Moral Regulation and Cultural Production: Evidence from Hollywood*

Ruixue Jia† David Strömberg‡

March 22, 2026

Abstract

Moral regulation is widespread across societies, yet its consequences have seldom been examined empirically. We study the Hays Code (July 1934–1960s), which imposed systematic moral guidelines on American cinema. Using a regression-discontinuity design, with non-U.S. films providing a comparison group, we find that the moral compliance of U.S. films rose sharply after 1935 and remained high for two decades. The Code also reshaped protagonists and political tone: protagonists became less likely to be women or working class, and political tones grew more conservative. Filmmakers adapted both by increasing compliance within genres and by shifting across them: less-compliant *Drama* declined while more-compliant *Western* and *Action* rose. Companies with a larger market size and immigrant film directors exhibited stronger responses. These findings reveal how moral constraint, market, and identity jointly shape cultural production and how well-intentioned moral regulation can generate broad and often unintended spillovers.

Keywords: Moral Regulation, Cultural Production, Censorship, Market Size, Immigrants

*We thank Sam Bazzi, Jinhui Bai, Heng Chen, Arash Nekoei, Nancy Qian, and seminar/conference participants at Berkeley, Chinese University of Hong Kong, Hong Kong Baptist University, Hong Kong University of Science and Technology, National University of Singapore, Singapore Management University, UCSD, University of Hong Kong, University of Monash, and University of New South Wales for helpful comments. We are grateful to Zhenglong Cong and Yijie Hao for excellent research assistance.

†UCSD, CEPR and NBER; rxjia@ucsd.edu.

‡Stockholm University; david.stromberg@ne.su.se

"No picture shall be produced which will lower the moral standards of those who see it." *The Hays Code*

---

1 Introduction

Moral regulation, defined as efforts to shape citizen's values and behavior not only through law and punitive control but also through cultural means such as art and literature, has been a pervasive feature across societies (Hunt, 1999). Governments, religious institutions, industries, and civil society alike have sought to define what constitutes acceptable conduct in domains such as sexuality, crime, and family life. The Victorian campaigns for public decency and temperance in Britain, China's socialist-era guidelines on "healthy" art and literature, and contemporary debates over online content moderation and book bans all exemplify how societies attempt to regulate morality. These cases illustrate that moral regulation is not confined to authoritarian regimes but often arises from interactions among the state, the market, and civil society. Yet, despite its prevalence and its significant social and political implications, systematic empirical studies of moral regulation remain limited.

A central question is how moral regulation reshapes cultural production. One defining feature of cultural goods that sets them apart from other regulated products is that they are interdependent bundles of content. Removing a moral element, such as the adultery in *Madame Bovary*, often requires revising other parts of the story or even abandoning the project altogether. This interdependence implies that moral regulation may spill over onto dimensions far beyond the targeted moral themes. Moreover, creators operate under market pressures, and their responses to moral regulation likely depend on the interplay between moral regulation and market forces.

We examine the intended aims and content spillovers of moral regulation, along with the responses of key players in cultural production, through one of the most prominent historical episodes of moral regulation: the Hays Code, which governed American cinema from July 1934 through the 1960s. As a comprehensive system of moral oversight, the Code restricted depictions of sex, crime, and family life, while also mandating respect for religion and national sentiment. Although never codified in law, the Code exerted binding force in practice: films lacking approval from the Production Code Administration were denied distribution and advertising, effectively excluded from the market. The Hays Code thus offers a well-defined and revealing setting to study how moral regulation operates and to uncover its broader implications for cultural production.

To study these questions, we leverage recent advances in large language models (LLMs) to analyze rich textual data on films produced in the US and the rest of the world. Solely based on each film's plot summaries, we quantify multiple dimensions of film content: (1) the degree of compliance with the Hays Code, (2) the specific moral domains implicated, and (3) broader social and political attributes, including the protagonist's gender, social class, and the overall political orientation of the narrative. We validate the compliance score using both internal and external checks, examining its correlation with the number of violations of the main Hays moral themes as well as with two external measures based on Wikipedia records and IMDb parental-guidance ratings. In our analysis, we discuss in detail the potential biases introduced by the LLM-based approach and implement several strategies to address them. We also complement the LLM-based measures with non-LLM proxies, such as film genre and the gender of the film's stars

To evaluate the impact of the Hays Code, we employ a regression-discontinuity (RD) design based on a dataset of 14,195 American films released between 1925 and 1955, an era often referred to as the "Golden Age of Hollywood" in film history. Our analysis focuses on changes in film content around 1934–35, when the Code came into force, and extends through the 2020s to examine longer-term patterns. To assess whether these shifts were specific to the US, we use a comparison group of 11,415 films produced in other countries. The main analysis is conducted at the annual level, which we complement with a quarterly analysis to more closely examine the period surrounding July 1934.

Our study proceeds in four sets of analyses. The first examines the Code's intended effect on moral compliance. We document a sharp increase in the Hays compliance score of American films after 1935. This shift is especially striking because it reversed an ongoing pre-1935 trend: before enforcement, U.S. films were becoming less compliant and increasingly converging toward their non-U.S. (primarily European) counterparts, consistent with historical accounts of pre-Code American cinema (Doherty, 1999; Vieira, 1999).[1] The enforcement of the Hays Code interrupted and reversed this convergence. Rather than continuing to move toward foreign films, American films broke away from them and became substantially more compliant.

The estimates confirm this pattern. While some spillovers from American films to foreign productions are possible, we find no comparable increase in other countries, which therefore serve as a natural comparison group. After accounting for potential common cross-country trends, we

[1]Other major historical developments, such as Prohibition (1920–1933) and the Great Depression (1929–1939), may have contributed to demand for more rebellious films (Doherty, 1999). However, they are less well suited to explain the sharp discontinuity in compliance around July 1934. We discuss these alternative explanations.

estimate that the compliance score of American films rose by about 0.8 points, or 11% of the pre-1935 mean and 45% of a standard deviation. This is a sizable effect, particularly because it remained visible through the 1950s. A quarterly RD design around July 1934 produces similar estimates.

A closer examination of the moral narratives shows that the changes were concentrated in areas such as crime and violence, moral resolution, sexual morality, family and marriage, and depictions of drugs, alcohol, and gambling. By contrast, because relatively few films directly violated religious norms or national sentiments, we do not observe clear shifts in these domains.[2]

Our second set of analyses explores spillovers along non-targeted dimensions including the social background of protagonists, the overall political orientation of narratives, and film genres. Following the introduction of the Hays Code, the likelihood that a film's protagonist was female declined by 19% relative to the pre-1935 mean, and the likelihood that the protagonist was from the working class fell by 15% of the same baseline. In addition, films' overall liberty score decreased by 17% of the pre-1935 standard deviation. These results suggest that moral regulation can have far-reaching social and political implications for film narratives that extend well beyond their explicit moral objectives, reflecting the notion that films are bundled cultural products. At the same time, drawing on contemporary audience ratings, vote counts, and the available box office and budget data, we find no clear discontinuities in either overall evaluations or production spending. This indicates that the systematic (horizontal) shifts in narrative content did not correspond to (vertical) declines in film quality or investment.

To better understand how compliance was achieved, we examine adaptation both across and within genres. Using the same RD design, we find clear shifts in genre composition: Drama declined while Western and Action rose, which reflects the fact that the former tended to be less compliant with the Code. We also find a clear rise in within-genre compliance following the introduction of the Hays Code. The increases also exhibit convergence across genres: those that had initially deviated more from the Code experienced larger subsequent adjustments. Film critics have noted that genres constitute a kind of social contract between filmmakers and audiences, defining what stories can be told and how (Schatz, 1981). Our findings suggest that this contract itself was reshaped by moral regulation.

Our third analysis explores how market characteristics affect the compliance to moral regulation by studying responses across film companies. Drawing on the literature on market size (e.g.,

[2]However, as we show, there were implicit changes in social and political narratives embodied in films that did not directly address national feelings.

Redding and Sturm, 2008), we construct a measure of market size for each film company based on the geographic distribution of its distribution networks. We then examine whether larger market size amplified or mitigated the effects of censorship. Theoretically, the direction of this relationship is ambiguous: larger market size could encourage firms to cater to audience preferences, thereby softening compliance, or strengthen incentives to adhere to censorship guidelines to secure and maintain access. Empirically, we find that greater market size *amplified* adherence to censorship, suggesting that the extensive margin (access to a bigger market) plays a dominant role. We also proxy market preferences using the Democratic vote share and Catholic population share in the pre-Code era and find that the influences of these measures are overshadowed by that of market size.

Our final analysis turns to the responses of film directors, key agents in cultural production alongside film companies. We find that the rise in moral compliance persisted even when comparing films directed by the same individual, indicating behavioral adjustments within directors over time. Immigrant directors, in particular, played a distinctive role in the American film industry: they produced 19.5% of all films during this period and accounted for 37.5% of those with an IMDb rating of 8 or higher. They also exhibited stronger response to the Hays Code. Among the immigrant directors, those with fewer pre-1935 films and therefore less-established careers, responded most strongly. This sensitivity among immigrant directors, especially the less-established ones, likely reflects a greater concern with social and institutional acceptance.

There are empirical challenges when using LLMs to predict dependent or independent variables (Ludwig, Mullainathan and Rambachan, 2025). In our setting, we are concerned that the LLM (GPT-4.1) may confirm the researcher's hypothesis because it already "believes" it to be true, which we call *AI-Confirmatory Bias*. Specifically, the LLM may believe that the Hays Code compliance was higher for films released after 1934 and hence it increases the compliance score for those films, thereby mechanically generating the observed discontinuity. To assess the importance of this potential bias, we formalize it and implement three empirical strategies. First, we assign the year 1933 to all films in the LLM analysis to eliminate any potential influence of temporal information. Second, we develop a procedure to anonymize all film summaries by (1) replacing personal names (first, last, and nicknames) with generic role labels and (2) removing all explicit references to production or release dates. We then use these anonymized descriptions to re-estimate the Hays compliance score. Third, we ask the LLM to predict each film's release year and control for whether the LLM believes that the release year was post 1934. All three strategies indicate that any potential bias, if present, is too small to account for a sizable share of our main finding.

A related concern is that the LLM model (GPT-4.1) may have its own bias. A related concern is model-specific bias in GPT-4.1 itself. To address this, we use Grok-4.1 as an alternative model and further restrict the information and norms to what would have been available before December 31, 1930. Reassuringly, this alternative model yields a highly similar pattern.

Our study contributes to several lines of research. First, we provide systematic evidence on how moral regulation shapes cultural production, a widespread yet understudied phenomenon. A bourgeoning literature on the economics and politics of morality (e.g., Graham, Haidt and Nosek, 2009; Haidt, 2012; Enke, 2020) show that morality is an important predictor of political ideology and voting. The Hays Code regulates moral values that, according to this theory, are associated with conservative values, notably sanctity, authority and loyalty, while values associated with liberal values were less regulated (care/harm) or not at all (liberty/oppression). This is consistent with the films' increased conservative slant post-Hays. Yet, the consequences of moral regulation itself have rarely been studied empirically. In our setting, historians and film scholars have long argued that the Hays Code reshaped American cinema by influencing moral narratives (e.g., Sklar, 1975; Black, 1994). Our analysis offers quantitative evidence and uncovers important implications beyond explicitly moral themes such as genres, leader characters, and political tones.

Second, we show that market size can *reinforce* rather than constrain regulation, which is related to an important literature on censorship. Censorship is often understood as the product of direct state coercion, and thus associated primarily with authoritarian regimes. Governments may ban books, shutter newspapers, or imprison writers who challenge the official line. Yet censorship can also emerge through softer forms of self-regulation, as we illustrate in this study. Our finding on market size stands in contrast to much of the existing literature, which emphasizes how market forces may counteract censorship or enhance media freedom (e.g., Besley and Prat, 2006; Gehlbach and Sonin, 2014; Petrova, 2011; Tella and Franceschelli, 2011; Qin, Strömberg and Wu, 2018). Our results with an explicit measure of market size highlight that the extensive margin of access, which can dominate the intensive margin of market size, can play a critical role in explaining how firms respond to moral regulation. This finding is likely to be relevant in other settings where government censorship or moral regulations can govern access to market.[3]

Relatedly, prior research on censorship in economics and political science has examined the

[3]For instance, in Bu et al. (2025), we find that market incentives have reinforced state censorship in the Chinese film market. Chen and Li (2025) find that news outlets excluded from the Chinese market subsequently adopted more negative coverage of China and increased reporting on politically sensitive topics, suggesting that access to the Chinese market may influence potential self-censorship. To our knowledge, however, no prior work provides direct evidence using explicit measures of market size.

political logic of censoring certain types of contents (e.g., King, Pan and Roberts, 2013; Esberg, 2020) and the costs of censorship for information dissemination and knowledge production (e.g., Chen and Yang, 2019; Becker, Pino and Vidal-Robert, 2021; Comino, Galasso and Graziano, 2024; Moser and Parsa, 2025). Our study contributes to this literature by focusing on the transformation of cultural narratives and by providing direct evidence on content spillovers.

Third, we provide evidence that immigrant film directors exhibited stronger responses to moral regulation. While a large literature highlights the contributions of immigrants to innovation and economic growth in the U.S.,[4] the behavioral responses of immigrants to social and political constraints have received less systematic attention. Our findings suggest that moral regulation not only shaped the content of American cinema but also interacted with the social positions of its creators, particularly those navigating the pressures of market access and cultural assimilation.

Finally, our work complements a growing literature on the economic and social influence of cultural products. Influential studies have shown that films and television can shape political attitudes (e.g., Ang, 2023; Esposito et al., 2023) and behaviors from divorce and fertility to educational attainment (e.g., Chong and Ferrara, 2009; Jensen and Oster, 2009; Ferrara, Chong and Duryea, 2012; Riley, 2024). Comparatively little is known about what determines the narratives of these cultural products. Michalopoulos and Rauh (2024) provide compelling evidence that films mirror societies' core beliefs. Tan and Wang (2024) demonstrate how McCarthy-era political repression pushed films toward less progressive content. Our study adds to this line of inquiry by showing how moral regulation, market size, and identity of the creators jointly shape cultural narratives.

2 Context and Data

2.1 The Hays Code

The Hays Code, formally known as the Motion Picture Production Code, was a set of moral guidelines that governed the content of American cinema from July 1934 until the 1960s. Its adoption marked the climax of social and political anxiety about Hollywood's growing influence. By the late 1920s, going to the cinema had become a weekly ritual for over 65% of Americans, giving films an unprecedented role in shaping public attitudes (Finler, 1988). At the same time,

[4] We cannot give a fair review of this important literature here. See an earlier review in Borjas (1999). More recent studies include Akcigit, Grigsby and Nicholas (2017) and Sequeira, Nunn and Qian (2020) among many others.

public concern over depictions of sex, crime, and violence on screen, coupled with a series of scandals involving film stars, led to mounting pressure from religious groups, politicians, and civic organizations for greater regulation of the industry.

To preempt the threat of federal or state censorship, the major studios adopted self-regulation. Under Will H. Hays, former U.S. Postmaster General and head of the Motion Picture Producers and Distributors of America (MPPDA), the industry drafted the Production Code in 1930. Enforcement, however, was lax or absent, and the ensuing *pre-Code* years saw films that openly defied prevailing moral norms (e.g, Doherty, 1999; Vieira, 1999).

Mounting campaigns from Catholic organizations pushed the industry to strengthen oversight, with the Catholic Legion of Decency at the center of this pressure. For instance, on May 23, 1934, Cardinal Dennis Dougherty of Philadelphia urged all Catholics in his archdiocese to boycott movie theaters. He condemned how *"a great proportion of the screen productions deal largely with sex or crime...The usual theme of these moving pictures is divorce, free love, marital infidelity, and the exploits of gangsters and racketeers. A vicious and insidious attack is being made on the very foundations of our Christian civilization, namely, the sacrament of marriage, the purity of womanhood, the sanctity of the home and the obedience to lawful authority."* Within weeks, over 300,000 Catholics signed boycott pledges (Archdiocesan Collections, 2019).

Fearing market losses and the prospect of government intervention, the industry responded by adopting an amendment to the Code on June 13, 1934. The amendment created the Production Code Administration (PCA) under Joseph Breen and required all films released on or after July 1, 1934, to obtain a Seal of Approval before distribution.

In practice, the PCA supervised film compliance with the Hays Code from a project's earliest stages. Producers typically submitted story ideas, novels, or synopses to the PCA for an initial opinion on whether the material was acceptable under the Code. If approved, the producer then sent a detailed shooting script—a full version specifying dialogue, scenes, characters, and actions—for further review. The PCA issued written feedback identifying any elements that violated the Code and had to be removed or changed. If a story or script was deemed wholly unacceptable, the PCA explained which parts conflicted with specific Code provisions. After production, the completed film underwent a final review, and if it met all standards, the PCA granted a Certificate of Approval, allowing the film to display the official Seal of Approval for release (Shurlock, 1947).

Although not government legislation, the Code had binding force: films without PCA approval could not secure distribution through major theater chains, effectively barring them from the market.

The Code was effective for more than two decades. In the 1950s to 1960s, with cultural shifts, rising challenges from filmmakers, and the decline of studio control over distribution, the Code started losing its effectiveness. It was officially replaced in 1968 by the MPAA film rating system, which remains in use today. However, historians have noted that the erosion of the Code's influence began earlier, particularly after the Supreme Court's *Miracle* decision in 1952,[5] which recognized motion pictures as a medium protected under the First Amendment and thereby curtailed the legal basis for film censorship (Couvares, 2006).

The moral values regulated by the code reflected the values of those pushing for regulation. In Appendix A.1, we summarize the Code's general principles and specific applications across 12 domains, ranging from crime and sex to religion and national sentiment. The code restricts the coverage of a number of specified topics related to sexual morality, such as adultery, seduction, rape, sex perversion, miscegenation, and even child birth. The code also provides instructions for how family and marriage should be covered. The film should not throw sympathy against marriage as an institution, in particular, the love of a third party for one already married needed careful handling. Regarding crime, its presentation should not be overly brutal nor too detailed. Illegal drug traffic must never be presented and the coverage of liquor should be restricted. The films should have a correct moral resolution, meaning that the end should restores moral order so audiences aren't left sympathizing with wrongdoing. This implies, for example, that criminals are caught, that illicit relationships (adultery, seduction, prostitution) ends unhappily with repentance. It also implies that the final tone discourages imitation—no glamorous send-off for gangsters, no celebratory depiction of vice.

The code also specifies that films should show respect towards religion and national feelings. For example, films should not ridicule religious faiths, or present ministers as comic characters or villains, and the use of the flag should be consistently respectful. In addition, the code restricts the presentation of vulgarity, obscenity, profanity, nudity and undressing, indecent dancing, as well as bedroom scenes.

Liberals and conservatives tend to draw on different sets of moral foundations (e.g., Graham, Haidt and Nosek, 2009; Haidt, 2012; Enke, 2020). The Hays Code reflected a distinctly conservative moral framework, emphasizing foundations such as sanctity/purity and loyalty/authority. In contrast, moral concerns that dominate contemporary film standards—those grounded in the

[5]The *Miracle* refers to the Supreme Court case *Joseph Burstyn, Inc. v. Wilson* (1952), which arose after New York censors banned Roberto Rossellini's film *Il Miracolo* (written by Fellini) on the grounds of sacrilege. The Court ruled unanimously that motion pictures are a form of expression protected under the First Amendment, striking down state censorship laws and undermining the legal foundation for the Hays Code.

care, fairness, and liberty foundations, including norms against racism, sexism, and restrictions on freedom of expression—were largely absent from the Code.

In our analysis, we first show the general changes from 1925 to the 2020s and then zoom into 1925 to 1955 for our main analysis. We use 1935 as the cutoff year, as the Code was strictly implemented in July 1934.

2.2 Film Content

We draw on IMDb data to measure films and their characteristics. The core variables include each film's production year, country of origin, production company, and plot summaries. Multi-country or multi-company productions were rare during our study period (1925–1955). For the small fraction of films associated with multiple countries or companies, we focus on the leading country and leading company. In addition, we use each film's Wikipedia entry to help validate our measures and to supplement the dataset with box office and budget information whenever available.

