Is copyright an incentive to create a good anime?

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Abstract

Theoretically, copyright encourages creativity by rewarding creators for their efforts. This paper explores the effect of copyright on the quality of Japanese TV animation or anime, whose creators, anime studios, choose to be the copyright holder or to otherwise take a fixed payment instead of being the copyright holder. First, a simple economic model analysis shows that a creator chooses copyright to produce higher quality work if a fixed payment is sufficiently low. Even if a fixed payment is high, it is shown that copyright can be more favorable to a creator focusing on creativity more than profit. Then, the average treatment effect is estimated by using the quality measure of each anime work as the output; the treatment is whether or not an anime work was created by a creator who chose to be the copyright holder. The results show that, on average, anime works whose creators hold the copyright are more highly rated and viewed compared to the works whose creators do not hold the copyright. From this, it can be concluded that copyright is an incentive for anime studios to create higher quality anime.

Keywords: Copyright, creativity, the Japanese anime industry, average treatment effect

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1. Introduction

Theoretically, copyright encourages creativity by rewarding creators for their efforts and thus is an incentive for them to provide valuable artworks. However, as Towse (2010) points out, it is difficult to empirically verify its causal effect because copyright automatically attaches to the authors of all works that fall in the scope of the copyright law. Hence, it is hard to find counterfactual situations to test the impact of copyright on creativity. There has been only indirect data for research on the incentive role of copyright (Towse, 2013).

This paper explores counterfactual situations to test the effect of copyright on the quality of artistic work, particularly in the case of Japanese TV animation or anime. Under Article 29 of the Copyright Law of Japan, anime studios, the creators of anime, can be copyright holders only if they participate as members of the production committee (*Seisaku-iinkai* in Japanese), which consist of companies that finance the production.[1] Otherwise, studios do not possess the copyright and only receive a fixed payment from the production committee as contractors. Many anime studios create anime works but do not possess the copyright thereof. Therefore, a counterfactual analysis is available to examine the possible change in an anime's quality if its creator, who took a fixed payment instead of copyright, had ever chosen to be the copyright holder.

The analysis begins with a simple economic model that examines the relationship between copyright and a studio's creativity based on an economic explanation of the creative process by Throsby (2001). In this model, the quality of an anime is compared under two types of a studio's attitude toward creativity and two compensation schemes: by copyright or by a fixed payment. It is shown that copyright can be an incentive to create higher quality anime if a fixed payment is sufficiently low. Even if a fixed payment is high, it is shown that copyright can be more favorable to a creator focusing on creativity more than profit.

Empirically, the quality of anime work is measured by viewers' ratings posted on Anime News Network, a news and information website focusing on anime and manga (Japanese Comics).[2] The website claims to be the leading English language source for

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[1] Anime is categorized as a cinematographic, and its creator is denoted as "author" in the law.

[2] Anime News Network, FAQ, "What is Anime News Network (ANN)?" https://fast.animenewsnetwork.com/faq#what_is_ann (last accessed on September 9,

anime and manga news on the Internet, and its Encyclopedia, a collaborative database of anime and manga titles, offers user ratings and information about those titles. By using the quality measures of each anime as the output, the average treatment effect is estimated, where the treatment is whether or not an anime work is created by the studio holding the copyright. The estimation results show that, on average, anime works whose studios hold the copyright are more highly rated and viewed compared to the works whose studios do not hold the copyright. Since the results imply the causal effect of copyright, it can be concluded that copyright is an incentive for studios to create higher quality anime.

The paper proceeds as follows. Section 2 briefly explains the industrial organization of the Japanese anime industry and the production structure. Section 3 proposes an economic model for copyright and a studio's creativity. Section 4 presents the empirical framework, data, and the estimation results of the average treatment effect. Section 5 provides conclusions.

2. The Japanese anime industry

In 2018, the total revenue of anime and anime-related products was 2,001 billion yen. [3] This revenue comes from TV, movies, video, internet distribution, merchandising, music, pachinko (Japanese pinball), and live entertainment. The entire minutes of all TV anime produced in 2018 add up to 130,808 minutes. Many recent TV anime titles consist of 10 to 13 episodes, each of which is about 30 minutes long. Thus, roughly more than 300 new anime titles were produced in 2018.

