Self-regulation vs state regulation: Evidence from cinema age restrictions*

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Abstract

Motion picture ratings systems classify a movie's violent and sexual content and potentially require theater owners to restrict entry to minors. We study the impact of self-regulation on the leniency of ratings using cross-country variation in the level of restrictions applied to 1,810 movies that were released in 34 countries or provinces between 2000 and 2011. While ratings in most countries are issued by state-regulated bodies, ratings in six countries are issued by agencies created and operated by the film industry. Our data indicate that these self-regulatory organizations issue more lenient ratings to films with strong teenage appeal, which we demonstrate are most affected by restrictive ratings. Compared to movies with low teenage appeal, movies with high teenage appeal are available to audiences 2.6 months younger on average in countries with a self-regulated ratings agency.

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1 Introduction

Self-regulation, in which an industry-level organization determines and enforces the rules and standards of conduct for firms in the industry, is an important feature of many sectors including advertising, financial services, legal services, and industrial chemicals. In recent years, self-regulatory organizations have been created for crowdfunding and the emerging virtual currency economy. The European Parliament is also hoping that operators of large platforms such as Google and Facebook will self-regulate activity on their platforms to limit illegal transactions, prioritizing ads from affiliated companies, and the spread of inaccurate news.[1] The potential benefits of self-regulation over government-level regulation include greater speed, flexibility, and lower costs (Gunningham and Rees, 1997).

However, since self-regulatory organizations are formed to benefit their members, critics argue they may have inadequate incentives to protect the public (e.g., DeMarzo et al., 2005). For example, the three major trade associations in the alcohol industry adopted voluntary standards designed to limit youth access to alcohol marketing. However, a 1999 Federal Trade Commission report criticized the industry's requirement that more than half of the audience for its advertisements be over 21 since this far exceeded the proportion of the U.S. population that was under 21, which was 30 percent (FTC, 1999).[2] The industry's current standards require that 70 percent or more is 21 years or older. More recently, the Securities and Exchange Commission questioned whether U.S. exchanges should be responsible for monitoring and policing their own trading activities. As self-regulatory organizations, exchanges write market rules and are shielded from legal challenges from traders that lose money due to technical problems, including those from the contentious debut of Facebook Inc. (*Wall Street Journal*, 2 October 2013).

Self-regulation has been extensively studied in theory (Maxwell, Lyon, and Hacket, 2000; Nunez, 2001; DeMarzo et al., 2005; Granzl and Murrell, 2007). But despite the prevalence and importance of self-regulation, few empirical analyses have assessed the performance of self-regulatory organizations, and existing analyses have been limited to case studies without cross-sectional variation in the source of regulation. In financial markets, historical accounts indicate that self-regulation of commodity exchanges between 1865 and 1922 was not an efficient means to reduce the exercise of monopoly power (Pirrong, 1995). For the chemi-

[1] *The Economist*,"Regulating technology companies: Taming the beasts," 28 May 2016.

[2] The report also noted that only half of the companies reporting for the report could demonstrate that "nearly all of their ads were shown to a majority legal-age audience" and one quarter of companies showed "weeks when a large portion of ads were shown to a majority underage audience" (FTC, 2003, p. 12).

cal industry, studies of the Responsible Care program of 1989 find that membership in the program was a poor predictor of whether prescribed environmental standards were followed (Howard, Nash, and Ehrenfeld, 2000), and member firms did not improve their environmental, health and safety performance as fast as non-members (King and Lenox, 2000). However, empirical evidence indicates that the threat of government regulation induced U.S. firms to voluntarily reduce emissions from 17 toxic chemicals between 1988 and 1992 (Maxwell, Lyon, and Hackett, 2000).

In this paper, we analyze the performance of self-regulation using the example of motion picture rating systems. Motion picture rating systems are designed to protect children from unsuitable material by issuing certifications that classify a movie's violent and sexual content, and, in some cases, impose restrictions that require theater owners to refuse entry to minors. The existence of rating systems is motivated by a purported link between media content and the emotional and behavioral development of children. In 2000, the American Medical Association and five public-health organizations noted that research points "overwhelmingly to a causal connection between media violence and aggressive behavior in some children" (Anderson et al., 2003).[3] Research into the effects of media violence also finds that exposure to media violence leads children to become desensitized to violence, and to believe the world around them is cruel (Robinson et al., 2001). Related research into the effects of sexual content suggests that depictions of sex in the media promote a belief that promiscuity is the norm (e.g., Zillmann, 2000; Escobar-Chaves et al., 2005).[4]

The film industry is an ideal setting for studying self-regulation due to cross-country variation in the source of regulation for the same product. In the United States, movie ratings are issued by the motion picture industry's trade association, the Motion Picture Association of America (MPAA). Its most common ratings are PG-13 and R. Movies rated R are restricted to audiences 17 years and over unless they are accompanied by a parent or legal guardian while movies rated PG-13 are recommended for ages 13 and over but impose no

[3]After mass shootings in Colorado and Connecticut in 2012, the White House urged the movie industry to implement a stricter rating system for movie violence. The MPAA responded in April 2013 by expanding the content descriptions that accompany film ratings. However, they did not add any new certifications or make existing certifications more stringent.

[4]Evidence of a causal link between media violence and aggressive behavior, however, remains inconclusive. Studies that establish a correlation between television penetration and violent crime have been criticized for not adequately controlling for spurious factors (Savage, 2004). For example, Centerwall's (1992) widely-cited study that reports a link between South Africa's government-imposed delay on television broadcasting and that country's stagnant homicide rate cannot explain similar stagnation or declines in European homicide rates (Zimring and Hawkins, 1997). Longitudinal studies that track minors' consumption of television and later criminal convictions have been criticized for relying on aggression levels measured by a subject's peers (Savage, 2004).

restriction. Ratings in five other countries (Germany, Iceland, Japan, the Netherlands, and United Kingdom) are also issued by agencies created and administered by the film industry. In the majority of other countries, ratings for the same movies are issued by state-regulated agencies. In Australia, for example, certifications are issued by the Australian Classification Board, formed by the Australian government in 1970.

To assess the performance of self-regulation of movie rating systems, we have assembled an extensive data set of regulations (ratings) and product (movie) characteristics. The main data set consists of 1,810 movies released between 2000 and 2011. These movies were released in 34 countries or provinces giving us a sample of 44,945 movie-country ratings, of which we have 28,236 observations with revenue information. Our data include country-level box office revenues and admissions, measures of violence, sex, and profanity, and a measure of how appealing teenagers find each movie. Variation in the rating applied to the same movie across different countries allows us to control for a wide range of privately-observed movie characteristics that are correlated with ratings but not available in our data. Our measures of movie content and teenage appeal allow us to examine how self- and government-regulated systems issue ratings to movies with similar levels of violence, sex, and profanity but different levels of teenage appeal.

Using our data on box office performance, we first establish that restrictive ratings reduce box office revenues and attendance. We find that a one-year reduction in the minimum age required for entry increases box office revenue by 2.8 percent on average. We also find that the impact of restrictive ratings is smaller for movies targeting older audiences. Using our measure of teenage appeal, we find that a one-year reduction in the minimum age required for entry increases box office revenue by 4.3 percent for high teenage appeal movies. For mixed and low teenage appeal movies, the impact of a one-year reduction in the minimum age is about 2.1 percent for strict ratings that apply with or without an accompanying adult. These findings are robust to focusing on box office returns in English-speaking countries, using alternative controls for content, controlling for edits made across countries, and using attendance instead of box office revenues as the dependent variable.

Having established that restrictive ratings impose greater harm on box office revenues for high teenage appeal movies, we next examine how the assignment of ratings for the same movie varies across countries with different regulatory structures. Using a simple theoretical model, we show that a self-regulator who is concerned with maximizing industry revenues, subject to a constraint on the amount of offensive content available to minors, will issue more lenient classifications to movies appealing to teenagers compared to movies appealing

to older audiences.

Using cross-country variation in the ratings issued to the same set of movies, we confirm that self-regulatory organizations assign more lenient classifications to movies with high teenage appeal compared to movies with low teenage appeal. Regressions that control for unobserved movie characteristics and differences across countries in their preferences for movie content indicate that self-regulated rating agencies issue ratings that require audiences of low appeal movies to be 2.6 months older on average compared to high teenage appeal movies. These findings are robust to alternative violent and sexual content measures and removing movies that were edited for content in at least one country.

The remainder of this paper is organized as follows. Section 2 describes the regulation of rating systems around the world. In Section 3, we develop a simple model to motivate our main tests. Section 4 describes our data sources on movie ratings, violent and sexual content, and teenage appeal. Section 5 presents estimates of the impact of restrictive ratings on box office performance. In Section 6, we compare the leniency of movies ratings issued by self-regulatory and state-regulated agencies. A final section concludes.

2 Institutional background

Rating systems around the world differ in two important dimensions: the structure of certifications (the number of different certifications, the restrictions they impose, and their frequency of use), and the type of regulation (self- or state-regulation). In Section 5, we exploit variation in the structure of certifications to analyze the impact of restrictive ratings on box office performance and attendance. In Section 6, we use variation in the identity of the ratings agency (industry or state) to determine how the regulatory framework affects the assignment of restrictive certifications.

2.1 Structure of certifications

Across the 32 countries and 2 Canadian provinces (Ontario and British Columbia) in our data set, there is substantial variation in the number of certifications and the restrictions they impose. The smallest number of classifications is 2 (Belgium), the largest number is seven (Austria, Iceland, and New Zealand), and the median number is 5. These certifications are one of three types: (1) a minimum recommended age that is only advisory and does not impose any restrictions on entry, (2) a minimum unaccompanied age, below which minors can only enter when accompanied by an adult guardian, and (3) a minimum restricted age below

which no minors can enter. For example, in Sweden, the classifications are Universal, 7, 11, and 15. All ages are permitted to watch movies rated Universal. Children under 7 and 11 are allowed to watch movies rated 7 and 11 if they are accompanied by a parental guardian. However, theater owners are required to refuse entry to all minors under 15 for movies that are rated 15, even if a parental guardian is present. In the United States, classifications G, PG, and PG-13 carry no restrictions. Children under 17 years are permitted to enter movies rated R only if they are accompanied by a guardian, while children 17 years or lower are not permitted to enter movies rated NC-17. Figure A1 details the rating schemes for the 34 countries or provinces in our data set.[5]

Cultural factors, particularly attitudes towards censorship, vary across countries and influence the number of movies issued restrictive ratings. Many European countries, in particular, maintain a more liberal attitude toward censorship than the U.S. and Asian countries, and restrict a much smaller share of movies. Spain, for example, does not issue any restrictive ratings, except for pornographic movies. The one movie in our data set to be issued a restrictive rating (X) in Spain is the horror film *Saw VI*. The Spanish Ministry of Culture notes that all ratings are just recommendations for parents and teachers.[6] This extreme stance reflects a reaction to heavy censorship before 1975 under General Francisco Franco. Censorship in France was also abolished in the 1970s, and age restrictions on violent movies were limited in 1982 in an attempt to remove the "last vestiges of political censorship" (*The Telegraph*, 4 January 1982). The share of movies issued restrictive ratings (that prohibit at least some teenagers from entry) in France is 16.8 percent compared to 47.8 percent in other countries.

2.2 Type of regulation

There is also variation in who is responsible for issuing certifications across countries (Table A1). In 28 of the 34 countries or provinces in our data set, the ratings system is state-regulated such that certifications are determined by statutory agencies. In Australia, for example, ratings are issued by the Australian Classification Board, formed by the government in 1970. The country's classification scheme is defined by the Classification (Publications, Film and Computer Games) Act of 1995. In the majority of countries with state-regulated

[5]A Federal Trade Commission study found that 76 percent of underage children were not able to purchase tickets to R rated movies (`http://www.ftc.gov/news-events/press-releases/2013/03/ftc-undercover-shopper-survey-entertainment-ratings-enforcement`, accessed May 5, 2014).

[6]See "Nueva regulacion de la calificacion de peliculas cinematograficas y otras obras audiovisuales" (`http://www.mcu.es/gabineteprensa/mostrarDetalleGabinetePrensaAction.do?html=19592010nota.txt`).

ratings agencies, the agency is housed within the Ministry of Culture. The stated aim of the agency usually involves the protection of youth and/or society.

