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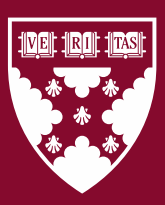

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Gender Inequality and the Direction of Ideas: Evidence from the Weinstein Scandal and #MeToo*

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Abstract

How do the Harvey Weinstein scandal and #MeToo affect women's likelihood of working in male-dominated domains and the types of ideas developed in Hollywood? To discern these events' impact, we exploit the variation in whether a producer previously collaborated with Weinstein. We find that compared to their non-associated counterparts, Weinstein-associated teams with female talent are *more* likely to work on male-oriented stories after the shock, and their depiction of female protagonists is *less* traditionally feminine. Finally, we find *no* change in the share of female-oriented stories by Weinstein-associated producers, even though they now work substantially more with female talent. Our findings suggest that these events have helped counteract gender stereotypes for women, but they do not mitigate the shortage of female-oriented ideas.

Keywords: Gender inequality; Gender segregation; Gender stereotypes; Scandal; Direction of innovation; Creative industries

JEL Codes: D91; J16; M14; L82

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1 INTRODUCTION

Although women have made considerable progress in the workplace, gender inequality remains significant and persistent on many fronts, particularly in the innovation, entrepreneurship, and creative industries (which we refer to as idea sectors). Apart from the general lack of female participation,[1] gender segregation—that is, men and women tending to work on different types of ideas, technologies, and products—is also prevalent. For example, women account for 10% of the inventors in chemical industries but for only 2% in engineering (Hoisl and Mariani, 2017). Furthermore, female-led startups are more likely to be in healthcare and education, rather than in information technology and finance (Hebert, 2020). Within these sectors, women also tend to work on ideas that are likely to appeal to female consumers (Koning et al., 2020; Einiö et al., 2020). For example, female screenwriters are more likely to write scripts for romance and drama films, genres that capture a higher share of the female audience, than other genres.[2]

The link between talent's gender and idea types suggests that reducing gender inequality matters not only for the allocation of talent but also for the types of ideas developed and consumer groups that would benefit from these ideas. Intuitively, increasing the share of female talent could increase the share of ideas that benefit female consumers (Koning et al., 2020), which is important as female-oriented products have historically been lacking in many sectors (Criado-Perez, 2019). This expectation, however, is built on the assumption that with more women, their likelihood of working on ideas that cater to women's needs will not drop. This may be the case if the primary reason for gender segregation is female talent's preference for or advantage over male talent in developing such ideas. However, gender segregation may also be driven by biases such as gender stereotypes that women face in exploring male-dominated domains (Hebert, 2020; Kanze et al., 2020). When gender stereotyping is also an important reason for gender segregation, apart from a general increase in female representation, improving gender equality likely also involves enabling female talent to work in male-dominated domains. Then, whether improvements to gender equality in the labor market will translate to greater gender equality in the product market is unclear.

[1] For example, women represent only 10% of inventors (Sugimoto et al., 2015); 9% of venture capital (VC) investors, and 11% of founders of VC-backed startups (Gompers and Wang, 2017); and only 5% of directors, 14% of writers, and 21% of producers of top-grossing films (Smith et al., 2020). See Fernandez-Mateo and Kaplan (2018) and Guzman and Kacperczyk (2019) for overviews of the underlying demand-side and supply-side reasons for gender inequality in entrepreneurship as well as in organizations more generally.

[2] https://writersguild.org.uk/wp-content/uploads/2018/05/WGGB-Gender-Inequality-and-Screenwriters-Report.pdf

Gender stereotypes permeate multiple aspects of a decision process. They not only influence evaluators' opinions on the demand side (Heilman, 1983; Cejka and Eagly, 1999; Tak et al., 2019) but also women's self-assessment, holding them back from seeking opportunities in male-dominated domains in the first place (Correll, 2001; Coffman, 2014). Moreover, there are coordination difficulties in that even if individual decision-makers are not biased against women, biased decisions may still arise if they are not sure whether critical third parties (e.g., follow-on investors and consumers) hold stereotypical beliefs (Correll et al., 2017). Thus, reducing gender segregation likely needs not only to counteract gender stereotypes of multiple decision-makers but also in a way that is transparent to other parties (Abraham, 2020).

In this paper, we study the impact of the Weinstein scandal and the associated #MeToo movement on gender segregation and the direction of ideas. These events (which we call the shock) began with two exposés in early October 2017 detailing decades of sexual harassment by the powerful movie producer Harvey Weinstein. The shock not only raised the public's awareness of the prevalence of sexual harassment but also its underlying causes, including significant gender disparities in representation and power, as well as entrenched gender stereotypes (Fiske and Glick, 1995; Dobbin and Kalev, 2017). Prior research shows that a scandal could trigger organizational responses that address the specific transgression and transgressor that provoke the scandal or closely related issues (Adut, 2005; Barnett and King, 2008; Galasso and Luo, 2021). In this paper, we posit that highly publicized scandals that reveal deep-seated issues with wide-ranging negative consequences could also engender change in relatively distinct phenomena.

Specifically, we examine three questions: (1) Is gender segregation in idea development reduced after the shock—in our context, is female talent more likely to work on male-oriented ideas that had been dominated by male talent? (2) Because product characteristics, especially that of cultural goods, tend to reflect current norms, we also ask: Has the shock changed the nature of female-oriented ideas (e.g., how women are portrayed) compared to traditional female stereotypes? (3) Finally, given that products specifically catering to female consumers are lacking in many sectors, we ask: What is the shock's impact on the overall share of female-oriented ideas?

Given the broad reach of the Weinstein scandal and the #MeToo movement, it is difficult to find a control group that was not affected. To disentangle their impact from other confounding trends, we need to identify groups that were more affected by these events from those less affected. Hollywood, the epicenter of the movement, provides a setting to address this identification requirement. Whereas

the shock was likely to affect Hollywood producers in general, those who worked with Harvey Weinstein in the past were more affected (Luo and Zhang, 2022). This could be because scandals are more likely to damage the reputation of the associated parties (Pontikes et al., 2010) and/or because the association increases the saliency of these events and makes them pay more attention (Fiske and Taylor, 1991). Therefore, separating producers based on whether they had worked with Weinstein and comparing their decisions before and after the shock helped isolate the effect of the shock from other confounding factors.

Because making movies is a prolonged process, we study the time when new projects are initially set up, which is identified empirically by the acquisition of movie scripts. Because producers who had worked with Weinstein (henceforth, Weinstein-associated producers) are significantly more experienced than those who had not (non-associated), we use a matched sample of 1,977 projects newly set up between 2014 and 2019 for which the two groups of producers are observably similar. Our primary measure of an idea's gender orientation is the gender of the protagonist (Basinger, 1993). Consistent with gender segregation found in other settings, projects written by female writers were 2.5 times as likely as projects written by male writers to feature female protagonists (68.4% vs. 27.3%). Also consistent with the notion that male-dominated domains tend to command higher status and greater resources (Cejka and Eagly, 1999), male-protagonist movies are typically made with higher budgets and released on more screens.

We report three key findings. First, we find that compared to their non-associated counterparts, Weinstein-associated teams with female talent (either screenwriters or producers) are *more* likely to work on male-protagonist stories (and less likely to work on female-oriented stories) after the shock than before. Second, using a measure constructed with machine-learning methods (Devlin et al., 2018) and gender-stereotypical characteristics established in the gender-role literature (Bem, 1974), we find that the portrayal of female protagonists by Weinstein-associated producers is *less* traditionally feminine after the shock than before. Both findings support the idea that these events have helped counteract gender stereotypes for women. Also consistent with this effect, we find an increased consumer demand for films with female leads that defy traditional female stereotypes, as shown by more favorable reviews and higher box-office revenues of such movies released after the shock.

Finally, because female talent is more likely to work on male-oriented ideas, there is *no* significant change in the overall proportion of female-oriented ideas by Weinstein association, even though

Weinstein-associated producers are substantially more likely to work with female writers after the shock (Luo and Zhang, 2022). While the two aforementioned findings suggest promising progress, given that stories with central female characters are significantly lacking relative to women's share of the population (Smith et al., 2020), these events do not help fill this void, at least in the short run.

Our findings show that highly publicized events that expose deep-seated issues around gender stereotypes not only enabled female talent to work in traditionally male-dominated domains, but also shaped the nature of female-oriented products away from traditional stereotypes in an important cultural industry. Taken together, our paper contributes to and *connects* several strands of research on gender inequality, innovation, scandals, and social movement in several ways.

First, our paper joins an emerging set of research that links gender inequality in the labor market in idea sectors to the types of ideas and products that reach consumers (Tak et al., 2019; Koning et al., 2020; Einiö et al., 2020; Koning et al., 2021). Our results challenge the intuitive statement that increasing female participation in the workforce will lead to more female-oriented ideas (Koning et al., 2020, 2021). They highlight the importance of understanding the underlying reasons for gender segregation in a given context; specifically, we show that gender stereotypes are an important source of gender segregation. To research on gender stereotypes (Heilman, 1983; Coffman, 2014; Bordalo et al., 2016; Cejka and Eagly, 1999; Tak et al., 2019; Hebert, 2020; Kanze et al., 2020), we add new evidence on how such biases can be counteracted. Finally, from an empirical standpoint, we add new measures for market segmentation in terms of product appeal to male versus female consumers, which differs from prior research that typically differentiates sectors by whether they are numerically dominated by female or male workers (Reskin, 1993; Blau et al., 2014). Compared to Koning et al. (2020, 2021) that also capture an idea's consumer appeal, we deepen the characterization of ideas to also include the nature of female- (and male-) oriented ideas relative to traditional stereotypes.

Second, our paper contributes to the literature on scandals (Fine, 1997; Adut, 2005). Studies of scandals are more commonly about the reactions of third parties such as customers and investors toward the offender and their associates, for example, through public denouncement and cutting ties (Jensen, 2006; Pontikes et al., 2010). Our paper adds new evidence on how the associated parties respond to a scandal. Compared to prior work that has focused on responses that address the specific transgressions that provoke the scandal or closely related issues (Barnett and King, 2008; Galasso and Luo, 2021), we conceptualize and show empirically that scandals that reveal deep-seated issues may also engender change in a relatively distinct phenomenon. Applying this general idea to our

specific context, we also link studies on gender segregation with studies on sexual harassment in the workplace through gender stereotypes, which are a major driver of both phenomena (Heilman, 1983; Fiske and Glick, 1995; Cejka and Eagly, 1999; Welsh, 1999; Correll, 2001).

Third, our paper adds new empirical evidence to the social movement literature: it is among the first studies to quantify the impacts of one of the most significant social movements in recent decades. Compared to prior work that has focused on in-person social movement organizations (Ingram et al., 2010; McDonnell and King, 2013), our paper documents the effects of a relatively new phenomenon of online social movements (Tufekci, 2018; Mina, 2019), highlighting their role in lowering costs in disseminating information and mobilizing collective action. Compared to other studies of the #MeToo movement (Levy and Mattsson, 2019; Lins et al., 2021; Gertsberg, 2022; Luo and Zhang, 2022) that examine its impact on sex crime reporting and gender inequality in the workplace, our study is novel in linking the movement also to the direction of innovation and ideas.

2 CONCEPTUAL FRAMEWORK

One of the central ideas of our paper is that the transgression that provokes a scandal may share the same underlying causes with a range of social or economic phenomena; as such, in responding to the scandal, decision-makers may initiate changes that surpass penalizing the offender or preventing future transgressions. Applying this idea to the Weinstein scandal and #MeToo movement, we argue that these events may lead to changes in a relatively distinct phenomenon: gender segregation in the labor market. The link between gender segregation (the phenomenon) and sexual harassment (the transgression that provoked the scandal) is a common contributor: entrenched gender stereotypes.

2.1 Scandals as triggers for change

We begin by discussing the mechanisms and necessary conditions whereby a scandal—a public disclosure of a transgression—may spawn change. The power of a scandal lies in *publicity*, which has two effects. The first is straightforward: publicity is an effective way to raise the public's awareness of the transgression and related problems. This may lead to change for extrinsic reasons; for example, the offender and associated parties want to restore their reputation and mitigate the risk of losing customers or the support of other stakeholders (Barnett and King, 2008; Galasso and Luo, 2021). There may also be intrinsic motivations to change, as the increased awareness may trigger sympathy for the victims or guilt for being a part of the environment that has enabled the transgression (McCarthy and

Zald, 1977; Tarrow, 1998; Haidt, 2003).

The second effect of publicity is more subtle. The transgression could be widely known to individuals and tolerated beforehand; but the publicity transforms private knowledge into common knowledge—that is, from "everybody knows" to "everybody knows that everybody knows" (Adut, 2005). By making an individual's knowledge and attitude toward the transgression transparent to others, a scandal raises the cost of inaction. This is important because, as we discuss in the next section, an important hindrance to social change is plural ignorance, which refers to a situation in which people are unclear about other parties' preferences (Ridgeway and Correll, 2006; Abraham, 2020). Scandals help overcome this coordination problem by aligning and providing transparency of various parties' preferences (or, at the minimum, their publicly stated commitments).

Of course, not all transgressions become scandals and not all scandals attract sustained attention and lead to substantive change. The probability of a scandal, its extent, and its consequences depend on several factors. First, attention-based theories suggest that public attention is driven by salience (Fiske and Taylor, 1991). Intuitively, high-status offenders are more likely to attract attention (Adut, 2005; Graffin et al., 2013), as are deeply offensive and visceral transgressions—for example, the exposés of sexual abuse of children by Catholic priests and the graphic footage of George Floyd's death. The same events can also be more salient to people who find them more relevant personally; for example, those who know the parties involved or those who can better relate to these events because of their own past experience (Loewenstein and Small, 2007).

Second, technologies and institutions that can disseminate information to the masses and mobilize collective action are also critical (Fine, 1997). Historically, mass media, such as newspapers, has been instrumental in disseminating information to the public (Fine, 1997), and social movement organizations, such as women's rights organizations, have also played critical roles in leveraging scandals to mobilize people and resources (Snow and Benford, 1988; McCarthy and Zald, 1977). Recently, digitization and new business models such as social media have not only drastically lowered the cost of disseminating information but have also lowered the cost of mobilizing participation and resources to a scope and speed that is difficult for traditional media or in-person organizations to match (Tufekci, 2018; Mina, 2019).

Third, scandals that reflect deeper structural issues are also more likely to sustain public attention, and change is more likely when society has some shared ideas that help suggest actions that might constitute a solution (Fine, 1997). Organizational responses documented in the prior literature

have largely (and naturally) focused on actions aiming to address the specific transgression or closely related issues, which include establishing auditing and reporting systems (Crosbie and Sass, 2017); setting new industry standards (Barnett and King, 2008); and devoting significant resources to activities to prevent future transgressions (Hoffman and Jennings, 2010; Galasso and Luo, 2021). In this paper, we posit that *scandals may engender substantive change in a phenomenon that is relatively distinct from the specific transgression causing the scandal.* This is likely to happen when a scandal reveals deep-seated causes (for the transgression) that have other wide-ranging negative consequences affecting large percentages of the population. Correspondingly, the discourse the scandal triggered, organizations exposed, and actions the public demanded are all likely to be significantly wider in scope. For example, reflecting unchecked corporate greed, the Enron scandal has affected corporate governance far beyond preventing financial fraud and has expanded ethics education across business schools (Conroy and Emerson, 2006). The killing of George Floyd has motivated many organizations to pledge racial equality in the workplace,[3] including providing employment opportunities for black talent and supporting black entrepreneurship.