The key players of the industry are anime studios, which are currently comprised of 542 studios in Tokyo, and several local studios such as Kyoto animation (Kyoto) and PA WORKS (Toyama). They engage in planning, production, scriptwriting, direction, drawing, computer graphics, art, special effect, shooting, and editing. The total revenue of all commercial anime studios was 267 billion yen in 2018, which was about 0.13 of the total revenue of the anime and related products industry. This small share of anime studios in the industry implies that the copyright of many anime works belongs to

2020)

[3] The data of Japanese anime industry is from the Association of Japanese Animations, *Anime Industry Report 2019 Summary* https://aja.gr.jp/download/anime_ind_rpt2019_summary_en (Last accessed on September 9, 2020).

anime-related companies other than studios.

A group of an anime work's copyright holders is called the "production committee," a joint venture by several companies in anime-related businesses to fund and coordinate the production, distribution, and marketing of an anime work (Craig 2020, Chap. 9). The member companies include TV networks, DVD publishers, movie distributors, manga publishers, record labels, toy and video game makers, web streaming services, and so on. As joint copyright holders of an anime work, they share the revenue to the committee. The share in revenue and content of the rights differ among member companies, but the leading company that invests the most considerable amount has the largest share. Large studios mainly create anime as the primary contractor of the committee, taking a fixed payment for the production cost. In most cases, the production process is divided, and the primary contractor subcontracts many operations to other studios.

Anime studios themselves often participate in the production committee when they create an original anime as opposed to a derivative work of a novel or manga created by others. They also participate in the committee when they bear a part of the production costs and become joint copyright holder with other member companies. Otherwise, they transfer all copyright, except for moral rights, to the committee and only receive a fixed payment.

The 2009 report by the Japanese Fair Trade Commission reveals that anime studios have relatively weak bargaining power against their client companies, especially TV networks.[4] Creating higher quality anime requires a larger amount of drawing, which increases production costs. Thus, many anime studios who try to raise the quality of their works tend to request for higher payments. However, especially for contracts with TV networks, many studios answered that payments are insufficient to create high-quality anime, and the client often refuse their request for a pay increase.

3. Copyright and creativity: an economic model

This section proposes a simple economic model to explain the relationship between copyright and the creativity of an anime studio manifested by the quality of its work.

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[4] The report (only in Japanese) is available at
https://www.jftc.go.jp/houdou/pressrelease/cyosa/cyosa-ryutsu/h21/090123.html (last accessed on September 9, 2020).

The model is based on the economic explanation of creativity by Throsby (2001), who classifies types of creators into the next three: (I) income as constraint, (II) income as joint maximand, and (III) income as sole maximand. The type I creators maximize a work's quality and require only a fixed amount of income that covers the costs for living and creation. The type II creators maximize both work's quality and profits. The type III creators are the same as profit-maximizing firms.

Throsby (2001) categorizes the entertainment industry companies like film and commercial television as Type III because their creations are solely for business. However, as Craig (2020) explains, many current anime studios split away from established major studios because of animators or directors who wanted more creative freedom. An anime studio can be seen not only as a business entity but also as a group of creators seeking artistic value. Thus, in the following, anime studios are categorized either as type I or II. [5] Based on these behavior models of Throsby (2001), the effect of copyright on work's quality is examined.

3.1 Basic setting

Let q be the quality of an anime work and $C(q) = q^2$ be the creation cost of the work. When a studio does not hold the copyright of its work, it receives a fixed payment F from the production committee. On the other hand, when a studio holds copyright as a member of the production committee, the expectation of the present value of revenue given q during the copyright term is modeled as,

$$R(q) = aq,$$

where the parameter $a > 0$ includes the exogenous factors such as market size, studio's bargaining power against other committee members, and discount rate. A work's market size may differ from others due to marketing strategies such as export and merchandising. If a studio's bargaining power is strong, it may obtain a significant share of the revenues from its work. Finally, if a studio is smaller and younger, the discount rate to the future revenue would be higher. Along with these exogenous factors, the expectation of the revenue increases when the quality increases.

