed, each of these signals has its weaknesses and its qualities. Reporting sexual orientation through the gender of the partner has two main advantages: it announces without ambiguity that the applicant is homosexual, while being a member of an LGBT association is only taken as a proxy of different sexual orientation: an individual can defend the rights of homosexuals without being a homosexual. Finally, reporting sexual orientation through the gender of the partner indicates nothing but the applicant's sexual orientation, while applicants' voluntary involvement in an LGBT association might suggest they are activists. Therefore, the extent of the discrimination found with this last signal should be interpreted with care because it runs the risk of it being overestimated[16].

However, reporting sexual orientation through the gender of the partner is not without its weaknesses. It is already very unconventional to talk about sexual orientation in applications, but mentioning it so openly can be perceived as truly disturbing by employers and may alert them to the fact that they are being tested (especially in the matched procedure). One may think it is a lot more trivial to report having been in an LGBT association ten years ago at the end of a resume.

Thus, we hypothesize that the smaller gap found between homosexual and straight candidates when reporting sexual orientation through the gender of the partner rather than

by indicating membership of an LGBT association may also be due to a higher risk of detection. In this case, the level of discrimination may be underestimated.

In addition, the way correspondence tests are performed does not seem to significantly affect the results. The levels of discrimination reported with single inquiries and matched procedures are similar.

Due to a lack of data, we have been unable to find any significant differences in discrimination between applicants who report their sexual orientation through social media and individuals who indicate they are members of an LGBT association.

6. Conclusion

By means of this meta-analysis, we provide evidence of substantial hiring discrimination based on sexual orientation in the OECD labor market. At the initial stage of the hiring process, we find that openly homosexual applicants face similar discrimination as ethnic minority applicants (Zschirnt and Ruedin, 2016): homosexual applicants have almost 40 percent lower odds of receiving a positive response from an employer, for equal information provided in the resumes, than straight candidates. However, this result needs to be nuanced because discrimination varies according to the type of occupation and gender of the applicant: more concretely, discrimination is significantly lower in the selection process for high-skilled jobs than in the selection process for low-skilled jobs. Moreover, there is a significant difference in discrimination between gays and lesbians when they apply for low-skilled jobs: straight males are twice as likely to be chosen by employers as gay males are, while lesbians have "only" 31 percent lower odds than straight women of receiving a positive response from an employer. We were able to determine that this discrimination is not only a matter of preferences (e.g. xenophobia, homophobia) but is also due to a lack of information on the applicants. Indeed, providing more (positive) information in the content of the applications significantly reduces the gap between straight and homosexual applicants, which implies that employers need to be "reassured" about homosexual applicants. Understanding the nature of discrimination is a necessary step in setting the right policies to limit it. Reducing uncertainty regarding gay and lesbian characteristics and mitigate the impact of negative stereotypes through a better knowledge of sexual minorities could be part of it, as discrimination does not appear to stem entirely from the homophobic preferences of recruiters. Finally, discrimination found by studies conducted in Europe is significantly higher than discrimination reported by studies performed in North America and it seems that the way of signaling sexual orientation could influence the level of discrimination. We hope that our results provide important information for the future development of non-discrimination and equal hiring opportunities for homosexuals in the labor market in OECD countries.

Notes

1. Note that there is also an emerging literature on the position of transgender people in the labor market (e.g. Van Borm and Baert, 2018; Winter *et al.*, 2018; Drydakis, 2017; Leppel, 2016; Bardales, 2013) but to date, there is not enough data to make a proper meta-analysis of gender-identity based discrimination. Therefore, we opted to concentrate our analysis on sexual orientation.

2. A qualitative review of 12 of these 19 studies was produced by Valfort (2017) and Baert (2018). We found 19 of them because we also looked for unpublished articles, non-scientific journals, doctoral dissertations, or even abstracts. Having data from many unpublished articles is essential for a good meta-analysis due to the possibility of publication bias.

3. For a thorough discussion on the best procedure to choose when making testing, see Vuolo *et al.* (2018).

4. Because of the control that correspondence testing provides, the studies carried out by this method really are comparable, unlike in-person tests.