Moral Compliance, Genres and Protagonist Characteristics Using plot summaries alone, we employ large language models to quantify several dimensions of film content: (1) the degree of compliance with the Hays Code (scored from 1 to 10), (2) the specific moral dimensions implicated, and (3) broader social and political features, including the protagonist's gender (female or male), social class (poor, middle, or rich), and the overall political orientation of the narrative (ranging from 1, very conservative, to 10, very liberal).

We present two examples, *Baby Face* (1933) and *All about Eve* (1950), in Appendix A.2 to illustrate the data on film summaries. As shown there, each film typically has multiple summaries, sourced from a diverse set of IMDb users. We incorporate all available summaries in our analysis, and the multiplicity of contributors helps mitigate concerns about idiosyncratic audience bias. In Table 1, we use these films to demonstrate how we code key variables and identify potential reasons for Hays Code violations.

Baby Face (1933) portrays seduction without offering a clear moral resolution, resulting in a low compliance score. The protagonist was described as a young woman "who has been abused by men all her life and decides to turn the tables." Notably, the widely circulated version of the film had already been cut during the period of loose Code enforcement and is often credited as a key catalyst for the strict regime introduced in July 1934 (Vieira, 1999). By contrast, *All About Eve* (1950) includes immoral behavior but condemns it, yielding a much higher level of compliance.

The young actress engaged in such behavior was characterized as "seemingly timid but secretly ruthless," a framing that leads the narrative toward clear moral resolution.

Figure 1 displays the most frequent bigrams appearing in the stated reasons for Hays Code violations. The recurring phrases center on crime, violence, and domestic life (particularly adultery and infidelity).

We organize the film-level content variables into three groups. The first captures the degree of moral compliance and issues related to it, serving as proxies for adherence to the Hays Code. This measure may face the challenge of AI-confirmatory bias, which we consider in detail in our research design (Section 3). The second includes genre tags assigned by IMDb for each film. The third group consists of more objective measures of lead characteristics, such as gender and social background. While each set of variables is imperfect on its own, together they provide mutually reinforcing evidence of how film content evolved under the Code. Appendix A.3 reports summary statistics for these film characteristics, where we further separate them by being made in the U.S. or not.

Correlations with Internal and External Measures The long-term trajectory of the compliance score from 1925 to the 2020s indicates that this measure is informative. As shown in Figure 2, the compliance score for U.S. films declined in the years leading up to the Code, consistent with historical accounts of "pre-Code" cinema that openly challenged prevailing norms (e.g., Doherty, 1999). Moreover, the measure captures important shifts in American society beyond the 1930s, including the sharp decline in compliance during the 1960s and its resurgence in the 1970s. Unless the model were sophisticated enough to encode all such historical dynamics, these patterns are unlikely to arise mechanically.

We check the correlations between Hays compliance score and the number of violations for the seven main themes laid out by the Hays code, presented in Appendix A.4. As expected, films with more violations tend to receive lower Hays scores. The relationship is also not perfectly linear: once the number of violations exceeds five, the LLM generally assigns very low compliance scores.

We further conduct two additional validation checks by using external measures. First, we draw on information from each film's Wikipedia entry and record whether the Hays Code is mentioned, using the keywords "Hays Code," "Production Code," or "Censorship". Appendix A.5 presents the correlation between a film's Hays compliance score and the probability of such a mention. The negative relationship provides suggestive evidence of the score's meaningfulness: films with lower compliance are more likely to reference the Hays Code.

Second, we use IMDb Parents Guide ratings as another external proxy for content, where a higher rating indicates greater restrictiveness (see Appendix A.5 for details). As shown, a higher Hays compliance score indicates less restrictive content.

2.3 Film Distribution Networks and Market Size

During our study period, American films were distributed through an institution known as the *film exchange*, which managed the circulation of film copies to local cinemas. Within this distribution system, the major production companies, known as the "Big Five" (Paramount, Metro-Goldwyn-Mayer, Warner Bros., Fox, and RKO) and the "Little Three" (Universal, Columbia, and United Artists), operated their own distribution networks, while smaller studios relied on independent distributors.

We digitize the locations of film exchanges and the presence of distributors in 1933 as recorded in *The Film Daily Yearbook* (Alicoate, 1934). Appendix A.6 provides an example of the original data, which shows the distributors based in Atlanta. The coverage of these networks varied substantially. For instance, Paramount Pictures maintained presence in 31 exchange localities across the country, whereas First Division Exchanges was represented in 10 in the northeast, as shown in the map in Appendix A.6.

To connect production companies with the film exchange localities, we use IMDb data on film distributors. By linking producers to their distributors and then matching distributors to their corresponding exchange cities, we are able to depict a company's geographic distribution network.

This distribution structure is analogous to a transportation network, allowing us to draw on the spatial economics literature to construct a measure of market size for each film company (e.g., Redding and Sturm, 2008). To do so, we use the population data from the US census 1930 to calculate market size via these distribution networks (see more details in Section 5).

Moreover, we measure the ideological partition of a market using two proxies. The first is the Democratic presidential vote share in 1932, using county-level returns from Amlani and Algara (2021). The second draws on the Catholic population in 1926 from U.S. Bureau of the Census (1929).[6]

[6]Between 1900 and the 1930s, the census on religious bodies was conducted in 1906, 1916, 1926, and 1936.

2.4 Film Directors

The decades we study coincided with major waves of migration to the U.S., which brought many talented filmmakers who profoundly shaped Hollywood's creative landscape. Notable examples include Frank Capra (Italy), Ernst Lubitsch (Germany), and Alfred Hitchcock (Britain), who directed 34, 23, and 17 films in our U.S. film sample. Given that immigrant status may have influenced directors' sense of security and social acceptance in the industry, we examine how this background affected their compliance with moral regulation.

We obtain information on film directors from IMDb. For most directors, we are able to identify their country of birth using IMDb and Wikipedia. We code a director as an immigrant if he or she was born outside the U.S. (see more details in Section 6). We also examine directors' responses in relation to their compliance history and their prior experience, measured by the films they had directed before 1935.

3 Research Design

Yearly and Quarterly RD Design We employ a regression-discontinuity (RD) design, which enables us to visualize and estimate the main effects of the Hays Code. Our main analysis is based on annual release data, which we complement with a quarterly design when month-of-release information is available. Specifically, release month is observed for 94.2% of U.S. films and 80.5% of non-U.S. films.

In our yearly design, because the Code was formally implemented in July 1934, we set 1935 as the treatment cutoff, while recognizing that some responses may have begun in late 1934. Let $t = year - 1935$, and d_i be an indicator variable for the film being released after 1934. For simplicity, we focus on 1925-1955 (i.e., before the relaxation of the Code). Our baseline specification is:

$$y_{i,t} = \alpha + \beta \cdot d_i + f(t) + \varepsilon_{i,t} \tag{1}$$

where $y_{i,t}$ denotes a film-level outcome for film i released in year $1935 + t$. The running variable t is the distance to 1935.

For the specification of $f(t)$, we allow the slope of the running variable to differ before and after the cutoff as in standard RD designs. Following the RD literature (see the review in Cattaneo and Titiunik (2022)), we adopt linear interactions in our main analysis to mitigate potential overfitting

concerns. We also include quadratic interactions as robustness checks. We focus on parametric specifications to enable a tractable triple-interaction framework that illuminates heterogeneity across countries (U.S. vs. non-U.S.), companies, and film directors.

In our analysis, we first estimate equation (1) separately for U.S. films and for non-U.S. films.[7] To assess whether U.S. films responded differently than those from other countries, we then estimate a pooled triple-interaction specification with country interactions:

$$\begin{aligned} y_{i,t,c} = \alpha \ &+ \beta\, d_i \times US_i + \beta_2\, d_i \\ &+ f(t) + f(t) \times US_i + \mu_c + \varepsilon_{i,t,c}, \end{aligned} \tag{2}$$

where β captures the discontinuous jump in U.S. films at 1935 relative to the control group of non-U.S. films. μ_c indicates country fixed effects and $f(t)$ represents the linear interaction between the Post-1935 indicator d_i and the running variable t.

Since our running variable is defined in the time dimension, we cluster standard errors at the year level to account for correlations among films produced in the same year.

We complement the yearly design with a quarterly RD specification centered on July 1934, where the running variable is defined as the number of quarters relative to the Code's formal enforcement.

AI-Confirmatory Bias A key challenge when using LLMs to predict dependent or independent variables is that the LLM confirms the researcher's hypothesis because it already "believes" it to be true. In our case, the LLM may have implicitly incorporated knowledge of the Hays Code's timing, mechanically producing a discontinuity around 1934–35. The LLM's training data may include a discussion of the Hays Code, perhaps indicating that compliance to the code was greater after 1934. The LLM may consequently increase its prediction of Hays compliance for films that it suspects were released after 1934. The underlying cause of this problem is a leakage of the target hypothesis (e.g., "post-1935 films are more compliant") into the variable construction stage.

To see this challenge formally, consider the true relationship between a film's moral compliance and the post–Hays Code indicator is given by equation Equation (1). The key identifying assumption is that, controlling flexibly for continuous time trends, Cov(d_i, ε_i)=0. In practice, we do not observe $y_{i,t}$ directly. Instead, we rely on the LLM's predicted compliance score $\hat{y}_{i,t}$, which is inferred from the film's synopsis text s_m. Suppose that, after reading the plot summary, the LLM forms an internal

[7] We exclude Germany from our sample due to its major political realignment beginning in 1933.

belief about when the film was made, represented by an inferred year indicator $\hat{d}_i$, potentially based on both its knowledge of the true year and textual cues such as whether the film was a Western.

When predicting Hays compliance, the LLM may use both the textual content and its inferred production year:

$$\hat{y}_{i,t} = \beta_{\text{LLM}}\hat{d}_i + \beta d_i + f(t) + \eta_i, \tag{3}$$

where β_{LLM} captures the additional influence of the LLM's belief about the production year and η_i contains the error from Equation (1) and a prediction error. Our estimate will be biased if $\beta_{\text{LLM}} \neq 0$ and $\hat{d}_i$ is correlated with d_i, controlling for continuous time trends captured by $f(t)$.[8]

We address this concern using four strategies. The first three rely on GPT-4.1 while attempting to minimize the influence of release timing on the compliance measure. The fourth uses Grok-4.1 as an alternative model, restricting it to information and norms available prior to December 31, 1930. The fifth uses non-LLM measures as additional alternatives.

Specifically, our first strategy holds $\hat{d}_i$ constant by assigning the same year, to all films when using the LLM method to predict Hays compliance. We use 1933 in this analysis. We compare the long-run trends of compliance scores from both the original measure and this strategy during 1925–2020s. As shown in Figure 2, the two series exhibit remarkably similar dynamics, suggesting that the sharp change around 1934–35 is not mechanically driven.

Our second strategy "hides" $\hat{d}_i$ by anonymizing all film summaries, which minimizes the likelihood that the LLM relies on background temporal information. Specifically, we anonymize all films by (1) replacing personal names (first, last, and nicknames) with generic role labels, and (2) removing all occasional references to production or release dates (e.g., release or production years) in some of the summaries. To give an example, the first of several summaries of *All About Eve* will be changed as follows:

> *Original:*
>
> "Eve Harrington (Anne Baxter) is waiting backstage to meet her idol, talented but aging Broadway star Margo Channing (Bette Davis). It seems innocent enough as Eve explains that she has seen Margo in EVERY performance of her current play. Margo

[8]Note that this bias may appear even if the films in our sample were not part of the LLM's training data and the LLM only used textual features for its prediction $\hat{d}_i$. Suppose, for example, that the LLM was trained on data post our sample period, and that the share Western films increase discontinuously after 1934. The LLM sees that Westerns in our sample are more Hays compliant and holds the belief that Hays compliant films are more likely released post 1934. Hence it increases $\hat{d}_i$ for the Western films. This way, $\hat{d}_i$ and d_i will be correlated, controlling for continuous time trends.

and her friends take Eve under their wing but only theatre critic Addison DeWitt (George Sanders) sees through Eve's evil plan, which is to take Margo's parts and her fiancé, Bill Simpson (Gary Merrill) too."

Anonymized version:

"The aspiring actress is waiting backstage to meet her idol, a talented but aging Broadway star. It seems innocent enough as the aspiring actress explains that she has seen the star in every performance of her current play. The star and her friends take the aspiring actress under their wing, but only a theater critic sees through the aspiring actress's evil plan, which is to take the star's parts and her fiancé too."

As illustrated in this example, the anonymized version reduces the likelihood that the LLM relies on information about specific characters or stars to infer a film's production period. As shown in Figure 2, this series of measure also follow closely to the original measure and the measure assuming a release year of 1933 for all films.

Our third strategy controls for $\hat{d}_i$. We ask the LLM to predict the release year for each film, based on its synopsis only. The LLM often provides reasoning such as "The plot and character names suggest a classic farce style popular in mid-20th-century cinema" or "The plot and character names suggest a classic Western film typical of the early 20th century" (see Appendix A.7 for more examples). Although the LLM cannot predict the actual release year in most cases, the correlation between the actual and predicted release year is nevertheless positive (with a correlational coefficient of 0.37, see Appendix A.7 for details). We use this to construct $\hat{d}_i$ and add this as a control to the regression.

Importantly, while including $\hat{d}_i$ corrects the bias through β_{LLM} it may also introduce a *downward* bias in β. This occurs if $\hat{d}_i$ is positively correlated with both d_i and the error term η_i—for example, because both $\hat{d}_i$ and $\hat{y}_i$ depend on overlapping textual features.

Our fourth strategy uses company characteristics and more objective outcomes, such as film genre and the gender and social background of protagonists. For these, film genre is provided by IMDb, and for gender, we can use the gender of the first-billed star as another proxy for validation (Ludwig, Mullainathan and Rambachan, 2025). There is also less concern that the LLM sets $\beta_{\text{LLM}} \neq 0$ here since there is no prior discussion or the effects of the Hays Code on these characteristics.

A different yet related concern is that the baseline LLM itself, GPT-4.1, may reflect model-specific biases. To address this possibility, we replicate the analysis using an alternative model,

Grok-4.1, while restricting it to information and normative standards available prior to December 31, 1930. Although Grok-4.1 generates somewhat more dispersed scores, the resulting dynamics closely track those obtained from GPT-4.1, as indicated by the crosses in Figure 2. This similarity suggests that model-specific bias is unlikely to be a central concern.

4 Moral Compliance and Its Broader Implications

We begin by examining changes in moral compliance with the Hays Code in Section 4.1. While the increase in compliance itself may not be surprising, it provides a useful benchmark for interpreting subsequent results. Section 4.2 analyzes broader transformations in lead characters and the political tone of films, followed by Section 4.3 asking whether these content changes necessarily translate into ratings. Section 4.4 then explores how compliance was achieved by studying within- and cross-genre shifts.

4.1 Changes in Hays Compliance

Baseline Estimates Figure 3 plots changes in the Hays compliance score for the United States and other countries. Panel (a) shows a sharp rise in the U.S., with an initial jump in 1934 that became even more pronounced in 1935. The increase persisted through the 1950s, indicating a lasting shift rather than a short-lived discontinuity.

By contrast, Panel (b) shows that films from other countries display much smaller changes over the same period. Although the fitted line may appear to show a jump, a closer look at the year-to-year pattern reveals no clear discontinuity, a finding consistent with the regression results with a flexible trend presented below.

It is useful to note that non-U.S. films exhibited lower average compliance than their U.S. counterparts. From this perspective, the pre-Code U.S. pattern may be interpreted as a process of convergence toward non-U.S. (primarily European) films. The enforcement of the Hays Code, however, appears to have interrupted this convergence.

Panels (c) and (d) present quarterly RD patterns using July 1934 as the cutoff. Panel (c) shows little evidence of a change in U.S. films prior to July 1934, followed by a marked increase in compliance within the subsequent few quarters. Panel (d) again shows no comparable change among non-U.S. films.

The RD estimates from Equation (1) for U.S. films are reported in Columns (1) and (2) of

Table 2A, using linear and quadratic interactions, respectively. Columns (3) and (4) present the corresponding estimates for non-U.S. films. Consistent with Figure 3, the discontinuity for U.S. films is both sizable and evident, whereas no clear comparable discontinuity appears for non-U.S. films.

Columns (5) and (6) of Table 2A report the results from equation (2), using linear and quadratic interactions, respectively. Our preferred linear specification indicates that the compliance score of U.S. films increased by approximately 0.81 points. The mean and standard deviation of the compliance score for films in the pre-Hays period are 7.58 and 1.80, respectively. Hence, the estimated change corresponds to about 11% of the sample mean and 45% of the standard deviation. This effect is sizable, particularly given that it represents a sustained shift that persisted for over two decades, until the compliance level declined amid the broader societal transformations described in the background.

We present the corresponding estimates from the quarterly RD design in Panel B of Table 2. Here, the running variable is the number of quarters relative to July 1934. The estimates are broadly similar to those from the yearly specification.

We further plot the distribution of Hays compliance scores before and after 1935 in Appendix B.1. The figure shows a clear rightward shift in the distribution: films with lower compliance scores become less common, while films with higher scores become more prevalent. This redistribution across the score distribution underlies the increase in average compliance documented in our baseline estimates.

Assessing Potential AI-Confirmatory Bias Here, we adopt four strategies to assess potential bias arising from the possibility that the LLM may infer a film's production year and use it to gauge Hays Code compliance.

Our first strategy, holding $\hat{d}_i$ constent, uses compliance scores generated by assigning all films to the same year (1933). As shown in Columns (1)–(9), we obtain an estimate of 0.735, equivalent to 10.4% of the pre-1935 mean (7.06) and 42% of the pre-1935 standard deviation, only marginally smaller than our baseline estimate.

Our second strategy, "hiding" $\hat{d}_i$, employs compliance scores derived from the anonymized film summaries as an alternative dependent variable. As shown in Columns (4)–(6) of Table 3, the estimated coefficient is around 0.71, which is 9.3% of the pre-1935 mean (7.66) and 42% of the pre-1935 standard deviation (1.71). Thus, even with reduced contextual information in the

anonymized texts, we obtain estimates close to our baseline.

Our third strategy, controlling for $\hat{d}_i$, includes the LLM-predicted Post-1935 as a control. As shown in Columns (1)–(3) of Table 3, the estimated effect of interest declines slightly from 0.807 to 0.789, which is 10.4% of the pre-1935 mean (7.58) and 44% of the pre-1935 standard deviation (1.80).

Additionally, in Appendix B.2, we present the results for the Grok-model measure where we restrict the information set to that by December 31, 1930. If anything, the estimates are a bit larger than our baseline.

Taken together, the similarity of the estimates across these different strategies suggests that our baseline results are unlikely to be mechanically driven. If any bias exists, its magnitude is unlikely to account for a meaningful share of the main effect. In later analyses, we further mitigate this concern by incorporating additional objective measures of film characteristics.

Specific Moral Themes Based on the Hays Code, we classify its moral themes into seven categories and use LLMs to evaluate changes in the extent to which films violated each of them: (1) crime and violence, (2) moral resolution, (3) sexual morality, (4) family and marriage, (5) religious activities, (6) national feelings and patriotism, and (7) drugs, alcohol, and gambling. We present the reasoning for this classification in Appendix A.1.

Figure 4 visualizes these categories, showing the extent to which films potentially violated the moral standards prescribed by the Hays Code. As illustrated, violations related to crime, sex, family, and vices such as drugs, alcohol, and gambling (categories 1–4 and 7) declined after the Code's enforcement, reflecting a broad tightening of moral boundaries in film content.

By contrast, few films in our sample explicitly violate norms on religion (category 5) or patriotism (category 6), and we therefore do not observe clear discontinuities in these domains. Yet, as we document in the following sections, even in the absence of overtly religious or political violations, the moral regulation imposed by the Hays Code reshaped cinema in subtler but systematic ways, altering the social and political undercurrents embedded in film genres and in the portrayal of leading characters.