In six countries (Germany, Iceland, Japan, the Netherlands, the United Kingdom, and the United States), the practice of classifying films is self-regulated. Either ratings are issued by the film industry directly, or membership of the board that issues ratings is determined by the film industry. In the United States, movie ratings are issued by the Classification and Rating Administration, which is part of the Motion Picture Association of America (MPAA), a self-regulatory organization and trade group formed by Hollywood's largest studios. In the Netherlands, the classification system, Kijkiwijzer, is implemented by the Netherlands Institute for the Classification of Audio-visual Media (NICAM). NICAM's board consists of representatives of film distributors, cinema operators, distributors, and both public and commercial broadcasters. Classifications are calculated by a computer program based on answers that film distributors themselves provide to a 60-part on-line questionnaire.[7] The Kijkiwijzer system has also been used in Iceland since 2005 under the direction of FRISK (formerly SMAIS), whose members are the majority of Iceland's cinema, distributors and television stations.[8] In Germany, movie ratings are issued by an independent board, the Voluntary Self-Control of the Film Industry (Freiwillige Selbstkontrolle der Filmwirtschaft), created by the Head Organization of Film Industry (SPIO).

Ratings systems in two countries, the United Kingdom and Japan, were created by film studios but have evolved to establish greater independence from the film industry. Nevertheless, board membership and policy is still determined by the film industry. The British Board of Film Classification (BBFC), first established by the British Film Industry in 1913, is currently managed by a council of six members from the manufacturing and servicing sections of the film industry, as well as other industries. The members are not involved in classification decisions but are responsible for appointing the President and two Vice Presidents, who are consulted on difficult classification decisions.[9] Japan's Film Classification and Rating Committee, Eiga Rinri Iinkai (EIRIN), was first established in 1949 as a self-regulatory organization patterned after the MPAA. Its policy, classification guidelines, and management regulations are provided by Japan's major and independent producers, distributors, and exhibitors, as well as foreign representatives of the film industry.[10]

[7]https://www.kijkwijzer.nl/nicam, accessed August 25, 2017.

[8]See http://www.kvikmyndaskodun.is/Page/Article/6, accessed August 25, 2017.

[9]See http://www.bbfc.co.uk/about-bbfc/who-we-are, accessed November 15, 2013.

[10]https://web.archive.org/web/20161204160558/http://eirin.jp/english/002.html, accessed August 25, 2017.

Unlike in the U.S., however, the ratings agencies in Germany, Iceland, Japan, the Netherlands, and the United Kingdom are impacted by legislation. The existence of such legislation implies that classification in these countries might be more accurately described as "co-regulated" (Senden, 2005). In Britain and Japan, legislation exists that requires distributors to obtain certifications before release. In Britain, the Licensing Act of 2003 requires local authorities only grant cinemas licenses to operate under the condition that they follow BBFC classification decisions.[11] Similarly, Japan's Healthy Environmental Law of 1957 establishes that EIRIN certifications are required for domestic releases. In Germany, the Netherlands, and Iceland, legislation exists that makes it illegal for minors to be shown disturbing imagery that might harm their well-being. The operation of Germany's self-regulation system is subject to the Law for the Protection of Youth in Public Places of 2002, which, in addition to specifying age categories, requires that media with "extremely realistic, cruel and sensational presentations of violence for its own purpose and dominant of the given scene" must not be available to children or adolescents.[12] In the Netherlands and Iceland, Article 240a of the Criminal Code and the Act on the Monitoring of Children's Access to Films and Computer Games No. 62/2006 imposes similar stipulations on the ratings agency.

3 Theoretical framework

In this section, we present a simple model of self-regulation in the context of the movie industry. The central insight is that a self-regulator seeking to maximize industry revenue subject to a constraint on the amount of violence available to young audiences will issue comparatively lenient ratings to movies that are more affected by restrictions, such as movies appealing to teenagers. We first begin by illustrating the problem faced by a government regulator before turning to the problem of a self-regulator.

3.1 State regulation

Assume that a government regulator is devising a rating system for movies that differ in the level of some potentially offensive content such as violence, sex, or profanity. The level of that content across movies, $x \in [0, 1]$, follows a uniform distribution. To allow for creative freedom and avoid censorship, the government aims to be as permissive of this content as possible subject to a constraint on the expected level available to young audiences, $C \geq 0$.

[11] See http://www.bbfc.co.uk/education-resources/education-news/same-difference, accessed November 15, 2013.

[12] See http://178.63.105.143/media_content/1369.pdf, accessed November 15, 2013.

This constraint might be influenced by cultural, religious, and political factors. For countries like France and Spain, C may be large. For countries with less permissive attitudes towards violent or sexual content, such as the United Arab Emirates, C might be small.

The game proceeds in two stages. In the first stage, the state regulator chooses the cut-off level of content, $\overline{x}$. In the second stage, a movie with *ex ante* unknown content x is submitted for rating. If $x \geq \overline{x}$, then it is issued a restrictive rating. Otherwise, it is unrestricted.[13] Conditional on $\overline{x}$, the expected level of offensive content that is unrestricted is: $\overline{x}E(x|x \leq \overline{x}) = \frac{\overline{x}^2}{2}$. The government's choice problem is:

$$\begin{aligned} \underset{\overline{x}\in[0,1]}{\text{maximize}} \quad & \overline{x} \\ \text{subject to} \quad & \frac{\overline{x}^2}{2} \leq C \end{aligned}$$

which yields an optimal government threshold of $\overline{x}^*_G = \sqrt{2C}$. The threshold is increasing in C, i.e. $\frac{\partial \overline{x}^*_G}{\partial C} \geq 0$. In our empirical tests, we control for country-specific attitudes toward censorship, which will determine the relative number of restrictive ratings issued, with an extensive set of country-content and content-genre interactions.

3.2 Self-regulation

Now consider the decision of a self-regulator who is devising a rating system for movies that differ in an additional dimension not considered relevant by government regulators: the level of teenage appeal. Assume there is an equal probability that a given movie will exhibit high teenage appeal (H) or low teenage appeal (L). The level of offensive content, $x_k \in [0, 1]$, follows a uniform distribution for both high and low teenage appeal movies, $k \in \{H, L\}$. In the first stage, the self-regulator chooses the cut-off levels of content, $\overline{x}_k$, for each movie type. In the second stage, a movie of type k is submitted for rating. If $x_k \geq \overline{x}_k$, then it is issued a restrictive rating. Otherwise, it is unrestricted.

Restrictive ratings lower revenue for each movie type such that revenue for a movie is x_k if it unrestricted and $(1 - \rho_k)x_k$ if it is restricted. However, as above, a permissive ratings system increases the likelihood that movies with offensive content will be available to young audiences, which may spark outrage from parents, and potentially lead to government regulation.[14] The self-regulator ensures that, in expectation, the level of offensive content

[13]The assumption of a threshold level of violence is consistent with our data on violent content. Between 2000 and 2011 in the U.S., there were no PG-13 rating (unrestricted) movies with violent content scores of 9 or 10 out of 10, and only a handful with scores of 8.

[14]In the U.S., the MPAA is particularly sensitive to criticism from parents that cites particular movies

that is unrestricted is below some constraint, $C \geq 0$, which may or may not be the same as the state regulator's own constraint. Given threshold levels of content, $\overline{x}_H$ and $\overline{x}_L$, the expected level of content available to audiences is $\frac{1}{2}\overline{x}_H E(x|x \leq \overline{x}_H) + \frac{1}{2}\overline{x}_L E(x|x \leq \overline{x}_L) = \frac{\overline{x}_H^2 + \overline{x}_L^2}{4}$.

Assuming that the self-regulator aims to maximize industry revenue subject to the content constraint, its maximization problem is:

$$\begin{aligned} \underset{\overline{x}_H, \overline{x}_L \in [0,1]}{\text{maximize}} \quad & \frac{1}{2}\Big(1 - \rho_H(1 - \overline{x}_H)\Big) + \frac{1}{2}\Big(1 - \rho_L(1 - \overline{x}_L)\Big) \\ \text{subject to} \quad & \frac{\overline{x}_H^2 + \overline{x}_L^2}{4} \leq C \end{aligned}$$

The first-order conditions with respect to $\overline{x}_H$ and $\overline{x}_L$ are:

$$\frac{1}{2}\rho_H - \frac{1}{4}\lambda \overline{x}_H^* = 0 \tag{1}$$

$$\frac{1}{2}\rho_L - \frac{1}{4}\lambda \overline{x}_L^* = 0 \tag{2}$$

where λ is the Lagrange multiplier. Solving for $\overline{x}_H^*$ in terms of $\overline{x}_L^*$ gives:

$$\overline{x}_H^* = \Big(\frac{\rho_H}{\rho_L}\Big)\overline{x}_L^* \tag{3}$$

which implies that threshold levels of offensive content are larger for high teenage appeal movies if the financial penalty of restrictive ratings is larger, $\rho_H > \rho_L$. In Section 5, we confirm that restrictive ratings have a larger effects on revenues for high teenage appeal movies compared to low teenage appeal movies.

If $\rho_H > \rho_L$ then the model implies that there can exist two movies with the same content level, $\tilde{x} \in (\overline{x}_L^*, \overline{x}_H^*)$, but different levels of teenage appeal and therefore different restrictions. While the high teen appeal movie will be unrestricted, the low teen appeal will be restricted. We test if self-regulated ratings agencies are more lenient on high teenage appeal movies than low teen appeal movies, controlling for country-specific preferences for violent, sexual, and profane content, in Section 6.

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with excessively violent content. For example, the PG-13 rating was created in 1984 in response to criticism over the level of violence in the movies *Gremlins* and *Indiana Jones and the Temple of Doom* (*New York Times*, June 20, 1984). The MPAA routinely surveys parents to establish the percentage of movies that, in their opinion, were issued a fair rating.

The thresholds chosen by a self-regulator for high and low teen appeal movies are:

$$(\overline{x}_H^*, \overline{x}_L^*) = \left(\sqrt{\frac{4C}{1+\left(\frac{\rho_H}{\rho_L}\right)^2}}, \sqrt{\frac{4C}{1+\left(\frac{\rho_L}{\rho_H}\right)^2}} \right) \tag{4}$$

If $\rho_H > \rho_L$ and the constraints are the same (C), then self-regulators will be more lenient on high teenage appeal movies than state regulators ($\overline{x}_H^* > \overline{x}_G^*$) but more restrictive on low teenage appeal movies ($\overline{x}_L^* < \overline{x}_G^*$). Unfortunately it is not possible to test this prediction explicitly, since we do not observe two identical countries that differ only in the type of regulation. In Section 6, we provide evidence that state-regulated countries in our data set are actually more lenient on violence than self-regulated countries. This is, at least in part, driven by the fact that Austria, France, and Spain, for cultural and political reasons, impose very few restrictions on movies. If C is sufficiently large then $\overline{x}_G^* > \overline{x}_H^*$, so state-regulated countries like Spain can be more lenient on potentially offensive content than self-regulated countries.

4 Data

Our data set combines information on country-specific film classifications, box office performance (revenue and attendance), two measures of violent, sexual, and profane content, and a measure of teenage appeal for 1,810 releases across 32 countries and two provinces between 2000 and 2011.

4.1 Movie classifications, box office data, and additional controls

Data on 44,945 movie-country classifications were obtained using systematic searches of rating agency websites (Table A1) and the Internet Movie Database (`http://www.imdb.com`), a popular website for information on movies, TV and entertainment programs. To describe the variation in the age groups that are affected by each country's classification system, we construct two alternative versions of the variable *Teen availability*$_{ij}$. The first definition, unaccompanied availability, is the share of teenagers aged between 10 and 17-years-old in country j who can see the movie i without an accompanying parent or guardian. For example, a movie rated R in the U.S. has an unaccompanied availability of $1/8 = 0.125$, because teenagers aged 17 can watch the movie unaccompanied, and teenagers aged between 10 and 16 can only see the movie when accompanied by an adult. The second definition, strict availability, is the share of teenagers aged between 10 and 17-years-old who can see

the movie, with or without a parent or guardian. A movie rated R in the U.S. has a strict availability of 1, because it is possible for anyone to see the movie when accompanied by an adult.

For six countries or provinces in our data (Austria, British Columbia, Denmark, Hungary, Portugal, and Uruguay), strict availability was 1 for every movie in our sample (Figure 1).[15] For Austria and Hungary, unaccompanied availability was 1 for every movie, meaning that any teenager in those countries could watch any movie in our sample, even without an accompanying adult. Of the 34 countries or provinces in our sample, 14 do not distinguish between accompanied and unaccompanied availability in their ratings systems.