A studio can either choose to be a copyright holder as a member of the production committee or to take a fixed payment as the contractor without holding the copyright.

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[5] The production committee member companies other than anime studio would care for profits rather than the artistic value and thus be categorized as type III.

In reality, a studio that chooses copyright receives a fixed payment from the committee, but at the same time, invests as a committee member. Therefore, in case a studio chooses copyright, it is assumed that the fixed payment offsets the investment, and the copyright is the only revenue source. Let q_c be the quality of an anime work when the studio has its copyright, and q_f be the quality when the studio does not have the copyright and takes a fixed payment instead.

3.2 Behavior of studios

First, for the type I studio, the income is sufficient if it is equal to the production cost, and the objective is to maximize the quality as much as possible. Then, it solves

$$\max\{q_c^*, q_f^*\},$$

where

$$R(q_c^*) = C(q_c^*),$$
$$F = C(q_f^*).$$

Since $q_c^* = a$ and $q_f^* = \sqrt{F}$,

$$q_c^* \geq q_f^* \Leftrightarrow a^2 \geq F.$$

Therefore, if the fixed payment F is smaller than a^2, the studio chooses copyright to create higher quality work.

Second, for the type II studio, both the quality and income are the objectives to be maximized. If the studio chooses copyright, it determines q_c to maximize

$$\pi(q_c) \equiv R(q_c) - C(q_c).$$

Since $\pi(q_c)$ is concave, from the first-order condition, the level of quality maximizing $\pi(q_c)$, q_c^+, is

$$q_c^+ = \frac{a}{2}.$$

If the studio chooses the fixed payment F, the maximization problem is assumed that it makes the quality q_f as large as possible, ensuring at least the same level of profit as copyright, that is,

$$F - C(q_f) \geq \pi(q_c^+).$$

Then, the optimal quality level for the fixed payment q_f^+ satisfies

$$F - C(q_f^+) = \pi(q_c^+),$$

and thus, by assuming $F > a^2/4$,

$$q_f^+ = \sqrt{F - \frac{a^2}{4}}.$$

The studio solves $\max\{q_c^+, q_f^+\}$, and

$$q_c^+ \geq q_f^+ \Leftrightarrow \frac{a^2}{2} \geq F.$$

The results of the above analysis are summarized as the following:

(i) If $a^2/4 < F \leq a^2/2$, both types I and II studios choose copyright, which is an incentive to create higher quality works.

(ii) If $a^2/2 < F \leq a^2$, type I studio chooses copyright, and type II studio chooses the fixed payment. Copyright is an incentive to create higher quality work only for type I studio.

(iii) If $a^2 < F$, both types I and II studios choose the fixed payment, and the copyright is not an incentive to create higher quality works.

Whether copyright is an incentive for creating a higher quality work depends on the relative size of fixed payment and studios' types. If a fixed payment is sufficiently low, many studios will choose copyright to create higher quality anime. Even if a fixed payment is high, copyright can still be more desirable for studios focusing on creativity more than profits. As explained in the previous section, many anime studios have relatively weak bargaining power and are occasionally forced to accept insufficient payments. Moreover, creators in many anime studios value creative freedom. Therefore, the model implies that Japanse anime studios would choose copyright to create higher quality anime, if possible, rather than a fixed payment.

4. Empirical analysis

4.1 Framework

In this section, the effect of having and not having a work's copyright on its quality is examined by estimating the average treatment effect. The observation unit for the estimation is an anime work; the outcome is its quality; the treatment is whether or not its creator, anime studio, holds the copyright.