In the following sections, we apply the idea described in this section to the Weinstein scandal (and the #MeToo movement) and the phenomenon of gender segregation. We first discuss gender segregation and highlight gender stereotypes as a contributor to the phenomenon. In the section that follows, we discuss the role of gender stereotypes in enabling sexual harassment in the context of the Weinstein scandal and #MeToo movement and hypothesize the impact of these events on gender segregation and product development in idea sectors.

2.2 Gender segregation and gender stereotypes

Research in economics and sociology has documented pervasive gender segregation across tasks, occupations, and industries (e.g., Reskin, 1993; Blau et al., 2014; Goldin, 2015; Chan and Anteby, 2016). Gender segregation has been found to be significantly related to women's social and economic standings (Cohen et al., 1998) and organizational outcomes such as job satisfaction and firm performance (Reskin et al., 1999; Cohen and Broschak, 2013).

Although many possible factors contribute to gender segregation, research has suggested that entrenched gender stereotypes—which are generalized beliefs about the traits and abilities of men and women—play a prominent role in hindering women's ability to succeed in male-dominated domains

[3] https://www.washingtonpost.com/business/interactive/2021/george-floyd-corporate-america-racial-justice/

(e.g., Heilman, 1983; Correll, 2001; Coffman, 2014; Bordalo et al., 2016). Men are typically thought to have agentic traits such as being ambitious, competitive, and analytical, whereas women are thought to possess communal traits such as being compassionate, understanding, and warm (e.g., Bem, 1974). These stereotypical beliefs imply two types of expectations that impact how individuals are evaluated (Eagly, 1987; Correll and Ridgeway, 2006): (1) the general expectation that men are more competent than women, regardless of the task at hand; and (2) the specific expectation that men are better at jobs and roles perceived to require masculine traits and women are better at those that are perceived to require feminine traits. The combination of these two expectations may explain why research consistently finds women are devalued in male-dominated domains, whereas such devaluation is not consistently found for men in female-dominated domains (e.g., Williams, 1992; Tak et al., 2019; Kanze et al., 2020).

Gender stereotypes permeate multiple aspects of a decision process. On the demand side, the mismatch between female stereotypes and the perceived requirements tends to result in a negative evaluation of women in male-dominated jobs (Heilman, 1983; Cejka and Eagly, 1999). When ambiguity and uncertainty are high, which is the case in idea sectors, decision-makers are especially likely to rely on readily observable factors such as gender for evaluation. On the supply side, gender stereotypes may also influence women's self-assessments, holding them back from pursuing certain jobs and career paths in the first place (e.g., Correll, 2001; Coffman, 2014).

Moreover, when coordination across multiple decision-makers is necessary, gender stereotypes may also lead to biased decisions even if the direct decision-makers themselves do not hold stereotypical beliefs. For example, even if women do not self-stereotype, the anticipation of employers' stereotypical beliefs may discourage them from entering male-dominated domains (Fernandez-Mateo and Fernandez, 2016). Similarly, even if the direct decision-makers (e.g., the hiring managers or early investors of a startup) are not biased against women, biased decisions may arise due to their concerns about the evaluation criteria of relevant third parties (e.g., company leadership or follow-on investors) (Fernandez-Mateo and King, 2011; Correll et al., 2017). Thus, reducing gender segregation likely requires counteracting stereotypes of multiple decision-makers as well as in a way that is transparent to other parties (Abraham, 2020).

2.3 The Weinstein scandal, the #MeToo movement, and their impact

The Weinstein scandal and #MeToo movement have the potential to engender significant changes because they meet the aforementioned conditions to attract and, importantly, sustain public interest. To start, the Weinstein scandal involved a high-profile individual; the transgressions (sexual harassment and assault) were particularly egregious. Furthermore, the authoritative nature of the reporting outlets (*The New York Times* and *The New Yorker*) granted credibility to the allegations.[4] Moreover, social media amplified the scandal, ultimately leading to the #MeToo movement. While Tarana Burke first used the term "Me Too" in the sexual abuse context in 2006, it was not until after the Weinstein scandal broke that the term started to receive unprecedented public attention.[5]

Important for our research questions, while these events are triggered by sexual harassment, they have led to a significant awakening of deeper issues that have enabled sexual harassment, which include entrenched gender stereotypes, as well as gender inequality in representation and power. Research has documented various motivations for sexual harassment—sexual desires, reassertion of male dominance, and protective paternalism—all of which reflect stereotypical assumptions about women's traits, abilities, and the roles for which they are suited (Fiske and Glick, 1995; Welsh, 1999). Whether motivations to engage in sexual misconduct actually leads to action, however, depends largely on the characteristics of the organizational setting. Organizations with substantial gender disparities in representation and power are more likely to rely on gender stereotypes to categorize women and are, consequently, more likely to be permissive of sexual misconduct (Fiske, 1993; Fiske and Glick, 1995; Dobbin and Kalev, 2017).

The enabling role of gender stereotypes and gender inequality in sexual harassment and their various consequences for women in life and work, while long-existing in research, is made particularly salient in personal accounts disclosed both on social media and in opinion pieces published by tradi-

[4] "Harvey Weinstein Paid Off Sexual Harassment Accusers for Decades," by Jodi Kantor and Megan Twohey, October 5, 2017, *The New York Times*. "From aggressive overtures to sexual assault: Harvey Weinstein's accusers tell their stories," by Ronan Farrow, October 10, 2017, *The New Yorker*.

[5] On October 15, 2017, a few days after the reporting of accusations against Weinstein, Alyssa Milano posted on Twitter encouraging women who had been sexually harassed to write #MeToo on social media. Within 48 hours, the hashtag was tweeted nearly a million times, and Facebook reported 45% of its users in the U.S. were friends with someone who had posted a "#MeToo" status (https://www.cbsnews.com/news/metoo-more-than-12-million-facebook-posts-comments-reactions-24-hours/). Within a year, the #MeToo hashtag has been used more than 19 million times on Twitter (https://www.pewresearch.org/fact-tank/2018/10/11/how-social-media-users-have-discussed-sexual-harassment-since-metoo-went-viral), and revelations of sexual misconduct spread across many industries, including politics, academia, restaurants, and various media and entertainment sectors (https://www.vox.com/a/sexual-harassment-assault-allegations-list).

tional mass media. These broader reckonings have led us to expect these events to engender changes beyond penalizing the offenders and preventing future sexual misconduct. While the impact of these events is potentially wide-ranging,[6] we focus on their impact in idea sectors in this paper, particularly, the extent of gender segregation and the types of ideas developed.

2.3.1 *On women's likelihood of working on male-oriented ideas.*

The Weinstein scandal and #MeToo may spur actions that reduce gender segregation—specifically, to increase women's likelihood of working on male-oriented ideas. On the demand side, the decision-makers (such as the hiring managers) may take actions to reduce the influence of gender stereotypes by collecting more information to mitigate uncertainty and by undertaking training to mitigate implicit or explicit stereotyping (Perry et al., 1994; Heilman and Caleo, 2018). Even if stereotypical beliefs are slow to change, managers may also be motivated to take action to reduce gender segregation directly. An important reason is the increased demand from relevant third parties such as consumers, investors, and key talent. In the film industry, for example, major studios, film festivals, and celebrities have pledged varying commitments to promote gender parity. The public nature of these demands makes it less necessary for managers to speculate about other parties' preferences. As discussed, such transparency is critical for overcoming potential coordination difficulties that often hinder change.

On the supply side, increased awareness of gender stereotypes may have made female talent less likely to self-stereotype. Similarly, the transparent shift in demand discussed previously (either directly from the hiring managers or indirectly from third parties) also encourages female talent to search for and accept employment opportunities in male-dominated spaces. For all of these reasons, we expect that in idea sectors in which gender stereotypes are prevalent:

Hypothesis 1 (H1). *Among female talent, the likelihood of working on male-oriented ideas will increase after the Weinstein scandal and #MeToo movement relative to before these events.*

2.3.2 *On the nature of female-oriented ideas.*

Cultural aspects of a product often reflect and may even influence cultural and social norms. Media products such as films, television, and advertising have long been criticized for playing an important

[6]For example, educators began to teach students to have a better understanding of gender stereotypes, arguing that this is "one of the most effective ways to combat sexism" (https://www.wnyc.org/story/after-metoo-high-school-students-learn-about-gender-roles/). Of the 200 men in prominent positions who were fired due to allegations of sexual harassment, half of the replacements were women ("#MeToo Brought Down 201 Powerful Men. Nearly Half of Their Replacements Are Women," October 23, 2018, *The New York Times*). In venture capital, where female talent makes up a small minority, Calder-Wang et al. (2021) found an increased female representation after #MeToo.

role in objectifying women, as well as perpetuating gender stereotypes and harassment of women (Strinati, 2004; Gill and Orgad, 2018). Smith et al. (2020), for example, found that female characters in films are far more likely than their male counterparts to be referred to as physically attractive and to be shown in sexually revealing clothing with some nudity. This phenomenon is also common for products that explicitly appeal to consumers of different genders. For example, research shows that children's toys are more gender-divided than ever.[7] Even for products that appeal to consumers largely due to their functionalities, gender stereotypes are often deployed in marketing messages and product development.[8] Following the same general idea discussed in Section 2.1, another area in which decision-makers may take action to counteract gender stereotypes for women is the nature of products and how they are marketed:[9]

Hypothesis 2 (H2). *Female-oriented ideas are less likely to be stereotypically feminine after the Weinstein scandal and #MeToo movement relative to before these events.*

2.3.3 *On the overall share of female-oriented ideas.*

Scholars and commentators have remarked on the scarcity of products specifically catering to women's needs in many markets. For example, many have noted the underinvestment in research on medical conditions that disproportionately affect women (e.g., Leprince-Ringuet, 2018; Koning et al., 2020). Data suggest that crash test dummies modeled after men may partly explain the higher likelihood of injuries and death of women in car accidents (Wu, 2021). Criado-Perez (2019) provided many examples of the consequences resulting from treating men as the default and women as atypical. In media, prior research has found consistently higher coverage of men than of women (Strinati, 2004). For films specifically, less than a third of all speaking characters in top-grossing films are female, and only 28% of the films have a female lead or co-lead (Smith et al., 2020).

For this reason, it is important to investigate whether the Weinstein scandal and #MeToo have led to a change in the overall share of female-oriented ideas. Conceptually, *the net effect is ambiguous*.

[7] https://www.npr.org/2019/03/26/705824731/sparkle-unicorns-and-fart-ninjas-what-parents-can-do-about-gendered-toys. https://www.theatlantic.com/business/archive/2014/12/toys-are-more-divided-by-gender-now-than-they-were-50-years-ago/383556/

[8] For example, "Lady Dorito," which Pepsi developed to minimize crunch noise, received backlash for perpetuating gender stereotypes. https://temple-news.com/products-for-ladies-promote-gender-stereotypes/.

[9] Anecdotally, after #MeToo, brand consultants encouraged marketers to break traditional gender roles and stereotypes (https://brandgenetics.com/wp-content/uploads/2020/01/What-Women-Want-Decoding-the-Future-of-Femininity-Brand-Genetics-Insight.pdf). Relatedly, brands such as Victoria's Secret have experienced declining sales and consumer appeal (https://www.nytimes.com/2018/11/16/style/victorias-secret-bras-decline.html?searchResultPosition=56).

This is because of two opposing effects. On the one hand, Luo and Zhang (2022) found that female representation may have increased after these events. This effect alone is likely to increase the overall proportion of female-oriented ideas because female talent is generally more likely to work on female-oriented ideas (Koning et al., 2020, 2021). On the other hand, as previously argued under H1, female talent may be *less* likely to work on female-oriented ideas. The net effect of these events on the overall share of female-oriented ideas is, therefore, ambiguous.

3 SETTING, DATA, AND METHOD

3.1 Research setting

Making a movie is a long, costly, and uncertain process. We study the time when new projects are initially set up, which is empirically identified by the acquisition of movie scripts.[10] The key decision-makers at this point are movie producers, who typically work in teams and are partners or executives of production companies and studios. They select projects primarily from two sources: 1) finished scripts acquired from writers (about half of the projects are from this source); and 2) projects based on pre-existing work (e.g., a novel), with the writers hired to adapt them into scripts.

While producers are the key decision-makers of project selection, other parties' preferences and actions matter. Even though writers generally have a weaker bargaining position than producers, they have the option to refuse to work on a project or refrain from selling a script to a producer. The producers also need to account for the preference and evaluation criteria of other key industry stakeholders who may not get involved with a project until later in the process—such as directors, actors, and studio executives who decide whether to finance a project. These players' willingness to participate and invest in a project is critical for its success; indeed, Luo et al. (2020) showed that only about 16% of new movie projects that are identified at the same stage as our study are eventually financed and theatrically released.

3.1.1 *Association with Harvey Weinstein*

Whereas the shock may affect Hollywood producers in general, we argue that the impact is greater for producers who have collaborated with Harvey Weinstein in the past (Luo and Zhang, 2022). First,

[10] We do not examine a writer's decision to *start* working on an original script because neither the timing of such decisions nor data on completed but unsold scripts are systematically available. We also do not compare movies that are *released* before and after the Weinstein scandal and #MeToo because the prolonged process of making a movie implies that many movies released after these events were developed before them.

scandals are more likely to damage the reputation of parties associated with the offender (Jensen, 2006; Pontikes et al., 2010). This is especially true for collaborators who are perceived to be aware and tolerant of Weinstein's behavior (e.g., frequent or male collaborators). Thus, compared to non-associated producers, Weinstein-associated producers are more motivated to take action to repair their reputations and mitigate the risk of losing customers or other stakeholders.

A separate, but not necessarily mutually exclusive reason is that their association with Harvey Weinstein may have also made these events more salient to his collaborators. Research shows that saliency makes people pay more attention, and it could increase the intensity of emotions such as sympathy as well (Fiske and Taylor, 1991; Dickert and Slovic, 2009). Thus, even if not to repair their reputation, Weinstein-associated producers may still be more likely to take action to address the issues highlighted by these events or leverage opportunities that arise from these events.

The above arguments motivate our empirical strategy: by comparing Weinstein-associated producers with non-associated producers, we are able to discern the specific impact of the shock. Non-associated producers control for two types of factors that similarly affect both groups of producers: 1) industry-level impacts of the shock, and 2) other factors unrelated to the shock that may have separately affected a producer's project-selection decisions around the same time.

3.2 Data

Our primary data source is Done Deal Pro (DDP), a database that tracks script transactions—both acquisitions of original screenplays and adaptation contracts—on a daily basis.[11] The database contains 4,836 records from January 2014 to September 2019. We are left with 4,045 projects, after excluding 1) 572 observations that have no information about the writers or the producers; 2) 76 additional observations by the Weinstein company or by producers who faced allegations of sexual harassment themselves after the shock;[12] and 3) 143 additional observations missing information on the logline—which typically consists of one to three sentences that describe the movie plot—that we use to construct our dependent variables.

[11] Various industry organizations recognize DDP as a leading movie project information source. To the best of our knowledge, the timing of these transactions provides the earliest systematic measure of the start of new movie projects.

[12] *Vox* compiles a list of people who have been accused of sexual misconduct since April 2017 (https://www.vox.com/a/sexual-harassment-assault-allegations-list). We exclude these people and the Weinstein company itself because the negative publicity and potential litigation may have been sufficiently disruptive to drive them out of the market. (The Weinstein company, for example, filed for bankruptcy.)

3.2.1 *Dependent variables*

We construct measures for two types of outcomes: 1) the gender orientation of an idea (that is, whether an idea is more likely to appeal to a female audience or to a male audience); and 2) how women (and men) in the stories are portrayed compared to their traditional gender stereotypes. Both measures are constructed based on a script's logline, which is the only source of content information that is systematically available for early-stage projects.