Data on box office revenue (in nominal U.S. dollars) come from Box Office Mojo (`http://www.boxofficemojo.com`). Data on admissions for 17 European countries and the U.S. come from the Lumiere database (`http://lumiere.obs.coe.int/`). Data on country-specific edits, the countries that produced the movie, and languages in the movie come from `http://www.imdb.com`. Additional production budget information comes from `http://the-numbers.com`. Genre categories come from the website Screen It!, which is described below.

4.2 Measure of teenage appeal

We construct a measure of teenage appeal using information from the website Screen It! (`http://www.screenit.com`), which is a resource for parents to monitor the movies that might interest their children. Screen It! reviews contain a section answering the question "Will Kids Want to See it?" The one- or two-sentence responses to this question follow certain formats, which allows us to group responses into four categories indicating a movie's appeal to teenagers. Category 1 indicates movies aimed at young children. Category 2 denotes movies that are likely to appeal to pre-teens and teenagers ("high appeal"). Examples include *Transformers* (U.S. rating PG-13), *Ratatouille* (G), and *Freddy vs. Jason* (R). Category 3 denotes movies that may appeal to certain teenagers ("mixed"). Examples include *Slumdog Millionaire* (R), *The Da Vinci Code* (PG-13), and *Pride and Prejudice* (PG). Category 4 indicate movies that are unlikely to appeal to teenagers ("low appeal"). Examples include *Little Miss Sunshine* (R), *Julie & Julia* (PG-13), and *No Country for Old Men* (R).[16] Details

[15] Spain and the U.S. each had only one movie in our sample for which strict availability was less than 1: *Shame* for the U.S. (rated NC-17) and *Saw VI* for Spain (rated X).

[16] One limitation of this categorization is that it is assigned after a movie has been released and rated, which raises the possibility that the rating influences the site's assessment of teenage appeal. However, summary statistics suggest that any bias is likely to be small. Of the 456 movies deemed to have high teenage appeal,

on our coding rules are provided in Table A2. We exclude movies that are aimed at young children (Category 1) from our analysis to focus on how the impact of restrictive ratings varies between high and mixed/low teenage appeal movies.[17]

4.3 Measures of violent and sexual content

Movie IDs are matched to content ratings from Kids-In-Mind (`http://www.kids-in-mind.com`).[18] This nonprofit organization assigns a 0- to 10-point rating to the level of sex and nudity, violence, and profanity in movies. Content ratings are assigned by volunteers who follow objective guidelines. A particular content score depends on both quantity and context. Therefore, two movies with different scores for violence may contain the same frequency of violence, but not the same level of violence. For example, *Batman Begins* has a lower violence score than its sequel *The Dark Knight* (6 versus 7) because the latter includes more disturbing imagery. However, both movies contain comparable quantities of violent scenes.[19] A robustness check uses measures of violence, sex, and language (on a 4-point scale) for 1,038 movies from Ireland's state-regulated ratings agency, the Irish Film Classification Office.

4.4 Construction of the sample

Violent, sexual and profane content scores are available for 2,224 of 6,068 movies with revenue data. Teenage appeal codes are available for 1,987 of these movies (usually wide-release movies). After removing 39 documentaries and 138 features that appeal to young children, we are left with 1,810 movies. These movies account for 87.1 percent of U.S. box office

129 (28.3 percent) are rated R or NC-17.

[17]To validate our measure of teenage appeal, we use data on exit poll scores given by audience members. The scores are based on between 400 and 600 ballots obtained from polls conducted by CinemaScore (`http://www.cinemascore.com`) in five randomly chosen cities on a movie's opening night. Average letter grade scores are calculated for the following male and female age groups: under 21, 21-34, 35 and over. These data are available for 298 movies between 2000 and 2003. Least squares regressions indicate that, controlling for movie characteristics such as budget and certification, *Teenage appeal* is positively and statistically significantly correlated with the scores given by audience members under 21 but not correlated scores from other age groups. For more information on CinemaScore grades see `http://deadline.com/2014/08/b-grade-for-turtles-what-cinemascores-mean-and-why-exit-polling-matters-816538/`, accessed September 4, 2014.

[18]These data are also described in Dahl and DellaVigna (2010) who find that the incidence of violent crimes between 1995 and 2004 was lower on days when theater attendance at violent movies was larger.

[19]Despite a high correlation between content ratings and movie classifications, the website notes that "while the current [rating] system does not serve consumers well, it works perfectly for the filmmakers, the studios and the theater chains. It is based on a cozy relationship between the MPAA, the film industry, and the theater chains. It is a malleable system that can be altered at will to accommodate changes in the market." See `http://www.kids-in-mind.com/help/about.htm`, accessed November 17, 2013.

revenues.[20] Of the 1,810 movies, 454 are classified as "high teen appeal," 797 as "mixed teen appeal," and 559 as "low teen appeal." For eight countries (Australia, France, Germany, the Netherlands, New Zealand, Spain, the United Kingdom, and the United States), our data include box office revenues for 1,000 or more titles. For 28 of 31 countries, our data include more than 500 titles. Our final sample comprises 28,236 movie-country observations with information on box office receipts. We have additional data on ratings (but not revenue) for Ireland and two Canadian provinces (British Columbia and Ontario). Box office receipts for Canada are part of U.S. box office while Irish receipts are part of United Kingdom box office totals.

5 Empirical evidence on the impact of restrictive ratings

In this section, we exploit variation in the restrictiveness of certifications across countries that are issued to the same movie to test if restrictive ratings lead to lower box office revenues. Using data on a movie's appeal to teenage audiences, we then assess whether the impact of restrictive ratings is weaker for movies that appeal mainly to older audiences.

Figure 2 demonstrates, for three franchises and one movie, the type of variation in teenage appeal and certifications we exploit. The *Pirates of the Caribbean* and *Final Destination* franchises exhibit the strongest appeal to teenage audiences, while the *Saw* series exhibits slightly weaker appeal, and the movie *Revolutionary Road* exhibits very low appeal.[21] Movies in the *Saw* franchise are typically very restricted across countries due to its graphic violence (low values of *Teen availability*), but for certain entries and countries, they are available to teenagers aged between 14 and 17 years. *Revolutionary Road* and the *Pirates* franchise demonstrate the opposite picture. While the movies are generally available to teenagers across countries (high values of *Teen availability*), restrictions on younger teens aged between 10 and 12 years-old exist. The *Final Destination* franchise illustrates a case with almost uniform variation in the restrictions applied across countries.

A summary plot of our data on ratings, teenage appeal, and revenues indicates that restrictive ratings lower box office revenues, particularly for movies with strong teenage

[20] Total box office revenue for the 1,810 in our data set is $97.8 billion. Total box office revenues for all 6,549 U.S. releases between 2000 and 2011 is $112.4 billion.

[21] The first entry in the *Pirates* franchise is coded as mixed appeal, and the first three sequels are coded as high appeal. All entries in the *Final Destination* series are coded as high appeal. Four of seven entries in the *Saw* franchise are coded as high appeal, two are coded as mixed appeal, and one is coded as low appeal. *Revolutionary Road* is coded as low appeal.

appeal. For high teenage appeal movies, mean market shares decrease from 4.1 to 0.7 percent as the minimum age required for entry increases from 11 to 18 years (left-hand panel of Figure 3). For mixed and low teen appeal movies, market share are much less responsive to age restrictions. For mixed appeal movies, average market shares vary between 0.5 and 1.0 percent. For low appeal movies, average market shares vary between 0.3 and 0.6 percent.[22] The drop in the line for high teenage appeal movies between *Teen availability* levels of 0.875 and 1 is driven by the existence of a unique 11 rating in Scandinavian countries (Denmark, Finland, Norway, and Sweden) that denies 10 year-olds from seeing the movie without a parental guardian.[23]

5.1 Baseline estimates

Though the left-hand panel of Figure 3 is highly suggestive, we cannot assume a causal relationship between restrictive ratings and box office performance due to the absence of adequate controls for a movie's underlying box office appeal.[24] Movie certifications are not assigned randomly. Therefore, if a movie's box office performance is affected by its rating, studios may modify the movie's content during production to target a specific classification. In particular, if the movie's premise appeals to teenagers then it is more likely to have its content tailored to obtain a less-restrictive rating. The breadth of the movie's appeal will therefore be correlated with its rating and box office potential.

Our empirical strategy addresses this concern by including movie fixed effects in our regressions to absorb all unobserved characteristics of a movie, which is possible because we observe the performance of the same movie in multiple countries. The right-hand panel of Figure 3, which plots the residuals from a regression of log total revenue on movie fixed effects and country-year fixed effects, reveals that restrictive ratings are associated with lower revenues, even when controlling for unobserved movie characteristics. While average

[22]These findings are consistent with Miramax's unsuccessful efforts to boost the box office returns of *The King's Speech* (coded as "low teenage appeal" in our data) by obtaining a less-restrictive rating. After winning the Oscar for Best Picture in 2011, the studio removed some profanity from the R rated movie to obtain a PG-13 rating and appeal to a broader audience. The studio head of Miramax commented that "The British numbers are huge because the rating lets families see the movie together" ("The Weinstein Company Wants To Censor The King's Speech", CinemaBlend, 26 January 2012. Available at: `http://www.cinemablend.com/new/The-Weinstein-Company-Wants-To-Censor-The-King-s-Speech-22835.html`, accessed 20 August 2012). Despite the rating change, box office revenues for the historical drama did not rise. The PG-13 version opened on 1 April 2011 and grossed $1.2 million on its opening weekend from 1,007 theaters. The R-rated version grossed $1.6 million from 1,062 theaters during the previous weekend.

[23]More than two-thirds of movies with this rating are unrestricted in the U.S.

[24]The absence of adequate controls is also a weakness of previous studies of restrictive ratings, e.g., Terry, Butler, and De'Armond (2004), Leenders and Eliashberg (2011), and Palsson, Price, and Shores (2012).

log revenue rises for high teen appeal movies with unaccompanied *Teen availability* above 0.5, it remains fairly flat for mixed or low teen appeal movies.[25]

Our baseline regression incorporates additional controls, including controls for country-specific preferences for genre and content:

$$\log(y_{ijt}) = \beta_0 + \beta_1 Teen\ availability_{ij} + \boldsymbol{x'_{ij}\delta} + \boldsymbol{z'_i\gamma_j} + \rho_{jt} + \omega_i + \varepsilon_{ijt} \tag{5}$$

where $\log(y_{ijt})$ is the log of box office revenue of movie i released in country j in year-of-first-release t, *Teen availability*$_{ij}$ is the share of teenagers aged between 10 and 17-years-old in country j who are able to view movie i without restriction, and ω_i is a fixed effect for movie i. The coefficient β_1 is the change in log revenue from removing the restrictions on a movie so that it is available to all teenagers (*Teen availability*$_{ij} = 1$) instead of no teenagers (*Teen availability*$_{ij} = 0$). Positive values for β_1 mean that age restrictions reduce the revenue for a movie in a particular country. Identification of β_1 comes from comparisons of the performance of the *same* movie across countries with *different* degrees of age restrictions. As discussed in Section 4, we report results for two definitions of *Teen availability*: unaccompanied (share who can see the movie without a parent or guardian) and strict (share who can see a movie, with or without a parent or guardian).

There are two vectors of movie-specific covariates in our regression model. The vector $\boldsymbol{x_{ij}}$ contains characteristics of movie i that are specific to country j. These include a dummy variable that is equal to 1 if one of the languages used in movie i is the same as an official language in country j (*Same language*). We also include a dummy variable that is equal to 1 if country j is one of the production countries for movie i (*Same country*), to allow for the possibility that movies perform better in their country of origin, particularly if the country is featured in the movie.[26] Finally, we control for release date differences between countries by including a variable counting the number of weeks separating a film's release in country j from its earliest release date in another country.[27]

The second movie-specific covariate vector $\boldsymbol{z_i}$ contains characteristics of movie i that are common across all countries. These include fully-flexible measures of the level of violent,

[25]The downward spike in the figure at *Teen availability* of 0.125 is driven by the fact that only 2 of 31 countries (the U.S. and Philippines) have ratings systems that restrict movies to audiences 17 years or above.