Let Y_1 denote an anime's quality if its studio chose copyright and Y_0 the quality if its studio chose a fixed payment instead of copyright. The expectation of the difference,

$E[Y_1 - Y_0]$, indicates the causal effect of having the copyright on the quality. It cannot be estimated because we cannot observe both Y_1 and Y_0 for an anime work. However, it can be estimated based on the observed outcome data by using variables that affect both the outcomes and treatment but are not affected by treatment. If the outcomes and treatment are independent conditional on a vector of covariates X that satisfies the above conditions, the average treatment effect can be estimated as

$$E[Y_1 - Y_0|X] = E[Y_1|X] - E[Y_0|X].$$

For the details, see, for example, Wooldrige (2010).

4.2 Data and sample

The population for the analysis consists of TV anime works created by Japanese studios whose works are included in an anime ranking list "Anime Top 100 Most Popular" of Anime News Network. The Top 100 are chosen from all anime works, including TV anime, movies, and original video animation (OVA), created by Japanese studios. Detailed information for every anime work is provided on each work's page in the website's "Encyclopedia," including viewers' ratings and the number of votes, which are used as the quality measure in the following analysis. The anime works are limited to ones where one episode is aired in the 30-minute broadcast time; short TV anime aired in less than 30 minute time is excluded. Anime works jointly created by two or more studios are also excluded so that the covariates X can include characteristics of a single studio.

Moreover, anime works created by the following studios are dropped from the population: (i) studios that created few works as the primary contractor; (ii) subsidiaries of large companies; (iii) studios that mainly created kids anime. These are excluded for the following reasons. For (i), a subcontractor only takes the fixed payment from the primary contractor and cannot be a copyright holder. For (ii), a studio's financial status is affected not only by the revenues from an anime work but also by the investment from the parent company. Some studios became subsidiaries during the sample period, and their works are excluded except for ones that they created when they were independent companies. For (iii), many kids anime titles have no vote for ratings in Anime News Network.

The sample includes TV anime works that were aired in Japan between 2000 and 2018 and whose production committee members were disclosed. Two quality measures

are used as the output variables. One is the average (arithmetic mean) of all viewers' ratings (0 to 10) for each title ("rating" hereafter). The other is each title's average rating multiplied by the number of votes ("popularity" hereafter). The works that have no vote are excluded from the sample. Finally, the sample for the estimations consists of 493 anime works created by 17 independent anime studios.

4.3 Variables

The variables used to estimate the average treatment effect are characteristics of an anime work and its creator, i.e., the studio in charge of its creation as the primary contractor of the production committee. The data was taken from Anime News Network and Wikipedia from October 2019 to April 2020. All the characteristics possibly related to the quality and the decision to take copyright are adopted as variables.

(1) Studio creativity

A studio will create higher quality anime if its creators have a higher level of creativity. Since a studio's level of creativity is not directly observed, a substitute variable is introduced. The variable studio creativity is defined as the number of each studio's titles listed in "Anime Top 100 Most Popular" of Anime News Network, which includes many classic titles created out of the sample period. The studio creativity differs among studios and is constant during the sample period.

(2) Studio age

The ages of studios may affect the copyright decision and works' quality. Older studios may have relatively strong bargaining power against the production committee. Younger studios may have more highly motivated creators. The variable studio age is defined as the number of years from the studio's establishment to the work's initial on-air year of the first episode.

(3) Number of episodes

An anime with more episodes generates larger revenue for its creator because of its volume and thus may affect the copyright decision.

(4) Derivative work dummy

Many anime works are derivative works of popular comics or novels, for which the popularity can be highly expected. Being a derivative work or not can affect both the copyright decision and its quality.

(5) Sequel and spinoff dummy

Sequel and spinoff works are included in the sample as independent observations because different studios occasionally create an original and its sequel/spinoff works, respectively. However, in many cases, a sequel or spinoff work is created after its original work has commercially succeeded. Thus, being a sequel or spinoff needs to be controlled.

(6) Publication year dummies

Older titles tend to have more votes. Furthermore, several macroeconomic factors can affect a studio's copyright decision. For example, on-demand subscription services have been increasing studios' revenue sources through the 2010s. The Japanese government has been improving the business environment of the anime industry since the early 2010s under the "Cool Japan Strategy."[6] The year effects and those macroeconomic factors are controlled by the year dummy variables, which takes one for the initial on-air year of a work's first episode.