For an idea's gender orientation, our primary measure is the gender of the protagonist (see Appendix B.1 for details of the construction of this measure). For 77% of the projects, the pronoun or the name associated with the protagonist is clearly male or female. For the remaining 23%, we use supervised machine-learning techniques, trained on loglines for which the protagonist's gender is clearly coded, to predict whether a logline is likely to feature a female or a male protagonist. Combining manually coded and predicted classifications, 31.0% of the loglines feature only female protagonists; 62.1% feature only male protagonists; and the remaining 6.9% feature both female and male protagonists. Our key dependent variable, *female protagonists*, indicates projects with only female protagonists and projects with protagonists of both genders. Thus, the omitted benchmark is projects with only male protagonists.

Intuitively, with a woman at the center of the story, female audiences are more likely to find stories with female protagonists more appealing than stories with male protagonists (Basinger, 1993). To empirically verify that the protagonist's gender indeed captures the gender orientation of an idea, we conduct two tests. First, we construct an alternative measure based on a survey of MTurk workers' ratings of how much a typical man or woman in the U.S. will like a movie based on a given logline (see Appendix B.2 for a detailed explanation of the construction of this measure). We create a variable, *gender appeal*, which categorizes the loglines as significantly more appealing to women than to men (22% of the loglines and coded as 1); significantly more appealing to men than to women (26% of the loglines and coded as -1); and similarly appealing to either gender (the remaining 51% and coded as 0). This demand-based measure is highly correlated with the protagonist's gender. For example, 44% of loglines featuring female protagonists are rated as significantly more appealing to women, whereas this is the case for only 8% of loglines featuring male protagonists. Second, using a different dataset of released movies, we find that relative to male reviewers, female reviewers (both professional critics and *Rotten Tomatoes* users) rate movies with a majority of female leads more

favorably than movies with a majority of male leads. (See Appendix Table B.2 for the reviewer-movie level regressions, which include both movie and reviewer fixed effects). This result further corroborates that the protagonist's gender is a reasonable proxy for the gender orientation of an idea.

To investigate how women and men in the stories are portrayed compared to their traditional gender stereotypes, we employ recent advances in machine-learning techniques. Specifically, we employ the BERT machine-learning model, which converts keywords, phrases, and paragraphs into multidimensional vectors (Devlin et al., 2018). In this vector space, we calculate the distance of the vector representing a given logline to a benchmark vector representing feminine characteristics, compared to a benchmark vector representing masculine characteristics.[13] These benchmark characteristics come from the Bem Sex-Role Inventory (BSRI) (Bem, 1974), which includes 20 masculine characteristics that are judged to be significantly more desirable for a man than for a woman and 20 feminine characteristics that are judged to be significantly more desirable for a woman than for a man. The literature has interpreted these masculine characteristics to represent agentic or instrumental traits (e.g., "acts as a leader," "competitive," and "analytical"), whereas the feminine characteristics represent communal or caring traits (e.g., "affectionate," "compassionate," and "understanding"). We use BSRI because it has been considered the gold standard in gender-role evaluation for the past 40 years (Dean and Tate, 2017), and because it is consistent with the traditional gender stereotypes central to the literature on gender segregation discussed above.

Higher values of this gender-role measure indicate more feminine portrayals of the protagonists, and a zero value indicates that the logline is equally distant from masculine and feminine benchmarks. As we show in Appendix Figure B.1, while a high variance exists in how male and female protagonists are each portrayed based on this measure, the proportion of female-protagonist stories is monotone increasing as this measure increases, suggesting that the measure passes a basic validity test. An examination of the loglines associated with different parts of the distribution of this measure (see examples listed in Appendix Table B.6) also suggests that the measure does a reasonable job of capturing the relative femininity/masculinity of the protagonist.[14] In the analysis, we use a dummy

[13] See Appendix B.3 for a detailed description of the construction of this measure, which is similar in spirit to that of Cao et al. (2020). Our measure differs from theirs in two aspects. First, compared to word2vec models they use to encode words into vectors, BERT models take into consideration the context of each word. For example, BERT models will yield different vectors for the word "bank" as a financial institute from the bank of a river, whereas word2vec models will produce the same vector. Second, the gender benchmarks they use are three pairs of words, woman/man, she/he, and female/male. By contrast, our benchmarks are specifically about gender stereotypes.

[14] For example, films such as *Captain Marvel* (*"Captain Marvel aka Carol Danvers is an air force pilot whose DNA is fused with that of an alien after an accident giving her superhuman strength and even the ability to fly"*), which features

variable, *feminine*, to indicate that the portrayal of the protagonist is relatively feminine; that is, the gender-role measure is above the sample median.

3.2.2 *Independent variables*

As aforementioned, our empirical strategy exploits the differential responses of Weinstein-associated producers versus non-associated producers after the shock. Using cast and crew information from the Internet Movie Database (IMDb), we define a production team as Weinstein-associated if at least one of the producers played any of the four major roles (producing, directing, acting, and writing) in a movie Weinstein produced and released before October 2017. Out of 5,342 unique producers, 11.9% had past collaborations with Weinstein. Because the majority (81%) of the projects involved more than one producer, 43.2% of the projects were managed by a Weinstein-associated production team. Overall, Weinstein-associated and non-associated producers are not differentially likely to work on female-protagonist stories (0.376 vs. 0.381, p-value = 0.734) before the shock. Protagonists of both genders developed by Weinstein-associated producers are also similarly traditionally feminine as those by non-associated producers.

The gender of the writers is determined by *genderize.io*, a commonly used gender-classification software based on a person's first name. If the confidence level of the predicted gender is below 95%, we manually confirm the person's gender using additional Internet sources. Out of the 3,650 unique writers, 23.30% are female. Because the majority (76.8%) of the projects involved a single writer, a similar percent (25.8%) of projects included at least one female writer. As mentioned, the gender of the protagonist and the gender of the writer are highly positively correlated. In particular, projects with at least one female writer are 2.5 times as likely as projects written by all-male writers to feature a female protagonist (68.4 vs 27.3%, p-value is 0.000). For each gender of the protagonists, those written by female writers are more likely to be relatively feminine.

We codify the gender of producers similarly. Twenty-six percent of the 5,342 unique producers are female, and 50.1% of the projects are managed by production teams with at least one female producer. Similar to projects with female writers, projects managed by teams with at least one female producer are also significantly more likely than projects managed by all-male production teams to

a female protagonist in a traditionally male plot line, scored at around the 15th percentile; however, the film *Girl on the Train* (*"A woman who is devastated by her recent divorce spends her daily commute fantasizing about the seemingly perfect couple who live in a house that her train passes every day until she sees something shocking happen there one morning and becomes entangled in the mystery that unfolds"*) scored at around the 85th percentile.

feature female protagonists (44.2 vs 31.3%, p-value is 0.000). Furthermore, protagonists of each gender are also significantly more feminine if they are produced by teams with at least one female producer than if they are produced by an all-male production team.

3.2.3 *Control variables*

We control for a large number of variables that may correlate with the type of project; for example, more-experienced producers and writers may be more trusted with male-oriented projects, which tend to have higher budgets. We construct several measures to capture a producer's experience and industry status. In particular, *Producer experience* is the number of producing credits a producer obtained in the 10 years before the focal project for movies distributed by the top-30 movie studios; *Producer prior awards* is the number of Best Picture Academy Awards (the Oscars) a producer has won or for which he/she was nominated; and *Producer experience with major studios* and *Producer experience with top agencies* are, respectively, the likelihood of working with major studios and the largest agencies on past projects, as captured by the DDP database since 2004. *Producer team size* is the total number of producers in a team, and the maximum of the producers' characteristics aforementioned is taken for teams with multiple producers.

For writer characteristics, we control for *Writer experience*, which is the number of writing credits a writer obtained in the previous 10 years for movies distributed by a top-30 movie studio, with the maximum taken for teams with multiple writers; and *Top four agencies*, which indicates that at least one of the writers is represented by one of the four largest talent agencies in Hollywood.

Finally, in addition to a set of dummy variables indicating 14 genres, script characteristics also include *Original*, which indicates that the script is based on original content rather than on existing properties such as books and short stories; *Talent attached*, which equals one if some directing and/or acting talent was committed at the time of the record; and *Rights purchase*, which indicates that the transaction is about adaptation rights (the writers are the authors or creators of the pre-existing properties). We also include a set of dummy variables for 28 movie studios.

3.3 Empirical strategy

We estimate the following difference-in-differences (DiD) style regressions:

$$Y_i = \alpha + \delta \text{Weinstein association}_i \times \text{Post-shock}_t + \gamma \text{Weinstein association}_i + y_t + \beta X_i + \varepsilon_i, \qquad (1)$$

where Y_i equals one if project i features female protagonists (or if the portrayal of the protagonist is relatively feminine); Post-shock$_t$ equals one for the time period after (and including) the fourth quarter of 2017; Weinstein association$_i$ indicates whether any producer on the production team had collaborations with Weinstein before the shock; X_i are control variables; and y_t are quarterly fixed effects. We cluster standard errors at the studio level. As discussed, non-associated producers help to control for any industry-level changes in response to the shock and any confounding factors unrelated to the shock. Under the parallel-trend assumption, δ captures the average differential effect of the shock by the association with Weinstein.

A key identification challenge is that there may be variables that are related to both the association with Weinstein and the change in outcome over time. This is a likely concern because the two groups of producers are observably different from one another: Weinstein-associated producers are significantly more experienced, have won or been nominated for more awards, and are more likely to work with major movie studios and large talent agencies (see Table A.1 for a summary of these variables by Weinstein association for the unmatched sample). Thus, any changes in the demand or supply of female-oriented projects during our sample period that are unrelated to the shock, but may affect producers of different experience levels differently, would bias our estimates. To address this challenge, we use coarsened exact matching (Iacus et al., 2012) method to create a matched sample that consists of 1,977 projects.[15] Table 1 shows that the two groups of projects are well-balanced along producer characteristics and most of the other variables. Moreover, as we show later with time-specific estimates, there are also no significant pre-trends, which further supports the parallel-trend assumption.

Finally, because all producers compete for the same pool of ideas and writers, it is possible that part of the differential response is due to a competition effect, whereby associated producers may compete for certain types of projects or writers with non-associated producers. Thus, the differential change estimated from Equation (1) should be interpreted as the relative change between the two groups due to the shock, rather than as an absolute change by the treatment group.

[15]The matching variables are: Producer experience, Producer prior awards, Producer experience with major studios, Producer experience with top agencies, Include female producers, Producer team size, and Post-shock.

4 RESULTS

4.1 Effects on gender segregation

We start by examining whether the shock has affected gender segregation in idea development. We provide two sets of analyses. We first consider only the gender of the writers. We then also consider the gender of the producers. Anecdotal evidence suggests that female producers, although among the initial decision-makers, also suffer from stereotypical beliefs (by studio executives, for example) about their ability to develop and manage male-oriented projects, which are generally more expensive than female-oriented projects.[16]

4.1.1 *By gender of the writers*

Columns 1 and 2 of Table 2 present the sub-sample results split by the writer's gender. Column 1 shows that conditional on projects written by all-male writers and compared to non-associated producers, Weinstein-associated producers are similarly likely to develop female-protagonist stories after the shock compared to before the shock. When at least one female writer is employed, however, Weinstein-associated teams are *less* likely to develop female-protagonist stories. While the DiD coefficient is not precisely estimated (p-value is 0.170), the magnitude of 11.0 percentage points is sizable, representing a 15% change compared to the pre-shock level.[17] Because the omitted benchmark is stories featuring only male protagonists, this result means that female writers in Weinstein-associated teams are *more* likely to work on male-oriented ideas.

Column 3 of Table 2 combines the first two columns in a triple-differences regression:

$$\begin{aligned} Y_i \;=\; & \alpha + \delta \text{Weinstein association}_i \times \text{Female writers}_i \times \text{Post-shock}_t + \gamma_1 \text{Weinstein association}_i \times \text{Post-shock}_t \\ & + \gamma_2 \text{Weinstein association}_i \times \text{Female writers}_i + \gamma_3 \text{Post-shock}_t \times \text{Female writers}_i \\ & + \gamma_4 \text{Female writers}_i + \gamma_5 \text{Weinstein association}_i + y_t + \beta X_i + \varepsilon_i. \end{aligned} \tag{2}$$

The triple-differences coefficient, −0.184 (p-value is 0.011), shows that projects by Weinstein-associated producers with at least one female writer are significantly less likely to feature female protagonists

[16] Using the separate dataset of 761 released movies for which resource-allocation information is available, we find that movies with a majority of males in leading roles are produced with 13.8 million higher budget and shown on 300 more screens than movies with a majority of females in leading roles during the opening weekend.

[17] Projects by Weinstein-associated producers written by female writers featured female protagonists about 74% of the time before the shock.

than if the writers are all male (and after controlling for the common trends that they share with their respective counterparts among the non-associated teams).[18]

4.1.2 *By gender of the writers and the producers*

Table 3 further divides the sample into four groups by the gender of both the writers and the producers. An interesting contrast appears: the DiD coefficient is positive and economically large, at 11.5 percentage points when the writers and the producers are all male (Column 1). In contrast, for teams with at least one female writer, one female producer, or both, the DiD coefficient is negative and economically large (Columns 2-4). To obtain a more precise estimate for teams with at least one woman, we group the three subsamples used in Columns 2-4 in Column 5. The DiD coefficient (16.2 percentage points) becomes significant at the 1% level.

The last column of Table 3 uses a single triple-differences regression to compare teams with at least one woman (the sample used in Column 5) to all-male teams (the sample used in Column 1). It confirms the previous result that Weinstein-associated teams with at least one woman are significantly less likely to develop female-protagonist stories (and more likely to work on male-protagonist stories), relative to all-male Weinstein-associated teams (and after controlling for the common trends that they share with their respective counterparts among the non-associated teams). The triple-differences coefficient is estimated to be 27.5 percentage points and is significant at the 1% level. Figure 1 plots the time-specific triple-differences coefficients estimated from an extended version of Column 6 of Table 3. To provide more precise estimates, we use half-year periods before and after the shock in the triple-differences interactions. The results show no obvious pre-trend; the triple-differences coefficients after the shock are consistently negative, economically large (around 20 percentage points), and mostly statistically significant.

The results in this and the previous sections are consistent with Hypothesis 1 that the Weinstein scandal and #MeToo enabled female talent (both female writers and female producers) to work on more male-oriented ideas, resulting in a reduction in gender segregation in idea development. In addition, we find some, albeit weaker, evidence that all-male producing and writing teams are more

[18] We prefer to use linear probability models to examine the differential likelihoods of female-protagonist stories by Weinstein association, conditional on the writer's gender because they simplify the interpretation of the coefficients. An alternative specification is to employ a multinomial logit model for which the dependent variable is defined as four combinations of the writer's gender and the protagonist's gender. The result of the multinomial logit regression is consistent with linear probability models (see Table A.2).

likely to work on female-oriented ideas after the shock.[19] Thus, it appears that the shock has led to a reduction in gender segregation in both directions.

4.1.3 *Alternative specifications*

Our results so far are robust to a series of alternative specifications. Appendix Table A.3 replicates the triple-differences result in Column 6 of Table 3 using only projects by single writers (77% of the sample) and only projects for which the director information is available (45% of the sample). We also find consistent results using a continuous measure of the Weinstein association (i.e., the total number of movies released by all the producers in the production team in collaboration with Weinstein before the focal project) instead of the binary variable used in the main specification. In addition, the result is robust to defining female-protagonist stories as those with only female protagonists, with the omitted group including those featuring only male protagonists and protagonists of both genders. The result is also robust to dropping projects for which the protagonist's gender is predicted rather than manually coded.