[26]For example, Australian box office revenues for the film *Australia* ($26.5 million) were more than double United Kingdom revenues ($11.4 million) despite Australia's smaller population.

[27]For example, the action-thriller *Taken* was released in France on February 28, 2008 but was not released in the U.S. until January 30, 2009. Films that perform poorly in initial markets may receive limited advertising in subsequent markets, may be prone to increased piracy that limits their box office potential (Danaher and Waldfogel, 2012), or may not be released at all.

sexual, and profane content of the movie, as well as dummy variables representing the genre of the movie.[28] We allow the coefficients on $\boldsymbol{z_i}$ to vary by country, allowing for country-specific preferences for movie content and genre that might be driven by cultural, religious, or political factors. Specifically, we include interactions between country and an indicator for each genre and an indicator for each violent, sexual, and profanity content level (1, 2,. . . ,10). All of the regression models include country-year fixed effects ρ_{jt}. These allow for flexible trends in the overall size of the market for movies in each country.

Estimation results confirm that restrictive ratings have a significant negative effect on box office performance. A one-year reduction in the minimum age required for entry (Δ *Teen availability*$_{ij} = 0.125$) increases box office revenue by 2.8 percent (significant at 1 percent, Table 1, column 4). This result implies that, all else equal, a movie that is completely unrestricted in country a will perform 24.5 percent better than the same movie restricted to patrons 18 years or older in another country b.[29] Results using the strict definition of teen availability are very similar (Table 1, column 5).

Estimates without movie fixed effects reveal that a movie's violent content is positively related to box office revenues, while sex and profanity are negatively correlated with revenue. After controlling for production budget, a one-point increase in violent content is associated with revenues that are 9.4 percent higher (significant at 1 percent, Table 1, column 2).[30] The desirability of violent content is reflected in the distributions of violent content scores across different ratings and teenage appeal categories. These distributions indicate that producers seek to maximize the level of violence in their movies subject to receiving a particular rating. More than 50 percent of unrestricted PG-13 movies with strong teenage appeal in the U.S. have violent content scores of 6 (29 percent) or 7 (25 percent), while sexual content levels are symmetrically distributed around a score of 4. This suggests that leniency in ratings is likely to be more profitable if it is directed towards violence rather than sexuality or profanity.

A second specification allows the effect of restrictive ratings to vary with the teenage

[28]The genres are Action/Adventure, Comedy, Drama, Horror, Romantic Comedy, Romantic, Science-Fiction, and Thriller. Films are categorized in at most three genres. Our genre controls come from Screen It!

[29]Other results from Table 1 are of interest. Movies produced domestically perform 56.7 percent better than movies produced in foreign countries (significant at 1 percent, Table 1, column 4). Revenue decreases by 8.2 percent for each month separating a film's release and its earliest release in another country (significant at 1 percent, Table 1, column 4). Revenue is higher in countries where the official language is used in the movie, although this effect is not statistically significant.

[30]For illustrative purposes, we treat the violent, sexual, and profanity content variables as cardinal measures in Columns 1 and 2 of Table 1. All other specifications in the paper use fully-flexible versions of these variables, in which each level of the variable between 0 and 10 has an individual country-specific effect.

appeal of the movie:

$$\begin{aligned}\log(y_{ijt}) = \beta_0 + \beta_1 Teen\ availability_{ij} + \beta_2 Teen\ availability_{ij} \times Mixed\ teen\ appeal_i \\ + \beta_3 Teen\ availability_{ij} \times Low\ teen\ appeal_i + \boldsymbol{x'_{ij}\delta} + \boldsymbol{z'_i\gamma_j} + \rho_{jt} + \omega_i + \varepsilon_{ijt}\end{aligned} \tag{6}$$

where *Mixed teen appeal*$_i$ and *Low teen appeal*$_i$ are defined as above. The excluded group is movies with high teenage appeal. Negative coefficients on the interactions between the appeal categories and $Teen\ availability_{ij}$ would indicate that restrictive ratings have a weaker effect on movies that do not have strong teenage appeal.

Estimation results confirm that restrictive ratings have the strongest effect on movies with high teenage appeal. For such movies, a one-year reduction in the minimum age required for entry increases box office revenue by 4.3 percent (significant at 1 percent, Table 2, column 4). For movies with mixed teenage appeal, the impact of a one-year reduction in the minimum age required for entry decreases by 2.8 percent (significant at 5 percent, Table 2, column 4). For movies with low teenage appeal, the impact of a one-year reduction decreases by 1.6 percent (Table 2, column 4). Though estimates of β_2 and β_3 are not statistically significantly different from each other, the larger apparent effect of restrictive ratings for low teenage appeal movies compared to mixed teenage appeal movies suggests that restrictive ratings might alert older audiences to content that they may find undesirable even though they are still permitted to watch the movie.[31] However, for the strict definition of teen availability, there is a larger difference in the effect of restrictive ratings between movies with high and low teenage appeal (Table 2, column 5).

5.2 Robustness checks

Our findings are robust to a range of alternative specifications. We restrict the sample to predominantly English-speaking countries (Australia, New Zealand, the United Kingdom, and the United States) where the share of total box office attributed to the movies in our sample is greatest. For movies with high teenage appeal, a one-year reduction in the minimum age required for entry increases revenues by 5.3 percent for high teenage appeal movies (significant at 5 percent, Table 3, Column 1).

The use of dubbing versus subtitling varies across countries. In France, Germany, Italy, and Spain, foreign language movies are dubbed. In other parts of Europe, for example, the

[31]For example, a local poll conducted before the opening of *Passion of the Christ* indicated that the film's R-rating was the main reason only one in three members of The Church of Jesus Christ of Latter-day Saints in Utah would see Mel Gibson's violent telling of Christ's last days. Source: `http://www.deseretnews.com/article/590045378/LDS-most-likely-to-stay-away-from-Passion.html`, accessed August 28, 2017.

Netherlands, Belgium, and the United Kingdom, movies are subtitled (Mera, 1999). We therefore allow the coefficients on *Same country*, *Same language*, and *Release date delay* to vary by country. The results are very similar to the base case specification. For movies with high teenage appeal, a one-year reduction in the minimum age required for entry increases revenues by 4.2 percent (significant at 1 percent, Table 3, Column 2).

An additional check substitutes the controls for movie content with content measures from Ireland's state-regulated ratings agency. These measures are available for a smaller number of movies (1,038 instead of 1,810). For movies with high teenage appeal, a one-year reduction in the minimum age required for entry increases revenues by 5.2 percent (significant at 1 percent, Table 3, Column 3). For mixed and low teenage appeal movies, revenue increases from less restrictive ratings are 2.7 and 2.9 percent smaller (significant at 5 percent, Table 3, Column 3).

An additional robustness check controls for edits made across countries. Movies are sometimes edited in particular countries, typically to secure more lenient ratings.[32] Results are robust to excluding all 133 movies that were edited in any country. For movies with high teenage appeal, a one-year reduction in the minimum age required for entry increases revenues by 4.4 percent (significant at 5 percent, Table 3, Column 4). For mixed and low teenage appeal movies, less restrictive ratings are estimated to increase revenues by 1.3 and 2.6 percent (Table 3, Column 4).

Box office revenues of movies that cater to children and senior citizens may underestimate attendance because these groups are often able to purchase tickets at a discount. If restrictive ratings are disproportionately applied to movies aimed at these two groups, then the impact of restrictive ratings may be biased upward. Estimates that use data on box office attendance from 17 European countries and the U.S., rather than box office receipts, confirm the negative impact of restricting ratings on box office performance when attendance is used instead of revenue. For movies with high teenage appeal, a one-year reduction in the minimum age required for entry increases admissions by 4.3 percent (significant at 1 percent, Table 3, Column 5). For mixed and low teenage appeal movies, a one-year reduction in the minimum age increases admissions by 1.6 percent and 2.4 percent (Table 3, Column 5).

Results for all robustness checks are qualitatively similar when using the strict measure of teen availability (Table 4). In most cases, the difference in the revenue effects between high teen appeal and low teen appeal movies is greater when using strict teen availability. The difference is statistically significant at the 5 percent level in all but one column.

[32] Of cuts made to 28 movies in the United Kingdom, running times were reduced by 20 seconds on average.

6 Examining the issuance of restrictive ratings across movie types

Having shown that restrictive ratings impose a larger penalty on the box office performance of movies with high teen appeal compared to low teen appeal movies, we now examine if self-regulatory agencies are comparatively lenient on high teen appeal movies as predicted by the simple model developed in Section 3.

In an ideal experiment, we could test whether high teenage appeal movies receive more lenient ratings by comparing ratings issued by government and self-regulated rating agencies to pairs of movies that differed only in their level of teenage appeal. All other characteristics of the movies in a pair—such as their levels of violent and sexual content—would be identical. Any systematic difference in ratings would only reflect differences in teenage appeal and how these differences are assessed by the two regulatory regimes. Unfortunately, since any two movies differ in a variety of dimensions that are not directly measurable, this experiment is not possible. Nevertheless, our data are rich enough to allow us to compare the ratings issued by self- and government-regulated systems to movies with similar levels of violent, sexual, and profane content.

Figure 4 displays the average availability across countries for high and low teen appeal movies that have high levels of violent content (greater than 5). To control for correlation between restrictive ratings and sexual content, we exclude movies with high sexual content (more than 5). The figure reveals that the majority of countries are comparatively lenient on movies with strong teenage appeal. However, the United States, which is especially lenient towards movies with strong teen appeal, is a clear outlier. Three of the five other self-regulated or co-regulated countries (the Netherlands, Iceland, and the UK) are also above the line although not discernibly more lenient than other state-regulated countries. The essential features of this figure are unchanged when movies with higher levels of sexual content are added (Figure A2).

Comparisons of ratings issued to movies with different levels of teenage appeal, but with the same level of violent content, also indicate that self-regulated agencies are comparatively lenient on movies with high teenage appeal. In the U.S., for movies with low levels of sexual content and violent content scores between 6 and 8, mean teen availability is 0.90 for high teenage appeal movies and 0.52 for low teenage appeal movies (Figure 5). Though both co- and state-regulated countries are more lenient on high teenage appeal movies compared to mixed and low teenage appeal movies, there is a small but discernible bias toward greater

leniency in co-regulated countries.[33]

6.1 Baseline estimates

To identify the magnitude of leniency among self-regulated countries, our baseline regression compares the restrictiveness of ratings across countries, controlling for unobserved movie characteristics, as well as country-specific preferences for particular genres and content:

$$\begin{aligned} Teen\ availability_{ijt} = {} & \beta_1 Self\text{-}reg_j * Mixed\ teen\ appeal_i \\ & + \beta_2 Self\text{-}reg_j * Low\ teen\ appeal_i + \boldsymbol{x'_{ij}\delta} + \boldsymbol{z'_i\gamma_j} \\ & + \rho_{jt} + \omega_i + \varepsilon_{ijt} \end{aligned} \tag{7}$$

where *Self-reg*$_j$ is a dummy variable that equals 1 if ratings in country j are issued by a self-regulatory agency (Germany, Iceland, Japan, the Netherlands, the United Kingdom, and the United States). Controls $\boldsymbol{x_{ij}}$, $\boldsymbol{z_i}$, and ρ_{jt} are defined as above. Coefficients β_1 and β_2 measure the extent to which ratings issued by self-regulatory rating agencies display greater leniency towards movies with higher teenage appeal. Negative values indicates self-regulatory agencies are comparatively lenient on high teenage appeal movies.

Estimation results indicate that, after controlling for country-specific preferences for content and genre, countries with self-regulatory organizations issue more lenient ratings to movies with high appeal to teenagers. Movies with low appeal to teenagers are restricted to audiences $\frac{0.027}{0.125} = 0.22$ years (2.6 months) older on average (significant at 1 percent, Table 5, Column 1). This effect is more than twice as large as the increase in leniency shown by ratings agencies towards locally-produced movies. The coefficient on *Same language* indicates that movies in the country's official language are issued ratings that are more lenient by 2.9 months (significant at 10 percent, Table 5, Column 1).

Using the strict definition of teen availability, movies with mixed appeal to teenagers are restricted to audiences 1.2 months older on average (significant at 5 percent, Table 5, Column 5). Movies with low teenage appeal are restricted to audiences 2.1 months older on average (significant at 1 percent, Table 5, Column 5).