5. Note, however, that we reach similar conclusions with simple risk ratios.

6. Note that similar conclusions are reached using a fixed-effect model, but as this model assumes that all studies share the same real variable of interest, excessive importance is given to the two studies with the biggest samples, while the others are largely ignored. Yet these latter studies, although having a smaller sample, capture an effect that these two large studies do not.

7. Note that Drydakis *et al.* (2018) have recently demonstrated the impact of masculine and feminine traits on the hiring response rates in a correspondence testing study: "In both male and female-dominated occupations, women with masculine personality traits have an occupational access advantage."

8. We use the same classification as Drydakis (2009, 2011, 2014, 2015) for low skilled, high skilled, masculine and feminine jobs: Industrial jobs, Sales, Restaurant and café services and Office jobs are considered as low-skilled jobs. Moreover, we also included Customer service, Cleaner and Nurse in this category. High-skilled jobs regroup analytical positions, accountancy, banking, finance, management but also education and teaching, engineering. Accountancy, banking, finance, management, engineering, industrial, and jobs like motor vehicle driver are considered as "Masculine" jobs while education and teaching jobs, social care, social services, charity, and some jobs like occupational therapist, nurse, cleaner are considered as "Feminine."

9. Indeed, in jobs considered as feminine (masculine), gay (lesbian) applicants seem to face less discrimination than lesbian (gay) applicants, but the difference in discrimination is not significant at the 10 percent level.

10. Consider examples of different cover letters sent to test statistical discrimination (Drydakis, 2014): "Standard information" applicant: "Dear Sir/Madam, please find attached my Curriculum Vitae for your kind consideration for the vacancy as was advertised in […]. Yours sincerely, Name and surname." compared to "Detailed information" applicant: Dear Sir/Madam, please find attached my Curriculum Vitae for your kind consideration for the vacancy as was advertised in […]. I have ten years of relevant working experience (Job task/Job Specific Skills/Firm). I provide a reference letter from my previous employer. Yours sincerely, Name and surname."

11. We did not find any evidence of publication bias with Egger's test ($z = 0.3743, p = 0.7081$) but, as we can never affirm with certainty the absence of a publication bias, we choose to present estimates from the WLS-MRA model. "Simulations and statistical theory show that WLS-MRA provides satisfactory estimates of meta-regression coefficients that are practically equivalent to random effects when there is no publication bias. When there is publication selection bias, WLS-MRA always has smaller bias than mixed effects or random effects" (Stanley and Doucouliagos, 2015, 2017).

12. A limit value of 10 (or sometimes 5) is a rule of thumb commonly used in the literature (Hair *et al.*, 1998).

13. The rate of positive responses increases significantly more for homosexuals than for heterosexuals by the provision of positive information.

14. Indeed, in such a case, increasing the information would not affect the level of discrimination.

15. Note that this result is not significant at the 5 percent level: $p = 0.063$.

16. Nevertheless, this problem can be mitigated by emphasizing the managerial or financial tasks an applicant holds in the organization that are not in the political realm but relevant from a human capital perspective (e.g. Weichselbaumer, 2003; Tilcsik, 2011; Patacchini *et al.*, 2015; Drydakis, 2015) or by indicating that membership of this group is long outdated (e.g. Drydakis, 2011, 2014).