4.1.4 *Alternative measures of gender orientation*

In this section, we show that our core result that women are more likely to work on male-oriented ideas after the shock is robust to using two alternative measures of gender orientation. First, Columns 1 and 2 of Table 4 present results using the demand-based measure, *gender appeal*, as the dependent variable. Consistent with what we find with the protagonist's gender, the results show that Weinstein-associated teams with at least one female writer or producer are significantly more likely than their non-associated counterparts to shift away from content that is likely to be more appealing to women and toward content that is more appealing to men. We do not find any significant change for all-male Weinstein-associated teams relative to their non-associated counterparts.

Columns 3 and 4 of Table 4 examine whether changes in an idea's gender orientation are also reflected by shifts in genre. About 60% of the projects are categorized into more than one genre (e.g., action drama). The dependent variable, *female genres only*, indicates projects categorized exclusively as genres that tend to appeal to female audiences; i.e., drama, romance, and romantic comedy (Wühr et al., 2017). The results show that, among teams with female writers or produc-

[19] For all-male writing and producing teams, while the coefficient of 'W(einstein) Association × Post-shock' in Column 6 of Table 3 is not statistically significant, alternative specifications in Appendix Table A.3 show mostly significant or marginally significant estimates.

ers, Weinstein-associated teams are significantly more likely than their non-associated counterparts to shift away from exclusively female genres after the shock. In contrast, among all-male teams, Weinstein-associated producers are more likely to develop projects in exclusively female genres after the shock, compared to their non-associated counterparts (p-value is 0.101).

4.2 Effects on the direction of ideas

So far, we have demonstrated that the Weinstein scandal and #MeToo reduced gender segregation in the labor market. Next, we explore whether the shock affected the direction of ideas; in particular, how female characters are portrayed and the overall share of female-oriented ideas.

4.2.1 *Nature of female-oriented (and male-oriented) ideas*

Table 5 presents regression results in which the dependent variable, *feminine*, indicates whether the gender-role measure is above the sample median. Panel A restricts the sample to projects featuring female protagonists. Column 1 shows that compared to female protagonists of non-associated producers, those of Weinstein-associated producers are significantly *less* traditionally feminine after the shock than before the shock. Columns 2 and 3 show that this result holds for both all-male writing and producing teams and teams including at least one woman (writer or producer), with the magnitude being greater for the former. Columns 4 and 5 show that the shift of female-protagonist stories away from traditional female stereotypes holds for projects in both exclusively female genres and genre combinations that are not exclusively female. The magnitude of the change, however, is greater for the latter.

The finding that female protagonists are portrayed with fewer traditional feminine stereotypes after the shock is consistent with anecdotal evidence that film and television productions have seen more strong female characters or female characters portrayed in traditionally male plot lines.[20] This finding complements our first set of results that women are more likely to work on male-oriented ideas, suggesting an overall impact of the Weinstein scandal and #MeToo on mitigating gender stereotypes, both on-screen and off-screen.

Panel B presents the same set of regressions as Panel A, but for the subsample of projects featuring male protagonists. We find no significant differential change due to the Weinstein association in the portrayal of male protagonists. This result holds regardless of the gender composition of the team and

[20] https://qrewcial.com/women-in-television-2018-female-character-roles-in-the-post-metoo-era/.

the film's genre. The lack of change in the portrayal of men is consistent with the idea that the shock led primarily to discussions around the gender norms attached to women.

4.2.2 *Overall share of female-oriented ideas*

The raw data show that there is an overall increase in the share of female-protagonist stories after the shock relative to before the shock (0.422 vs. 0.357, p-value is 0.012). However, the increase is statistically similar for both Weinstein-associated producers (by six percentage points from 0.369 to 0.429) and non-associated producers (by seven percentage points from 0.345 to 0.415). This makes it difficult to conclude that the overall share of female-oriented ideas changed as a result of the scandal and #MeToo. The regression results (Column 1 in Table 6) are consistent with the raw data; the DiD coefficient of interest is small and statistically insignificant. Figure 2 plots the half-year-specific DiD coefficients estimated from an extended version of Column 1 of Table 6. The graph confirms both an absence of a pre-trend between the two groups of projects before the shock and a lack of differential change afterward. In Columns 2 and 3, we confirm the lack of change by the Weinstein association in the overall share of female-oriented ideas using the two alternative measures of gender orientation: *gender appeal* and *female genres only*.

As discussed, even though there are more female writers after the shock (Luo and Zhang, 2022), the change in the share of female-oriented ideas is *ex-ante* ambiguous if female talent is more likely to work on male-oriented ideas. The results in this section show that the reduction in gender segregation offsets the increase in the representation of female writers on projects, leading to *no differential change* in the development of female-oriented ideas by the Weinstein association.

4.3 Potential mechanisms

4.3.1 The Weinstein scandal and #MeToo counteract gender stereotypes for women

Our first key result—that female talent is taking on more male-oriented projects—is consistent with our expectation that the Weinstein scandal and #MeToo movement helped counteract gender stereotypes regarding women's ability to work in male-dominated domains. The idea that these events counteract gender stereotypes is also supported by our second key finding on the change in the depiction of female protagonists away from traditional stereotypes.

As discussed, the shock may have counteracted gender stereotypes through multiple channels. It could be because of the mitigation of decision-makers' stereotypical biases about women's abilities

or an incentive to meet the increased demand from stakeholders for actions to offset possible negative consequences of gender stereotypes. Moreover, the effect could have come from the supply side in that female talent feels more aware and empowered to seek opportunities in male-dominated domains. Admittedly, we are limited in our ability to systematically assess the relative importance of these various channels. Anecdotally, all channels seem to be present, which is reasonable given the significance of these events and the industry's wide exposure to them.[21]

While it is difficult to observe the belief changes of industry players directly, we can, however, examine potential changes in consumer demand by comparing the performance data of movies that were released before and after the shock. To do this, we employ a separate dataset of 761 movies released between January 2014 and September 2019. The results show a potential increase in the demand for female characters that defy traditional female stereotypes.[22] In particular, Columns 1-3 of Appendix Table A.4 show that, among movies that feature female protagonists, the critic and user scores from *Rotten Tomatoes* and box office performance become significantly *lower* after the shock for stories in which female protagonists are depicted as relatively feminine compared to those in which they are depicted as relatively masculine. In contrast, the last three columns of Table A.4 show that, for released movies that feature male protagonists, we do not see any significant changes based on the movie's relative femininity in all three performance measures.

The final piece of evidence supporting our theory is an outcome-based test to verify the presence of gender stereotypes for female talent in the first place. While industry insiders acknowledge the presence of prevailing gender stereotypes, the following results provide empirical support for this claim. The idea behind the test is that gender stereotypes would result in a higher approval threshold for projects by talent who are discriminated against, leading to better average outcomes of approved projects by the disadvantaged group (Becker, 1993; Hebert, 2020). We use movies released before

[21]For example, people started to talk explicitly about the "cultural biases" that "help perpetuate myths about women and hold them back, much like the idea that women-driven shows and films don't attract viewers" (source: http://www.bu.edu/articles/2018/women-and-gender-bias-in-post-metoo-hollywood/) and to take the initiative to "hire women into roles that are traditionally male roles" (source: https://www.voanews.com/arts-culture/battle-gender-equality-hollywood). The hiring of screenwriter Phoebe Waller-Bridge to work on the latest James Bond film, 'No Time to Die,' is one such example (source: https://www.bbc.com/news/entertainment-arts-50331077).

[22]See Table A.4 for a detailed explanation of the construction of this sample. Note that these changes could be driven by the shock and/or other factors. Identifying the causal effect of the shock on end consumers is challenging. We do not find it convincing to use the variation in the producers' association with Weinstein, because it does not seem reasonable to assume that consumers would pay much attention to who the filmmakers are, let alone differentiate films that are produced by people who had past collaborations with Weinstein. In contrast, journalists covering the film industry and industry insiders such as studio executives and talent are likely to have such information. Moreover, as discussed above, Weinstein-associated producers may be more motivated to act due to their own increased awareness of these events.

the shock to avoid any influence of the shock. The results suggest the presence of gender stereotypes for women: Columns 4-6 of Table A.5 show that for male-protagonist films, those that include at least one female writer, director, or producer receive higher critic and user scores, as well as higher box office revenue, compared to movies with all-male teams. In contrast, we do not find evidence for gender stereotypes for men, as there are no statistically significant differences in the performance of male-and female-developed (released) movies oriented toward a female audience (Columns 1-3 of Table A.5).

4.3.2 Substituting female-oriented ideas for female writers

While not discussed in our theory, we also explore whether the finding that all-male writing and producing teams develop more female-oriented ideas after the shock is because the shock has also helped mitigate gender stereotypes for male talent. Several pieces of evidence suggest that this explanation is less likely to be this result's primary driver. First, although the share of female writers is higher for female-protagonist stories than for male-protagonist stories, there are still more male writers than female writers working on female-protagonist projects (54% vs. 44%). Second, as previously described, we do not find any significant changes in consumer preference for male protagonists or in producers' choice of how to depict them after the shock. Third, the aforementioned outcome-based tests also find no strong evidence for the presence of gender stereotypes for male talent in the first place. As noted by Luo and Zhang (2022), production teams with only male producers seem to face greater difficulty than teams with female producers in attracting female writers after the shock. Thus, a possible explanation for this finding is that all-male production teams may have focused on the gender orientation of the idea, rather than the gender of the writers, as a way to respond to the scandal and answer the movement's call for change.

4.3.3 Alternative explanations

The following section discusses some alternative explanations for our findings that the data do not support:

Cost explanations. Rather than counteracting gender stereotypes for women, an alternative interpretation for the reduction in gender segregation—that is, the greater likelihood of Weinstein-associated production teams with female talent developing male-oriented ideas—could be that these producers are more experienced with male-protagonist stories. As such, it is less costly for them to provide more opportunities for women in male-oriented rather than female-oriented segments. The

data (Appendix Table A.6) show that teams with more experience in male-protagonist projects in the past and teams with less such experience are statistically similar in their increase in the likelihood of developing male-oriented stories. This lack of heterogeneity does not seem to support the cost explanation.

Demand shifts for female- versus male-oriented ideas. Another alternative explanation for our results is that there is a demand shift around the time of the shock. Specifically, if there is a demand increase for male-developed female-oriented stories and female-developed male-oriented stories, then we may observe a reduction in gender segregation. Again, using data on released movies, the results in Columns 1-3 of Table A.7 show that for female-protagonist movies, compared to movies developed by all-male teams, there are *no* differential changes in the *Rotten Tomatoes* critic scores or user scores or in the U.S. box office performance for movies developed by teams that include at least one female writer, director, or producer. Similarly, Columns 4-6 of Table A.7 show relatively stable demand for male-protagonist movies based on the gender of the team. Thus, we do not observe demand shifts in ways that explain our results on gender segregation.

Selection of writers. Yet another alternative interpretation of our results is that Weinstein-associated producers have a greater incentive to compete for female writers who were already more likely to write male-oriented stories than an average female writer. If this is the case, our results do not necessarily reflect female writers' increased likelihood of working on male-oriented stories after the shock but, rather, their differential tendency to work on such stories in the first place. The data also do not support this interpretation: Table A.8 shows that there is *no* differential change in the writers' past tendency of working on female-oriented stories after the shock between Weinstein-associated producers and their non-associated counterparts.

4.4 DISCUSSION

4.4.1 Limitations

Apart from our inability to systematically assess the different channels through which these events may have counteracted gender stereotypes for women, the net welfare effect of our results is also unclear and difficult to assess. On the one hand, the finding that female talent is better able to explore the male-oriented idea space implies promising progress. On the other hand, given that stories with central female characters remain significantly lacking relative to women's percentage of the popula-

tion, no clear evidence exists that the Weinstein scandal and the #MeToo movement helped address this issue. It is possible that breaking barriers to enter male-dominated domains is more urgent or easier to fulfill and is thus among the first set of outcomes we can observe. It would be valuable to examine the longer-term impacts of these events.

Similarly, while the data suggest that producers' decisions to develop female characters that defy traditional stereotypes are consistent with what consumers demand, it is unclear whether such changes have substantively contributed to the public discourse on gender inequality. Not unlike varying opinions on the value, goal, and approach of feminism, people's opinions differ regarding what strong female characters mean and how to best characterize women and gender dynamics in films.[23] Compared to studies that have analyzed a small number of completed movies (e.g., Sutherland and Feltey, 2017), our focus on a large number of early-stage projects with limited information on plots, characters, dialogues, and scenes constrains our ability to examine these questions in depth. Future research based on more extensive data—such as completed movies and, beyond the movie industry, advertising and YouTube videos—may shed a more nuanced light on the impact of these events on cultural discourse.

4.4.2 External validity

Finally, because our results are derived from one setting, it is important to consider the generalizability of our results. Hollywood is a setting in which these events are more likely to help women break down barriers to enter gender-incongruent spaces. For example, public and media attention is high; it is the epicenter of the scandal that triggered the movement; more opportunities for change exist, as projects are frequently set up and talent is hired on a non-permanent basis; gender stereotyping appears to be prevalent in determining the availability of opportunities; and skills are generally transferable across female-oriented and male-oriented projects. In contrast, in other settings—those that attract less media attention; have fewer employment opportunities; in which gender segregation is driven primarily by preference or comparative advantage; and skills and qualifications are less transferable across domains (e.g., inventors trained in chemistry rather than in engineering)—we expect the shock to lead to a smaller increase in opportunities for women or that opportunities will be concentrated in

[23]For example, industry commentators have debated the merits and limitations of films that explore topics of sexual misconduct after #MeToo (e.g., Bombshell, The Assistant, and Promising Young Women), which vary in their approaches, narratives, and central themes, in terms of advancing women's causes (https://www.vulture.com/2020/02/me-too-movies-at-sundance-conflicted-stories-hit-hollywood.html).

gender-congruent segments.

Our finding that the shock has led to developing more female characters that defy traditional stereotypes reflects the cultural nature of films. Similar types of changes may occur in other cultural and consumer-goods industries (e.g., toys, clothing) that reflect and shape cultural and social norms. While we do not expect a significant effect on the characteristics of products that influence consumers' willingness to pay mainly via their functionality, we may see changes in how these products are advertised and marketed, particularly for products whose brand image is connected to social beliefs and values.

5 CONCLUSION

In this paper, we examine whether the Harvey Weinstein scandal and the MeToo movement have led to any significant changes in women's likelihood of working in male-dominated domains and whether it impacted the types of ideas developed. We use the variation in the association with Weinstein to identify producers that are more versus less affected by these events. We find that compared to their non-associated counterparts, female talent on Weinstein-associated teams is more likely to work on male-oriented stories after the shock. Consequently, we find no change in the overall proportion of female-oriented stories by Weinstein-associated producers, even though they now work substantially more with female talent. We also find that the depiction of female protagonists by Weinstein-associated producers is less traditionally feminine after the shock. Taken together, our findings show that the Weinstein scandal and the #MeToo movement, by uncovering deep-seated issues around gender stereotypes, have enabled female talent to explore male-dominated domains and have reshaped the nature of cultural products. And yet, they do not mitigate the shortage of female-oriented ideas. From an organization's perspective, our findings highlight that inequality is multi-faceted and that policies designed to address inequality need to consider not only the number, but also the types of opportunities, positions, and tasks that disadvantaged groups can pursue.