Given the presence of country-specific controls for genre and content, the regression results do **not** show whether self-regulated countries are more lenient on high teenage appeal movies than state-regulated countries. They only indicate that, conditional on a country's culture and preferences, self-regulated countries are relatively more lenient on high teenage

[33] As before, the essential features of this figure are not affected by incorporating movies with higher levels of sexual content (Figure A3).

appeal movies compared to mixed or low teen appeal movies. Figure 5 indicates that self-regulated countries are in fact less lenient on violence. However, as mentioned earlier, this is driven at least in part by the inclusion of state-regulated countries (Austria, France, and Spain) that seldom impose restrictions on films.

An additional specification differentiates between those self-regulated agencies that are impacted by applicable legislation (Germany, Iceland, Japan, the Netherlands, and the United Kingdom) and the United States, which operates in a legislative vacuum:

$$\begin{aligned} Teen\ availability_{ijt} = {} & \beta_1 USA_j * Mixed\ teen\ appeal_i + \beta_2 USA_j * Low\ teen\ appeal_i \\ & + \beta_3 Co\text{-}reg_j * Mixed\ teen\ appeal_i + \beta_4 Co\text{-}reg_j * Low\ teen\ appeal_i \\ & + \boldsymbol{x'_{ij}\delta} + \boldsymbol{z'_i\gamma_j} + \rho_{jt} + \omega_i + \varepsilon_{ijt} \end{aligned} \tag{8}$$

where USA_j is a dummy variable equal to one for the United States, and $Co\text{-}reg_j$ is a dummy equal to one for any of the five co-regulated ratings agencies.

Regression results reveal that, compared to high teenage appeal movies, the United States is more permissive towards mixed teenage appeal movies, and much more restrictive towards low teenage appeal movies. Co-regulated countries are restrictive towards both mixed and low teenage appeal movies. In the United States, movies with mixed appeal to teenagers are available to audiences 2.8 months younger on average (significant at 5 percent, Table 6, Column 1). Movies with low teenage appeal are restricted to audiences 5.8 months older on average in the United States (significant at 1 percent, Table 6, Column 1). In co-regulated countries, movies with mixed appeal and low appeal to teenagers are restricted to audiences 1.2 and 1.7 months older on average (significant at 5 percent, Table 6, Column 2). The effect of co-regulation is larger for the strict measure of teen availability, particularly for movies with low teen appeal (Table 6, Column 5).[34]

The positive coefficient on *USA*×*Mixed teen appeal* is surprising given that restrictive ratings have less effect on revenues for movies with mixed teenage appeal. One explanation is that the U.S. rating system has less flexibility to impose restrictions on younger age groups. For example, the only restrictive rating with widespread use is the R-rating, which restricts teenagers 16 years-old and younger from seeing the movie. Therefore, if a movie appeals to 15 or 16 year-olds, the only way to make it available to these age groups is to make it available to all age groups with a PG-13 rating. In co-regulated countries like the United

[34]The insignificant results for the U.S. using strict availability reflect the lack of variation in this measure for the U.S.: only a single movie in our sample has a strict availability different from 1 in the U.S.

Kingdom of Germany, movies can be issued ratings to restrict anyone below 12 years-old from entry, as well as ratings for 16 year-olds or above (Germany) and 15 year-olds or above (United Kingdom).

The coarseness of ratings in the United States is, of course, by design. The creation of the benign PG-13 rating nicely illustrates the tension between increasing revenues with more on-screen violence and avoiding conflict from concerned parents. An intermediate rating between PG and R had been considered by the MPAA as early as 1974. However, complaints from concerned parents and film critics about the level of violence in two PG-rated movies in 1984 (*Indiana Jones and the Temple of Doom* and *Gremlins*) expedited the introduction of the new rating.[35] Rather than imposing further restrictions, the new rating made more violent content available to minors. Movies that would have been rated R could now be seen by all children under 17. News reports initially indicated that the new rating would restrict movies to children 13 years and over unless they were accompanied by a parent guardian (e.g., *New York Times* June 20, 1984). However, when the PG-13 rating debuted on June 25 it was only advisory.[36] Richard Heffner, chairman of the Classification and Rating Administration, claims that the president of the MPAA, Jack Valenti, told him to "talk about it as a restricted rating, because then the public will feel that we didn't do them in" (Kendrick, 2009, p. 202).

6.2 Robustness checks

An alternative explanation for the comparatively lenient ratings issued in self-regulated countries is that teenage appeal is correlated with other movie characteristics that affect ratings. An obvious candidate is sexual content.[37] The U.S. rating system, for example, is often criticized for being overly lenient towards violence and overly restrictive towards sexual content (e.g., Dick, 2006). Our baseline specification includes flexible country-specific controls

[35] A film buyer for a Midwest theater chain noted that 50 people had walked out of a screening of *Gremlins* due to its violence (*New York Times*, June 20, 1984). *New York Times* film critic Vincent Canby, wrote that Steven Spielberg was "vividly demonstrating the inadequacy of the PG tag" (*New York Times*, June 10, 1984).

[36] Jack Valenti, head of the MPAA at the time, argued that the rating could only be advisory because theater owners are unable to prove that a child was 12 or below without IDs (*New York Times*, June 28, 1984).

[37] On average, movies with low teen appeal have greater sexual content. The mean sexual content rating is 4.0 for high teen appeal movies and 5.0 for low teen appeal movies. Since the MPAA is more restrictive of sexual content, if a movie's storyline is compatible with a PG-13 rating, sexual content will be excised in the development stage to avoid limiting the size of the potential audience. See `http://insidemovies.ew.com/2013/03/14/death-of-the-hollywood-sex-scene/`, accessed November 18, 2013

for the level of violence, sex, and profanity. Our estimates are robust to using alternative content measures from Ireland's state-regulated ratings agency (Table 6, Column 2).

Another explanation is that studios edit their movies to obtain desired ratings, and this is more likely for movies with high teenage appeal, which are harmed more by a restrictive rating. Specifically, studios may edit movies in ways that are imperceptible to the econometrician and do not affect the (discrete) violence score. We address this concern by excluding those 133 movies that were edited for content in at least one country. In the United States, movies with low teenage appeal are restricted to audiences 6.0 months older on average (significant at 1 percent, Table 6, Column 3). In co-regulated countries, movies with low appeal to teenagers are restricted to audiences 1.3 months older on average (significant at 10 percent, Table 6, Column 3).

Our sample for the restrictiveness regressions includes observations for which we do not have box office revenue data and so are excluded from the analysis in Section 5. The self-regulation results are unaffected by using only the observations from the revenue sample and, if anything, the effects of self-regulation and co-regulation are larger in magnitude. In the United States, movies with low teenage appeal are restricted to audiences 6.8 months older on average (significant at 1 percent, Table 6, Column 4). In co-regulated countries, movies with low appeal to teenagers are restricted to audiences 2.5 months older on average (significant at 1 percent, Table 6, Column 4).

7 Conclusion

This paper analyzes the performance of self-regulation using the example of motion picture rating systems. This setting is particularly attractive due to the existence of cross-sectional variation in the source of regulation. Using data on 1,810 movies across 31 countries, we find that restrictive ratings impose a large penalty on box office performance, particularly for those movies that appeal to teenage audiences. Controlling for unobserved characteristics with movie fixed effects, we find that a one-year reduction in the minimum age required for entry increases revenues by 4.3 percent. The effect of age restrictions is smaller for movies with mixed or low teenage appeal. For strict restrictions, a one-year reduction in the minimum age for entry increases revenues by about 2.1 percent for mixed or low teen appeal movies. These findings are robust to focusing on box office returns in English-speaking countries, using alternative controls for content, controlling for edits made across countries, and using attendance instead of box office receipts.

To investigate whether self-regulatory organizations assign more lenient classifications to movies with high teenage appeal, for which restrictive ratings impose a greater economic penalty, we compare the ratings issued for the same movies across countries and regulatory environments, controlling for country-specific preferences for content and genre. For strict classifications, we find that movies with mixed appeal to teenagers are restricted to audiences 1.2 months older on average, while movies with low teenage appeal are restricted to audiences 2.1 months older on average.

The potentially adverse effects of self-regulation are not confined to the movie industry. For example, in 2006 ten U.S. food and beverage producers launched the Children's Food and Beverage Advertising Initiative (CFBAI), a self-regulatory program to encourage the advertising of healthier foods to children under 12. One of the initiative's commitments is to include healthier foods in "child-directed" advertising, which is media advertising where children under the age of 12 do not comprise more than 35 percent of the audience.[38] However, this definition excludes shows with very large audiences such as *American Idol*, which is viewed by hundreds of thousands of children (*The Economist*, November 23, 2013).[39] Furthermore, products that meet the "CFBAI Category-Specific Uniform Nutrition Criteria" that may be used in child-directed advertising include Kellogg's Frosted Flakes, Cocoa Puffs, Chocolate Lucky Charms, and McDonald's Chicken McNuggets Happy Meal. The malleability of this categorization is similar to the flexibility of the U.S. motion picture rating system, which is particularly lenient on violent content that appeals to teenage audiences.

[38]Children's Food and Beverage Advertising Initiative, *Program and Core Principles Statement, 4th edition*, available at `http://www.bbb.org/`, accessed May 9, 2014.

[39]Available at: `http://www.economist.com/news/international/21590489-are-children-fair-game-sophisticate` accessed May 9, 2014.

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Table 1: Country-level movie revenue estimation results

	(1) No Movie FE	(2) Include Budget	(3) Movie FE	(4) Country× content	(5) Strict ratings
Teen availability (0–1)	0.633**	0.207**	0.322**	0.219**	0.224**
	(0.071)	(0.074)	(0.031)	(0.035)	(0.036)
Violent content	0.317**	0.090*			
	(0.035)	(0.035)			
Sexual content	-0.105**	-0.055			
	(0.034)	(0.036)			
Profanity content	-0.334**	-0.116**			
	(0.039)	(0.036)			
Same country (0/1)	0.539**	0.298**	0.453**	0.449**	0.452**
	(0.063)	(0.070)	(0.040)	(0.040)	(0.040)
Same language (0/1)	0.787**	-0.204	0.286**	0.172	0.177
	(0.155)	(0.244)	(0.106)	(0.109)	(0.110)
Release delay (months)	-0.008	-0.109**	-0.091**	-0.086**	-0.086**
	(0.005)	(0.022)	(0.006)	(0.005)	(0.005)
Log budget		0.576**			
		(0.083)			
Teen availability	Unaccomp	Unaccomp	Unaccomp	Unaccomp	Strict
Country-year FE	Y	Y	Y	Y	Y
Movie FE	.	.	Y	Y	Y
Country-content FE	.	.	.	Y	Y
Observations	28236	21727	28236	28236	28236
No. of movies	1810	1321	1810	1810	1810

Note: Each observation is a country-movie. The dependent variable in all regressions is the log of the total box office revenue earned by the movie in that country. Country-content effects in Columns 4 and 5 include full interactions of each country with discrete values of three measures on a 10-point scale of violent, sexual, and profanity content, as well as interactions of each country with 11 genre categories. Teen availability is defined using the unaccompanied measure in Columns 1–4 (the proportion of teenagers who can see the movie without a parent) and the strict measure in Column 5 (the proportion of teenagers who can see the movie, even with a parent).

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. Standard errors in parentheses are clustered by movie.

Table 2: Country-level movie revenue estimation results, with teen appeal interactions

	(1) High teen appeal	(2) Med teen appeal	(3) Low teen appeal	(4) Country× content	(5) Strict ratings
Teen availability (0–1)	0.343**	0.118*	0.230**	0.339**	0.360**
	(0.072)	(0.056)	(0.066)	(0.070)	(0.068)
× Mixed teen appeal				-0.221*	-0.188*
				(0.089)	(0.087)
× Low teen appeal				-0.125	-0.194*
				(0.093)	(0.098)
Same country (0/1)	0.332**	0.344**	0.612**	0.444**	0.446**
	(0.089)	(0.059)	(0.071)	(0.041)	(0.041)
Same language (0/1)	-0.049	0.312*	0.199	0.166	0.173
	(0.394)	(0.141)	(0.139)	(0.119)	(0.121)
Release delay (months)	-0.082**	-0.103**	-0.076**	-0.087**	-0.087**
	(0.011)	(0.008)	(0.008)	(0.005)	(0.005)
Teen appeal sample	High	Medium	Low	All	All
Teen availability	Unaccomp	Unaccomp	Unaccomp	Unaccomp	Strict
Country-year FE	Y	Y	Y	Y	Y
Movie FE	Y	Y	Y	Y	Y
Country-content FE	Y	Y	Y	Y	Y
Country-appeal-content	.	.	.	Y	Y
Observations	8380	12102	7754	28236	28236
No. of movies	454	797	559	1810	1810

Note: Each observation is a country-movie. The dependent variable in all regressions is the log of the total box office revenue earned by the movie in that country. Columns 1 to 3 show the results from Column 4 in Table 1, split by the level of teen appeal. Columns 4 and 5 show the results for all movies, but including interactions of teen appeal with teen availability and with country-content effects. Teen availability is defined using the unaccompanied measure in Columns 1–4 (the proportion of teenagers who can see the movie without a parent) and the strict measure in Column 5 (the proportion of teenagers who can see the movie, even with a parent).