(7) Genre dummies

An anime work of specific genres may obtain higher or lower ratings than others. Moreover, anime works of some genres, such as "action" and "science-fiction," may generate more merchandising revenue, for which copyright can be a strong incentive to create high-quality anime. In the Encyclopedia pages of Anime News Network, one or more genre tags are attached to each anime title, and sixteen genres are identified from the sample data. Among these sixteen genres, the genre "erotica" is removed. There are three works for which the genre "erotica" is attached, and they are all created by studios that do not hold their copyright. Thus, the "erotica" dummy can perfectly predict the

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[6] Cool Japan Proposal, the Cabinet Office of Japan, https://www.cao.go.jp/cool_japan/english/pdf/published_document3.pdf (Last acceessed on September 9, 2020)

treatment for those three works. Since multiple genres are attached to them, their genre characteristics are explained by genre dummies other than "erotica."

4.4 Sample summary

Table 1 shows descriptive statistics for the outcome and the work level variables except for genre/year dummies, dividing the sample into copyright and no copyright treatment. The sample averages for the two quality measures (i.e., rating and popularity) are both higher in copyright treatment than in no copyright treatment. The difference in the average number of episodes is relatively large; the number in copyright treatment is about 1.3 times larger than that in no copyright treatment. No significant differences are observed for the studio age, the number of derivatives, and the number of sequel/spinoff works.

Table 1 Descriptive statistics for the outcome and the work level variables

	Treatment	
	Copyright	No copyright
Outcome		
Rating		
Average	7.336	7.160
Standard deviation	0.784	1.014
Popularity		
Average	11056.019	7767.402
Standard deviation	16773.413	11296.024
Independent Variables		
Studio age (average)	23.758	24.511
Number of episodes (average)	24.659	18.786
Number of derivative works	193	204
Number of sequel/spinoff works	55	55