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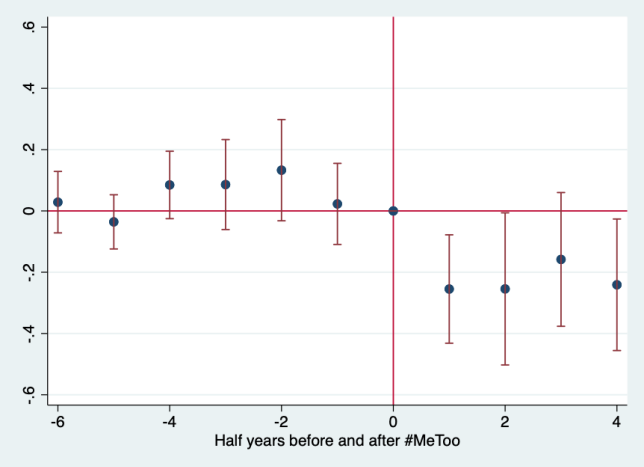
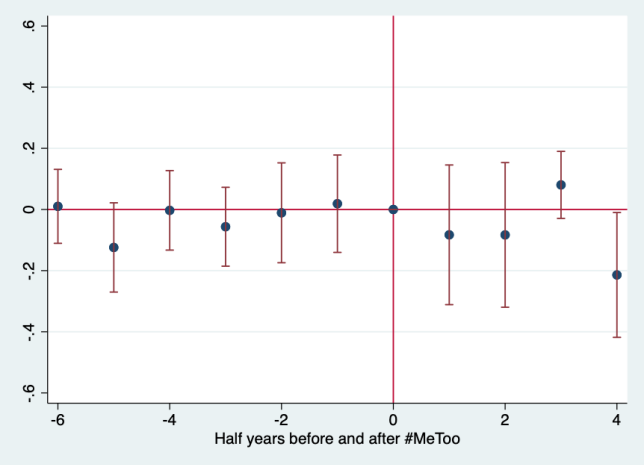
Figure 1: Time-specific effects on gender segregation



Note: This figure plots the time (half year)-specific triple-differences coefficients estimated from an extended version of Column 6 of Table 3. The dependent variable of the regression is whether or not a project features female protagonists, with the omitted group including projects featuring only male protagonists. The regression compares teams that include at least one female writer or producer against all-male writing and producing teams (and after controlling for common trends that they share with their respective counterparts among the non-associated teams). The vertical line indicates the half year before the reporting of the Weinstein scandal and the #MeToo movement (that is, the second and the third quarters of 2017).

Figure 2: Time-specific effects on the overall share of female-protagonist stories



Note: This figure plots the time (half year)-specific difference-in-differences coefficients estimated from an extended version of Column 1 of Table 6. The dependent variable of the regression is whether or not a project features female protagonists, with the omitted group including projects featuring only male protagonists. The regression compares Weinstein-associated teams and non-associated teams. The vertical line indicates the half year before the reporting of the Weinstein scandal and the #MeToo movement (that is, the second and the third quarters of 2017).

Table 1: Summary statistics

	Weinstein association = 0			Weinstein association = 1			
	Obs	Mean	SD	Obs	Mean	SD	(p-value)
Female protagonists	981	0.36	0.48	996	0.38	0.469	(0.32)
Gender appeal	981	-0.09	0.70	996	-0.04	0.71	(0.09)
Female genre only	981	0.23	0.42	996	0.24	0.43	(0.54)
Feminine	981	0.48	0.50	996	0.52	0.50	(0.07)
Post-shock	981	0.23	0.42	996	0.23	0.42	(0.85)
Include female writers	981	0.23	0.42	996	0.24	0.43	(0.58)
Include female producers	981	0.52	0.50	996	0.52	0.50	(0.86)
Producer experience	981	9.53	8.04	996	9.08	7.51	(0.20)
Producer prior awards	981	0.41	0.97	996	0.41	0.95	(0.94)
Producer exp. w/ major studios	981	0.65	0.39	996	0.66	0.37	(0.61)
Producer exp. w/ top agencies	981	0.73	0.28	996	0.74	0.28	(0.80)
Producer team size	981	3.43	1.78	996	3.51	1.76	(0.32)
Writer experience	981	0.93	1.66	996	0.92	1.66	(0.94)
Writer team size	981	1.28	0.51	996	1.23	0.48	(0.07)
Top four agencies	981	0.56	0.50	996	0.57	0.50	(0.51)
Original	981	0.61	0.49	996	0.64	0.48	(0.20)
Complete script	981	0.55	0.50	996	0.54	0.50	(0.68)
Talent attached	981	0.52	0.50	996	0.57	0.49	(0.01)
Rights purchase	981	0.17	0.38	996	0.17	0.37	(0.79)

Note: This table summarizes the variables by the association with Weinstein. The matched sample we use in this paper is based on the matched sample generated by Luo and Zhang (2022). Eighty-one observations are dropped because they do not contain the logline information that is necessary to generate the dependent variables on which this paper focuses. Additional control variables that are not summarized here include a set of dummy variables indicating 14 (non-mutually exclusive) genres and 28 movie studios.

Table 2: Effect on the gender of the protagonist

Dependent variable	Female protagonists		
Sample	All-male writers	Incl. female writers	All
	(1)	(2)	(3)
W Association × Post-shock	-0.001	-0.110	-0.003
	(0.056)	(0.078)	(0.060)
W Association	0.003	0.055*	0.001
	(0.022)	(0.032)	(0.023)
W Association × Post-shock × Includes female writers			-0.184**
			(0.068)
Includes female writers × Post-shock			0.062
			(0.093)
Includes female writers × W Association			0.054*
			(0.031)
Includes female writers			0.386***
			(0.028)
Includes female producers	0.046***	0.088**	0.056***
	(0.015)	(0.038)	(0.017)
Writer experience	0.010*	-0.034*	0.005
	(0.005)	(0.020)	(0.004)
Producer experience	-0.002*	0.006**	-0.001
	(0.001)	(0.002)	(0.001)
Producer prior awards	0.015	-0.001	0.011
	(0.009)	(0.019)	(0.009)
Producer exp. w/major studios	0.054**	0.056	0.069***
	(0.023)	(0.086)	(0.019)
Producer exp. w/top agencies	0.015	-0.176*	-0.045**
	(0.035)	(0.089)	(0.020)
Other controls	Y	Y	Y
Genre FE	Y	Y	Y
Studio FE	Y	Y	Y
Quarter FE	Y	Y	Y
Observations	1511	466	1977
R^2	0.112	0.174	0.226

Note: OLS regressions. The dependent variable of all columns is whether or not the project features female protagonists, with the omitted group including projects featuring only male protagonists. Columns 1 and 2 split the sample by whether the writers are all male or at least one of the writers is female. Column 3 combines the first two columns into a single triple-differences regression, comparing teams that include at least one female writer against all-male writing teams. Other controls include Producer team size, Writer team size, Top four agencies, Original, Complete script, Talent attached, and Rights purchase. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Effect on the gender of the protagonist, by the gender of the writers and the producers

Dependent variable	Female protagonists					
Sample	All-male producers		Include female producers		Include female writers or producers	All
	All-male writers	Include female writers	All-male writers	Include female writers		
	(1)	(2)	(3)	(4)	(5)	(6)
W Association × Post-shock	0.115	-0.313	-0.109*	-0.111	-0.162***	0.112
	(0.091)	(0.288)	(0.064)	(0.094)	(0.055)	(0.088)
W Association	-0.060*	0.177	0.054**	0.015	0.049***	-0.048
	(0.034)	(0.112)	(0.021)	(0.055)	(0.013)	(0.031)
Includes female writers					0.408***	0.409***
					(0.035)	(0.032)
Includes female producers					0.081**	0.063*
					(0.033)	(0.032)
W Association × Post-shock						-0.275***
×Includes female writers or producers						(0.083)
Includes female writers or producers						0.101
× Post-shock						(0.069)
Includes female writers or producers						0.106***
× W Association						(0.029)
Includes female writers or producers						-0.054
						(0.046)
Other controls	Y	Y	Y	Y	Y	Y
Genre FE	Y	Y	Y	Y	Y	Y
Studio FE	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y
Observations	820	129	691	337	1157	1977
R^2	0.129	0.535	0.168	0.219	0.253	0.229

Note: OLS regressions. The dependent variable of all columns is whether or not the project features female protagonists, with the omitted group including projects featuring only male protagonists. Columns 1-4 split the sample in four ways: by the gender of the producers and by the gender of the writers. Column 5 combines the three subsamples used in Columns 2-4 into one group—that is, teams that include at least one female writer or one female producer. Column 6 combines Columns 1 and 5 into a single triple-differences regression, comparing teams that include at least one female writer or producer against all-male writing and producing teams. All regressions use the same set of controls as in Table 2. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Alternative measures of an idea's gender orientation

Dependent variable	Gender appeal		Female genres only	
Sample	All-male teams	Incl. female writers or producers	All-male teams	Incl. female writers or producers
	(1)	(2)	(3)	(4)
W Association × Post-shock	0.047	-0.112**	0.058	-0.067**
	(0.053)	(0.042)	(0.034)	(0.025)
W Association	-0.073*	0.103***	-0.034**	0.037**
	(0.036)	(0.029)	(0.015)	(0.015)
Includes female writers		0.452***		0.023
		(0.058)		(0.017)
Includes female producers		0.175**		0.027
		(0.066)		(0.032)
Writer experience	-0.016**	0.015	0.000	-0.000
	(0.007)	(0.012)	(0.002)	(0.007)
Producer experience	-0.003	0.002	-0.002	-0.000
	(0.003)	(0.002)	(0.001)	(0.001)
Producer prior awards	0.004	-0.012	-0.002	-0.003
	(0.029)	(0.025)	(0.005)	(0.011)
Producer exp. w/major studios	0.034	0.063**	0.034	-0.050**
	(0.059)	(0.030)	(0.022)	(0.024)
Producer exp. w/top agencies	-0.093	-0.204***	-0.041*	-0.022
	(0.060)	(0.036)	(0.022)	(0.018)
Other controls	Y	Y	Y	Y
Genre FE	Y	Y	Y	Y
Studio FE	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y
Observations	820	1157	820	1157
R^2	0.247	0.330	0.611	0.701

Note: OLS regressions. The dependent variable of the first two columns is the gender appeal of a project, which equals 1 if rated as significantly more appealing to women, −1 if significantly more appealing to men, and 0 if similarly appealing to both genders. Columns 1 and 2 split the sample by whether the writers and the producers are all male or at least one of them is female. The last two columns replicate the first two columns but use Female genres only—an indicator for projects categorized only as female genres and not as male or neutral genres—as the dependent variable. Other controls include Producer team size, Writer team size, Top four agencies, Original, Complete script, Talent attached, and Rights purchase. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Effect on the portrayal of the protagonists relative to traditional gender stereotypes

(a) Projects featuring female protagonists

Dependent variable	Feminine				
Sample	All	All-male teams	Include female writers or producers	Female genres only	Non-female genres only
	(1)	(2)	(3)	(4)	(5)
W Association × Post-shock	-0.135***	-0.304**	-0.109**	-0.069*	-0.151***
	(0.036)	(0.132)	(0.048)	(0.034)	(0.053)
W Association	0.064*	0.112**	0.092*	0.072**	0.053
	(0.031)	(0.047)	(0.051)	(0.032)	(0.052)
Includes female writers	-0.040		-0.102**	0.016	-0.071
	(0.034)		(0.043)	(0.042)	(0.044)
Includes female producers	0.037		-0.031	-0.049	0.082**
	(0.029)		(0.042)	(0.031)	(0.032)
All other controls	Y	Y	Y	Y	Y
Observations	735	195	540	209	526
R^2	0.216	0.440	0.248	0.334	0.241

(b) Projects featuring male protagonists

Dependent variable	Feminine				
Sample	All	All-male teams	Include female writers or producers	Female genres only	Non-female genres only
	(1)	(2)	(3)	(4)	(5)
W Association × Post-shock	0.003	-0.036	0.043	0.005	0.015
	(0.064)	(0.125)	(0.077)	(0.116)	(0.048)
W Association	0.018	0.009	0.016	-0.116**	0.048
	(0.025)	(0.035)	(0.032)	(0.051)	(0.031)
Includes female writers	0.037		0.079*	-0.028	0.037
	(0.028)		(0.044)	(0.087)	(0.044)
Includes female producers	0.066		0.172*	0.101*	0.058
	(0.043)		(0.093)	(0.049)	(0.038)
All other controls	Y	Y	Y	Y	Y
Observations	1242	625	617	250	992
R^2	0.179	0.216	0.264	0.214	0.186

Note: OLS regressions. The dependent variable of all columns, *feminine*, is a dummy variable indicating that the gender-role measure is above the sample median. Panel 1 uses projects featuring female protagonists. Columns 2 and 3 split this subsample by whether the project is developed by an all-male writing and producing team or a team including at least one female writer or producer. Columns 4-6 split this subsample by whether or not the project is categorized as female genres only. Panel 2 presents the same set of regressions as Panel 1 but for the subsample of projects featuring male protagonists. All regressions use the same set of controls as in Table 2. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Effect on the overall share of female-oriented ideas

Dependent variable	Female protagonists	Gender appeal	Female genre only
	(1)	(2)	(3)
W Association × Post-shock	-0.018	-0.004	-0.016
	(0.064)	(0.047)	(0.024)
W Association	0.011	0.028	0.003
	(0.023)	(0.026)	(0.015)
Includes female producers	0.130***	0.185***	0.024**
	(0.013)	(0.032)	(0.010)
Writer experience	-0.006	-0.014*	-0.002
	(0.005)	(0.008)	(0.003)
Producer experience	-0.000	0.000	-0.001
	(0.001)	(0.001)	(0.001)
Producer prior awards	0.014	0.000	-0.003
	(0.010)	(0.025)	(0.007)
Producer exp. w/ major studios	0.052***	0.042	-0.017
	(0.016)	(0.024)	(0.014)
Producer exp. w/ top agencies	-0.048*	-0.165***	-0.021
	(0.025)	(0.045)	(0.013)
Writer team size	-0.050***	-0.055**	-0.013
	(0.017)	(0.024)	(0.009)
Producer team size	-0.018**	-0.002	0.005
	(0.008)	(0.007)	(0.003)
Top four agencies	0.004	0.021	0.005
	(0.021)	(0.030)	(0.011)
Other controls	Y	Y	Y
Genre FE	Y	Y	Y
Studio FE	Y	Y	Y
Quarter FE	Y	Y	Y
Observations	1977	1977	1977
R^2	0.123	0.261	0.656

Note: OLS regressions. The dependent variable of Column 1 is whether or not the project features female protagonists. The dependent variable of Column 2 is the gender appeal of a project, which equals 1 if rated as significantly more appealing to women, −1 if significantly more appealing to men, and 0 if similarly appealing to both genders. The dependent variable of Column 3 is female genres only—an indicator for projects categorized only as female genres and not as male or neutral genres. Other controls include Original, Complete script, Talent attached, and Rights purchase. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Online Appendices (not for publication)

A APPENDIX TABLES AND FIGURES

Table A.1: Summary statistics, unmatched sample

	Weinstein association = 0			Weinstein association = 1			
	Obs	Mean	SD	Obs	Mean	SD	(p-value)
Female protagonists	2295	0.38	0.48	1750	0.38	0.49	(0.73)
Gender appeal	2295	-0.03	0.70	1750	-0.06	0.70	(0.16)
Female genre only	2295	0.26	0.44	1750	0.26	0.44	(0.85)
Feminine	2295	0.51	0.50	1750	0.51	0.50	(0.99)
Post-shock	2295	0.25	0.43	1750	0.27	0.44	(0.26)
Include female writers	2295	0.26	0.44	1750	0.25	0.43	(0.50)
Include female producers	2295	0.49	0.50	1750	0.54	0.50	(0.00)
Producer experience	2295	6.29	7.44	1750	11.87	9.35	(0.00)
Producer prior awards	2295	0.30	0.94	1750	1.23	2.05	(0.00)
Producer exp. w/ major studios	2295	0.49	0.43	1750	0.66	0.35	(0.00)
Producer exp. w/ top agencies	2295	0.55	0.39	1750	0.76	0.25	(0.00)
Producer team size	2295	2.79	1.70	1750	3.86	2.09	(0.00)
Writer experience	2295	0.78	1.51	1750	1.02	1.70	(0.00)
Writer team size	2295	1.27	0.50	1750	1.24	0.49	(0.10)
Top four agencies	2295	0.47	0.50	1750	0.59	0.49	(0.00)
Original	2295	0.64	0.48	1750	0.64	0.48	(0.93)
Complete script	2295	0.58	0.49	1750	0.55	0.50	(0.04)
Talent attached	2295	0.54	0.50	1750	0.59	0.49	(0.00)
Rights purchase	2295	0.18	0.38	1750	0.17	0.37	(0.36)

Note: This table summarizes the variables by association with Weinstein using the unmatched sample. The sample is based on the unmatched sample used in Luo and Zhang (2022), dropping 143 observations that do not have the logline information that we use to generate the dependent variables on which this paper focuses. See Notes in Table 1 in the paper for the definitions of the variables. See Notes in Table 1 in the paper for the definitions of the variables.