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. Standard errors in parentheses are clustered by movie.

Table 3: Robustness checks for country-level movie revenue estimation results, using unaccompanied measure of teen availability

	(1) English-speaking	(2) Country specific	(3) Irish content	(4) Exclude cut	(5) Log admission
Teen availability (0–1)	0.412*	0.327**	0.409**	0.344**	0.339**
	(0.172)	(0.069)	(0.077)	(0.078)	(0.088)
× Mixed teen appeal	-0.021	-0.216*	-0.221*	-0.239*	-0.215+
	(0.215)	(0.089)	(0.094)	(0.100)	(0.110)
× Low teen appeal	-0.194	-0.122	-0.232*	-0.140	-0.153
	(0.215)	(0.093)	(0.103)	(0.101)	(0.123)
Dep. var. (log)	Revenue	Revenue	Revenue	Revenue	Admissions
Teen availability	Unaccomp	Unaccomp	Unaccomp	Unaccomp	Unaccomp
Observations	5865	28236	21042	25855	19078
No. of movies	1810	1810	1038	1677	1792

Note: Each observation is a country-movie. The dependent variable in Models 1 to 4 is the log revenue of the movie. The dependent variable in Model 5 is the log of the number of admissions to the movie. Model 1 only includes observations for the U.S., U.K., Australia, and New Zealand. Model 2 allows the same country, same language, and release delay coefficients to vary by country. Model 3 uses flexible interactions with the content classifications from the Irish Film Classification Office. Model 4 excludes movies that were cut in any country. All regressions include the same interactions and controls as in Columns 4 and 5 of Table 2, including the movie fixed effects and country-level content interactions. Teen availability is defined using the unaccompanied measure (the proportion of teenagers who can see the movie without a parent).

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. Standard errors in parentheses are clustered by movie.

Table 4: Robustness checks for country-level movie revenue estimation results, using strict measure of teen availability

	(1) English-speaking	(2) Country specific	(3) Irish content	(4) Exclude cut	(5) Log admission
Teen availability (0–1)	0.486**	0.333**	0.418**	0.364**	0.315**
	(0.180)	(0.068)	(0.076)	(0.076)	(0.093)
× Mixed teen appeal	-0.204	-0.175*	-0.233*	-0.202*	-0.171
	(0.207)	(0.087)	(0.093)	(0.098)	(0.113)
× Low teen appeal	-0.482*	-0.159+	-0.231*	-0.213*	-0.290*
	(0.230)	(0.096)	(0.104)	(0.105)	(0.137)
Dep. var. (log)	Revenue	Revenue	Revenue	Revenue	Admissions
Teen availability	Strict	Strict	Strict	Strict	Strict
Observations	5865	28236	21042	25855	19078
No. of movies	1810	1810	1038	1677	1792

Note: See notes for Table 3. Teen availability is defined using the strict measure (the proportion of teenagers who can see the movie, even with a parent).

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$. Standard errors in parentheses are clustered by movie.

Table 5: Teen availability by type of regulation

	(1) Country× content	(2) Irish content	(3) Exclude cut	(4) Revenue sample	(5) Strict ratings
Self-reg × mixed teen appeal	-0.005	-0.005	-0.001	-0.005	-0.013*
	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)
Self-reg × low teen appeal	-0.027**	-0.021*	-0.024**	-0.038**	-0.022**
	(0.007)	(0.009)	(0.007)	(0.009)	(0.007)
Same country (0/1)	0.011+	0.016*	0.012*	0.015*	0.003
	(0.006)	(0.008)	(0.006)	(0.006)	(0.006)
Same language (0/1)	0.030+	0.014	0.024	0.043*	0.008
	(0.015)	(0.019)	(0.016)	(0.018)	(0.012)
Release delay (months)	-0.000	-0.000	-0.000	-0.001	-0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Dep. var. (availability)	Unaccomp	Unaccomp	Unaccomp	Unaccomp	Strict
Country-year FE	Y	Y	Y	Y	Y
Movie FE	Y	Y	Y	Y	Y
Country-content FE	Y	Y	Y	Y	Y
Observations	44945	28590	41407	28236	44945
No. of movies	1810	1038	1677	1810	1810

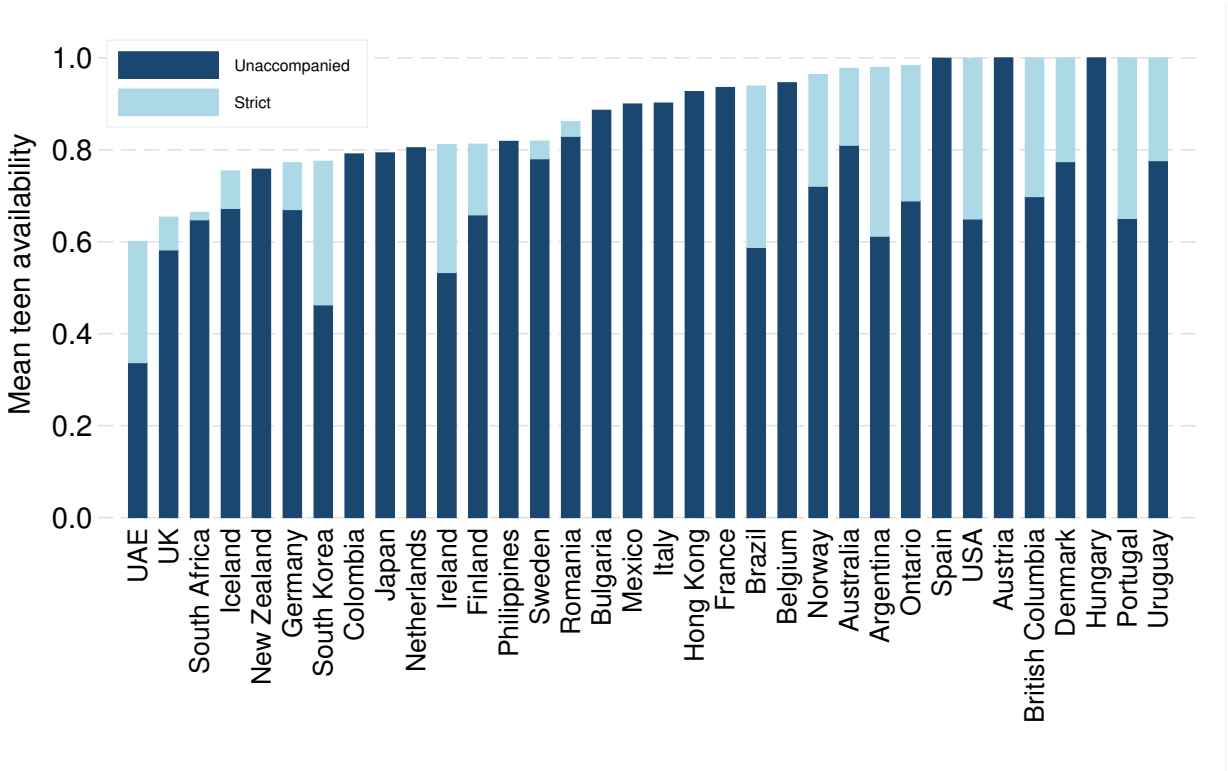
Note: Each observation is a country-movie. The dependent variable in Models 1 to 4 is the unaccompanied teen availability of the movie in each country. This is measured on a scale from 0 to 1, where 0 means that no teenagers aged 10–17 can see the movie unaccompanied, and 1 means that all can. The dependent variable in Model 5 is the strict teen availability, measured as the proportion of teenagers who can see the movie, even with a parent. Model 4 uses the sample of country-movie observations from Table 1 for which we have revenue data.

Table 6: Teen availability by type of regulation

	(1) Country× content	(2) Irish content	(3) Exclude cut	(4) Revenue sample	(5) Strict ratings
USA × mixed teen appeal	0.029*	0.032*	0.029*	0.027*	-0.002
	(0.012)	(0.016)	(0.013)	(0.013)	(0.005)
USA × low teen appeal	-0.060**	-0.062**	-0.062**	-0.071**	0.006
	(0.016)	(0.020)	(0.017)	(0.018)	(0.005)
Co-reg × mixed teen appeal	-0.013*	-0.014+	-0.008	-0.015*	-0.015*
	(0.006)	(0.008)	(0.006)	(0.007)	(0.007)
Co-reg × low teen appeal	-0.018*	-0.011	-0.014+	-0.026**	-0.030**
	(0.007)	(0.009)	(0.007)	(0.009)	(0.009)
Same country (0/1)	0.010	0.014+	0.010	0.013*	0.003
	(0.006)	(0.008)	(0.006)	(0.006)	(0.006)
Same language (0/1)	0.028+	0.012	0.022	0.040*	0.009
	(0.015)	(0.019)	(0.016)	(0.018)	(0.012)
Release delay (months)	-0.000	-0.000	-0.000	-0.001	-0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Dep. var. (availability)	Unaccomp	Unaccomp	Unaccomp	Unaccomp	Strict
Country-year FE	Y	Y	Y	Y	Y
Movie FE	Y	Y	Y	Y	Y
Country-content FE	Y	Y	Y	Y	Y
Observations	44945	28590	41407	28236	44945
No. of movies	1810	1038	1677	1810	1810

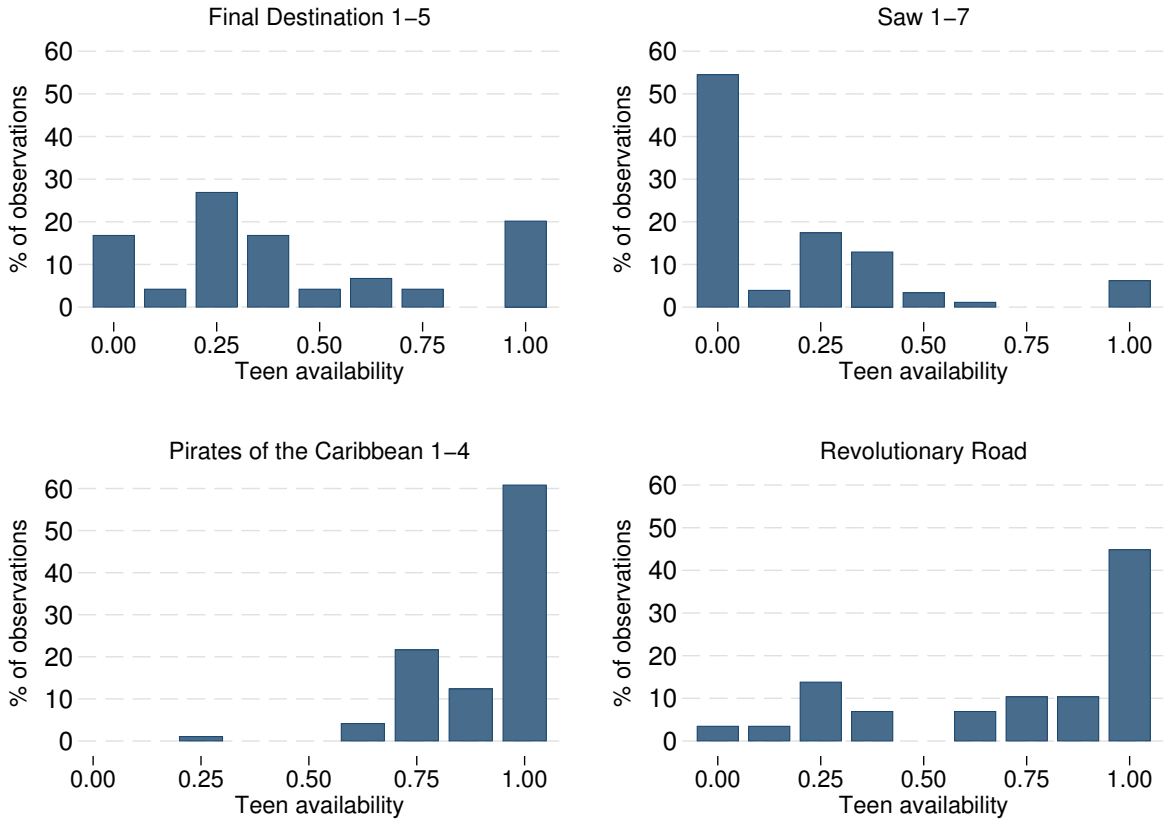
Note: See notes to Table 5.