Figure 1 and 2 shows the number of works by genres and years. The ratio of copyright treatment to no treatment works is especially high in Science fiction and Magic (more than 2), and low in Slice of life (less than 0.5). For the year trend, the number of copyright treatment works is larger than the number of no copyright treatment works after 2012.
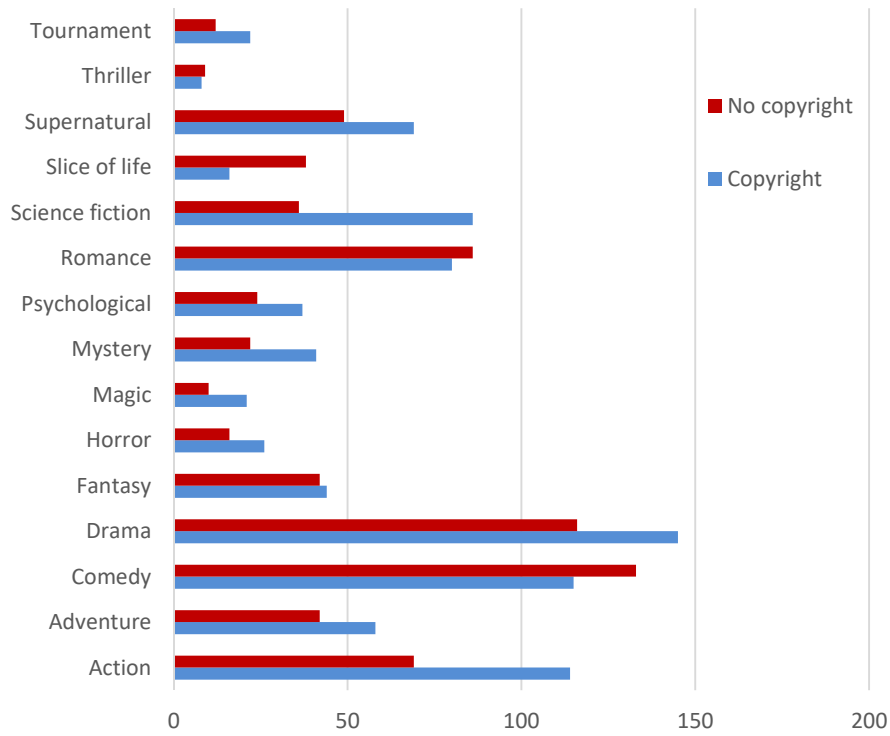
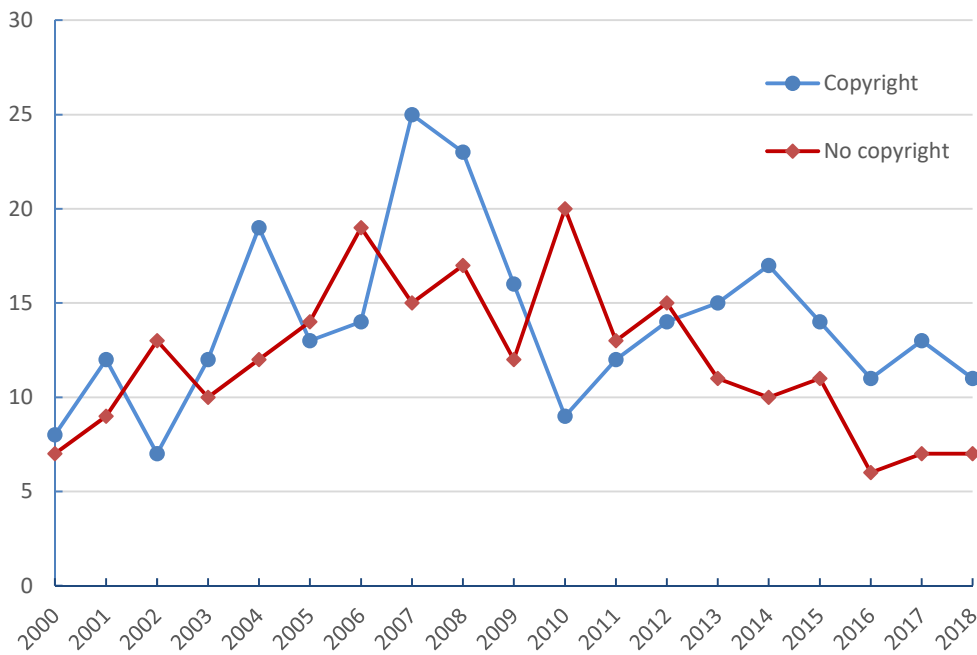Figure 1 Number of works by genres

Figure 2 Number of works by years

Table 2 shows the statistics related to studios: studio creativity, each studio's total number of works in the sample, the number of works with copyright in the sample, the ratio of works with copyright to all sample works, and the average rating and popularity

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of all sample works. Differences among studio creativity are significant. A few studios created many popular titles as opposed to others that created a few. Moreover, there are studios whose works are all with copyright or without copyright in the sample, which is the reason why studio dummies cannot be used as variables for estimating the average treatment effect.

The correlation between studio creativity and the ratio of works with copyright to all sample works is 0.293. The correlations between studio creativity and average rating/popularity are 0.187 and 0.219, respectively. These correlations imply that the studio characteristic may be necessary as an explanatory variable for the outcome and copyright decision.

Table 2 Descriptive statistics for the studio level sample data

Studio	Studio creativity (Number of works in "Top 100")	Total number of works (A)	Number of works with copyright (B)	Ratio of works with copyright to all works (B/A)	Average ratings	Average popularity
Arms	1	19	1	0.053	6.645	8078.843
Artland (before 2006)	1	3	0	0.000	7.672	15426.657
Bones	8	36	35	0.972	7.548	15116.124
Brain's Base	2	26	4	0.154	7.403	6560.226
GAINAX	1	7	7	1.000	7.092	11630.457
GONZO (before 2016)	5	39	32	0.821	7.107	11589.775
J.C.STAFF	5	73	30	0.411	7.372	7792.727
Kyoto Animation	8	26	20	0.769	7.848	19150.930
Madhouse (before 2011)	12	65	26	0.400	7.311	10105.432
Manglobe	2	15	5	0.333	7.401	11015.084
P.A. Works	1	3	2	0.667	7.892	20236.042
Pierrot	5	41	33	0.805	6.941	8257.963
Production I.G	4	40	35	0.875	7.324	9467.070
Radix (before2006)	1	3	2	0.667	5.914	2559.209
SHAFT	2	22	14	0.636	7.638	7881.292
Studio DEEN	5	67	18	0.269	6.886	5524.653
WHITE FOX	1	8	0	0.000	7.419	3940.958