Table A.2: Robustness: Multinomial logit

	(1)	(2)
Baseline choice: All-male writers & male protagonists		
Alternative choice 1: All-male writers & female protagonists		
W Association × Post-shock	-0.118	-0.118
	(0.259)	(0.265)
W Association	0.108	0.043
	(0.147)	(0.118)
Alternative choice 2: Include female writers & male protagonists		
W Association × Post-shock	1.042***	1.134***
	(0.220)	(0.216)
W Association	-0.291**	-0.269**
	(0.119)	(0.114)
Alternative choice 3: Include female writers & female protagonists		
W Association × Post-shock	0.345	0.426
	(0.281)	(0.314)
W Association	0.046	0.039
	(0.147)	(0.142)
Other controls	N	Y
Quater FE	Y	Y
Observations	1977	1977

Note: Multinomial logit regressions (matched sample). The dependent variable indicates four options that vary based on the gender of the writers and the gender of the protagonists: the baseline option of "all-male writers and male protagonists" and three alternative options, which are "all-male writers and female protagonists," "include female writers and male protagonists," and "include female writers and female protagonists." Results from Column 2 show that, relative to non-associated producers, the relative risk ratio of the alternative "include female writers & male protagonists" versus the baseline choice "all-male writers & male protagonists" for Weinstein-associated producers increased by $exp(1.134) = 3.10$ times after the shock compared to before (p-value is 0.000). The relative risk ratio of "include female writers & male protagonists" versus the alternative "include female writers & female protagonists" increased differentially for Weinstein-associated producers by $exp(1.134 - 0.426) = 2.02$ times (p-value is 0.0322), and the relative risk ratio of "include female writers & male protagonists" versus the alternative "male writers & female protagonists" increased differentially for Weinstein-associated producers by $exp(1.134 + 0.118) = 3.49$ times (p-value is 0.001). Moreover, the Hausman test cannot reject the null hypothesis of independence of irrelevant alternatives; that is, we do not observe systematic changes in the coefficients after excluding any one of the outcomes from the model. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Robustness: Effect on the gender of the protagonist, by the gender of the writers and the producers

Dependent variable	Female protagonists			Female protagonists only	Female protagonists	Female protagonists only	Female protagonists
Sample	Single writer	Director available	All	All	Exclude cases with predicted protagonist gender		Unmatched sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
W Association × Post-shock × Includes female writers or producers	-0.351***			-0.300***	-0.264**	-0.310***	-0.098
	(0.094)			(0.075)	(0.106)	(0.100)	(0.058)
W Association × Post-shock	0.220**	0.259**		0.156*	0.127	0.184**	0.046
	(0.092)	(0.106)		(0.087)	(0.084)	(0.077)	(0.050)
Includes female writers or producers × Post-shock	0.156**		0.015	0.106*	0.062	0.076	0.051
	(0.063)		(0.059)	(0.053)	(0.081)	(0.059)	(0.048)
Includes female writers or producers × W Association	0.111***			0.106***	0.064*	0.072*	0.055*
	(0.037)			(0.027)	(0.034)	(0.036)	(0.028)
W Association	-0.065*	-0.104*		-0.076**	-0.027	-0.066***	-0.018
	(0.032)	(0.052)		(0.035)	(0.026)	(0.022)	(0.020)
Includes female writers	0.439***	0.244***	0.406***	0.454***	0.435***	0.496***	0.396***
	(0.032)	(0.058)	(0.033)	(0.018)	(0.049)	(0.025)	(0.027)
Includes female writers or producers	-0.078		-0.014	-0.125***	-0.033	-0.117*	-0.067
	(0.061)		(0.044)	(0.042)	(0.070)	(0.057)	(0.047)
Includes female writers	0.078*	0.036	0.063*	0.125***	0.080	0.152***	0.093***
	(0.039)	(0.057)	(0.033)	(0.029)	(0.061)	(0.055)	(0.029)
W Association × Post-shock × Includes female writers, directors, or producers		-0.440***					
		(0.096)					
W Association (total) × Post-shock × Includes female writers or producers			-0.040***				
			(0.012)				
W Association (total) × Post-shock			0.027*				
			(0.014)				
Other controls	Y	Y	Y	Y	Y	Y	Y
Genre FE	Y	Y	Y	Y	Y	Y	Y
Studio FE	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y
Observations	1526	896	1977	1977	1480	1480	4045
R^2	0.246	0.220	0.227	0.234	0.260	0.268	0.196

Note: OLS regressions. The first six columns use the matched sample. Column 1 uses projects with single writers. Column 2 uses projects for which the director information is available. This regression compares teams with at least one female writer, director, or producer with all-male teams. Column 3 uses a continuous measure of association with Weinstein, W Association (total), which is the total number of past released movies on which all the producers in the team had collaborated with Weinstein before the focal project was set up. Columns 2 and 3 both include a full set of their respective double-interaction terms, some of which are not reported in the table due to the space constraints. Column 4 uses an indicator for stories featuring female protagonists only (those featuring protagonists of both genders are coded as zero). Columns 5 and 6 drop projects for which the gender of the protagonists is predicted (25% of the matched sample) rather than manually coded based on the pronouns and names associated with the protagonists. Column 7 uses the unmatched sample. All regressions use the same set of controls as in Table 2. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Movie performance before and after the shock: portrayal of protagonists

Sample	Feature female protagonists			Feature male protagonists		
Dependent variable	Critic score	User score	log(US B.O.)	Critic score	User score	log(US B.O.)
	(1)	(2)	(3)	(4)	(5)	(6)
Feminine × Released post-shock	-12.241**	-9.850**	-0.579**	-2.384	0.170	0.247
	(4.731)	(4.116)	(0.215)	(3.630)	(2.108)	(0.160)
Released post-shock	-2.775	-7.415	0.712	-11.907	-8.329	0.513
	(15.098)	(8.288)	(0.550)	(8.382)	(5.881)	(1.091)
Feminine	9.047**	6.067***	-0.002	4.622*	1.469	0.240***
	(3.147)	(2.067)	(0.149)	(2.571)	(1.702)	(0.083)
Maximum screen #	-0.915***	-0.200*	0.156***	-1.043***	-0.339***	0.147***
	(0.293)	(0.096)	(0.030)	(0.127)	(0.089)	(0.021)
Include female writers	-0.694	0.460	0.016	5.184*	3.761**	0.368
	(2.380)	(3.147)	(0.189)	(2.816)	(1.457)	(0.216)
Include female producers	-2.319	-5.094***	-0.002	3.449	-0.486	-0.080
	(2.615)	(1.727)	(0.150)	(3.317)	(1.638)	(0.076)
Include female directors	8.173**	1.497	-0.695**	5.278*	-0.211	-0.023
	(3.739)	(2.987)	(0.260)	(2.728)	(3.511)	(0.123)
# of critics	0.181***	0.067***	0.005**	0.186***	0.058***	0.004***
	(0.015)	(0.013)	(0.002)	(0.021)	(0.011)	(0.001)
# of users	1.323**	1.191***	-0.016	1.095**	1.619***	0.042*
	(0.528)	(0.398)	(0.043)	(0.406)	(0.271)	(0.023)
Genre, Studio, and Quarter FE	Y	Y	Y	Y	Y	Y
Observations	292	292	292	467	467	467
R^2	0.471	0.434	0.840	0.469	0.362	0.837

Note: OLS regressions, using movies released in theaters between January 2014 and September 2019. We construct this dataset by starting with the 2,872 movies that were released in U.S. theaters between January 2014 and September 2019 listed by *the-numbers.com*. We are left with 1,450 movies after dropping people listed as cast and crew for whom the confidence level of the prediction of *genderize.io* is below 90%; and keeping movies with non-missing information on the leading cast, the writers, the director, and the producers (the dropped movies are mostly indie productions or foreign movies). We further drop another 257 movies because we cannot find a match on *www.rottentomatoes.com*, 375 movies because the earliest professional reviews listed on *www.rottentomatoes.com* were published more than 180 days before the U.S. theatrical dates (these movies are mostly re-releases of foreign movies), and 57 movies because there is no review information on *www.rottentomatoes.com*. The final sample includes 761 movies.

Columns 1-3 use movies that feature female protagonists, and Columns 4-6 use movies that feature male protagonists. We identify the gender of the protagonists based on the leading cast information provided on *the-numbers.com*. Leading cast members are determined based on whether they appear on the movie's theatrical posters or are credited at the top of the posters if the posters show no actors or actresses at all. Movies for which the majority of the leading cast are female are categorized as featuring female protagonists, which constitutes 38% of the movies. The remaining 62% are categorized as movies featuring male protagonists.

Dependent variables: Critic and user scores are movie-level scores displayed on a movie page on *rottentomatoes.com*, and both variables range from 0 to 100. The U.S. box office (B.O.) performance is obtained from *the-numbers.com*.

Independent variables: *Released post-shock* is an indicator if the movie was released after October 15th 2017. *Feminine* is a dummy variable indicating that the gender-role measure is above the sample median.

Other variables: *Max screen #* is the maximum number of screens on which the movie is shown throughout its theatrical run. Because budget information is not available for all movies, we use *max screen #* to proxy for resources allocated to the movie. This is a reasonable proxy, as for 514 movies with budget information, the correlation between max screen and budget is 0.76. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Outcome-based tests for the presence of gender-stereotypes for women

Sample	Feature female protagonists			Feature male protagonists		
Dependent variable	Critic score	User score	log(US B.O.)	Critic score	User score	log(US B.O.)
	(1)	(2)	(3)	(4)	(5)	(6)
Include female writers, directors, or producers	6.150	0.329	-0.178	8.403***	2.885	0.173*
	(3.802)	(3.641)	(0.205)	(2.436)	(1.879)	(0.096)
# of critics	0.161***	0.057*	0.006***	0.199***	0.062***	0.005***
	(0.022)	(0.029)	(0.002)	(0.022)	(0.012)	(0.001)
# of users	2.667***	1.404**	-0.052	1.358***	1.656***	0.024
	(0.757)	(0.630)	(0.059)	(0.370)	(0.336)	(0.022)
Maximum screen #	-1.524***	-0.400***	0.151***	-1.281***	-0.406***	0.145***
	(0.305)	(0.126)	(0.035)	(0.198)	(0.116)	(0.023)
Genre FE	Y	Y	Y	Y	Y	Y
Studio FE	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y
Observations	200	200	200	344	344	344
R^2	0.489	0.439	0.849	0.460	0.386	0.839

Note: OLS regressions, using movies released in theaters between January 2014 and October 15 2017; that is, the part of the sample used in Table A.4 prior to the Weinstein scandal and the #MeToo movement. Columns 1-3 use movies that feature female protagonists, and Columns 4-6 use movies that feature male protagonists. We identify the gender of the protagonists based on the leading cast information provided on *the-numbers.com*. Leading cast members are determined based on whether they appear on the movie's theatrical posters or are credited at the top of the posters if the posters show no actors or actresses at all. Movies for which the majority of the leading cast are female are categorized as featuring female protagonists, which constitutes 38% of the movies. The remaining 62% are categorized as movies featuring male protagonists. The dependent variables are: critic and user scores are movie-level scores displayed on a movie page on *rottentomatoes.com*, and both variables range from 0 to 100. The U.S. box office (B.O.) performance is obtained from *the-numbers.com*. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Reduction in gender segregation, by producers' past experience working on male-oriented movies

Dependent variable	Female protagonists	
	More experience with male-oriented movies	Less experience with male-oriented movies
	(1)	(2)
W Association × Post-shock	-0.197***	-0.138*
	(0.059)	(0.071)
W Association	0.046**	0.048*
	(0.018)	(0.026)
Include female writers	0.358***	0.410***
	(0.062)	(0.024)
Include female producers	0.015	0.123
	(0.055)	(0.117)
Producers have no past credits	0.051	
	(0.219)	
Other controls	Y	Y
Genre FE	Y	Y
Studio FE	Y	Y
Quarter	Y	Y
Observations	582	575
R^2	0.283	0.284

Note: OLS regressions, using the sample of projects with at least one female writer or producer. The dependent variable is whether or not the project features female protagonists. We assign a production team to "More experience with male-oriented movies" if the team's aggregated percentage of past movies featuring female protagonists is below the median of this sample. Otherwise, we assign a project to "Less experience with male-oriented movies" otherwise. To find the producers' past experience with gender orientation of ideas, we first calculate the share of a producer's past movies that feature female protagonists and then aggregate this measure at the production team level using the mean.

Table A.7: Movie performance before and after the Weinstein scandal and #MeToo

Sample	Feature female protagonists			Feature male protagonists		
Dependent variable	Critic score	User score	log(US B.O.)	Critic score	User score	log(US B.O.)
	(1)	(2)	(3)	(4)	(5)	(6)
Include female writers, directors, or producers	-2.745	-2.859	-0.162	-2.359	0.714	0.211
×Released post-shock	(4.401)	(2.201)	(0.183)	(5.506)	(3.345)	(0.332)
Released post-shock	-13.309	-7.902	0.619	-11.787	-15.437**	0.241
	(8.887)	(6.310)	(1.114)	(11.959)	(6.963)	(0.649)
Include female writers, directors, or producers	4.970	0.760	-0.055	7.422	3.252	0.073
	(3.172)	(1.987)	(0.158)	(5.603)	(6.194)	(0.244)
# of critics	0.188***	0.058***	0.004***	0.185***	0.071***	0.005**
	(0.021)	(0.011)	(0.001)	(0.015)	(0.014)	(0.002)
# of users	1.122***	1.623***	0.045*	1.162**	1.065**	-0.019
	(0.367)	(0.279)	(0.022)	(0.502)	(0.387)	(0.045)
Maximum screen #	-1.087***	-0.347***	0.146***	-1.001***	-0.259**	0.153***
	(0.141)	(0.086)	(0.021)	(0.279)	(0.093)	(0.033)
Include female writers	1.938	3.770	0.443	-4.429	-1.540	-0.095
	(2.840)	(2.209)	(0.332)	(3.407)	(2.684)	(0.239)
Include female producers	2.271	-0.488	-0.051	-4.341	-6.011**	-0.002
	(3.905)	(1.467)	(0.076)	(2.963)	(2.656)	(0.154)
Include female directors	3.507	-0.235	0.014	7.045*	1.144	-0.669**
	(2.981)	(3.216)	(0.113)	(3.998)	(3.254)	(0.257)
Genre FE	Y	Y	Y	Y	Y	Y
Studio FE	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y
Observations	467	467	467	292	292	292
R^2	0.467	0.362	0.835	0.462	0.423	0.838

Note: OLS regressions, using movies released in theaters between January 2014 and September 2019. The sample used is the same as Table A.4. The first three columns use all released movies in the sample. Columns 4-6 use movies that feature female protagonists, which are movies for which the majority of the leading cast identified on *the-numbers.com* are female. Columns 7-9 use the remaining movies that feature male protagonists.