Figure 1: Average teen availability across 34 countries or provinces



Note: Unaccompanied teen availability measures the proportion of age groups between 10 and 17 years that are permitted to watch a movie without a parental guardian. Strict teen availability measures the proportion permitted to watch a movie with or without a parental guardian. Data on ratings for each movie are from `http://www.imdb.com` and rating agency websites.

Figure 2: Distribution of teen availability across countries, for selected franchises and movies

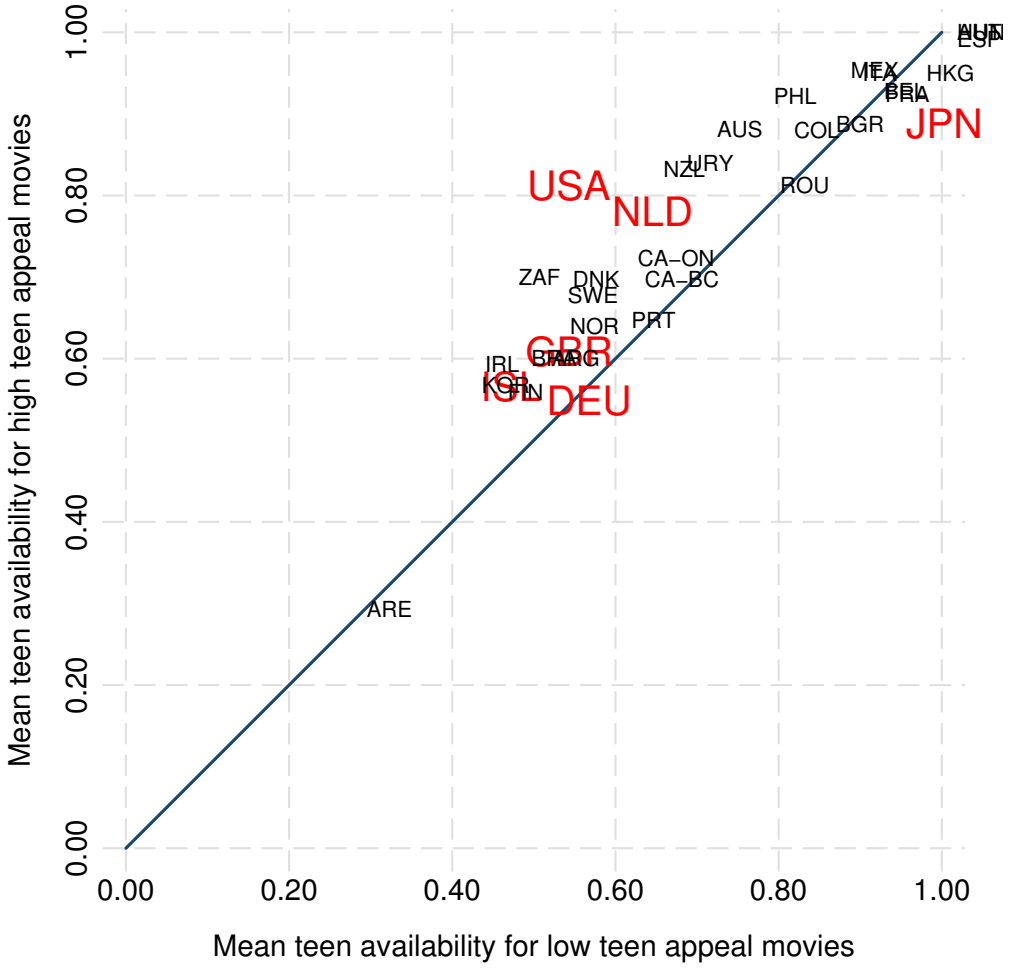


Note: The graphs show the distribution of the unaccompanied teen availability measure for the 34 countries or provinces in our data, for all movies in each franchise (*Final Destination*, *Saw*, or *Pirates of the Caribbean*) or the movie *Revolutionary Road*.

Figure 3: Teen appeal, teen availability, and box office performance

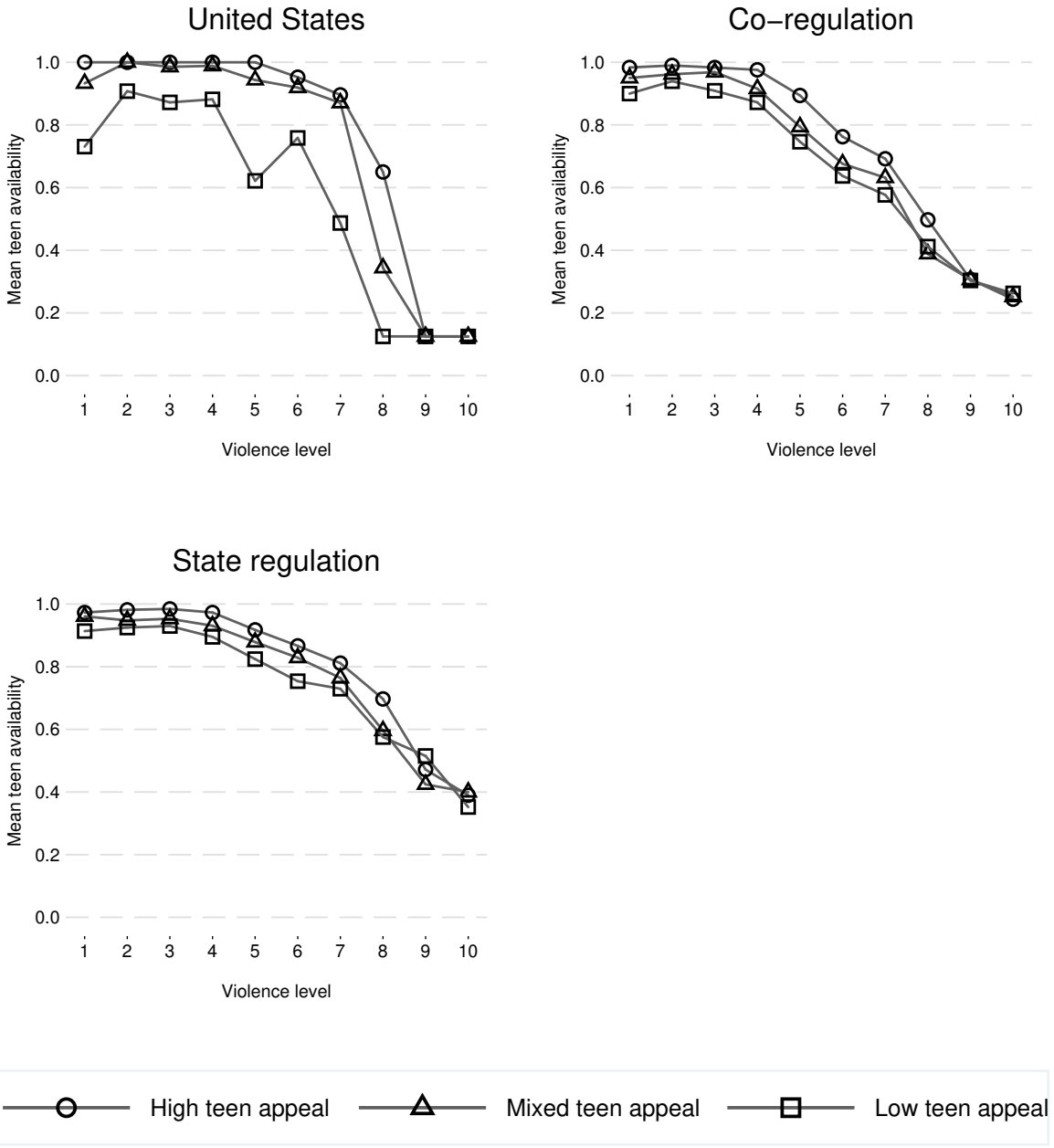
Note: The left graph shows the mean market shares, by teen appeal group and level of teen availability on the horizontal axis. Market share is the total revenue of the movie in a country, divided by the total revenue for all movies in that country and year. Only observations for countries with at least 50 movies in the year are included. The right graph shows the mean residuals, by teen appeal group and level of teen availability, from a regression of log total revenue on (i) movie fixed effects and (ii) country-by-year effects.

Figure 4: Mean teen availability for movies with high violent content and low sexual content, by level of teen appeal



Note: For each country, the graph shows the mean teen availability for high teen appeal movies (vertical axis) and low teen appeal movies (horizontal axis), for movies with high violent content and low sexual content (violent content score above 5 on a 10-point scale and sexual content score below 5 on a 10-point scale). Countries lying above the 45-degree line show relatively more lenience towards movies with high teen appeal. Highlighted countries have self-regulatory rating agencies.

Figure 5: Availability to teenagers by violence level and teen appeal, for movies with low levels of sexual content



Note: Each graph shows the mean teen availability, for each level of violent content, split by the teenage appeal. Only movies with a sexual content score below 5 on a 10-point scale are included. The three graphs show the mean availability for the United States, for co-regulated countries (Germany, Iceland, Japan, the Netherlands, and the United Kingdom), and for state-regulated countries. A larger gap between the high teen and low teen appeal lines suggests relatively more lenience towards high teen appeal movies.

Table A1: Countries and regulation

Country/ Province	Regul- ation	Ratings Agency	Parent Organization	Parent type	Legislation
United States	Self	Classification and Rating Administration	Motion Picture Association of America	Trade	
Germany	Self	Voluntary self-regulation board of the film industry	Head Organization of Film Industry (SPIO)	Trade	Y
Iceland	Self	NICAM (*since 2005)	Organization of Photographers in Iceland (SMAIS)	Trade	Y
Japan	Self	Film Classification and Rating Committee		Trade	Y
Netherlands	Self	NICAM		Trade	Y
United Kingdom	Self	British Board of Film Classification		Trade	Y
Argentina	State	Cinematographic Exhibition Advisory Commission	Ministry of Culture of the Nation	Govt.	Y
Australia	State	Australian Classification Board	Department of Communication and the Arts	Govt.	Y
Austria	State	Austrian Board of Media Classification	Federal Ministry of Education, Science and Culture	Govt.	Y
Belgium	State	Intercommunity Commission of Film Control	(Agreement b/w different communities	Govt.	Y
Brazil	State	Department of Justice, Rating, Titles and Qualification	Ministry of Justice	Govt.	Y
British Columbia	State	British Columbia Film Classification Office	Business Practices and Consumer Protection Authority	Govt.	Y
Bulgaria	State	National Commission of Film Classification	Ministry of Culture	Govt.	Y
Colombia	State	Film Classification Committee	Ministry of Culture	Govt.	Y
Denmark	State	Media Council for Children and Young People	Ministry of Culture	Govt.	Y
Finland	State	Finnish Board of Film Classification	Ministry of Education and Culture	Govt.	Y
France	State	Film Classification Committee	Ministry of Culture and Communication	Govt.	Y
Hong Kong	State	Film Censorship Authority	Office for Film, Newspaper and Article Administration	Govt.	Y
Hungary	State	National Media and Infocommunications Authority	Ministry of National Cultural Heritage	Govt.	Y
Ireland	State	Irish Film Classification Office	Department of Justice and Equality	Govt.	Y
Italy	State	Revision Commission	Minsitry of Cultural Heritage and Activities	Govt.	Y
Mexico	State	Director General of Radio, Television & Cinematography	Ministry of the Interior	Govt.	Y
New Zealand	State	Office of Film & Literature Classification	Department of Internal Affairs	Govt.	Y
Norway	State	Norwegian Media Authority (Medietilsynet)	Ministry of Culture and Church Affairs	Govt.	Y
Ontario	State	Ontario Film Review Board	Ministry of Government and Consumer Services	Govt.	Y
Philippines	State	Movie and Television Review and Classification Board	Office of the President	Govt.	Y
Portugal	State	Performance Classification Committee	Ministry of Culture	Govt.	Y
Romania	State	National Center of Cinematography	Ministry of Culture and Religious Affairs	Govt.	Y
South Africa	State	Film and Publication Board	Department of Communications	Govt.	Y
South Korea	State	Korea Media Rating Board	Ministry of Culture, Sports and Tourism	Govt.	Y
Spain	State	Commission for Film Classification	Ministry of Education, Culture and Sport	Govt.	Y
Sweden	State	Swedish Media Council	Ministry of Culture	Govt.	Y
UAE	State	National Media Council	Ministry of Information and Cultural Affairs	Govt.	Y
Uruguay	State	Institute for Children and Adolescents of Uruguay	Ministry of Social Development	Govt.	Y

Agencies and legislation in 2013. Compiled from a variety of sources, especially ratings agency websites and "Empirical Study on the Practice of the Rating of Films Distributed in Cinemas Television DVD and Videocassettes in the EU and EEA Member States," Prepared on behalf of the European Commission (May 2003). A list of sources is available upon request.