Influences of Other Historical Events? We interpret the sharp change around 1935, more precisely, July 1934, as reflecting the enforcement of the Hays Code. One may wonder whether other contemporaneous developments could account for this shift. Two prominent candidates are the Prohibition (1920–1933) and the broader trajectory of the Great Depression (1929–1939).

Both plausibly shaped audience demand and, through it, studio production choices. Indeed, film historians have argued that the social dislocation and moral ambiguity of the early Depression years, together with the culture surrounding Prohibition, helped fuel the popularity of boundary-pushing pre-Code films (e.g., Doherty, 1999).

That said, it seems difficult to reconcile these broader forces with the abrupt and discontinuous change we observe in Hays compliance. Prohibition ended in 1933, and the economic recovery associated with the Depression unfolded gradually rather than at a single, well-defined moment. If these factors were the primary drivers, one would expect smoother adjustments in film content rather than a sharp break. By contrast, the data show a declining trend in compliance prior to July 1934, followed by a sudden and sustained reversal immediately thereafter. This timing aligns closely with the institutional shift toward strict enforcement of the Code.

4.2 Changes in Gender, Class and Political Values

Moral regulations can have far-reaching implications that extend beyond narrow questions of acceptable content. The rich text data on film contents provide us an opportunity to investigate how moral narratives are closely related to broader social and political characteristics. In particular, we focus on three key dimensions of film contents: the gender of protagonists, the social class background of protagonists, and the political orientation of the values conveyed (conservative versus liberal).

The focus on conservative–liberal values is natural, as these dimensions are closely connected to the moral foundations described by Haidt (2012) and Enke (2020). We also focus on the characteristics of lead characters since a growing body of research shows that role models in films and television can shape economic and social behaviors from divorce and fertility to educational attainment (Ferrara, Chong and Duryea, 2012; Chong and Ferrara, 2009; Jensen and Oster, 2009; Riley, 2024). For a role model to be meaningful, the character must share salient characteristics with the audience. Hence, the traits of a film's protagonist—such as gender and social class—help determine which groups of viewers may identify with them. For instance, in an experimental study, Riley (2024) finds that exposure to a movie featuring a poor girl striving to become a chess master improves mathematics performance among low-performing female students.

Before turning to how each of these dimensions shifted with the introduction of the Hays Code, we first document the correlations between the Hays compliance score and these variables. This descriptive exercise provides a sense of how moral regulation was associated with broader aspects

of representation and political messaging, and serves as motivation for our RD analysis in the next section.

In Panel (a) of Figure 5, we plot the distribution of the Hays compliance score. Only a small share of films deviate substantially from the Code, as such films were unlikely to be produced. Very few films achieve a perfect compliance score of 10 either. Panels (b)–(d) show that higher compliance scores are negatively associated with the likelihood of featuring a female protagonist, a protagonist from a lower social background, or liberal political values. The nonlinear patterns in these correlations reflect the scarcity of films at both extremes of the compliance distribution, i.e., those that are highly noncompliant or fully compliant. Together, these patterns suggest that moral compliance was closely intertwined with broader social and political dimensions.

We next examine how gender, class, and political values changed with the introduction of the Hays Code. Parallel to our baseline analysis, Figure 6 presents the corresponding RD plots. As shown in Panel (a), there is a clear discontinuous decline in the likelihood that a film features a female protagonist. In the pre-Code period, women were lead characters in around 30 percent of the films. This dropped to around 25 percent in the post-Code era. Notice also the jump in female lead characters during the later years of World War II.

A similar pattern appears when we use the gender of the first-billed star as an alternative measure, as shown in Appendix B.3. Although the first-billed star is not always the protagonist, the two measures exhibit similar declines. Likewise, Panels (b) and (c) show comparable decreases in the likelihood that the protagonist comes from a lower social background or embodies liberal political values.

In contrast, we find no comparable changes around 1935 for non-U.S. films. Panels (d)-(f) in Figure 6 present the patterns for the gender and class of protagonists and the overall political tone. Across all these dimensions, there are no discernible shifts around 1935, confirming that these changes are specific to U.S. films.

Using the same RD specification as in Equations (1) and (2), we examine how these social and political characteristics changed in U.S. films relative to films produced elsewhere. The results are reported in Table 4.

Columns (1)-(3) show a clear decline in the likelihood of featuring female protagonists in U.S. films after 1935, whether we compare it with other countries or not. Relative to this comparison group, the probability of having a female protagonist in U.S. films fell by 5.5 percentage points, or 19% of the pre-1935 mean. Similarly, the probability of featuring a protagonist from a poor

background declined by 5.8 percentage points, or 15% of the mean. In addition, the overall liberty score decreased by 0.254 points (17% of the pre-1935 standard deviation).

Taken together, these results suggest that the Hays Code not only reshaped moral narratives but also altered the social and political composition of on-screen representation. The decline in female and working-class protagonists, along with the reduction in liberal political themes, points to a broader turn in American cinema following 1935. In other words, the Code's enforcement also implies a systematic narrowing of who and what could be portrayed on screen.

4.3 Quality and Audience Appeal

We have documented systematic changes in film narratives following the introduction of the Hays Code. Do these systematic (horizontal) shifts in content do not necessarily translate into (vertical) declines in film quality? We have no strong *a priori* expectation on this point. We conduct two sets of analysis to shed light on this issue.

Our first analysis relies on contemporary audience ratings of these historical films. We find no clear evidence of a decline in overall evaluations: as reported in Appendix B.4, the average rating of post-1935 films is not meaningfully different from that of pre-Code films. We also use the number of IMDb votes as a proxy for a film's modern viewership and report the corresponding trend in Appendix B.4. As expected, more recent films attract more votes, yet we again observe no systematic change across the cutoff.

Our second analysis examines box office revenues and production budgets, using information collected from Wikipedia for a subset of films. Wikipedia obtains these figures from film scholarship and provides references. Box office data are available for 1,828 American films in our sample during 1925–1955, and budget data for 1,253.

Within this subset, both box office receipts and budgets generally increased over time, with the expected decline during the Great Depression (1929–1933). However, we find no clear discontinuity around the implementation of the Code (Appendix B.5). Could this selected sample be missing the main pattern? To assess this possibility, we examine how the Hays compliance score changes within the same subset. As shown in Appendix B.5, we continue to observe a post-1935 rise in compliance, with a magnitude similar to our baseline estimates. This suggests that, although selected, the sample remains informative.

Taken together, these different, albeit imperfect, measures offer no clear evidence that the Hays Code induced vertical declines in perceived film quality, even as it generated substantial horizontal

changes in narrative content. This pattern is consistent with historical accounts suggesting that filmmakers worked hard to preserve audience appeal while operating under moral constraints (e.g., Schatz, 1981).

4.4 Adaptation: Across- and Within-Genre Changes

To understand how compliance with the Hays Code was achieved without substantially reducing audience appeal, we examine two dimensions of adaptation: changes in the genres that studios produced, and changes in compliance within genres. We find evidence of adjustment along both margins. When artists face new regulatory constraints, they must adapt to the altered environment—either by modifying existing scripts to meet the new standards or by developing entirely new narratives better suited to the prevailing moral framework. A simple way to capture this trade-off is to analyze shifts in the share of films produced across different genres. A shift within genre reflects more minor modification of film narratives, whereas across genre shifts reflects substantial modifications.

Variation in Genres In our data, each film can belong to up to three major genres. For example, if a film, such as *Scarface* (1932), is classified as Action, Crime, and Drama, we count it under each of these categories.

While the U.S. film data contain roughly 28 genres, more than 92% of all films in our sample fall into at least one of the top five: Drama, Comedy, Western, Crime, and Action. Specifically, 52% of films are classified as Drama, 28% as Comedy, 21% as Western, 17% as Crime, and 11% as Action. Owing to their differing thematic focuses, these genres exhibited substantial variation in Hays Code compliance. Figure 7 plots the average compliance scores for each genre before and after 1935.

Three patterns stand out. First, before 1935, Drama and Crime belonged to the low-compliance group, whereas Comedy, Western, and Action displayed relatively high compliance. This variation motivates our subsequent analysis of whether low-compliance genres became less prevalent under the Hays Code. Second, compliance rose across all genres after 1935, suggesting within-genre adjustments. Additionally, there exists a convergence pattern: the post-1935 variation in compliance across genres appears to be smaller than that before 1935. We next examine these patterns systematically.

Decline of Drama and Rise of Western and Action Using a dummy variable indicating each genre, we plot the RD patterns in Figure 8. The figure suggests that the low-compliance genres—Drama—declined after 1935, whereas the high-compliance genres—especially Western and Action—rose. The patterns for Comedy and Crime are less clear-cut.

In Appendix B.6, we plot the corresponding trends for non-U.S. films. As shown, there are no clear changes across genres around 1935, suggesting that genre shifts in the U.S. did not reflect any global change.

We next use the same baseline specification to quantify the magnitude of these shifts. As shown in Panel A of Table 5, Drama declined, while Western and Action increased after the introduction of the Hays Code. Relative to their pre-Code levels, these changes are substantial: Drama fell by 16%, Western rose by 57%, and Action rose by 44%. Given the relatively noisy RD pattern for Comedy in Figure 8, we interpret its increase with caution.

The rise of Westerns is particularly noteworthy. As Schatz (1981) observes, the Western genre forms a central component of America's "national mythology" and of American culture, "explaining its present in terms of its past and virtually redefining the past to accommodate the present." It is thus unsurprising that this genre, with its patriotic undertones, aligned naturally with the Hays Code's concern for "national feelings" and experienced a marked rise under moral regulation.

Within-Genre Compliance We present the within-genre change in compliance in Panel B of Table 5. As shown, the increase in compliance applies to each genre. Consistent with the earlier pattern, the effects are particularly pronounced for Drama and Crime (1.33 and 1.25, respectively). The Western genre also exhibits a positive but the smallest change (0.52), consistent with its already high pre-Code compliance levels.

In Appendix B.7, we plot the within-genre compliance estimates against the pre-1935 compliance scores. The strong negative relationship (correlation coefficient = –0.94) reveals a clear pattern of convergence: less-compliant genres such as Drama and Crime caught up with more-compliant ones following the introduction of the Hays Code.

5 Market Size and Moral Compliance

Film companies and directors are key agents in film production. In this section and the next, we examine how they responded to the Hays Code. Beyond providing within-company and within-

director evidence, we also investigate how market considerations shaped companies' responses and how personal background influenced directors' responses.

Theoretical Motivation Our third analysis examines how film studios adapted their production behavior under the joint influence of market forces and moral regulation. A film producer faces a basic trade-off: increasing compliance raises the likelihood of passing censorship and securing market access, but it can also reduce audience appeal relative to an unconstrained creative choice. The benefit of compliance thus operates on the *extensive margin*—through the probability of market access—while its cost works on the *intensive margin*, by lowering demand conditional on release and depending on demand elasticity.

Thus, the link between market size and compliance is theoretically unclear. Most of the existing literature has shown that a larger market can strengthen audience influence and thus dampen the effect of state or moral regulation (e.g., Besley and Prat, 2006; Gehlbach and Sonin, 2014; Petrova, 2011; Tella and Franceschelli, 2011; Qin, Strömberg and Wu, 2018). At the same time, when the market is larger, the potential gains from passing censorship also rise, which may increase incentives to conform. While this important mechanism is plausible, direct empirical evidence on the latter remains limited.

5.1 Description of Companies and Their Changes

During 1925–1955, a total of 1,283 companies produced the 14,195 American films in our sample.[9] Of these, 495 had produced films before 1935 (hence "old companies"), allowing us to examine within-company changes before and after the introduction of the Hays Code. These old companies were generally larger, producing 9,932 films, while the 788 new entrants—firms that began producing films only after 1935—accounted for 4,263 films. In other words, old companies made up 38% of all companies but produced 70% of the films.

Appendix B.8 plots the relationship between the logged number of pre-1935 films and the logged rank (according to the size of pre-1935 films) for the old companies. The relationship is approximately linear, consistent with a power-law pattern, except at the right tail (the largest firms), which flattens, indicating that the very largest companies are less dispersed than a pure power law would predict.

[9] Of the 14,195 films in our sample, fewer than 1% (135 films) lack information on their production companies. We treat these films as being produced by one missing company. Excluding them from the analysis does not affect our results.

For the old companies, the average Hays compliance score rose from 7.13 in 1933 to 8.02 in 1936. The newer firms recorded an average score of 8.01. Together, these patterns indicate that compliance with the Hays Code increased after 1935, and both old and new firms contributed to this change.

5.2 The Role of Market Size

Measuring Market Size Our proxy for market size borrows from the spatial economics literature and relies on the film distribution networks data. Specifically, we calculate the sum of population weighted by distance to the nearest distribution center (known as film exchange):

$$MS_{Co} = \sum_{e \in E_{Co}} \sum_{c:\, dist_{ce} \leq D} \frac{Pop_c}{dist_{c,e}}, \tag{4}$$

where MS_{Co} denotes the market size of company Co, E_i is the set of film exchanges operated by company Co, Pop_c is the population of county c, $dist_{c,e}$ is the distance between exchange e and county c, D is the maximum distribution radius. As the weighted sum of population is heavily skewed, we use its logged value in our analysis.

In our baseline specification, we set $D = 100$ miles, corresponding to a range that allowed for same-day shipping and return of film reels by train or truck—an essential feature given that each physical print circulated sequentially across theaters (the "film run"). We report results using alternative parameter values ($D = 50, 75, 150$ miles) as robustness checks.

In addition, we construct two measures of the political and social compositions of each firm's market, capturing the distance-weighted Democratic vote share and Catholic population share in the counties served by its exchanges. Let d_c denote the Democratic vote share in county c. Analogous to market size, we define:

$$DV_{Co} = \frac{1}{MS_{Co}} \sum_{e \in E_{Co}} \sum_{c:\, dist_{c,e} \leq D} \frac{Pop_c}{dist_{c,e}} d_c. \tag{5}$$

The variable DV_{Co} thus represents the population- and distance-weighted average Democratic vote share across all counties within a firm's distribution radius. It can be interpreted as the expected local Democratic vote support on a firm's market. Similarly, we define $Catholic_{Co}$ by replacing a county's population with its Catholic population and computing the share of Catholic population in a company's market reach.

Of the 495 companies that produced films between 1925 and 1934, we are able to map the distribution networks for 223. These companies were typically larger than those we could not trace and together accounted for 88% of all films produced by these companies (8,716 out of 9,932). Hence, the films we are unable to include in this analysis represent only a small portion of the sample.

The Amplifying Effect of Market Size We analyze the interaction between our size measures and Hays Code compliance using the following specification:

$$\begin{aligned} y_{i,Co,t} = \alpha + \tau \cdot d_i + \gamma\, S_{Co} \times d_i + f(t) \\ + \delta\, S_{Co} \times f(t) + \mu_{Co} + \varepsilon_{i,Co,t}, \end{aligned} \tag{6}$$

where μ_{Co} denotes company fixed effects, S_{Co} represents measures of size, and $f(t)$ represents the linear interaction between the Post-1935 indicator d_i and the running variable t. To facilitate the interpretation of magnitudes, we report the coefficients for one-standard-deviation change of S_{Co}.

In Columns (1)-(2) of Table 6, we first report the within-company coefficients for all U.S. companies and the old companies. The coefficients, around 0.915-0.934, indicate clear within-company adjustments.

Before examining market size, we report the estimate when using the number of pre-1935 films as a crude proxy for size in Column (3). We find that larger firms were more likely to comply: a one-standard-deviation increase in this measure is associated with 0.159 points higher compliance, accounting for 17% of the mean post-Code increase.[10]

The amplifying pattern is stronger when we use the market size measure defined in Equation (4). As shown in Column (4), a one-standard-deviation increase in this measure corresponds to 0.213 points higher compliance, or 23% of the mean increase. The results are robust to alternative thresholds D used to define market boundaries. We report the results for $D = 50, 75, 150$ miles in Appendix B.9.

When we account for the Democratic vote share in a market, the role of market size becomes even more pronounced (Column 5). The interaction between Democratic vote share and Post-1935 is negative but imprecisely estimated, suggesting that the overall scale of the market outweighs its ideological composition.

[10]The correlation between companies' pre-1935 film counts and their films' Hays compliance score is –0.04, suggesting no significant association before the Code.

Column (6) incorporates Catholic share as an additional proxy for ideological partition. The interaction between Catholic share and Post-1935 is positive but again imprecisely estimated, while the effect of market size grows marginally stronger. Taken together, these results consistently indicate that market size exerts the dominant influence, overshadowing any potential effects of a market's ideological structure.

6 Immigrant Film Directors and Compliance

Film directors are another key group shaping film production. Here, we examine their responses to moral regulation and how their immigrant backgrounds influenced their reactions to these social constraints.

6.1 Descriptive Patterns on Film Directors

Between 1925 and 1955, our sample includes 14,195 films directed by 1,322 individual directors. Some were remarkably prolific: for instance, Sam Newfield and William Beaudine each directed more than 140 films during this period. The top 20 most active directors alone accounted for approximately 15% of all films produced. Because many directors worked continuously across years, often before and after 1935, we are able to examine how moral compliance evolved even within the same individual directors over time.

Beyond overall patterns, we are particularly interested in whether directors' immigrant backgrounds influenced their responses to the Hays Code. We hypothesize that immigrant directors may have been more likely to comply with the Code, potentially reflecting a stronger sense of professional or cultural insecurity in a new environment.

Among the 1,322 directors in our dataset, we are able to identify immigrant status for 1,237 of them. The most common source countries were Britian, Germany, and France. Approximately 23.9% of these directors were immigrants, and together they directed about 19.5% of all films in our sample. Notably, immigrant directors were disproportionately represented among better-rating productions, accounting for 37.5% of films with an IMDb rating of 8 or above.

6.2 Compliance by Immigrant Background

We first examine whether the share of immigrant directors changed around 1935. As shown in Appendix B.10, there is a slight decline in the share of immigrant directors after 1935. However,

this change is not statistically significant once we account for underlying trends. We therefore do not draw firm conclusions about a shift in immigrant representation. We next turn to examining whether immigrant directors responded differently to the moral regulation.

Parallel to our earlier analysis, we estimate a specification with a triple interaction between an indicator for directors' immigrant background, the post-1935 period, and the running variable to capture heterogeneous responses to the introduction of the Hays Code across directors:

$$\begin{aligned} y_{i,D,t} = \alpha + \tau \cdot d_i + \gamma\, Immigrant_D \times d_i + f(t) \\ + \delta\, Immigrant_D \times f(t) + \mu_D + \varepsilon_{i,D,t}, \end{aligned} \tag{7}$$

where μ_D denotes film director fixed effects, $Immigrant_D$ represents whether a director is an immigrant, and $f(t)$ represents the linear interaction between the Post-1935 indicator d_i and the running variable t.

In Column (1) of Table 7, we find that the pattern of increased compliance holds within directors by including director fixed effects in our baseline analysis, implying behavior responses within the same film director.

Column (2) shows that immigrant directors exhibited significantly stronger compliance after 1935. The estimated magnitude implies that, on average, immigrant directors' compliance increased by roughly 32% relative to their non-immigrant counterparts.

In Columns (3) and (4), we restrict the sample to relatively more active directors by excluding those who directed fewer than five and ten films, respectively, between 1925 and 1955. If anything, the estimates become more precise and their magnitudes become a bit larger after imposing these restrictions.

To assess whether the effect of immigrant directors is confounded by the market size of their employers, we conduct a horse race between directors' immigrant background and companies' market size. In Column (5), we add company fixed effects and restrict the sample to firms with pre-1935 distribution network information. The estimated effect of immigrant directors becomes even larger within this sample. In Column (6), we further account for heterogeneous responses by market size and find that both the immigrant background and the market size remains to matter. These results suggest that the two dimensions operate jointly in shaping the strength of responses to moral regulation.

A Further Look by Directors' History and Experience In Appendix B.11, we show that directors who had produced less-compliant films prior to 1935 responded more strongly after the introduction of the Code: a one-standard-deviation decrease in pre-1935 compliance is associated with a sizable increase in post-1935 compliance, roughly 0.6 to 0.7 points, for both immigrant and non-immigrant directors. This shift represents a substantial convergence: directors who had previously deviated most from the Code moved disproportionately toward compliance once enforcement tightened. This pattern is parallel to the genre-level convergence documented earlier.