4.5 Estimation results of the average treatment effect

Two procedures are used to estimate the average treatment effect: regression adjustment and inverse-probability weighting. For the former, the outcome regression model is the linear one, and for the latter, the probability model of the treatment (copyright) is the logit.[7]

Tables 3 and 4 show the estimated average treatment effect for rating and popularity, respectively. See the Appendix for the estimation results of the outcome regressions and

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[7] Both estimations are conducted by using STATA.

the logit model of the treatment. The estimation results show that, on average, both the rating and popularity of works are higher if studios have copyright than if they do not. All the differences in the average rating and popularity are statistically significant at the 5% level. The results imply that copyright is an incentive for studios to create higher quality anime works.

Table 3 Estimated average treatment effect: rating

Regression adjustment	Coef.	Robust Std. Err.	p-value for z
ATE (Copyright − No copyright)	0.273	0.081	0.001
Possible outcome means			
Copyright	7.412	0.048	0.000
No copyright	7.139	0.073	0.000
Inverse probability weight	Coef.	Robust Std. Err.	p-value for z
ATE (Copyright - No copyright)	0.332	0.092	0.000
Possible outcome means			
Copyright	7.404	0.049	0.000
No copyright	7.072	0.085	0.000

Table 4 Estimated average treatment effect: popularity

Regression adjustment	Coef.	Robust Std. Err.	p-value for z
ATE (Copyright − No copyright)	4737.54	1251.76	0.00
Possible outcome means			
Copyright	12016.25	1150.79	0.00
No copyright	7278.72	714.66	0.00
Inverse probability weight	Coef.	Robust Std. Err.	p-value for z
ATE (Copyright - No copyright)	4711.66	1118.04	0.00
Possible outcome means			
Copyright	11437.43	1007.64	0.00
No copyright	6725.77	644.11	0.00

5. Conclusion

Copyright is indispensable for the anime industry because it is used for businesses such as DVD sales, internet distribution, and merchandising. Without copyright, anime works would hardly be provided as information goods. However, is there any difference between copyright and a fixed payment for anime studios to create high-quality anime? This paper addresses such a question both theoretically and empirically.

The economic model shows that copyright is superior when a fixed payment is

sufficiently low, which has been often observed in the Japanese anime industry because studios have relatively weak bargaining power against their clients. Moreover, even when a fixed payment is high, a studio that focuses on artistic value can choose copyright because its effort in raising the quality can be directly connected to a revenue increase, which covers the production costs for high-quality anime. The results of the empirical analysis support the model's implications. By estimating the average treatment effect, it is shown that a work's quality would have been lower if its creator had not held the work's copyright. Thus, copyright is essential not only for businesses using anime works but also for their artistic value.

Copyright, however, can also harm creativity because copyrighted materials are inputs for other creative works, as Landes and Posner (1984) point out. Nevertheless, such a negative effect may be minor. An example is a legendary anime *Moblie Suit Gundam*, aired in 1979-80.[8] Its creator, a studio *Nippon Sunrise*, was a young and small studio at that time. By the late 1970s, established anime studios dominated the TV anime market by providing derivative anime works of popular comics (manga), and the studio could not enter the market in the same way as those established studios. Then, it contracted a toy manufacturing company to create a TV anime so that the sponsor company could sell the anime's merchandise toys. That anime, *Moblie Suit Gundam*, was created as an original anime work inspired by another studio's highly popular anime, *Star Battleship Yamato,* aired in 1974-75. It also included a new idea: integrating a human drama into a science fiction story featuring robots (*mecha*) that were described as being governed by realistic physics and technological limitations. This new idea built a successful new genre called *mecha anime,* and many original anime works in this genre obtained considerable popularity.