Table A2: Grouping Screen It! Responses to Question "Will Kids Want to See it?"

Screen It! Response	Category	Examples
Yes / Good bet	High	*Harry Potter 5*: Yes, especially if they're fans of the books and/or previous films. *Transformers*: It's a good bet many will.
If . . . probably will	High	*Anchorman*: If they're fans of Ferrell and his comedy antics, or anyone else in the cast, it's a good bet they will. *Die Another Day*: If they're fans of the Bond films or anyone in the cast, it's a good bet they probably will.
If . . . they just might	Mixed	*Music and Lyrics*: If they're looking for a date movie, or are fans of Grant, Barrymore, anyone else in the cast, or romantic comedies, they just might. *Taken*: If they're into hard-hitting action films and/or are fans of anyone in the cast, they might want to.
If . . . they might but unlikely otherwise	Low	*Atonement*: Those who are fans of epic romantic dramas and/or anyone in the cast just might. Otherwise, it doesn't seem likely. *There Will Be Blood*: Older teens might be interested, but unless anyone is a fan of someone in the cast, it doesn't seem too likely.
Unless . . . it's unlikely	Low	*Frost/Nixon*: Unless they're interested in the true life story and/or are fans of anyone in the cast, it doesn't seem too likely. *Up in the Air*: Unless they're fans of anyone in the cast or the director of "Juno" and "Thank You For Smoking," it doesn't seem too likely many will be interested in this.

Notes: The first column describes the basic structure of common Screen It! responses to the question "Will Kids Want to See it?" The second column shows our categorization of these response types. The third column gives examples of responses for specific movies that we assigned to each category.

Figure A1: Rating systems around the world

	Age																		
Country / Province	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Argentina	ATP												13			16		18		
Australia	G									PG					M/MA			R		
Austria	U					6				10		12		14		16		18		
Belgium	KT															KNT				
Brazil	L									10		12		14		16		18		
British Columbia	G / PG													14A				18A / R		
Bulgaria	A / B											C				D		X		
Colombia	ATP						7					12			15			18		
Denmark	A						7				11				15					
Finland			3				7				11		13		15			18		
France	U									10		12				16		18		
Germany	FSK 0					FSK 6						FSK 12				FSK 16		FSK 18		
Hong Kong	I / IIA / IIB																	III		
Hungary	KN					6						12		14		16		18		
Iceland	L						7			10		12		14		16		18		
Ireland	G							PG				12A			15A	16		18		
Italy	T													VM14				VM18		

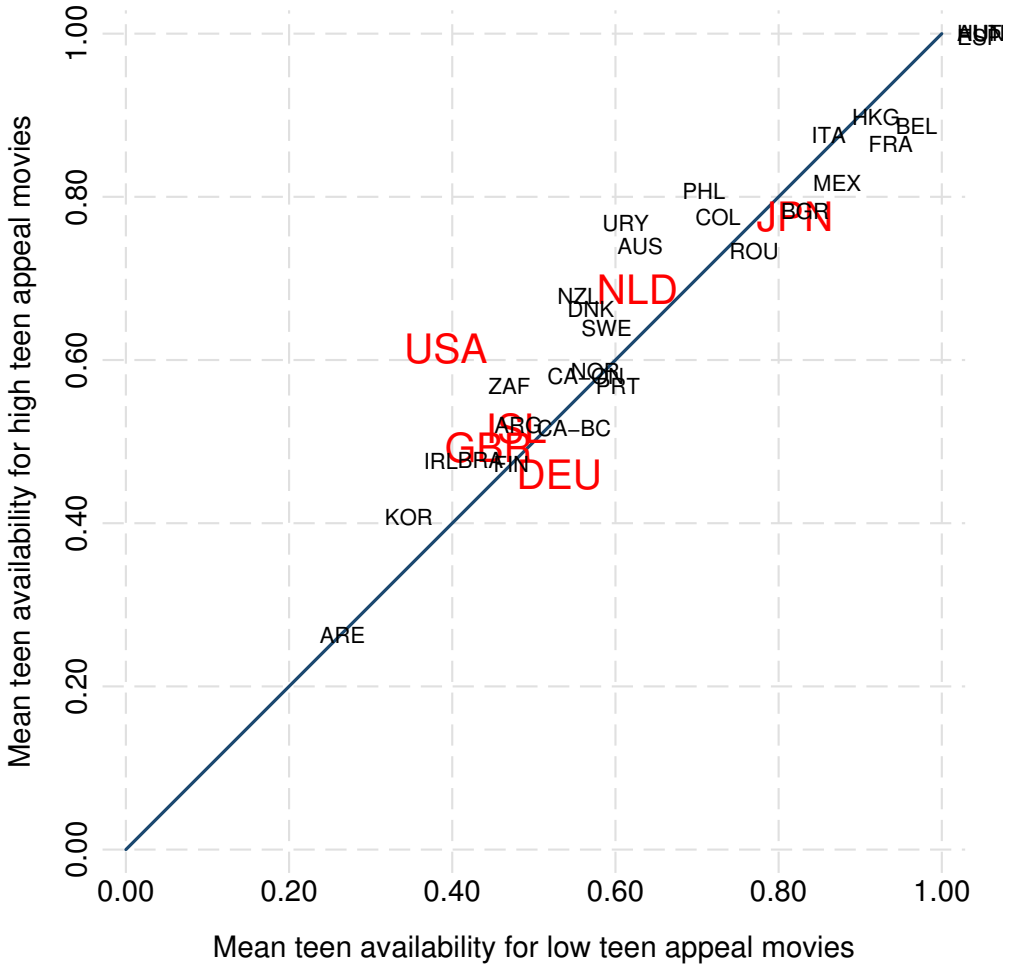
Note: Data on ratings from individual rating agency websites. A single underline indicates audiences under specified age require an adult guardian. A double underline indicates audiences under specified age not admitted.

Figure A1 (Cont.): Rating systems around the world

	Age																			
Country / Province	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Japan	G											PG12			R15			R18		
Mexico	AA						A					B			B15			C / D		
Netherlands	AL					6			9			12				16				
New Zealand	G / PG									M			R13		R15	R16		R18		
Norway	A						7				11				15			18		
Ontario	G / PG													14A				18A / R		
Philippines	G / PG												R13			R16		R18		
Portugal				M4		M6						M12				M16		M18		
Romania	AG											AP12			N15			IM18		
South Africa	A / PG									10			13			16		18		
South Korea	ALL											12			15			18		
Spain	APTA						7					12	13			16		18 / X		
Sweden	BTL						7				11				15					
United Arab Emirates	G												PG13		PG15 / 15+			18+		
United Kingdom	U							PG				12A			15			18 / R		
Uruguay	ATP								9			12			15			18		
United States	G									PG			PG-13				R	NC-17		

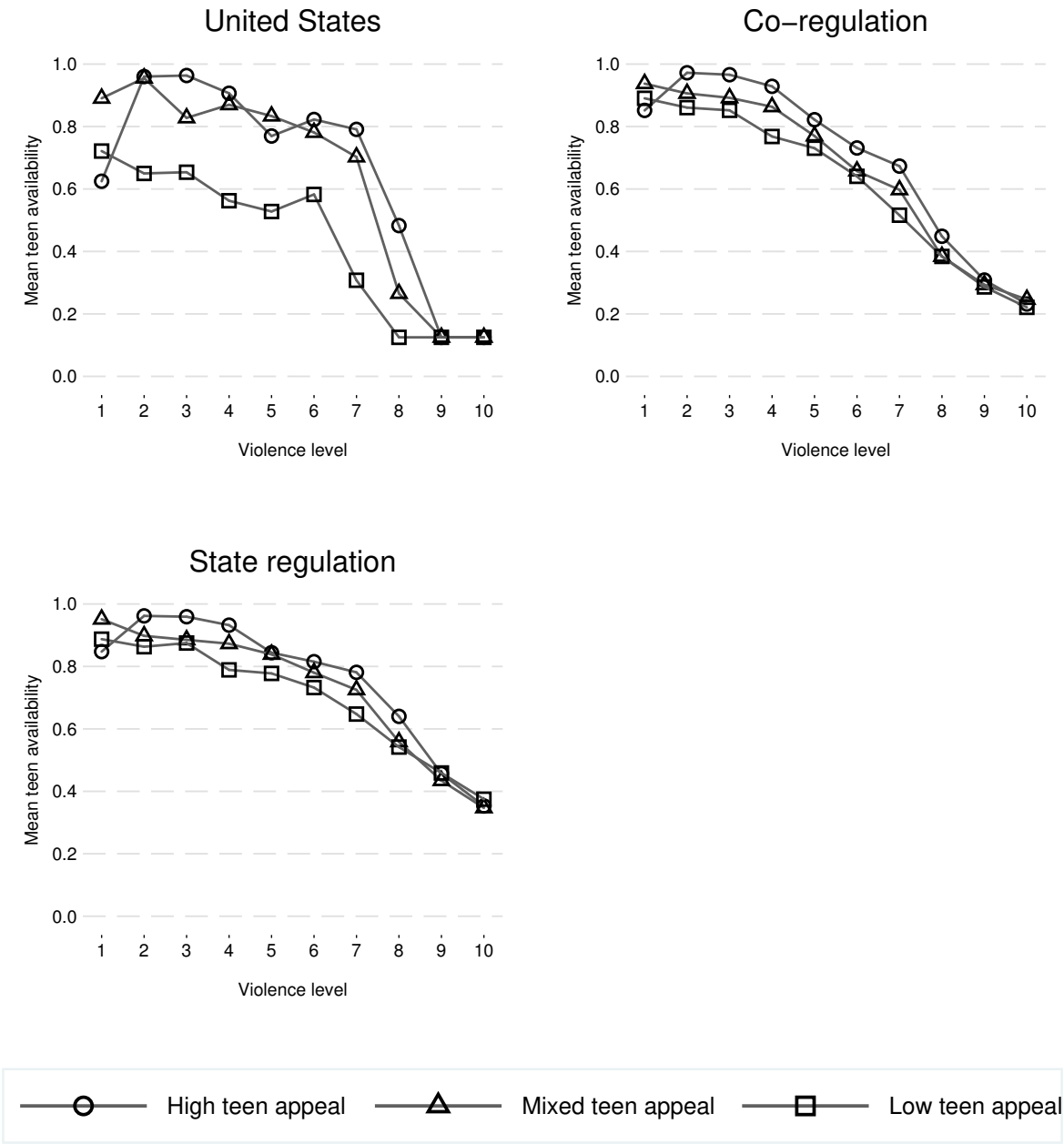
Note: Data on ratings from individual rating agency websites. A single underline indicates audiences under specified age require an adult guardian. A double underline indicates audiences under specified age not admitted.

Figure A2: Mean teen availability for movies with high violent content, by level of teen appeal



Note: See notes to Figure 4. This graph shows all movies with violent content scores above 5, without restricting the sample based on the level of sexual content.

Figure A3: Availability to teenagers by violence level and teen appeal



Note: See notes to Figure 5. This graph shows all movies, without restricting the sample based on the level of sexual content.