Moreover, the experience gradient among immigrant directors is also notable. A one-standard-deviation decrease in the number of films made before 1935 corresponds to an increase in post-1935 compliance of about 0.3 points, while no comparable effect appears for non-immigrants. This means that early-career immigrant directors, i.e., those with fewer pre-Code films, responded more strongly than the average director to the tightening of regulation. Their sensitivity to the Code aligns with the interpretation that immigrant directors who were still establishing their careers had stronger incentives to adapt to new constraints.

7 Conclusion

Moral regulation is a pervasive yet understudied force shaping cultural narratives. In this paper, we exploit a well-defined historical episode, the introduction of the Hays Code in the American film industry, to examine how moral regulation reshaped creative expression and the social and political content of films. Combining newly developed text-analysis methods with a regression-discontinuity design, we document a sharp rise in compliance with moral guidelines around 1935, which itself may not be surprising. Three other main findings, however, are far less obvious and carry broader implications.

First, we show that moral regulation reshaped not only explicit depictions of sex, crime, and violence but also the broader social and political messages conveyed in films. It systematically shifted the kinds of social types shown on screen: female and working-class protagonists receded from center stage, and political narratives tilted toward more conservative values. Filmmakers adapted by raising compliance within existing genres and by migrating toward safer genres such as the Westerns.

Second, we find that market forces reinforced, rather than counteracted, moral regulation. Companies with larger market size were more likely to comply with the Code, suggesting that

commercial incentives can amplify the reach of normative control when access to markets depends on conformity, a phenomenon for which there has been relatively little direct evidence.

Third, filmmakers' immigrant backgrounds affected their behavioral responses: immigrant directors were more likely to comply with the Code, possibly reflecting insecurity and sensitivity to social legitimacy within the industry. Consistent with this interpretation, less-established immigrant directors adapted even more sharply.

While our analysis centers on a specific historical setting, its implications extend beyond it. The Hays Code offers a lens to understand how moral and political boundaries interact with market structures to shape the production of ideas. In an era when debates over expression and content moderation have resurfaced across both offline and online platforms, the dynamics we identify, between regulation, markets, and identity, remain strikingly relevant. Because cultural products are interdependent bundles of meanings and messages, even well-intentioned moral regulation can generate unintended spillovers, an enduring challenge for any designer of norms, whether state or society.

References

[1] **Akcigit, Ufuk, John Grigsby, and Tom Nicholas.** 2017. "Immigration and the Rise of American Ingenuity." *American Economic Review*, 107(5): 327–331.

[2] **Alicoate, Jack,** ed. 1934. *The Film Daily Year Book of Motion Pictures.* The Film Daily.

[3] **Amlani, Sharif, and Carlos Algara.** 2021. "Partisanship & Nationalization in American Elections: Evidence from Presidential, Senatorial, & Gubernatorial Elections in the US Counties, 1872–2020." *Electoral Studies*, 73: 102387.

[4] **Ang, Desmond.** 2023. "The Birth of a Nation: Media and Racial Hate." *American Economic Review*, 113(6): 1424–1460.

[5] **Archdiocesan Collections.** 2019. "Dougherty's Movie Boycott." Published February 6, 2019.

[6] **Becker, Sascha O, Francisco J Pino, and Jordi Vidal-Robert.** 2021. "Freedom of the Press? Catholic Censorship during the Counter-Reformation." *CEPR Discussion Paper No. DP16092*.

[7] **Besley, Timothy, and Andrea Prat.** 2006. "Handcuffs for the Grabbing Hand? Media Capture and Government Accountability." *American Economic Review*, 96(3): 720–736.

[8] **Black, Gregory D.** 1994. *Hollywood Censored: Morality Codes, Catholics, and the Movies.* Cambridge University Press.

[9] **Borjas, George J.** 1999. "The Economic Analysis of Immigration." *Handbook of Labor Economics*, 3: 1697–1760.

[10] **Bu, Lingtian, Ruixue Jia, Meng Miao, and David Strömberg.** 2025. "Capital, Censorship, and Chinese Cinema." Working Paper.

[11] **Cattaneo, Matias D, and Rocio Titiunik.** 2022. "Regression Discontinuity Designs." *Annual Review of Economics*, 14(1): 821–851.

[12] **Chen, Heng, and Han Li.** 2025. "The Media and Foreign Powers: Does Market Access Matter for News Reporting?" *Economic Journal*, forthcoming.

[13] **Chen, Yuyu, and David Y Yang.** 2019. "The Impact of Media Censorship: 1984 or Brave New World?" *American Economic Review*, 109(6): 2294–2332.

[14] **Chong, Alberto, and Eliana La Ferrara.** 2009. "Television and Divorce: Evidence From Brazilian Novelas." *Journal of the European Economic Association*, 7(2-3): 458–468.

[15] **Comino, Stefano, Alberto Galasso, and Clara Graziano.** 2024. "Censorship, Industry Structure, and Creativity: Evidence from the Catholic Inquisition in Renaissance Venice." *The Journal of Law, Economics, and Organization*, ewae015.

[16] **Couvares, Francis G.** 2006. *Movie Censorship and American Culture.* Univ of Massachusetts Press.

[17] **Doherty, Thomas.** 1999. *Pre-code Hollywood: Sex, Immorality, and Insurrection in American Cinema, 1930–1934.* Columbia University Press.

[18] **Enke, Benjamin.** 2020. "Moral Values and Voting." *Journal of Political Economy*, 128(10): 3679–3729.

[19] **Esberg, Jane.** 2020. "Censorship as Reward: Evidence from Pop Culture Censorship in Chile." *American Political Science Review*, 114(3): 821–836.

[20] **Esposito, Elena, Tiziano Rotesi, Alessandro Saia, and Mathias Thoenig.** 2023. "Reconciliation Narratives: The Birth of a Nation after the us Civil War." *American Economic Review*, 113(6): 1461–1504.

[21] **Ferrara, Eliana La, Alberto Chong, and Suzanne Duryea.** 2012. "Soap Operas and Fertility: Evidence from Brazil." *American Economic Journal: Applied Economics*, 4(4): 1–31.

[22] **Finler, Joel.** 1988. *The Hollywood Story.* New York: Crown.

[23] **Gehlbach, Scott, and Konstantin Sonin.** 2014. "Government Control of the Media." *Journal of Public Economics*, 118: 163–171.

[24] **Graham, Jesse, Jonathan Haidt, and Brian A. Nosek.** 2009. "Liberals and Conservatives Rely on Different Sets of Moral Foundations." *Journal of Personality and Social Psychology*, 96(5): 1029–1046.

[25] **Haidt, Jonathan.** 2012. *The Righteous Mind: Why Good People are Divided by Politics and Religion.* Vintage.

[26] **Hunt, Alan.** 1999. *Governing Morals: A Social History of Moral Regulation.* Cambridge University Press.

[27] **Jensen, Robert, and Emily Oster.** 2009. "The Power of TV: Cable Television and Women's Status in India." *The Quarterly Journal of Economics*, 124(3): 1057–1094.

[28] **King, Gary, Jennifer Pan, and Margaret E Roberts.** 2013. "How Censorship in China Allows Government Criticism but Silences Collective Expression." *American Political Science Review*, 107(2): 326–343.

[29] **Ludwig, Jens, Sendhil Mullainathan, and Ashesh Rambachan.** 2025. "Large Language Models: An Applied Econometric Framework." National Bureau of Economic Research.

[30] **Michalopoulos, Stelios, and Christopher Rauh.** 2024. "Movies." National Bureau of Economic Research.

[31] **Moser, Petra, and Sahar Parsa.** 2025. "McCarthy and the Red-ucators: Effects of Political Persecution on Science." *New York University, Working Paper*.

[32] **Petrova, Maria.** 2011. "Newspapers and Parties: How Advertising Revenues Created an Independent Press." *American Political Science Review*, 105(4): 790–808.

[33] **Qin, Bei, David Strömberg, and Yanhui Wu.** 2018. "Media Bias in China." *American Economic Review*, 108(9): 2442–2476.

[34] **Redding, Stephen J, and Daniel M Sturm.** 2008. "The Costs of Remoteness: Evidence from German Division and Reunification." *American Economic Review*, 98(5): 1766–1797.

[35] **Riley, Emma.** 2024. "Role Models in Movies: The Impact of Queen of Katwe on Students' Educational Attainment." *Review of Economics and Statistics*, 106(2): 334–351.

[36] **Schatz, Thomas.** 1981. *Hollywood Genres: Formulas, Filmmaking, and the Studio System.* New York:McGraw-Hill.

[37] **Sequeira, Sandra, Nathan Nunn, and Nancy Qian.** 2020. "Immigrants and the Making of America." *The Review of Economic Studies*, 87(1): 382–419.

[38] **Shurlock, Geoffrey.** 1947. "The Motion Picture Production Code." *The Annals of the American Academy of Political and Social Science*, 254(1): 140–146.

[39] **Sklar, Robert.** 1975. *Movie-made America: A Cultural History of American Movies.* Vintage.

[40] **Tan, Hui Ren, and Tianyi Wang.** 2024. "McCarthyism, Media, and Political Repression: Evidence from Hollywood." National Bureau of Economic Research.

[41] **Tella, Rafael Di, and Ignacio Franceschelli.** 2011. "Government Advertising and Media Coverage of Corruption Scandals." *American Economic Journal: Applied Economics*, 3(4): 119–151.

[42] **U.S. Bureau of the Census.** 1929. *Census of Religious Bodies: 1926.* Washington, D.C.:U.S. Government Printing Office.

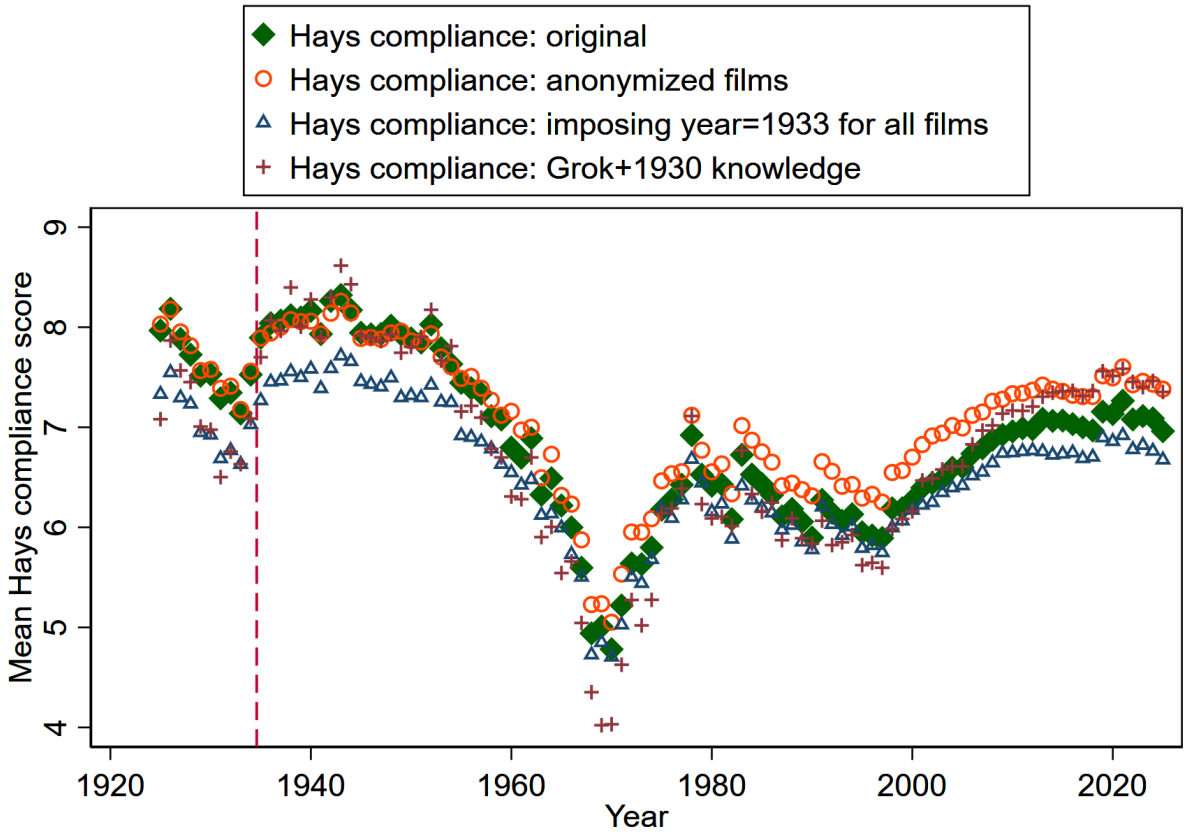
[43] **Vieira, Mark A.** 1999. *Sin in Soft Focus: Pre-Code Hollywood.* New York:Harry N. Abrams.

Figure 1: Frequent Reasons for Hays Code Non-Compliance



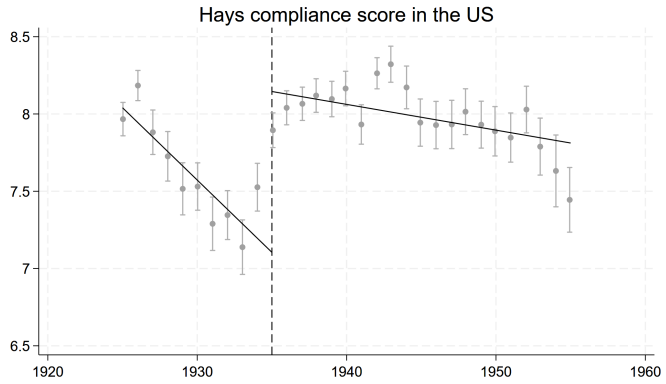
Notes: The figure plots the frequent bigrams in reasons for potentially violating the Hays Code.

Figure 2: Trends in Hays Compliance

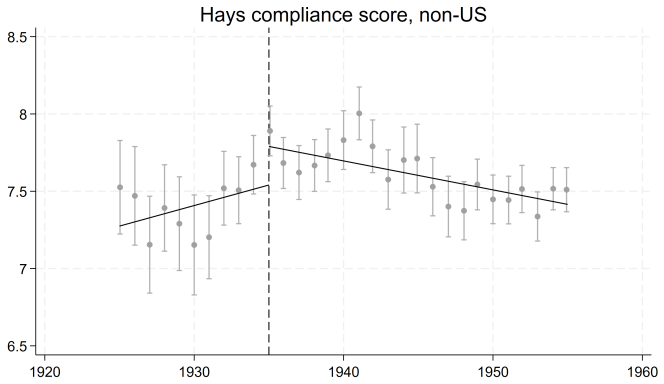


Notes: The Hays Code was enforced on July 1, 1934. The vertical line indicates the year of 1935.
The solid diamonds represent Hays compliance scores based on the original film plot summaries. The hollow dots are derived from anonymized versions of the films, in which we remove all specific names and temporal references. The triangles are based on scores imposing 1933 for all films. These three measures are generated using GPT-4.1.
The crosses denote scores produced by the Grok-4.1 model, where we explicitly restrict the model to information and norms available prior to December 31, 1930.

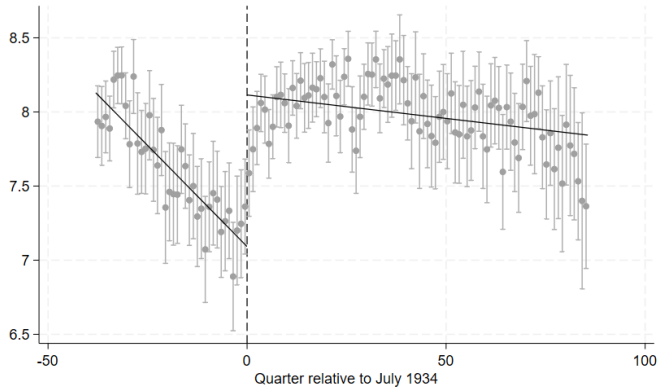
Figure 3: Hays Compliance Scores pre-post the Hays Code (July 1st, 1934)



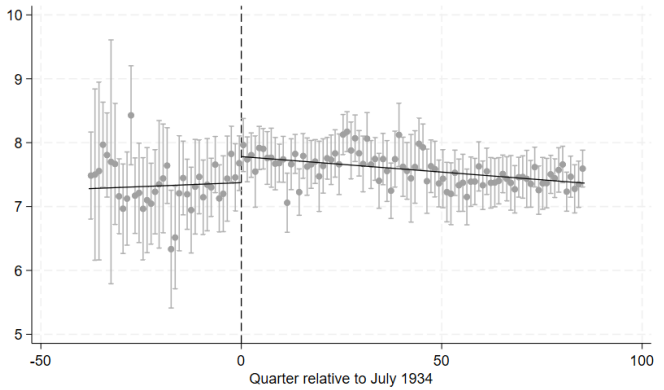
(a) US sample, 1935 as the cutoff



(b) Non-US sample, 1935 as the cutoff



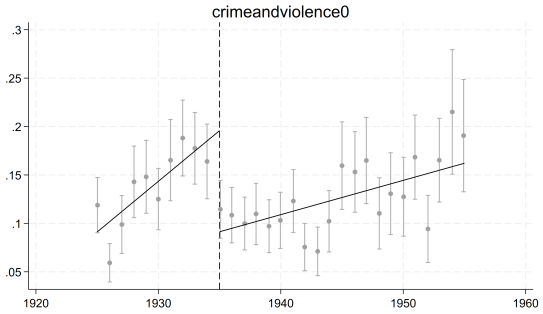
(c) US sample, July 1934 as the cutoff



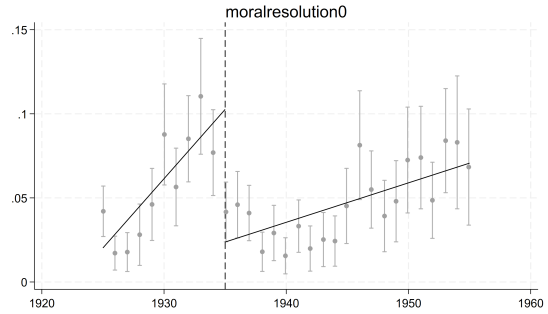
(d) Non-US sample, July 1934 as the cutoff

Notes: The Hays Code was enforced on July 1, 1934. Panels (a) and (b) present regression discontinuity patterns at the yearly level, with the vertical lines marking 1935, the first full year following enforcement. Panels (c) and (d) present regression discontinuity patterns at the quarterly level, with the vertical lines marking July 1934. Bars indicate confidence intervals.