Dependent variables: Critic and user scores are movie-level scores displayed on a movie page on *rottentomatoes.com*, and both variables range from 0 to 100. The U.S. box office (B.O.) performance is obtained from *the-numbers.com*.

Independent variables: *Released post-shock* is an indicator if the movie was released after October 15th 2017. *Majority female leads* equals one if the majority of the leading cast is female. *Include female writers, directors, or producers* indicates if the movie includes any female writers, directors, or producers.

Other variables: *Max screen #* is the maximum number of screens screens on which the movie is shown throughout its theatrical run. Because budget information is not available for all movies, we use *max screen #* to proxy for resources allocated to the movie. This is a reasonable proxy, as for 514 movies with budget information, the correlation between max screen and budget is 0.76. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: The writer's prior experience of writing female-protagonist stories

Dependent variable	Past tendency to write female-protagonist stories				
Sample	All	All	All-male writers	Incl. female writers	All
	(1)	(2)	(3)	(4)	(5)
W Association × Post-shock	0.014	0.014	-0.021	-0.013	-0.007
	(0.034)	(0.039)	(0.031)	(0.061)	(0.033)
W Association	0.008	0.005	-0.003	0.006	-0.003
	(0.015)	(0.014)	(0.010)	(0.031)	(0.010)
W Association × Post-shock × Includes female writers					0.006
					(0.070)
Includes female writers × Post-shock					0.062
					(0.068)
Includes female writers × W Association					0.038
					(0.030)
Includes female writers					0.107***
					(0.026)
Includes female producers		0.043***	0.027*	-0.020	0.015
		(0.010)	(0.014)	(0.017)	(0.011)
Writers have no prior credits	-0.272***	-0.288***	-0.245***	-0.466***	-0.304***
	(0.006)	(0.009)	(0.010)	(0.029)	(0.009)
Other controls	N	Y	Y	Y	Y
Genre FE	N	Y	Y	Y	Y
Studio FE	N	Y	Y	Y	Y
Quarter	Y	Y	Y	Y	Y
Observations	1977	1977	1511	466	1977
R^2	0.177	0.229	0.205	0.483	0.270

Note: OLS regressions (matched sample). The dependent variable is the tendency of the writers on a project to write female-protagonist stories before the focal project. It is the percentage of female-protagonist stories out of all the television series and films the writer obtained writing credits for before the focal project. To aggregate this measure to the project level, we take the mean of this variable among all the writers of the same project if the project includes more than one writer. Column 1 includes no controls except for the quarterly fixed effects and a dummy indicating that the dependent variable is not defined (because none of the writers on the project had any past writing credits), Column 2 includes a full set of controls, Columns 3 and 4 split the sample by whether there is at least one female writer, and Column 5 combines Columns 3 and 4 in a single triple-differences regression. Standard errors (in parentheses) are clustered at the studio level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B CONSTRUCTION OF THE OUTCOME VARIABLES

We use the logline of a script, a short summary typically consisting of one to three sentences, that is recorded in the Done Deal Pro database to construct the three variables that we use to characterize content: 1) the gender of the protagonists; 2) the appeal of the movie to a typical man and a typical woman in the U.S.; and 3) how the protagonist is portrayed relative to traditional perceptions of gender stereotypes.

B.1 Female protagonists

B.1.1 Mechanical Turk (MTurk) survey question

We ask MTurk workers to help us classify the gender of the protagonists. In particular, we ask the following question:

> Based on the following logline:
>
> *Pierre, a quietly resourceful bartender, returns to his hometown after the death of his parents. When he falls in love with the enigmatic Stella, he is unwittingly drawn into a circle of fate pitting him against the volatile criminal, Shane.*
>
> I think the gender of the protagonist is:
>
> ◯ Female ◯ Male ◯ Both female and male (if multiple protagonists) ◯ Unclear

We provide the following instructions that help MTurkers decide:

> Please help us classify the gender of the protagonist (lead character) of a movie, based on its logline (1-2 sentence summary). The following are a few notes that might help you decide:
>
> - A movie typically has a single central protagonist, so please select the third option only if you are sure that there are multiple central protagonists.
> - If both a male and a female character show up in a logline, typically, the one that shows up first is the protagonist (e.g., "Pierre, a quietly resourceful bartender, returns to his hometown after the death of his parents. When he falls in love with the enigmatic Stella, he is unwittingly drawn into a circle of fate pitting him against the volatile criminal, Shane." In this example, Pierre is the protagonist.)
> - Sometimes, you have to read to the end of the logline before you realize the gender of the protagonist (e.g., "Aiman, a young correctional officer, befriends older colleague Koon, an executioner at the prison, and Aiman must grapple with the possibility that he may have to take over the older man's job." In this example, "he" is

used to refer to Aiman, the lead character, and this gender pronoun shows up at the end.)

- Apart from gender pronouns, you can sometimes make inferences from the name of the lead character (e.g., if the protagonist's name is Emily, the protagonist is clearly female). Please indicate "unclear" if you are not sure about the gender of the name of the protagonist.
- Please do not classify the gender purely based on the person's profession, unless you are absolutely sure (for example, a U.S. sports figure could be a male or a female. If this is the only information available, please indicate "unclear.")
- Please click "unclear" if there is not enough information to tell whether the protagonist is a man or a woman or if the logline does not refer to a man or a woman.

The payment per assignment, which asks the above question about a single logline, is $0.04. We restrict the respondents to workers who have approval rates greater than 95%, have the number of Human Intelligence Tasks (HITs) approved to be greater than 500, and are located in the United States.

B.1.2 Construction of the variable *female protagonists*

We construct the variable, *female protagonists*, via a two-step process.

In Step 1, we construct a variable to capture the gender of the protagonist based on MTurk workers' answers to the above question through an iterative process. We ask two different MTurk workers to classify the gender of the protagonist for each of the 4,045 loglines in the unmatched sample. If their answers coincide, we code the gender of the protagonist accordingly. For loglines for which the two answers differ (1011 in total, and 25% of the entire sample), we ask a third MTurk worker the same question independently to break the tie. For these loglines, if two out of the three answers are consistent with each other, we code the gender of the protagonist accordingly. For a small number of loglines for which all three answers differ (242 in total, and six% of the entire sample), we ask a fourth MTurk worker independently. For these loglines, if two out of the four answers are the same, we code the gender of the protagonist accordingly. For loglines for which all four answers differ (28 observations in total), we (the authors) code up the final answer.

The variable *protagonist gender* generated via the above process categorizes 26.58% of the loglines as featuring female protagonists; 43.26% as featuring male protagonists; 6.85% as featuring both female and male protagonists; and 23.31% as unclear.

For a validity check, the left panel of Table B.1 summarizes the percentage of loglines in each category that are written by female writers. It is intuitive that the percentage of female writers is substantially higher for loglines with female protagonists compared to loglines that are categorized as featuring male protagonists (54% vs. 13%, p-value is = 0.0000). Seventeen percent of the loglines

that are categorized as unclear are written by female writers, which suggests that the majority of these "unclear" cases are likely to feature male protagonists, even though the short summary does not have clear gender pronouns or protagonist names that are clearly female or male. This is consistent with our manual examination of a randomly selected subset of "unclear" cases: for the majority of these loglines, the contextual information strongly suggests that the protagonist is male.

Table B.1: Percentage of female writers, by the gender of the protagonist

Step 1			Step 2		
Protagonist gender	N	Percentage of female writers	Protagonist gender	N	Percentage of female writers
Female	1075	53.8%			
Male	1750	13.0%			
Both	277	27.0%			
Unclear	943	17.3%	Female (predicted)	180	33.3%
			Male (predicted)	763	13.6%
Total	4045	26.0%			

Note: In Step 1, MTurk workers classify the gender of the protagonist based on the pronouns and names associated with the protagonist. For 23.31% of the loglines for which the gender of the protagonist is not immediately clear, we use supervised machine-learning method, based on observations that are clearly coded as featuring male or female protagonists in Step 1, to predict the gender of the protagonist.

In Step 2, to better utilize observations in the 'unclear' category, which comprise 23.31% of the sample, we employ machine-learning techniques to predict whether a given logline is likely to feature female or male protagonists based on the contextual information. In particular, we use the subset of loglines that are clearly identified as featuring female and male protagonists as the input into a supervised machine-learning model.[24] A random 80% of the clearly labeled loglines are allocated to the training set and the other 20% to the testing set.

To implement the procedure, we first encode the loglines into vectors. Recent advancements in natural language processing allow us to encode sentences or words in more meaningful forms than simply counting the frequency of the actual words used in the texts, taking into consideration the semantic and syntactic information of words.[25] The word2vec techniques and Bidirectional Encoder Representations from Transformers (BERT) language models are two important ones.[26] We use BERT models, created and published in 2018 by Jacob Devlin and his colleagues at Google (Devlin et al., 2018), in our paper. A key advantage of BERT models relative to word2vec models is that the former takes into consideration the context of each word. For example, bank as a financial institute is different from bank of the river. BERT models will yield different vectors for the word 'bank' in these two

[24]We chose not to include cases with both male and female protagonists, mainly because they made up of a very small percentage of the total sample, and it is possible that the coders were less stringent about finding a single central character in these cases.

[25]These vectors are known to capture analogical reasoning—for example, king − men + women = queen—or capture meaningful relationships with other vectors (e.g., the vector of dog will be quite similar to the vector of cat or domestic).

[26]The original models are trained on the BooksCorpus with 800M words and a version of the English Wikipedia with 2,500M words. BERT has achieved state-of-the-art performance on a number of NPL tasks.

different contexts, whereas word2vec will produce the same vector. In addition, BERT models will transform an entire paragraph into a vector in a single step, whereas with word2vec, one needs to transform each word into a vector first and then aggregate all the word vectors included in a logline to a single vector.

We use a pre-trained BERT model to convert each logline into a 768-dimension vector and then run a logistic regression to train the supervised learning classification. The label (female and male protagonist) is the dichotomous dependent variable, and the logline vectors are the predictors. The trained model achieves an accuracy rate of 98.04% for the training set and 94.86% for the testing set.

We then use the trained model to predict the gender of the protagonists for loglines that are categorized as 'unclear' in Step 1. Among the 943 loglines, 180 (19%) are predicted to feature female protagonists, and the other 763 (81%) are predicted to feature male protagonists. Such a split is consistent with the above statistic and our manual inspection that a vast majority of the unclear loglines likely feature male protagonists. To provide a reality check of this prediction, the right panel of Table B.1 tabulates the share of female writers for each predicted category: this percentage is 13.6% for loglines that are predicted to feature male protagonists, which is virtually the same as the percentage of female writers for loglines that are clearly identified as featuring male protagonists in Step 1. The percentage of female writers is 33.3% for loglines that are predicted to feature female protagonists, which is closer to the same percentage for loglines categorized as 'both' in Step 1 than to that for loglines that are clearly identified as featuring female protagonists in Step 1. The difference in the percentage of female writers for the two predicted categories among all the "unclear" loglines (33.3% vs. 13.6%) is statistically significant (the p-value is 0.0000).

Finally, the main outcome variable that we use in our paper, *female protagonists*, equals one if the protagonist's gender is classified as 'female' or 'both' by MTurk workers in Step 1, or if the protagonist's gender is 'unclear' in Step 1 and is predicted to feature female protagonists in Step 2. In the paper, we show the robustness of our core results to an alternative definition of 'female protagonist only' and to excluding all the "unclear" cases from the analysis.

Conceptually, what we mean by the gender orientation of an idea is that it is more likely to appeal to an audience of a given gender. At the intuitive level, by placing a woman at the center of the story universe, female-protagonist stories are likely appeal to a female audience. To verify this concept, we also construct a variable that is intended to capture the movie's likely appeal to an audience of a given gender more directly. We explain the construction of this variable in detail in the next section and show that the gender of the protagonists is highly correlated with this demand-side measure. Finally, we conduct an analysis using *Rotten Tomatoes* critic and user review data, which are presented in Table B.2. The results show that female reviewers (both critics and users) are more likely than male reviewers to rate movies with a majority of female leads more favorably compared to movies with a majority of male leads.

Table B.2: Critic and user reviews, by the gender of the protagonist

DV	Critic rating	User rating
	(1)	(2)
Female critic × Majority female leads	0.016**	
	(0.007)	
Female users × Majority female leads		0.123**
		(0.062)
Movie fixed effects	Y	Y
Critic (user) fixed effects	Y	Y
Observations	109498	464200
R^2	0.366	0.315

Note: OLS regressions using critic-movie- and user-movie-level data of 761 movies released in theaters between January 2014 and the third quarter of 2019. See Footnote **??** for a detailed description of the construction of this dataset. The dependent variable of Column 1 is a dummy variable indicating 'fresh' (positive) versus 'rotten' (negative), which is a binary rating scheme that *Rotten Tomatoes* uses to translate the reviews by professional critics. The dependent variable of Column 2 is the user rating that ranges from 0 to 5. The regressions include movie fixed effects and critic (or user) fixed effects. Standard errors (in parentheses) are clustered at the movie level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B.2 Gender appeal

As mentioned above, we construct a variable intended to capture the movie's likely appeal to an audience of a given gender. While this measure captures the gender orientation of an idea directly from the demand perspective, we rely on the gender of the protagonist as our primary measure in the paper because it is more precisely measured. Consumer appeal of a movie is notoriously difficult to predict for early-stage movie projects, let alone with the short descriptions that we have. Nonetheless, we show below that the gender of the protagonists is highly correlated with the demand-side measure. In Appendix Table 4 (Columns 1-3), we show that our baseline results are consistent when using this appeal measure instead.

B.2.1 MTurk survey design

MTurk workers are asked to classify the appeal of a logline separately for men and women at a 1-5 scale. Below is an example of a task:

> Below is a logline, which is a short summary of a movie. Using your best judgement, please help us rate the appeal of the movie for men and women:
>
> *An American civilian turned self-taught spy works with the FBI to bring down a Russian intelligence agent on American soil.*
>
> 1. Based on this logline, how much do you think a typical ***woman*** in the U.S. will like this movie?

○ Really Dislike ○ Dislike ○ Neither Like or Dislike ○ Like ○ Really Like

2. Based on this logline, how much do you think a typical ***man*** in the U.S. will like this movie?

○ Really Dislike ○ Dislike ○ Neither Like or Dislike ○ Like ○ Really Like

3. How do you identify your gender?

○ Woman ○ Man ○ Transgender ○ Non-conforming ○ Prefer not to respond

We ask the respondents to rate a movie's appeal based on their beliefs of how much a typical man or woman may like the movie, rather than on their own preferences because we want to capture the social perception of a movie's gender appeal. This is also likely to correspond with what the producers may perceive as a movie's appeal to consumers of a given gender. This method also does not require us to specify the respondents' gender ex-ante, which would have significantly raised the cost of soliciting respondents on MTurk. Wühr et al. (2017) conduct two separate studies that compare men's and women's own preferences with their evaluations of the preference of a typical man or a typical woman for 17 movie genres. The results show that for the majority of the genres, the perception of others' preferences is consistent in direction with one's own preferences (e.g., both surveys show that women prefer romance more than men), even though it tends to overestimate the actual gender differences.