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Appendix 1

Treatment	Country of analysis	Study	Resume sent	Procedure	Type of signal	Type of information	Type of occupation	Effect
Gays (vs straight males)	USA	Acquisti and Fong (2016)	2,091	Single	Social media	Detailed	Technical, managerial, and analytic positions	0
		Bailey et al (2013)	2,304	Matched	LGBT	Standard	Administrative/clerical, Warehouse	0
		Berger and Kelly (1981)	230	Matched	LGBT	Standard	Social care, social services	0
		Gorsuch (2015)	661	Single	LGBT	Standard	Office, retail, food, industry	Sign.
		Tilcsik (2011)	3,538	Matched	LGBT	Detailed	White-collar jobs at entry level	Sign.
		The Equal Rights Center and Freedom to Work (2012)	100	Matched	LGBT	Standard	Administrative assistant	Sign.
	Canada	Adam (1981)	81	Single	LGBT	Standard	Articling position at legal firm	Sign.
	France	Amadieu	500	Matched	LGBT	Standard	Commercial in the food industry	Sign.
		Challe et al (2018)	772	Matched	LGBT	Standard	Administrative manager	0
	Italy	Patacchini et al (2015)	1,163	Matched	LGBT	Standard	Administrative/clerical, Shop sales	Sign.
	Sweden	Ahmed et al (2013)	1,975	Single	Partner	Detailed	Shop sales, industrial, teacher, motor vehicle driver, cleaner, restaurant and café, Nurse	Sign.
	United Kingdom	Drydakis (2015)	5,628	Matched	LGBT	Detailed	Accounting, banking, finance and management, education and teaching, social care, social services and charity	Sign.
	Greece	Drydakis (2009)	3,428	Matched	LGBT	Standard	Office, industrial, restaurant/café services, shop sales	Sign.
	Cyprus	Drydakis (2014b)	4,846	Matched	LGBT	Standard/ Detailed	Office, industrial, restaurant/café services, shop sales	Sign.
Lesbians (vs straight females)	USA	Bailey et al (2013)	2,304	Matched	LGBT	Standard	Administrative/clerical, warehouse	0
		Gorsuch (2015)	673	Single	LGBT	Standard	Office, retail, food, industry	0
		Mishel (2016)	1,550	Matched	LGBT	Detailed	Office	Sign.
		The Equal Rights Center and Freedom to Work (2012)	100	Matched	LGBT	Standard	Administrative assistant	Sign.
	Canada	Adam (1981)	82	Single	LGBT	Standard	Articling position at legal firm	Sign.
	France	Challe et al (2018)	534	Matched	LGBT	Standard	Caregiver	0
	Germany	Weichselbaumer (2015)	1,339	Matched/ Single	Partner	Detailed	Office	Sign.

(continued)

Table AI.
Overview of correspondence studies conducted in order to test discrimination against gays and lesbians (all variables)

Treatment	Country of analysis	Study	Resume sent	Procedure	Type of signal	Type of information	Type of occupation	Effect
Lesbian (vs straight females)	Austria	Weichselbaumer (2003)	1,226	Matched	LGBT	Detailed	Office	Sign.
	Belgium	Baert (2014)	1,152	Matched	Partner	Detailed	Secretary, nurse, industrial, management, ergotherapist, engineer	0
	Italy	Patacchini et al. (2015)	1,157	Matched	LGBT	Standard	Administrative/clerical, shop sales	0
	Sweden	Ahmed et al. (2013)	2,015	Single	Partner	Detailed	Shop sales, industrial, teacher, motor vehicle driver, cleaner, restaurant and café, nurse	Sign.
	United Kingdom	Drydakis (2015)	5,470	Matched	LGBT	Detailed	Accounting, banking, finance and management, education and teaching, social care, social services and charity	Sign.
	Greece	Drydakis (2011)	2,114	Matched	LGBT	Standard	Office, industrial, restaurant/café services, shop sales	Sign.
	Cyprus	Drydakis (2014b)	4,216	Matched	LGBT	Standard/ Detailed	Office, industrial, restaurant/café services, shop sales	Sign.

Notes: "Sign." (respectively "0") indicates an overall significant discrimination (no discrimination) against homosexual applicants. In 15 studies, subjects signal their sexual orientation by highlighting involvement with an association for lesbian, gay, bisexual and transgender (LGBT) rights in the resume. In three studies, there is a mention of the partner's gender in the application. Finally, in Acquisti and Fong (2016), there is no mention of different sexual orientation in the application and homosexuality is signaled on social medias. In nine studies, the applications sent to employers consisted of more than a resume (such as a detailed cover letter, a reference letter, etc.) while in 11 studies, just a resume and a statement of interest was sent (Drydakis, 2014, did both)

Table AI.

Variable	Dummy	Frequency = 1	Frequency = 0
Matched	1 if matched procedure	50	21
Detailed information	1 if detailed information	44	27
Female	1 if female	39	32
Europe	1 if Europe	61	10
Partner	1 if partner	22	49
Online social networks	1 if online social networks	1	49
Low-skilled jobs	1 if low-skilled jobs	56	15
Feminine jobs	1 if feminine jobs	13	19

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