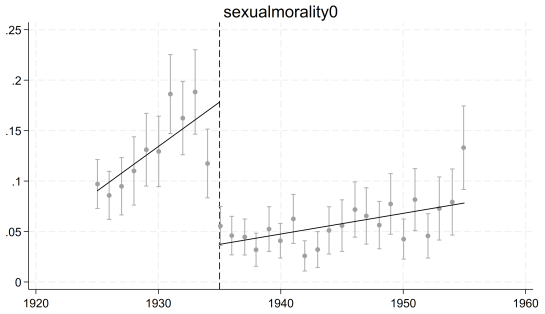
Figure 4: Potential Violence in Specific Moral Narratives in U.S. Films, Pre-Post 1935



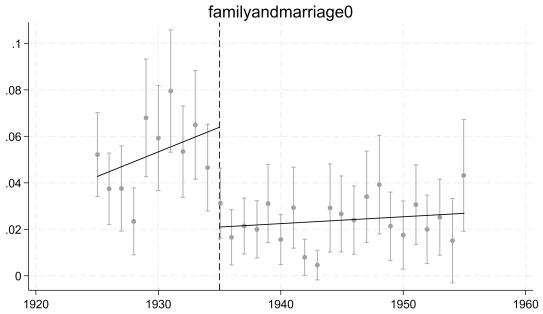
(a) Crime & Violence



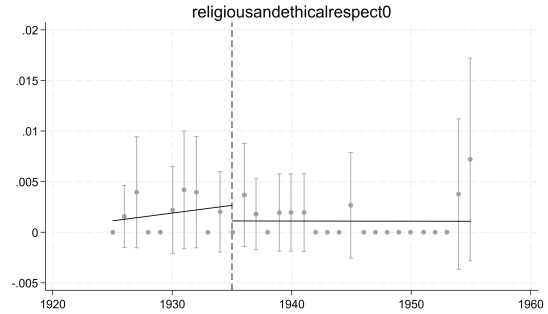
(b) Moral resolution



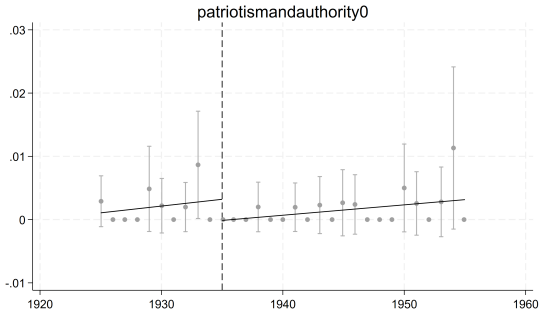
(c) Sexual morality



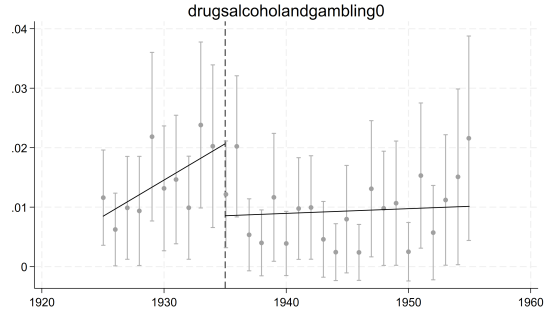
(d) Family & Marriage



(e) Religious activities



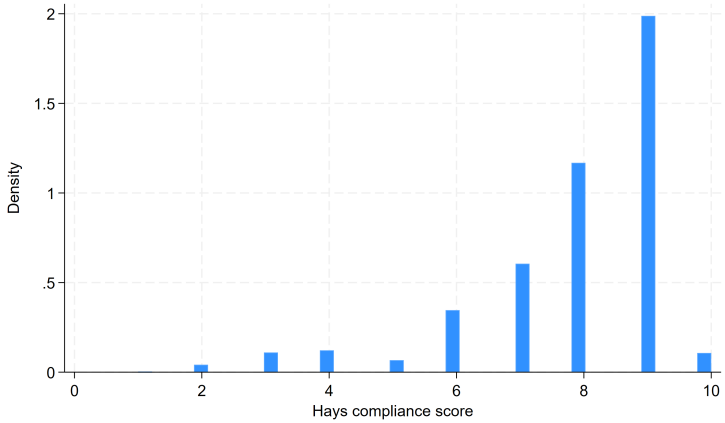
(f) National feelings & Patriotism



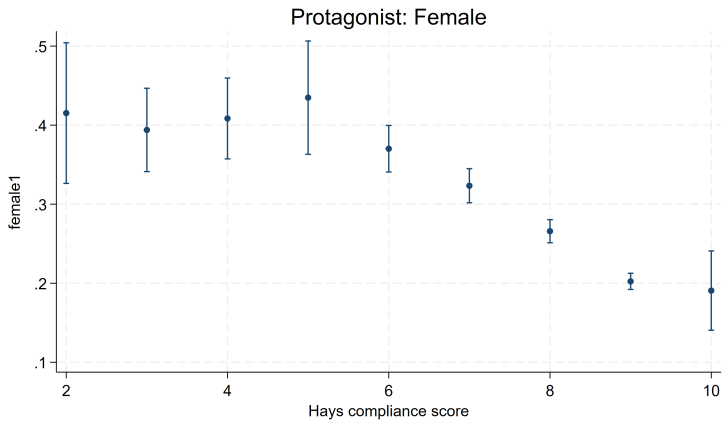
(g) Drugs, Alcohol & Gambling

Notes: The Hays Code was enforced on July 1, 1934. The vertical lines indicate the year of 1935. These plots depict the changes of specific moral themes.

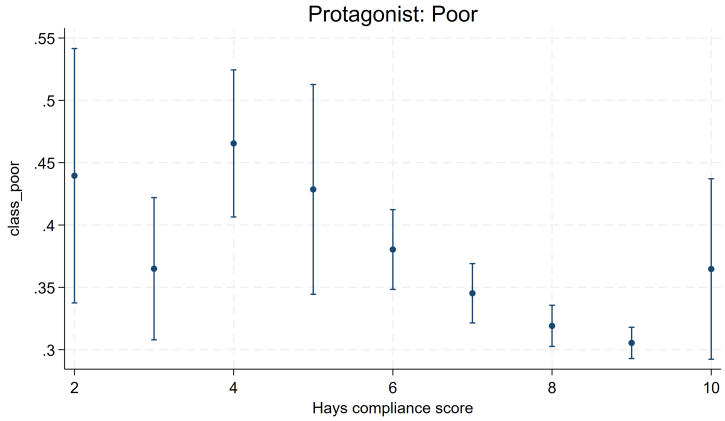
Figure 5: Hays Compliance vs. Social and Political Characteristics



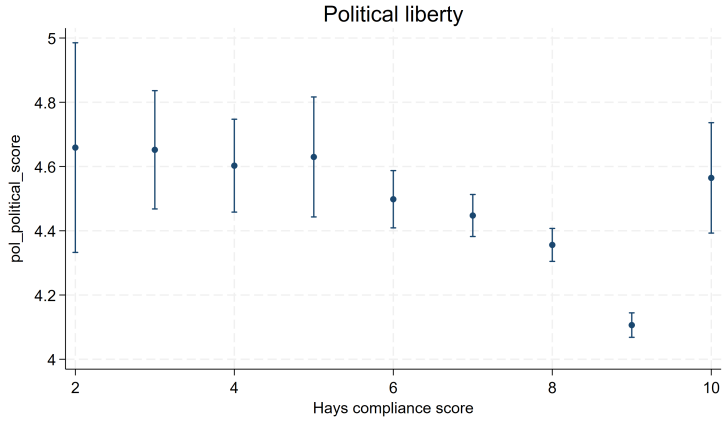
(a) Hays score distribution



(b) Hays vs. Female



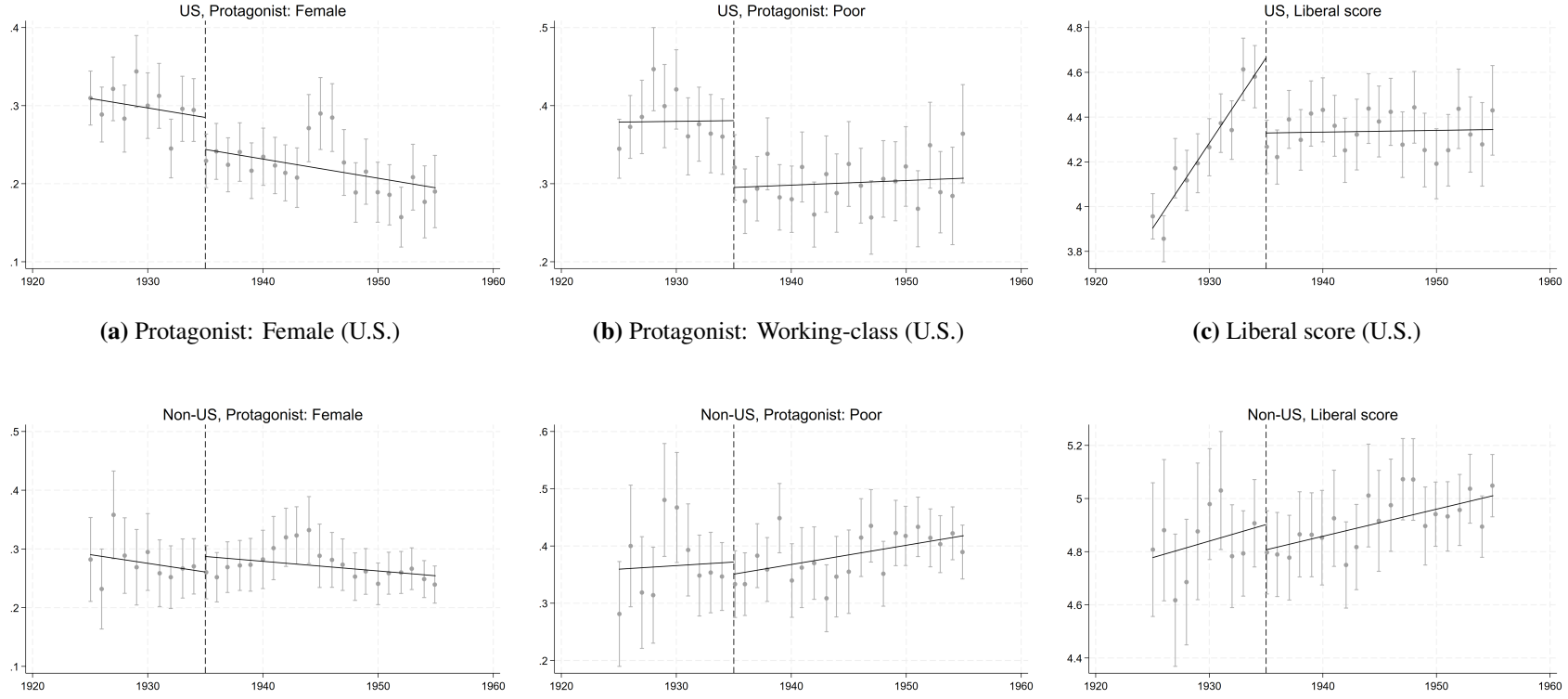
(c) Hays vs. Working class



(d) Hays vs. Liberal

Notes: These patterns are obtained from all films during 1925-55. Panel (a) plots the distribution of the Hays score. Panels (b)–(d) show the correlations between the Hays compliance score and three outcomes: the probability that the lead character is female, the probability that the lead character is from the working class, and the film's political liberty score.

Figure 6: Social and Political Characteristics in U.S. and Non-U.S. Films, RD Patterns

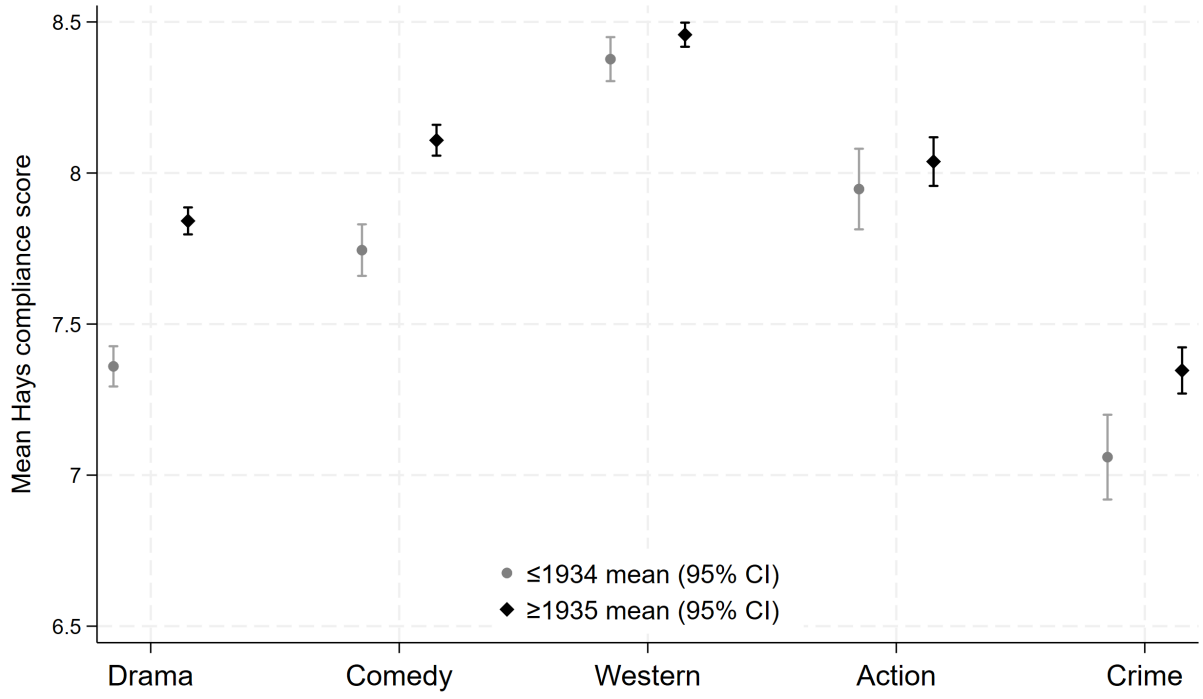


(a) Protagonist: Female (U.S.) **(b)** Protagonist: Working-class (U.S.) **(c)** Liberal score (U.S.)

(d) Protagonist: Female (Non-U.S.) **(e)** Protagonist: Working-class (Non-U.S.) **(f)** Liberal score (Non-U.S.)

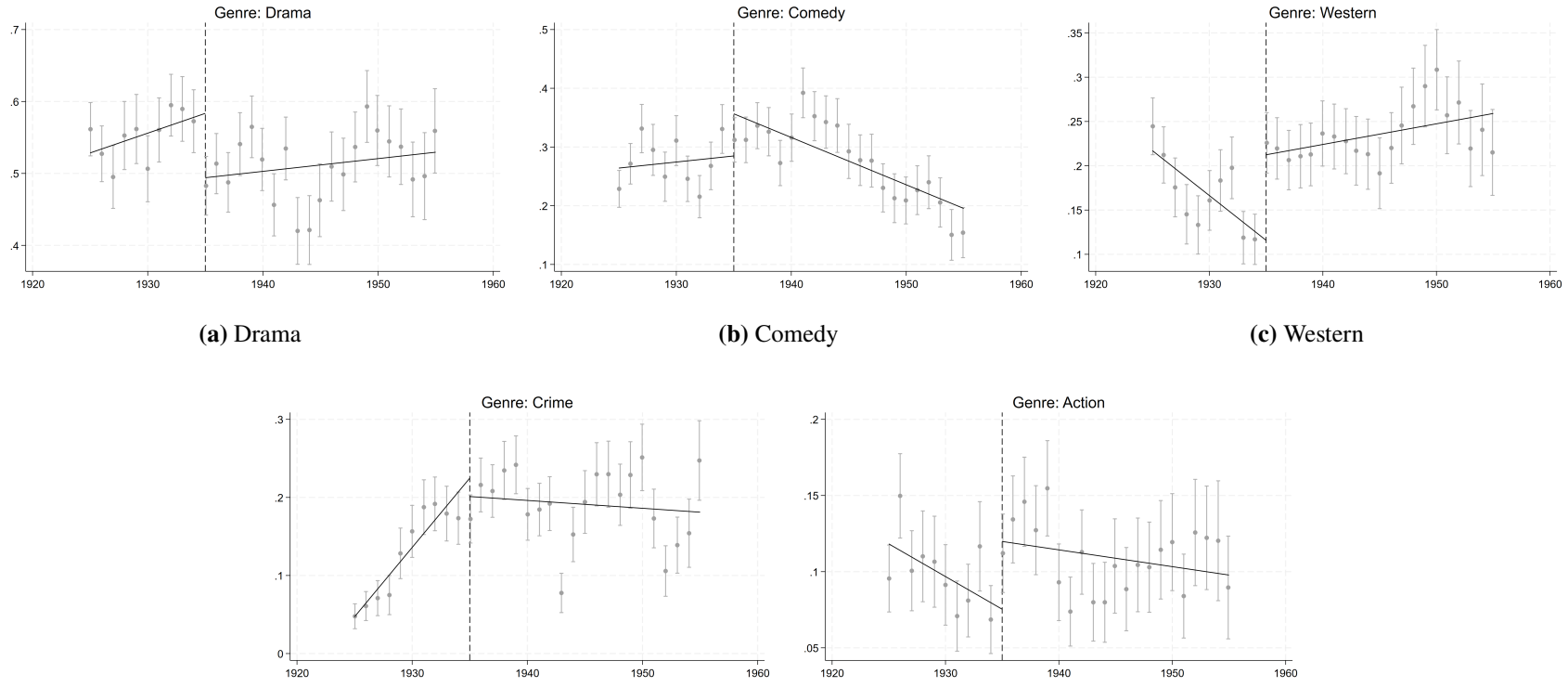
Notes: The Hays Code was enforced on July 1, 1934. The vertical lines indicate the year of 1935.
Each panel shows regression-discontinuity patterns around the introduction of the Hays Code (1935). Panels (a)–(c) depict U.S. films; Panels (d)–(f) depict non-U.S. films. Plots show, respectively, the probability that the protagonist is female, that the protagonist is from the working class, and the film's liberal political score.

Figure 7: Hays Compliance by Genre in U.S. Films, Pre-Post 1935



Notes: This figure plots the compliance scores for each major genre before and after 1935. One film can belong to multiple genres.

Figure 8: Changes in Genre Composition of U.S. Films: RD Patterns



(a) Drama **(b)** Comedy **(c)** Western

(d) Crime **(e)** Action

Notes: The Hays Code was enforced on July 1, 1934. The vertical lines indicate the year of 1935.
The outcome in each panel is whether a film has a specific genre. The changes come from a decline in Drama and a rise in Western and Action. The patterns for non-U.S. films are presented in Appendix B.6.

Table 1: Coding examples for Hays compliance scores

Title	*Baby Face* (1933)
Hays Compliance Score	2
Political Orientation Score	6
Hays Code Headings	1. Sexual Exploitation and Seduction (non-compliant) 2. Lack of Moral Punishment (non-compliant) 3. Cynical Tone and Ambiguous Morality (non-compliant)
Political Orientation	1. Female Sexual Agency and Empowerment 2. Cynical View of Gender and Power Dynamics 3. Moral Ambiguity; Use of Seduction as Strategy 4. Focus on Individual Survival and Pragmatism
Protagonist Gender	Female
Protagonist Social Class	Working Class
Title	*All About Eve* (1950)
Hays Compliance Score	8
Political Orientation Score	3
Hays Code Headings	1. Portrayal of Immoral Behavior (compliant) 2. Absence of Explicit Content (compliant) 3. Moral Resolution (compliant) 4. Ambiguity in Romantic Relationships (compliant)
Political Orientation	1. Ambition and Deception as Negative Traits 2. Emphasis on Established Social Circles 3. Focus on Personal Responsibility and Consequences 4. Lack of Progressive or Egalitarian Themes
Protagonist Gender	Female
Protagonist Social Class	Middle Class

Notes: This table presents examples for the coding of a few key variables to measure film contents. The circulated version of *Baby Face* (1933) had already been trimmed during the period of loose Code enforcement and is often cited as a major factor for the strict enforcement regime introduced in July 1934.

Table 2: Changes in Hays Compliance Score: RD Estimates

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent var.:	Hays score	Hays score	Hays score	Hays score	Hays score	Hays score
Sample:	US	US	Non-US	Non-US	All	All
Panel A: Yearly RD (cutoff = 1935)						
US × Post					0.807***	0.692**
					(0.144)	(0.255)
Post	1.041***	0.617***	0.250**	-0.060	0.234**	-0.075
	(0.166)	(0.217)	(0.111)	(0.075)	(0.100)	(0.081)
Linear interactions	Y	Y	Y	Y	Y	Y
Quadratic interactions		Y		Y		Y
Country FE					Y	Y
Dep. var. pre-cutoff Mean	7.65	7.65	7.41	7.41	7.58	7.58
Dep. var. pre-cutoff S.D.	1.71	1.71	1.98	1.98	1.80	1.80
Observations	14,195	14,195	11,451	11,451	25,639	25,639
Panel B: Quarterly RD (cutoff = July 1934)						
US × Post					0.689***	0.935***
					(0.154)	(0.223)
Post	1.014***	0.976***	0.364***	0.098	0.325***	0.041
	(0.114)	(0.159)	(0.113)	(0.108)	(0.110)	(0.103)
Linear interactions	Y	Y	Y	Y	Y	Y
Quadratic interactions		Y		Y		Y
Country FE					Y	Y
Observations	13,375	13,375	9,222	9,222	22,595	22,595

Notes: Hays score measures the degree of compliance to the Hays Code. Panel A reports parametric RD estimates allowing separate linear and quadratic trends on each side of the 1935 cutoff. In Column (5), we include all interactions between US, Post 1935, and the running variable (distance to 1935), and in Column (6), we further add all interactions between US, Post 1935 and the squared running variable (distance to 1935). Panel B reports the corresponding estimates based on quarterly RD (using July 1934 as the cutoff), where the running variable is number of quarters relative to July 1934.