The payment per assignment, which asks the above questions about a single logline, is $0.07. We restrict the workers to those who have approval rates greater than 95%, have the number of Human Intelligence Tasks (HITs) approved to be greater than 500, and are located in the United States to minimize differences in perceptions of appeal across cultures.

Each logline is classified 15 times by unique MTurk workers. After dropping classifications with very low work times (i.e., completion time less than ten seconds), we are left with a total of 50,163 usable classifications for 4,045 loglines. About 37% of the classifications were completed by women and 61% by men. Compared to male MTurk workers, female MTurk workers tend to rate a logline as having slightly higher female appeal (by 0.03) and lower male appeal (by 0.07). We do not think this systematic difference between female and male MTurkers is concerning. Because we randomize the order of the loglines, there are no reasons to expect that the share of female MTurkers rating a given logline will differ systematically by the key variables we use in the paper, such as the gender of the protagonists, the writers, or the producers. Moreover, the share of female MTurkers is not significantly correlated with the gender appeal measure we construct based on these answers. On average, loglines are rated as having higher appeal to men than to women (by 0.06), which is not surprising given that a greater proportion of the loglines are developed primarily for a male audience (e.g., having a male protagonist).

B.2.2 Construction of the variable *gender appeal*

For each logline, we conduct paired t-tests comparing the answers to the above two gender-appeal questions by the same MTurker.[27] We define a *gender appeal* variable that equals -1 if a logline is rated significantly more appealing to men than to women at the 5% level based on one-sided p-values; 1 if a logline is rated significantly more appealing to women than to men at the 5% level based on one-sided p-values; 0 for the remaining loglines.

Among the 4,045 projects, 22% are rated as significantly more appealing to women than to men; 26% are rated as significantly more appealing to men than to women; and the remaining 51% are likely to attract women and men to a (statistically) similar degree. Table B.3 tabulates the percentage of writers within each category of gender appeal that are female. Also consistent with what we expect, this percentage is increasing monotonically as we move from projects that are rated as more appealing to men to more appealing to women.

Table B.3: Percentage of female writers, by the appeal to a given gender

Gender appeal	N	Percentage of female writers
More appealing to men	1,079	10%
Similarly appealing to both genders	2,073	22%
More appealing to women	893	51%
Total	4,045	26%

The correlation between *gender appeal* and *female protagonists* is 0.47 (p-value = 0.000). Table B.4 tabulates the two measures of gender orientation. 48.13% of movies featuring female protagonists are rated as significantly more appealing to women, whereas this percentage is only 8.36 for movies featuring male protagonists). Similarly, 38.96% of movies featuring male protagonists are rated as significantly more appealing to men, whereas this percentage is only 4.06 for movies featuring female protagonists).

B.3 Gender-role measure: feminine-masculine characteristics

B.3.1 The construction of the measure

We aim to construct a measure that captures how a protagonist is portrayed relative to the traditional perception of gender stereotypes. To achieve this goal, we use the set of feminine and masculine characteristics in the Bem Sex-Role Inventory (BSRI) as the benchmark (Bem, 1974). We then create a measure that calculates a focal logline's distance to the feminine keywords relative to the masculine keywords in the vector space.

[27] Recall that our survey asks the same MTurk worker to rate the appeal of a given logline to both men and women. This allows us to conduct paired t-tests that help remove the baseline differences among the respondents.

Table B.4: Tabulation by gender appeal and by the gender of the protagonist

		Gender appeal			Total
		More appealing to men	Similarly appealing to both genders	More appealing to women	
Female protagonists	N	51	600	604	1,255
	Percent	4.06%	47.81%	48.13%	100%
Male protagonists	N	979	1,324	210	2,513
	Percent	38.96%	52.69%	8.36%	100%
Both female and male protagonists	N	49	149	79	277
	Percent	17.69%	53.79%	28.52%	100%

The Bem Sex-Role Inventory (BSRI) inventory is considered the gold standard of gender-role evaluation and has been used in thousands of studies in the more than 40 years since it was developed (Dean and Tate, 2017). Table B.5 lists the full set of feminine and masculine characteristics in Table 1 of Bem (1974).[28]

As Bem (1974) notes, these characteristics are selected as masculine or feminine on the basis of sex-typed social desirability (that is, a characteristic qualified as masculine if it is judged in American society to be more desirable in a man than in a woman, and as feminine if it is judged to be more desirable in a woman than in a man). In general, masculinity has been associated with instrumental traits, a cognitive focus on "getting the job done;" and femininity has been associated with expressive traits, an affective concern for the welfare of others. As Dean and Tate (2017) discuss, later work also characterizes masculine traits as agentic and feminine traits as communal, applying these concepts to a variety of contexts, such as the effectiveness and acceptability of styles of male and female leaders and how people's perception of self in relation to agency and communion attributes influences different social outcomes, such as attraction to different academic and professional fields.

It is useful to note a few caveats when interpreting the measure. First, as we explain below, by calculating the relative distance between a focal logline and these feminine and masculine characteristics, we are technically capturing not a specific character's personality traits but the overall description of the storyline. Nonetheless, as we discuss in the next section, it seems reasonable to interpret this measure as the depiction of the protagonist. This is likely because a logline centers mainly on the

[28]Bem (1974) arrived at the list of 40 feminine and masculine characteristics as follows. She started off with a set of personality characteristics that she and a group of students deemed to be positive in value and either masculine or feminine in tone (400 in total, with 200 for each gender). 100 judges were asked to rate each of the 400 characteristics according to questions such as: "In American society, how desirable is it for a man to be truthful?" or "In American society, how desirable is it for a woman to be sincere?" The judges were asked to answer each question based on a 7-point scale, ranging from 1 ("Not at all desirable") to 7 ("Extremely desirable"). A personality characteristic qualified as masculine if it was judged to be significantly more desirable for a man than for a woman ($p < 0.05$). Similarly, a personality characteristic qualified as feminine if it was judged to be significantly more desirable for a woman than for a man. Of the characteristics that satisfied these criteria, 20 were selected for the masculinity scale and 20 were selected as the femininity scale.

protagonist, and because the natural language processing tool that we use does a reasonably good job in relating the general social and professional contexts and activities that are often described by verbs and nouns to the benchmark characteristics that are mostly adjectives. Second, the BSRI inventory has been criticized in recent years as being outdated in depicting societal gender norms—for example, Donnelly and Twenge (2017) reviewed a large collection of studies that apply BSRI and show that women's femininity scores have decreased significantly over the years. This is not very concerning for our purpose both because we want to capture a more traditional depiction of stereotypical women and because what we care about is the direction of change (both before and after the shock and by Weinstein association).

Table B.5: BSRI masculine and feminine characteristics from Table 1 of Bem (1974)

Masculine items	Feminine items
Acts as a leader	Affectionate
Aggressive	Cheerful
Ambitious	Childlike
Analytical	Compassionate
Assertive	Does not use harsh language
Athletic	Eager to soothe hurt feelings
Competitive	Feminine
Defends own beliefs	Flatterable
Dominant	Gentle
Forceful	Gullible
Has leadership abilities	Loves children
Independent	Loyal
Individualistic	Sensitive to the needs of others
Makes decisions easily	Shy
Masculine	Soft spoken
Self-reliant	Sympathetic
Self-sufficient	Tender
Strong personality	Understanding
Willing to take a stand	Warm
Willing to take risks	Yielding

We construct this gender-role measure as follows:

- In Step 1, we use a BERT pre-trained model, as explained in the previous section, to convert each of the characteristics in the BSRI masculinity and femininity scales to a 738-dimension vector. Then, we create v_f, a single vector that represents feminine characteristics, by taking the average of all the vectors associated with the BSRI feminine characteristics. Similarly, we create v_m, which represents masculine characteristics, by taking the average of all the vectors associated with the BSRI masculine characteristics. We normalize both v_f and v_m to have unit length.

- In Step 2, we use the same BERT pre-trained model to convert each logline to a vector, v_l. Note that to avoid mechanical relationships between any gendered words in a logline and the benchmark characteristics, we replace a gendered word in a logline with a corresponding gender-inclusive word. For example, "she/he" is replaced with "they;" "woman/man" is replaced with "person;" and "wife/husband" is replaced with "spouse."[29]

- In Step 3, we want to construct a measure that ranks different loglines based on their relative distances to the benchmark feminine and the masculine vectors. One such measure can be calculated as follows (Cao et al., 2020):

$$G^l = \frac{Cos(v_l - v_m, v_f - v_m) \cdot |v_l - v_m|}{|v_f - v_m|} - \frac{1}{2} = \frac{\langle v_f - v_m, v_l - v_m \rangle}{|v_f - v_m|^2} - \frac{1}{2}. \tag{3}$$

  Geometrically, this measure is equal to the ratio between the length of the projection of the difference vector $(v_l - v_m)$ onto the difference vector $(v_f - v_m)$ and the length of the difference vector $(v_f - v_m)$, minus 0.5. The higher this measure, the closer the logline is to the benchmark feminine vector relative to the masculine vector. If a logline vector is equally distant to the two benchmark vectors, for example, the projection of $(v_l - v_m)$ onto $(v_f - v_m)$ would land in the middle between v_f and v_m. After deducting 0.5, the above measure would be zero. For loglines that are closer to the benchmark feminine vector than to the masculine vector, this measure would be positive, whereas for loglines closer to the masculine vector than to the feminine vector, this measure would be negative.

B.3.2 Description of the gender-role measure

Figure B.1a plots the percentage of female-protagonist stories for each bin of this measure. Consistent with what we might expect, the relationship is monotone positive. Figure B.1b shows that the density of this measure for female-protagonist stories is to the right of that for male-protagonist stories, though it exhibits a high variance for both sets of stories. The mean value of this measure is -4.11 for female-protagonist loglines and -6.21 for male-protagonist loglines (p-value is 0.000). That the mean of this measure is negative even for female-protagonist stories is consistent with the idea that the characteristics included in BSRI are likely to be too outdated to depict the current gender norms associated with women Donnelly and Twenge (2017).[30]

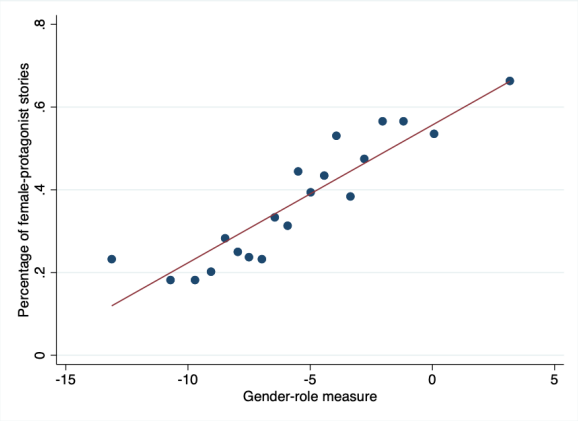
To give some sense of how this measure corresponds to the content of the logline, we provide several examples of loglines with male and female protagonists at different parts of the distribution in Table B.6. Note that these displayed loglines are prior to the removal of gendered pronouns and

[29]We use the following webpage of Springfield college for a list of gendered pronouns and nouns, available at https://springfield.edu/gender-pronouns#: :text=Pronouns%20can%20be%20in%20the,or%20she%2Fher%2Fhers.

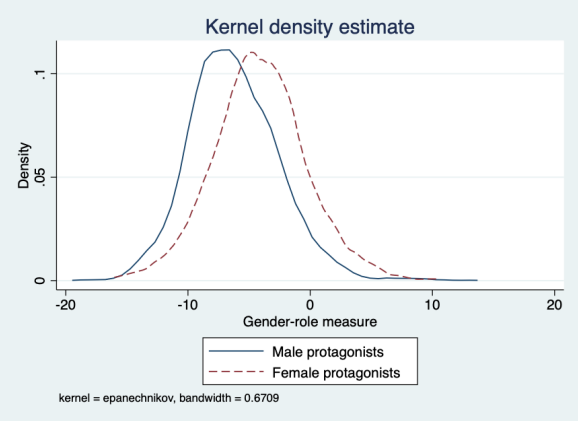
[30]Note, also, that because the measure is based on the entire logline, rather than on a specific character's personality description, it is also hard to interpret the value of this measure in relation to zero. Again, this is all right in our study because, as discussed, we care about the direction of change before and after the shock.

Figure B.1: Description of the gender-role measure

(a) Female-protagonist stories and the gender-role measure



(b) Kernel densities by female- and male-protagonist stories



Note: Based on the 4,045 observations in the unmatched sample.

nouns (as described in Step 2 above). For context, films such as Captain Marvel (*"Captain Marvel aka Carol Danvers is an air force pilot whose DNA is fused with that of an alien after an accident giving her superhuman strength and even the ability to fly."*), which features a female protagonist in a traditionally male plot line scored at around the 15th percentile; however, the film Girl on the Train (*"A woman who is devastated by her recent divorce spends her daily commute fantasizing about the seemingly perfect couple who live in a house that her train passes every day until she sees something shocking happen there one morning and becomes entangled in the mystery that unfolds."*) scored at around the 85th percentile.

Table B.6: Examples of loglines across the distribution of the gender-role measure

Percentile	Male-protagonist loglines	Female-protagonist loglines
5th	*"A newly released prison gangster is forced by the leaders of his gang to orchestrate a major crime with a brutal rival gang on the streets of Southern California."*	*"Seeker. Only when it's too late does she discover she will be using her new found knowledge and training to become an assassin. The events take her around the globe from remote estate in Scotland to a bustling futuristic Hong Kong."*
25th	*"A young boy travels the world with his scientist father, adopted brother from India, Bandit the bulldog, and a government agent assigned to protect them as they go on their adventures investigating scientific mysteries."*	*"A woman returns from combat and befriends a family in New York City. When a gang of thieves plot to take the family's valuables she fights to defend the family."*
50th	*"A 30-year-old guy meets the woman of his dreams and life could not be better, but right before his wedding he gets a knock at his door and a 66-year-old man walks in and says do not marry this girl because she will ruin your life."*	*"A Wall Street financial adviser who has recently lost her job adopts a dog which has been adopted twice and returned twice for being too unruly. The woman cannot find another job and starts training Roo! who wins a special award for the best mixed-breed dog at the Westminster Dog show's first-ever agility competition, marking the first time mixed-breed dogs have appeared at the show."*
75th	*"Rickie, a sensitive and intelligent young man with an intense imagination, sets out full of hope to become a writer. Giving up his aspirations and opting for convention and marriage to Agnes, he gradually finds himself sinking into conformity and bitter disappointment until he once again realizes his dreams of literary ambition."*	*"A former pageant queen embarks on an all-night adventure with four unlikely friends she meets while volunteering at a women's shelter."*
95th	*"After 20 years of marriage, a lawyer goes to great lengths to prove his love to his wife, a music lover, and save their relationship by taking piano lessons from a free-spirited female teacher to learn Robert Schumann's Traumerei, a tricky piece that is also his wife's favorite song."*	*"A woman loves her daughter, but after years of expulsions and strained home schooling, her precarious health and sanity are weakening day by day. The battle of wills between mother and daughter ultimately reveal the frailty and falsehood of familial bonds."*

Note: The distribution cutoff is uniform rather than specific to the gender of the protagonist. As explained in the previous section, we replaced gendered pronouns and nouns with their gender-inclusive counterparts before constructing the gender-role measure. We display the original loglines here for clarity.