The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: Assessing Potential LLM-induced Bias: Predicted Year, Anonymized Texts, and Imposing 1933

Strategy	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Alt. Hays score, year=1933 for all			Alt. Hays score, anonymized text			Hays score, w. LLM-predicted treatment		
Sample:	US	Non-US	All	US	Non-US	All	US	Non-US	All
US × Post 1935			0.710***			0.735***			0.789***
			(0.171)			(0.192)			(0.139)
Post 1935	0.920***	0.230***	0.210***	0.944***	0.235***	0.209***	1.001***	0.224**	0.212**
	(0.152)	(0.074)	(0.070)	(0.175)	(0.093)	(0.089)	(0.163)	(0.106)	(0.096)
US × Predicted Post 1935									0.032
									(0.102)
Predicted Post 1935							0.173*	0.156**	0.142**
							(0.089)	(0.065)	(0.065)
Country FE			Y			Y			Y
Linear interactions	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dep. var. pre-1935 Mean	7.70	7.67	7.66	7.07	7.05	7.06	7.65	7.41	7.58
Dep. var. pre-1935 S.D.	1.64	1.85	1.71	1.67	1.92	1.74	1.71	1.98	1.80
Observations	14,195	11,451	25,639	14,195	11,451	25,639	14,195	11,451	25,639

Notes: Columns (1)-(3) employ compliance scores derived by assuming all films were released in 1933. Columns (4)-(6) use Hays score measures calculated based on the anonymized version of the films. Columns (7)-(9) run horse-race tests between actual treatment and LLM-predicted treatment.
In Columns (3), (6), and (9), we include all interactions between US, Post 1935, and the running variable (distance to 1935).
The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Gender, Class, and Political Values: RD Estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent var.	Female	Female	Female	Working class	Working class	Working class	Liberal	Liberal	Liberal
Sample:	US	Non-US	All	US	Non-US	All	US	Non-US	All
Post 1935 × US			-0.055***			-0.058**			-0.254***
			(0.016)			(0.021)			(0.082)
Post 1935	-0.041**	0.026*	0.014	-0.086***	-0.021	-0.028	-0.336***	-0.095*	-0.082
	(0.016)	(0.014)	(0.013)	(0.018)	(0.025)	(0.023)	(0.057)	(0.054)	(0.055)
Country FE			Y			Y			Y
Linear interactions	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dep. var. pre-1935 Mean	0.30	0.27	0.29	0.38	0.37	0.38	4.22	4.84	4.41
Observations	14,195	11,451	25,639	11,637	7,279	18,914	14,195	11,451	25,639

Notes: Columns (1)-(3) estimate the change in the probability for the lead character being female, and Columns (4)-(6) for being from working class. Columns (7)-(9) estimate the change in the degree of having liberal political values. Column (2), (6) and (9) include all linear interactions between US, Post 1935, and the running variable (distance to 1935).
The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Cross- and Within-Genre Responses in U.S. Films: RD Estimates

	(1)	(2)	(3)	(4)	(5)
Panel A. Cross-genre changes					
Dependent var. (0/1)	Drama	Comedy	Western	Crime	Action
Post 1935	-0.089***	0.072**	0.097***	-0.024	0.044**
	(0.020)	(0.027)	(0.034)	(0.022)	(0.019)
Linear interactions	Y	Y	Y	Y	Y
Dep. var. pre-1935 Mean	0.55	0.27	0.17	0.12	0.10
Observations	14,195	14,195	14,195	14,195	14,195
Panel B. Within-genre changes					
Dependent var.	Hays score	Hays score	Hays score	Hays score	Hays score
Within-genre	Drama	Comedy	Western	Crime	Action
Post 1935	1.333***	0.881***	0.515***	1.255***	0.896***
	(0.218)	(0.183)	(0.104)	(0.246)	(0.296)
Linear interactions	Y	Y	Y	Y	Y
Dep. var. pre-1935 Mean	7.36	7.74	8.38	7.06	7.95
Observations	7,449	3,986	3,009	2,373	1,512

Notes: This table reports parametric RD estimates allowing separate linear trends on each side of the 1935 cutoff. In Panel A, each dependent variable indicates whether a film belongs to a specific genre. In Panel B, the dependent variable is the compliance score for each genre. Note that one film can belong to multiple genres.
Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Market Size and Moral Compliance

Sample:	(1) US all	(2) US old	(3) US old	(4)	(5) US old w. network	(6)
Post 1935 × Pre-1935 films (sd)			0.159*			
			(0.089)			
Post 1935 × ln Market size (sd)				0.213**	0.262***	0.315***
				(0.084)	(0.073)	(0.112)
Post 1935 × Democratic vote share (sd)					-0.150	
					(0.090)	
Post 1935 × Catholic share (sd)						0.163
						(0.102)
Post 1935	0.934***	0.915***	0.822***	0.941***	0.951***	0.909***
	(0.197)	(0.194)	(0.171)	(0.184)	(0.188)	(0.185)
Company FE	Y	Y	Y	Y	Y	Y
Linear interactions	Y	Y	Y	Y	Y	Y
Dep. var. pre-1935 Mean	7.65	7.65	7.58	7.58	7.58	7.58
Dep. var. pre-1935 SD	1.71	1.71	1.71	1.71	1.71	1.71
Observations	14,060	9,797	9,797	8,716	8,716	8,716

Notes: Column (1) includes all US films during 1925-55. Columns (2)-(3) restricts the sample to companies that had made films before 1935. Columns (4)-(6) focuses on those with distribution network information. Market size in Columns (4)-(6) is calculated based on Equation (4) and Column (5) includes the share of Democratic votes and Column (6) the share of Catholic population in a given market.
Columns (3)-(6) include all linear interactions between the size/share measure, Post 1935, and the running variable. The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Directors' Immigrant Background and Compliance

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent var.:	Hays score	Hays score	Hays score	Hays score	Hays score	Hays score
Sample:	US, all	US, all	Directors # ≥ 5 films	Directors # ≥ 10 films	Companies w. network	Companies w. network
Post 1935 × Immigrant		0.267*	0.292**	0.327**	0.541***	0.581***
		(0.137)	(0.133)	(0.132)	(0.144)	(0.137)
Post 1935 × Pre-1935 ln Market size						0.188***
						(0.066)
Post 1935	0.897***	0.840***	0.837***	0.826***	0.714***	0.702***
	(0.202)	(0.217)	(0.209)	(0.217)	(0.236)	(0.227)
Director FE	Y	Y	Y	Y	Y	Y
Company FE					Y	Y
Linear interactions	Y	Y	Y	Y	Y	Y
Dep. var. pre-1935 Mean	7.65	7.65	7.63	7.63	7.58	7.58
Dep. var. pre-1935 SD	1.71	1.71	1.70	1.69	1.71	1.71
Observations	14,106	13,896	12,681	11,579	8,323	8,323

Notes: Immigrant refers whether the film director was born outside of the U.S. Columns (3) and (4) remove the directors who had directed fewer than 5 and 10 films during 1925-1955. Columns (2)-(4) include all linear interactions between immigrant film director, Post 1935, and the running variable. Column (5) restrict the sample to companies with distribution network information available. Column (6) further controls for all linear interactions between market size, Post 1935, and the running variable.
The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix

A Background, Data, and Measurement

A.1 The Hays Code

The Code includes General Principles and detailed particular applications. The Code was formalized in 1930 but was enforced in July 1934 (Black, 1994). The general principles are as follows:

> 1. No picture shall be produced which will lower the moral standards of those who see it. Hence the sympathy of the audience should never be thrown to the side of crime, wrongdoing, evil or sin.
>
> 2. Correct standards of life, subject only to the requirements of drama and entertainment, shall be presented.
>
> 3. Law, natural or human, shall not be ridiculed, nor shall sympathy be created for its violation.

The applications concern: I—Crimes Against the Law, II—Sex, III—Vulgarity, IV—Obscenity, V—Profanity, VI—Costume, VII—Dances, VIII—Religion, IX—Locations, X—National Feelings, XI—Titles, and XII—Repellent Subjects.

Based on the language and intent of the original applications, we group them into seven analytical categories:

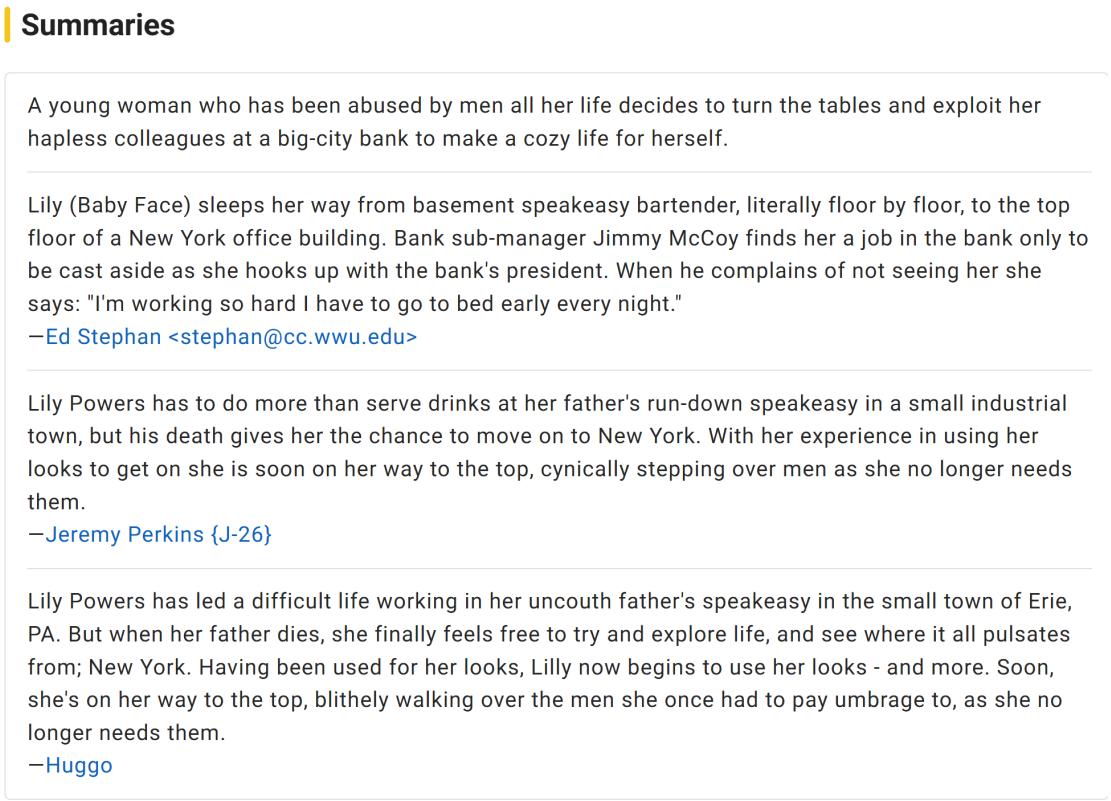
1. Crime and violence – encompassing portrayals that glorify or graphically depict criminal behavior, drawn primarily from Application I (Crimes Against the Law).
2. Moral resolution – reflecting whether wrongdoing is punished and virtue rewarded, also grounded in Application I but aligning with the General Principle that "sympathy should never be thrown to the side of crime."
3. Sexual morality – merging Applications II through VII, which together govern sex, vulgarity, obscenity, profanity, costume, and dances, all of which sought to regulate the display of bodies, desire, and language.

4. Family and marriage – derived from Applications II and III and from repeated Code references to the sanctity of marriage and the family as social foundations; this group captures portrayals of infidelity, divorce, and domestic relations.
5. Religious activities – corresponding to Application VIII (Religion), which prohibited ridicule of clergy, sacrilege, or any depiction that might undermine respect for religious institutions.
6. National feelings and patriotism – based on Application X (National Feelings), which cautioned against offending other nations and required films to respect patriotic sentiment and social harmony.
7. Drugs, alcohol, and gambling – drawn from Application XII (Repellent Subjects), which listed narcotics, excessive drinking, and gambling among the topics to be treated with extreme care or avoided altogether.

A.2 Plot Summaries

Each film typically has multiple summaries on IMDb, which helps mitigate concerns about idiosyncratic audience bias.

Figure A.2: I. Baby Face (1933)



Summaries

A young woman who has been abused by men all her life decides to turn the tables and exploit her hapless colleagues at a big-city bank to make a cozy life for herself.

Lily (Baby Face) sleeps her way from basement speakeasy bartender, literally floor by floor, to the top floor of a New York office building. Bank sub-manager Jimmy McCoy finds her a job in the bank only to be cast aside as she hooks up with the bank's president. When he complains of not seeing her she says: "I'm working so hard I have to go to bed early every night."
—Ed Stephan <stephan@cc.wwu.edu>

Lily Powers has to do more than serve drinks at her father's run-down speakeasy in a small industrial town, but his death gives her the chance to move on to New York. With her experience in using her looks to get on she is soon on her way to the top, cynically stepping over men as she no longer needs them.
—Jeremy Perkins {J-26}

Lily Powers has led a difficult life working in her uncouth father's speakeasy in the small town of Erie, PA. But when her father dies, she finally feels free to try and explore life, and see where it all pulsates from; New York. Having been used for her looks, Lilly now begins to use her looks - and more. Soon, she's on her way to the top, blithely walking over the men she once had to pay umbrage to, as she no longer needs them.
—Huggo

Source: https://www.imdb.com/title/tt0023775/plotsummary/?ref_=tt_stry_pl

Figure A.2: II. All about Eve (1950)

Summaries

A seemingly timid but secretly ruthless ingénue insinuates herself into the lives of an aging Broadway star and her circle of theater friends.

Eve Harrington (Anne Baxter) is waiting backstage to meet her idol, talented but aging Broadway star Margo Channing (Bette Davis). It seems innocent enough as Eve explains that she has seen Margo in EVERY performance of her current play. Margo and her friends take Eve under their wing but only theatre critic Addison DeWitt (George Sanders) sees through Eve's evil plan, which is to take Margo's parts and her fiancé, Bill Simpson (Gary Merrill) too.

Backstage story revolving around aspiring actress Eve Harrington. Tattered and forlorn, Eve shows up in the dressing room of Broadway mega-star Margo Channing and tells Margo and her friends a melancholy life story. Margo takes Eve under her wing, only to have Eve use her and connive against her.
—Jwelch5742

Margo Channing is a renowned and well-respected Broadway actress, her recent successes a collaboration with Producer Max Fabian, Playwright Lloyd Richards, and her current boyfriend Director Bill Sampson, with Bill, Lloyd, and Lloyd's "non-business" wife Karen a foursome as friends. They all have to deal with Margo's volatile insecurities, especially around the elephant in the room, namely that many are starting to have to suspend belief of forty year old Margo playing ingenues, i.e. characters in their twenties. Age also factors into Margo's doubts about her relationship with thirty-two year old Bill. Into their lives enters twenty-four year old Eve Harrington, outwardly a star-struck innocent who idolizes Margo in having seen every performance of their current play, Aged in Wood, because of Margo, Karen noticing her as a constant fixture outside the theater after every performance. After learning her hard-luck story and seeing her enthusiasm especially concerning anything concerning the theater, Margo hires Eve to be her personal assistant. But some, such as Margo's friend and maid Birdie Coonan, view Eve with suspicion, as her enthusiasm is a little too ardent. Eve slyly using opportunities slowly reveals her true scheming intentions, which those in this circle begin to notice, some sooner than later. What happens with Eve in her ultimate goal to be the Margo Channing of her generation is affected by theater columnist Addison DeWitt, whose power lies in being able to convey what he wants to the masses through his column.
—Huggo

Back to top

Aspiring actress Eve Harrington maneuvers her way into the lives of Broadway star Margo Channing, playwright Lloyd Richards, and director Bill Simpson. This classic story of ambition and betrayal has become part of American folklore. Bette Davis claims to have based her character on the persona of film actress Tallulah Bankhead. Davis' line "Fasten your seatbelts, it's going to be a bumpy night" is legendary, but all of the film's dialogue sparkles with equal brilliance.
—Jeanne Baker <jbaker@erim.org>

The ambitious Eve Harrington gets close to the great and temperamental stage artist Margo Channing and her friends Karen Richards and her playwright husband Lloyd Richards, her director boyfriend Bill Simpson, and producer Max Fabian. Everybody except cynical critic Addison DeWitt believes that Eve is simply a naïve, obsessed Margo fan and they try to help her. Actually, Eve is a cynical, manipulative snake that uses the lives of Margo and her friends to reach her show- business goals.
—Claudio Carvalho, Rio de Janeiro, Brazil

Stage star Margo Channing is friend to playwright Lloyd Richards and his wife Karen, in love with director Bill Simpson, and the idol of Eve Harrington. When Eve becomes Margo's secretary-aide, she starts to dominate, sending Bill Margo's birthday wishes and arranging a party for him, at which Margo explodes. Eve becomes Margo's understudy and when Margo misses a performance, critic Addison DeWitt gives Eve rave reviews while making acerbic remarks about aging actresses like Margo. At Margo and Bill's engagement party Eve tries to force Karen to get her the lead in Lloyd's new play. Margo tells Lloyd she is going to retire. Eve gets the part but Addison announces to her that he knows the lies and schemes she used to get where she is.
—Ed Stephan <stephan@cc.wwu.edu>

Source: https://www.imdb.com/title/tt0042192/plotsummary/?ref_=tt_stry_pl

A.3 Summary Statistics

Table A.3 reports summary statistics for films produced between 1925 and 1955 in the U.S. and other countries respectively.

Table A.3: Summary Statistics: U.S. and Non-U.S. Films (1925–1955)

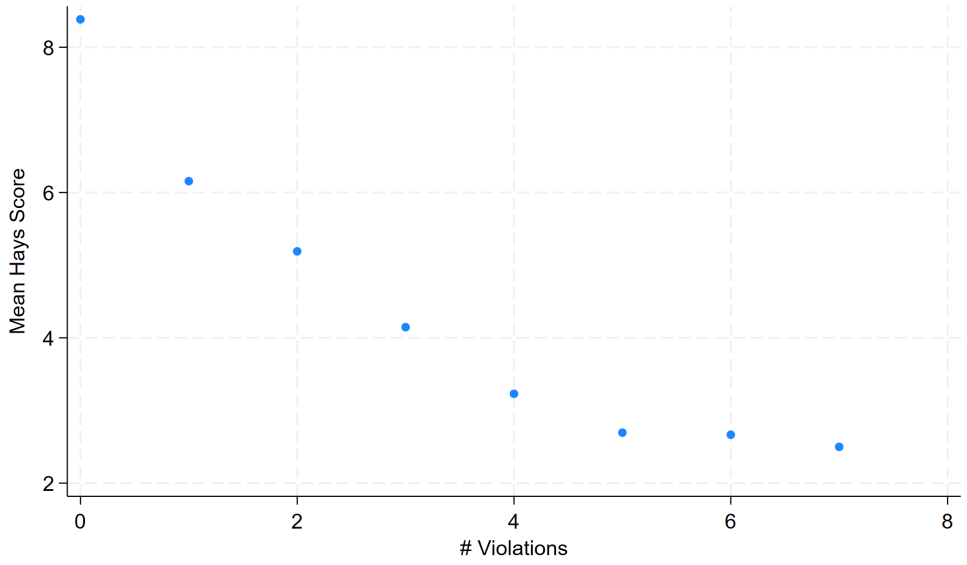
	U.S. Sample			Non-U.S. Sample		
Variable	Mean	SD	Obs	Mean	SD	Obs
Film content						
Moral compliance						
Hays compliance score	7.87	1.56	14,195	7.55	1.87	11,451
Hays score (assuming 1933 for all)	7.30	1.56	14,195	7.18	1.82	11,451
Anon. Hays score	7.86	1.53	14,195	7.71	1.75	11,451
Genres						
Drama	0.52	0.50	14,195	0.55	0.50	11,451
Comedy	0.28	0.45	14,195	0.31	0.46	11,451
Western	0.21	0.41	14,195	0.00	0.07	11,451
Crime	0.17	0.37	14,195	0.10	0.30	11,451
Action	0.11	0.31	14,195	0.03	0.16	11,451
Protagonist characteristics						
Female lead (=1)	0.25	0.43	14,195	0.27	0.44	11,451
Working-class lead (=1)	0.33	0.47	11,637	0.38	0.49	7,279
Political tone						
Political liberalism score	4.30	1.55	14,195	4.91	1.60	11,451
Film companies						
Old companies: w. pre-1935 films	0.39	0.49	1,283			
Old companies: #pre-1935 films	11.3	48.5	495			
Old companies: ln market size (100 miles)	15.6	1.67	223			
#Films by old companies			9,932			
#Films by old companies w. market size			8,716			
Film directors						
Immigrant directors	0.24	0.43	1,237			

Notes: This table reports summary statistics for films produced between 1925 and 1955. Hays compliance scores measure adherence to moral guidelines; genre and protagonist variables are indicator variables.

A.4 Internal Check: Compliance Score vs. Number of Violations

Figure A.4 plots the relationship between Hays compliance scores and the number of violations, where violations are defined based on the main themes of the Hays Code. As expected, films with more violations tend to receive lower Hays scores. The relationship is also not perfectly linear: once the number of violations exceeds five, the LLM generally assigns very low compliance scores.

Figure A.4: Compliance Score vs. Number of Violations

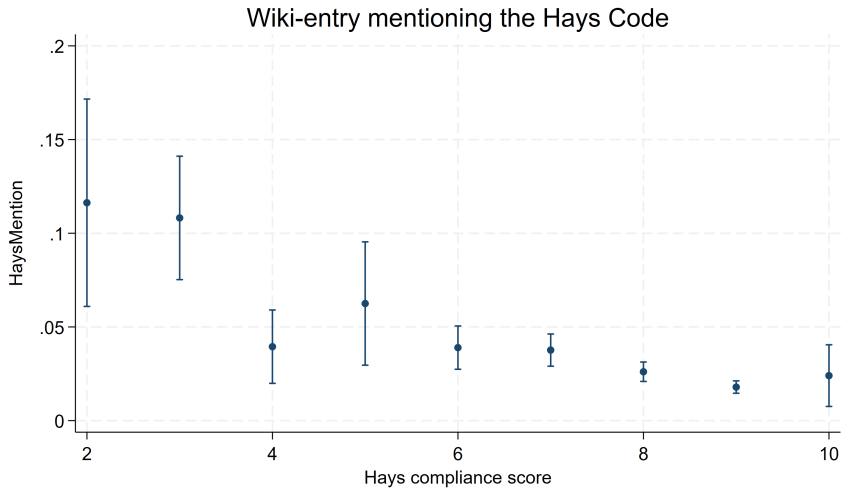


A.5 External Check: Compliance Score vs. External Measures

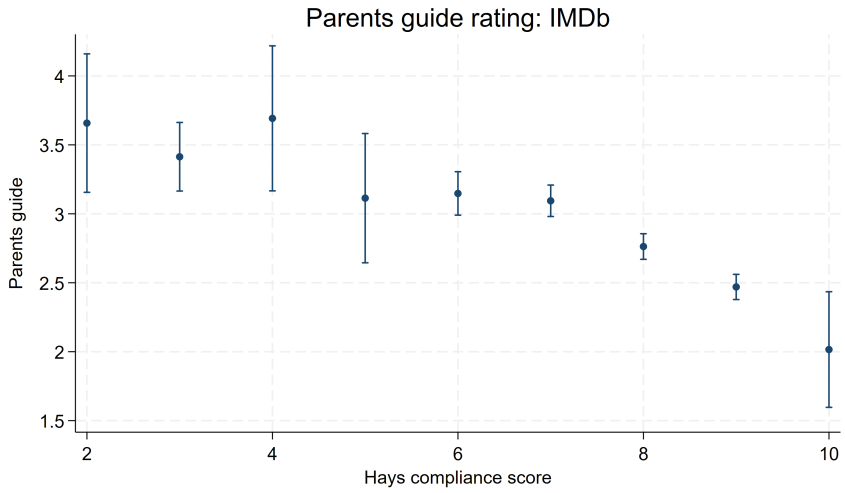
Figure A.5(a) plots the relationship between the LLM-generated compliance score and the probability that a film's Wikipedia entry mentions the Hays Code (using the keywords "Hays Code," "Production Code," or "Censorship"). The negative correlation indicates that the score is a meaningful measure: lower-score films are more likely to be associated with the Hays Code.

Figure A.5(b) plots the corresponding relationship using IMDb Parents Guide ratings. The rating covers five dimensions: sex and nudity, violence and gore, profanity, alcohol/drugs/smoking, and frightening or intense scenes. Each scored from 0 (none) to 1 (mild), 2 (moderate), or 3 (severe). We sum these components to construct an overall degree of restrictiveness. This measure is available for 3,327 U.S. films in our 1925–55 sample.

Figure A.5: Compliance Score vs. External Validation Measures



(a) Wiki Entry Mentioning the Hays Code



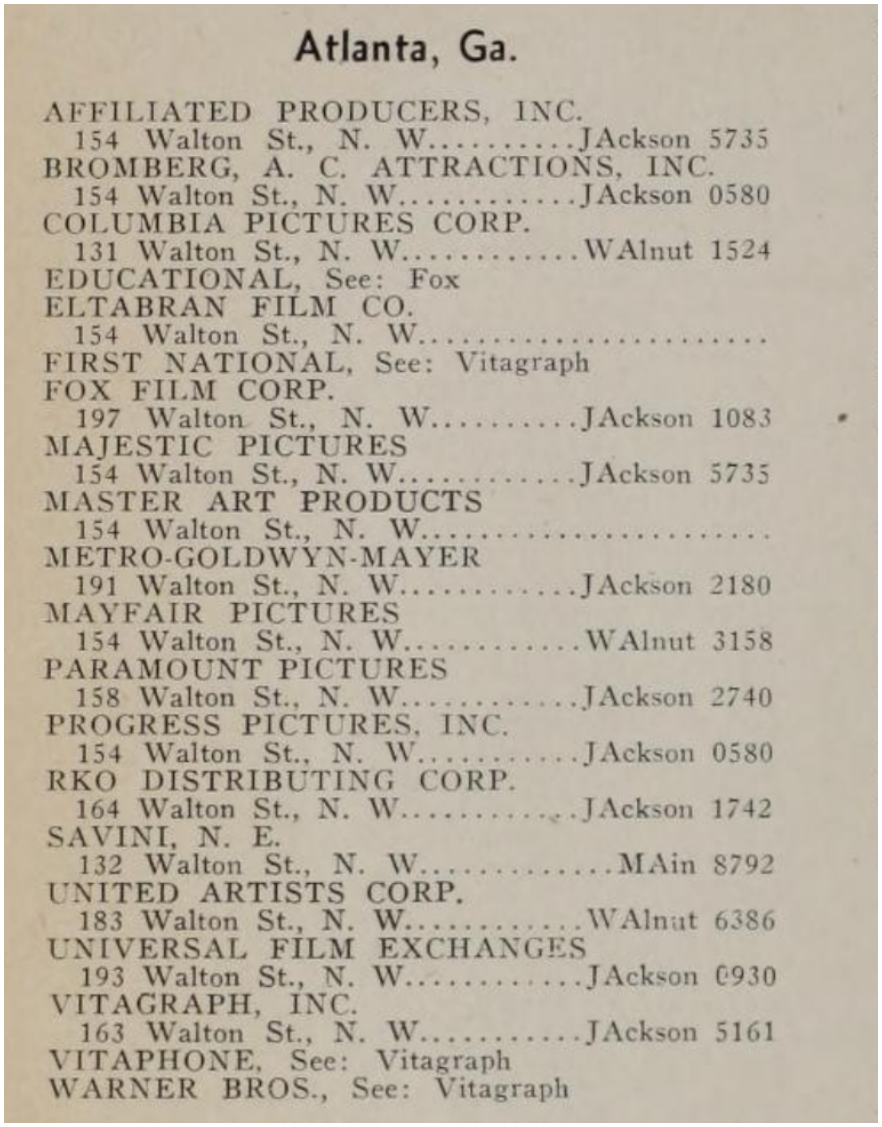
(b) IMDb Parents Guide Rating

Notes: Panel (a) plots the correlation between the Hays compliance score and the probability that a film's Wikipedia entry mentions the Hays Code. Panel (b) reports the corresponding relationship using IMDb Parents Guide ratings.

A.6 Film Exchange Localities: Data

Figure A.6I provides one example on the film exchanges in Atlanta. Based on such information, we depict the distribution networks by distributors. To illustrate the variation across distributors, Figure A.6II maps the presence of Paramount Pictures and that of First Division Exchanges.

Figure A.6: I. Film exchanges: An example

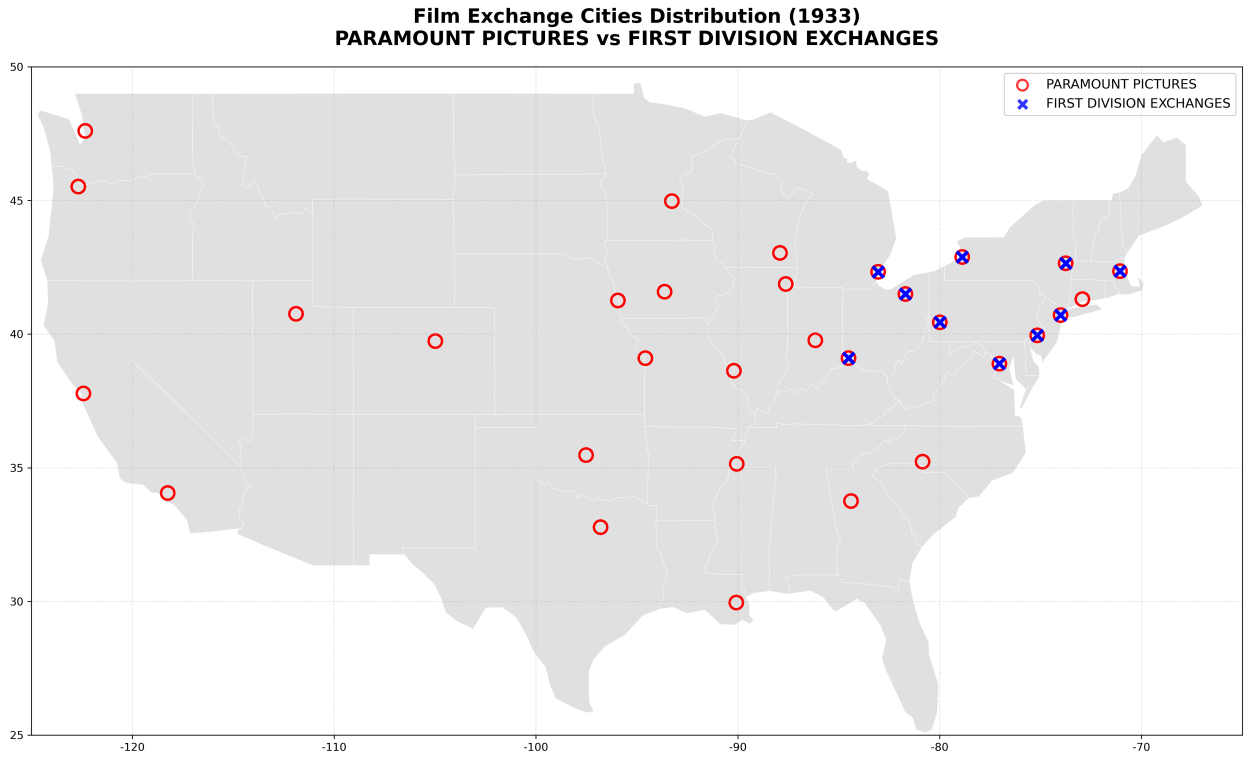


Atlanta, Ga.

AFFILIATED PRODUCERS, INC.
154 Walton St., N. W.....JAckson 5735
BROMBERG, A. C. ATTRACTIONS, INC.
154 Walton St., N. W.....JAckson 0580
COLUMBIA PICTURES CORP.
131 Walton St., N. W.....WAlnut 1524
EDUCATIONAL, See: Fox
ELTABRAN FILM CO.
154 Walton St., N. W.....
FIRST NATIONAL, See: Vitagraph
FOX FILM CORP.
197 Walton St., N. W.....JAckson 1083
MAJESTIC PICTURES
154 Walton St., N. W.....JAckson 5735
MASTER ART PRODUCTS
154 Walton St., N. W.....
METRO-GOLDWYN-MAYER
191 Walton St., N. W.....JAckson 2180
MAYFAIR PICTURES
154 Walton St., N. W.....WAlnut 3158
PARAMOUNT PICTURES
158 Walton St., N. W.....JAckson 2740
PROGRESS PICTURES, INC.
154 Walton St., N. W.....JAckson 0580
RKO DISTRIBUTING CORP.
164 Walton St., N. W.....JAckson 1742
SAVINI, N. E.
132 Walton St., N. W.....MAin 8792
UNITED ARTISTS CORP.
183 Walton St., N. W.....WAlnut 6386
UNIVERSAL FILM EXCHANGES
193 Walton St., N. W.....JAckson 0930
VITAGRAPH, INC.
163 Walton St., N. W.....JAckson 5161
VITAPHONE, See: Vitagraph
WARNER BROS., See: Vitagraph

Source: The Film Daily Year Book (Alicoate 1934).

Figure A.6: II. Localities of *Film Exchanges*: Paramount vs. First Division Changes



Notes: This map provides two examples for distributor presence across exchange localities.

A.7 LLM-predicted Year and Reasoning

Figure A.7 shows that although the LLM cannot precisely predict a film's release year, there remains a sizable positive correlation between the predicted and actual years.

Figure A.7: LLM-predicted Year vs. Actual Year (corr=0.346)

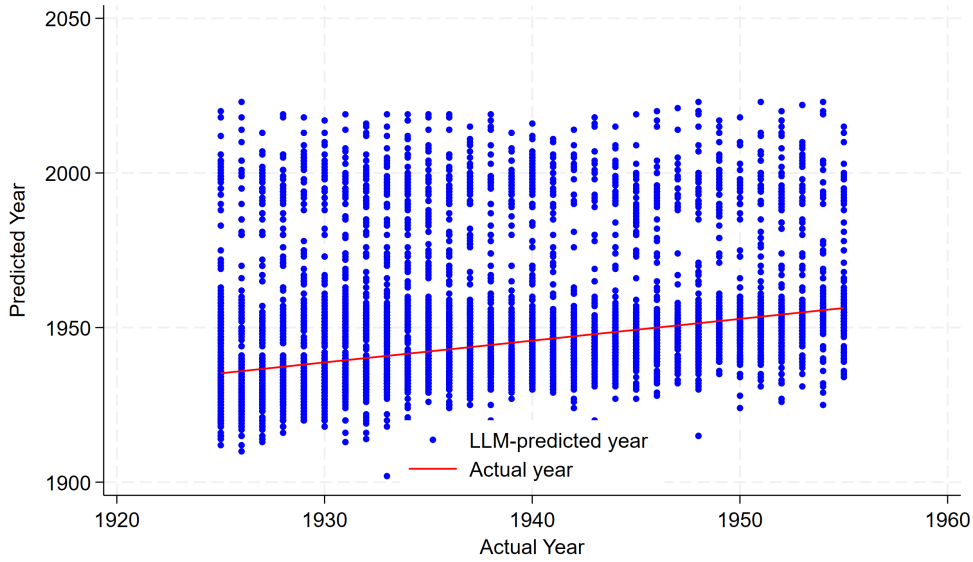


Table A.7 presents illustrative examples of these predictions along with the reasoning provided by the LLM. The examples suggest that film summaries often contain linguistic or thematic cues characteristic of particular decades, which the model can leverage to make its temporal inferences.
Table A.7 presents illustrative examples of these predictions along with the reasoning provided by the LLM. The examples suggest that film summaries often contain linguistic or thematic cues characteristic of particular decades, which the model can leverage to make its temporal inferences.

Table A.7: Examples of LLM Predicted Years and Reasoning

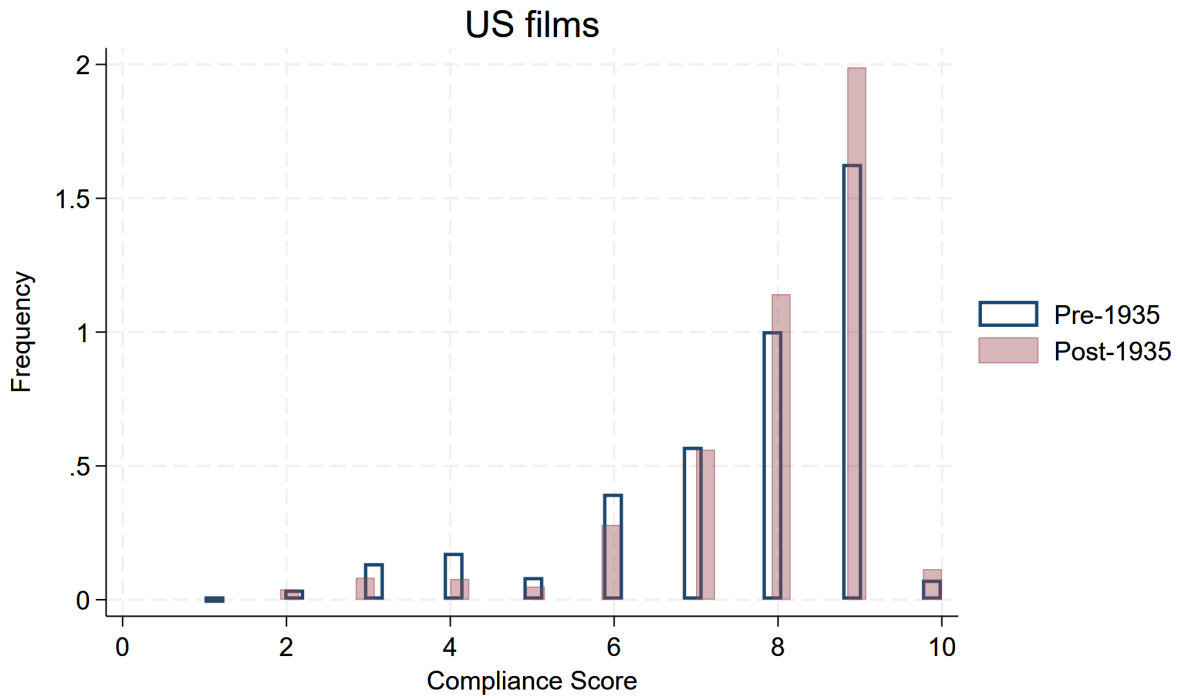
Actual Year	Predicted Year	Reasoning for Prediction
1936	1948	The mention of Charles Starrett and the style of Western films suggest a release in the late 1940s.
1925	1952	The plot and character names suggest a classic farce style popular in mid-20th century cinema.
1925	1927	The plot and character archetypes are typical of silent films and early cinema, suggesting a release in the late 1920s.
1925	1921	The mention of a partially lost film and the plot involving desert tribes suggest a silent film era production, likely from the early 1920s.
1925	1930	The plot and character names suggest a classic Western film typical of the early 20th century.
1925	1954	The narrative style and themes suggest a mid-20th century production, typical of films exploring historical settings with romantic and coming-of-age elements.
1925	1925	The synopsis style and mention of Pamela Short suggest a silent film era plot, typical of the 1920s.
1925	1995	The narrative style and themes suggest a mid-1990s European drama.
1925	1940	The plot resembles classic film noir and melodrama popular in the 1940s.
1927	1990	The plot resembles romantic comedies popular in the late 1980s and early 1990s.

B Additional Results

B.1 Distribution of Hays Compliance, Pre-Post 1935

Figure B.1 plots the distribution of Hays compliance scores before and after 1935. The figure shows a clear rightward shift in the distribution: films with lower compliance scores become less common, while films with higher scores become more prevalent. This redistribution across the score distribution underlies the increase in average compliance documented in our baseline estimates.

Figure B.1: Distribution of Hays Compliance Scores, Pre-Post 1935



B.2 Grok vs. GPT Measures

Table B.2 compare the estimates using the GPT model with those using the Grok model.

Table B.2: Changes in the Hays Compliance Score pre-post 1935

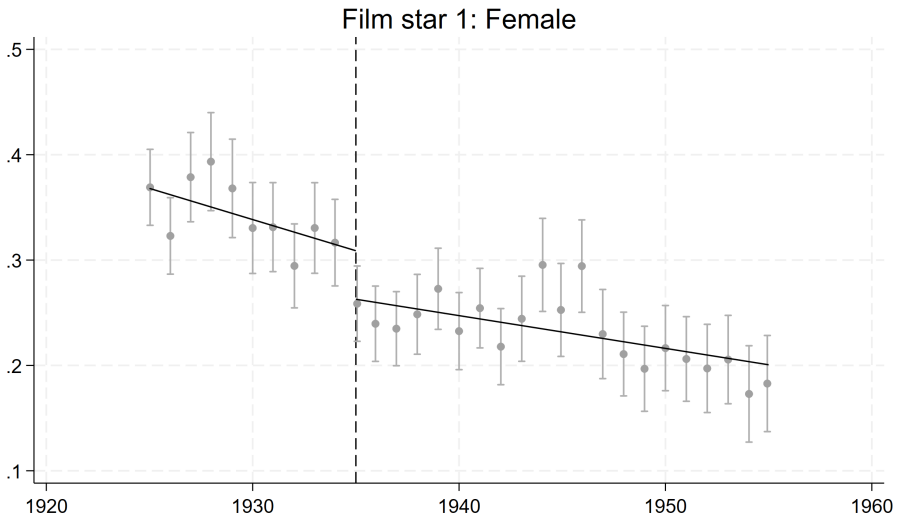
	(1)	(2)	(3)	(4)
	Hays score	Hays score	Hays score	Hays score
	US	US	US	US
Model	GPT 4.1	GPT 4.1	Grok 4.1	Grok 4.1
Post 1935	1.041***	0.617***	1.572***	1.210***
	(0.166)	(0.217)	(0.261)	(0.391)
Linear interaction	Y	Y	Y	Y
Quadratic interaction		Y		Y
Dep. var. pre-cutoff mean	7.65	7.65	7.69	7.69
Dep. var. pre-cutoff sd	1.71	1.71	3.12	3.12
Observations	14,195	14,195	14,195	14,195

Notes: Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B.3 Gender of the First-billed Star

In the U.S. films, we observe a decline in the share of female first-billed stars around 1935, as shown in Figure B.3. The list of stars for each film is obtained from IMDb.

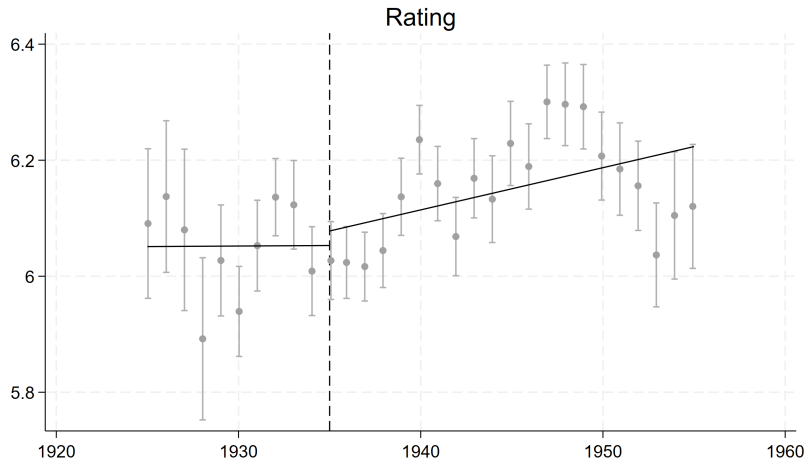
Figure B.3: Gender of the First-billed Star, US Films



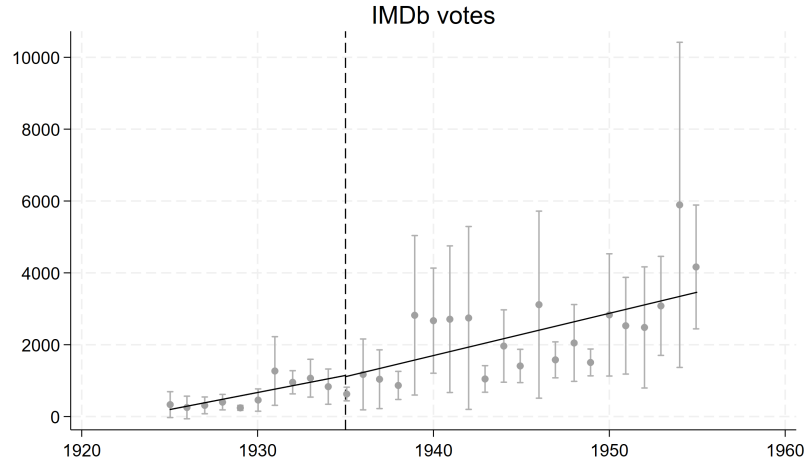
Notes: The Hays Code was enforced on July 1, 1934. The vertical line indicates the year of 1935.

B.4 Contemporary Ratings and Votes for U.S. Films

Figure B.4: Trends in Ratings and Votes: U.S. Films



(a) Average Ratings

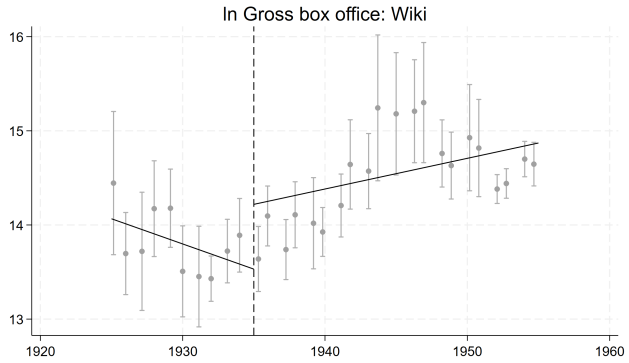


(b) Number of Votes

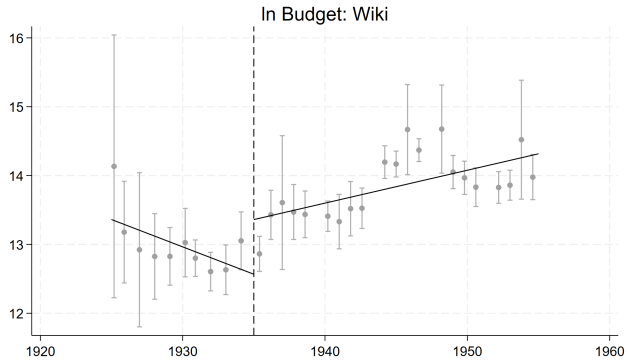
Notes: The Hays Code was enforced on July 1, 1934. The vertical lines indicate the year of 1935. Panels (a) and (b) plot the trends in today's ratings and votes of American films, based on IMDb data.

B.5 Box Office and Budget for Selected U.S. Films

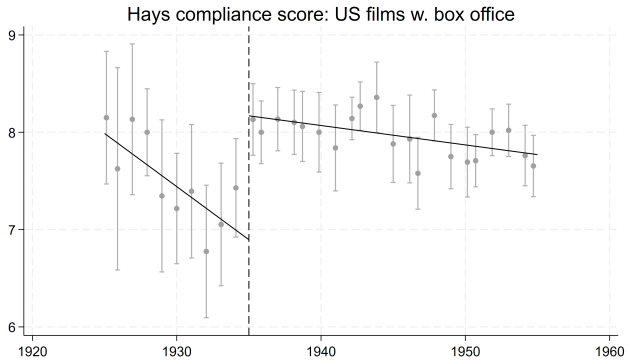
Figure B.5: Box Office and Film Budget: U.S. Films



(a) Box office (n=1,828)



(b) Budget (n=1,253)



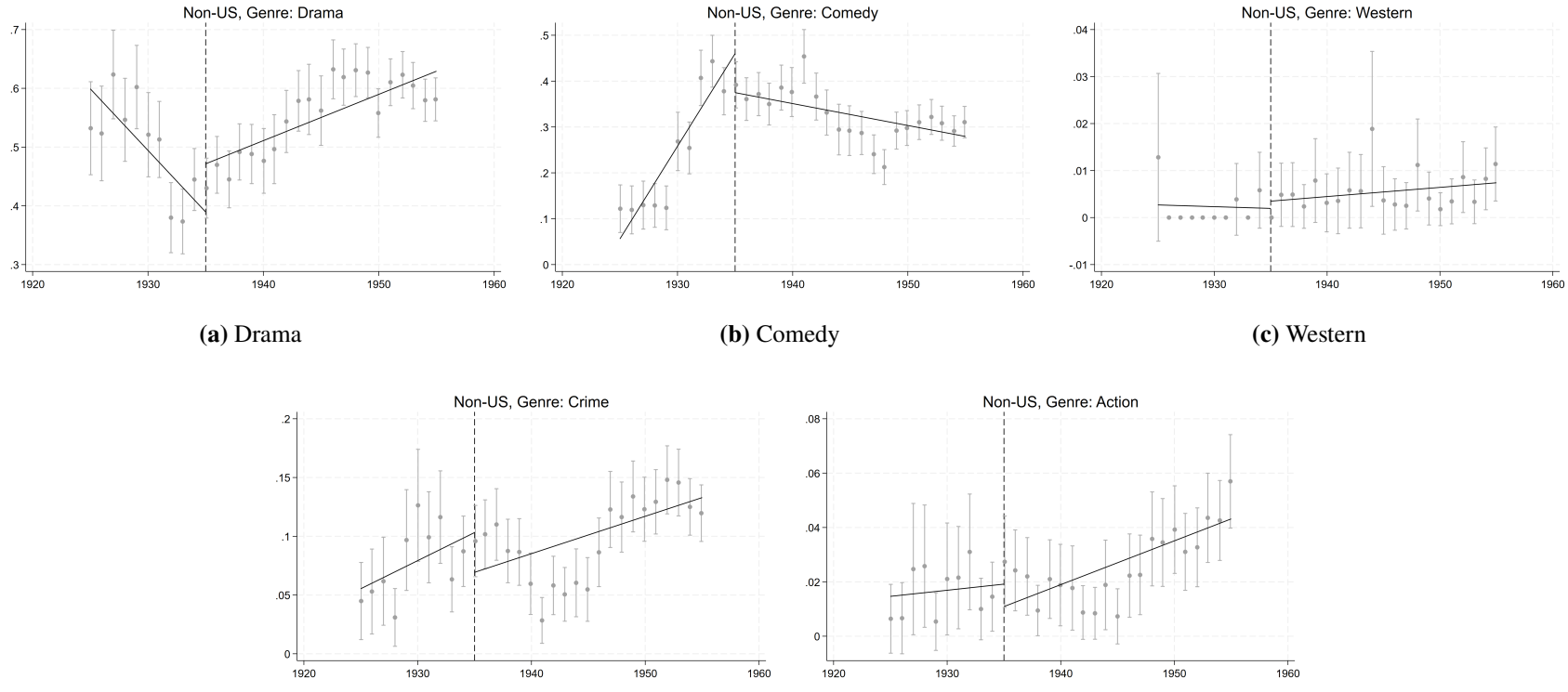
(c) Hays compliance score (n=1,828)

Notes: The Hays Code was enforced on July 1, 1934. The vertical lines indicate the year of 1935.
Panels (a) and (b) plot the trends for box offices and film budget, which are only available for a limited number of films based on their Wikipedia entries. Panel (c) plots the change in compliance within this selected sample of films.

B.6 Genre Composition of Non-U.S. Films

Unlike the U.S. films, we find no clear changes regarding genre composition around 1935 for non-U.S. films, as shown in Figure B.6.

Figure B.6: Changes in Genre Composition of non-U.S. Films



(a) Drama **(b)** Comedy **(c)** Western

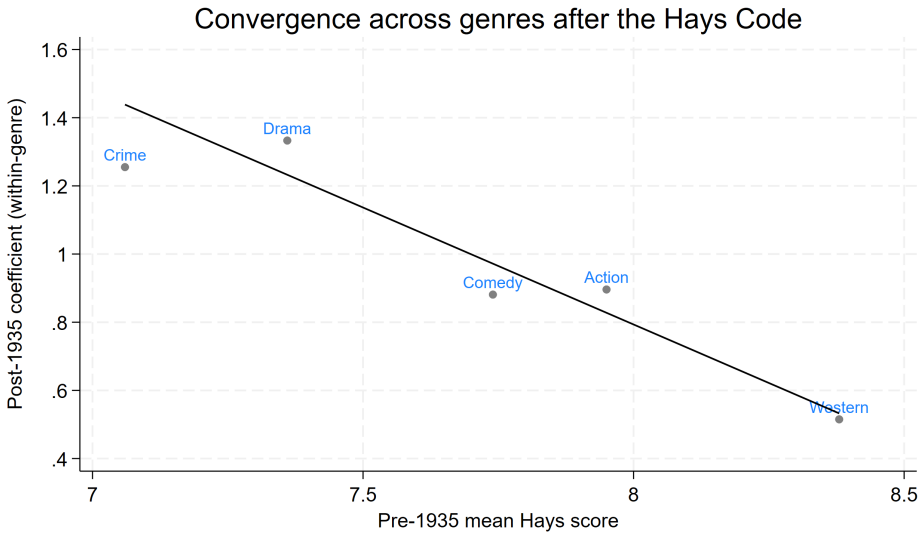
(d) Crime **(e)** Action

Notes: The Hays Code was enforced on July 1, 1934. The vertical lines indicate the year of 1935. The outcome in each panel is whether a film has a specific genre.

B.7 Convergence in Compliance across Genres in U.S. Films

Figure B.7 plot the within-genre coefficient against pre-1935 compliance for each genre. The negative relationship indicates a pattern convergence.

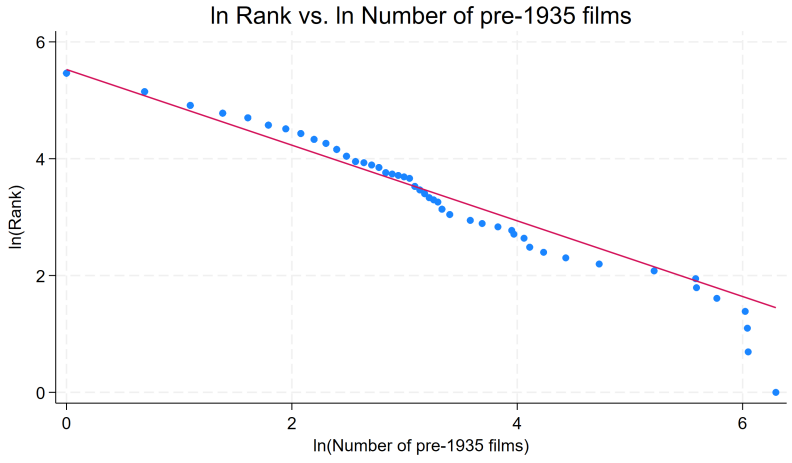
Figure B.7: Within-genre coefficient vs. Pre-1935 Compliance



B.8 Distribution of Number of Films by Companies

Figure B.8 plots the relationship between logged rank and logged number of films for the 495 U.S. film companies that had made films before 1935,

Figure B.8: ln Rank vs. ln Number of pre-1935 films for U.S. Companies



Notes: The figure plots the size distribution for U.S. film companies that had made films before 1935.

B.9 Alternative Definitions of Market Size for U.S. Companies

Table B.9: Alternative Definitions of Market Size and Compliance

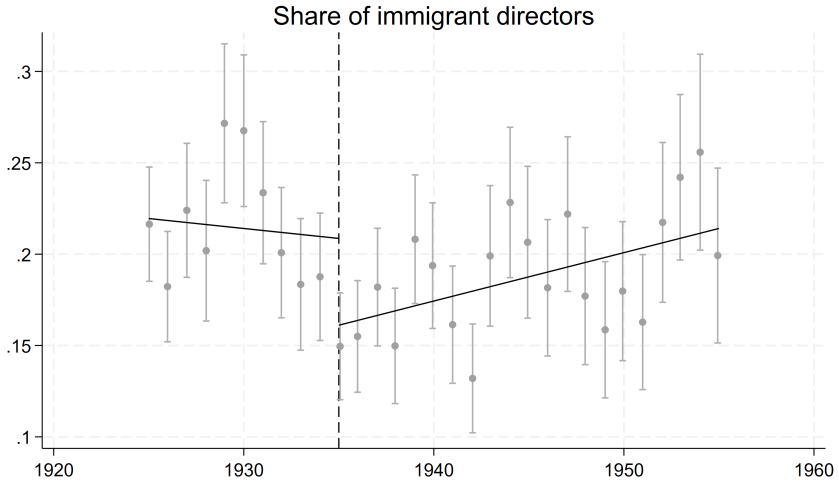
	(1)	(2)	(3)	(4)
Buffer =	100 miles	50 miles	75 miles	150 miles
Post 1935 × #Pre-1935 ln Market size (sd)	0.213**	0.207**	0.212**	0.217**
	(0.084)	(0.086)	(0.084)	(0.087)
Post 1935	0.941***	0.941***	0.941***	0.941***
	(0.184)	(0.185)	(0.184)	(0.183)
Company FE	Y	Y	Y	Y
Linear interactions	Y	Y	Y	Y
Observations	8,716	8,716	8,716	8,716

Notes: This table reports estimates from market sizes calculated based on different distances to an exchange change city. The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

B.10 The Share of Immigrant Film Directors

Figure B.10 plots the share of immigrant film directors in the U.S. over time. The slight decline around 1935 is not pronounced, so we refrain from drawing any firm conclusion regarding a change in immigrant representation during this period.

Figure B.10: Changes in the Share of Immigrant Film Directors in the U.S.



Notes: The Hays Code was enforced on July 1, 1934. The vertical line indicates the year of 1935. The plot depicts the change in the share of immigrant film directors in the U.S.

B.11 A Further Look by Director's History and Experience

We examine directors' responses by their pre-1935 compliance levels and by the number of films they had made, with both variables standardized for ease of interpretation in Table B.11. Two patterns emerge. First, we observe convergence: directors, immigrant and non-immigrant alike, who had produced less-compliant films before 1935 responded more strongly after the Code. Second, among immigrant directors, those with fewer pre-1935 films reacted more, likely because they had not yet fully established themselves and thus had stronger incentives to cater to the new regulatory environment.

Table B.11: Directors: Pre-1935 Compliance and Experience

	(1)	(2)	(3)	(4)
Dependent var.	Hays score	Hays score	Hays score	Hays score
Sample:	Immigrant	Non-immigrant	Immigrant	Non-immigrant
Post 1935	0.820***	0.756***	1.234***	0.770***
	(0.137)	(0.188)	(0.203)	(0.214)
Post 1935 × Pre-1935 Hays score	-0.627***	-0.688***		
	(0.189)	(0.065)		
Post 1935 × #Pre-1935 films			-0.340**	-0.069
			(0.128)	(0.072)
Director FE	Y	Y	Y	Y
Linear interactions	Y	Y	Y	Y
Observations	1,783	8,132	1,783	8,132

Notes: This table reports estimates based on directors' pre-1935 compliance levels and on the number of films they produced before 1935.
The reported number of observations excludes singleton groups that drop out once fixed effects are included. Standard errors are clustered at the year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.