Ideas are not protected by copyright, and thus there are plenty of resources to produce new creative works even under the restriction of copyright, as Liebowits and Margolis (2005) point out. At least in the Japanese anime industry, copyright has not been a restriction but a driving force of creativity.

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[8] The following explanation about *Moblie Suit Gundam* is from *GUNDAM-MONO: THE MEN WHO MADE GUNDAM*, a Japanese book published by KODANSHA in 2002.

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Appendix

Table A1 The estimation results of the outcome (rating) regressions

	Copyright			No copyright		
	Coef.	Std. Err	p-value for z	Coef.	Std. Err	p-value for z
Constant	6.880	0.299	0.000	6.205	0.565	0.000
Studio creativity	0.029	0.015	0.053	0.015	0.025	0.557
Studio age	-0.013	0.005	0.017	-0.019	0.007	0.008
Number of episodes	0.001	0.001	0.280	0.018	0.006	0.002
Derivative work	0.233	0.108	0.031	0.143	0.217	0.509
Sequel/Spinoff	0.076	0.097	0.432	0.558	0.140	0.000
Genre dummies						
action	-0.128	0.094	0.173	-0.484	0.129	0.000
adventure	-0.185	0.115	0.109	-0.419	0.194	0.031
comedy	0.175	0.094	0.063	-0.005	0.125	0.968
drama	0.622	0.097	0.000	0.442	0.165	0.007
fantasy	-0.003	0.138	0.985	-0.124	0.185	0.503
horror	-0.336	0.173	0.052	-0.194	0.183	0.288
magic	-0.330	0.148	0.026	0.038	0.263	0.884
mystery	0.093	0.127	0.465	0.140	0.197	0.478
psychological	0.265	0.139	0.056	0.548	0.176	0.002
romance	0.062	0.095	0.513	0.039	0.140	0.782
scifi	-0.217	0.103	0.035	0.014	0.192	0.941
life	0.546	0.187	0.003	0.396	0.169	0.019
supernatural	-0.021	0.118	0.862	0.009	0.143	0.950
thriller	0.426	0.335	0.203	0.106	0.198	0.591
tournament	-0.045	0.145	0.756	-0.400	0.312	0.200
Year dumies						
2001	-0.307	0.352	0.384	-0.067	0.587	0.909
2002	0.170	0.346	0.624	0.654	0.439	0.136
2003	0.078	0.332	0.816	1.007	0.453	0.026
2004	0.095	0.304	0.755	0.718	0.459	0.118
2005	0.296	0.314	0.347	0.529	0.482	0.273
2006	0.246	0.332	0.458	0.865	0.434	0.046
2007	0.225	0.333	0.498	0.696	0.513	0.174
2008	0.207	0.303	0.496	0.881	0.463	0.057
2009	0.178	0.331	0.590	0.810	0.429	0.059
2010	0.002	0.379	0.996	1.026	0.440	0.020
2011	0.422	0.332	0.204	0.679	0.446	0.129
2012	0.218	0.335	0.516	0.614	0.457	0.179
2013	-0.064	0.330	0.846	0.062	0.501	0.902
2014	-0.059	0.325	0.856	0.482	0.497	0.332
2015	0.034	0.315	0.913	0.935	0.454	0.039
2016	-0.081	0.377	0.830	0.652	0.543	0.230
2017	-0.143	0.363	0.694	-0.370	0.693	0.594
2018	0.080	0.372	0.830	0.700	0.528	0.185

Table A2 The estimation results of the outcome (popularity) regressions

	Copyright			No copyright		
	Coef.	Std. Err	p-value for z	Coef.	Std. Err	p-value for z
Constant	3703.21	4773.32	0.438	-1584.20	3227.15	0.623
Studio creativity	209.88	331.21	0.526	12.63	312.90	0.968
Studio age	-369.34	131.10	0.005	-182.48	89.71	0.042
Number of episodes	93.61	36.25	0.010	49.94	50.78	0.325
Derivative work	3778.42	2164.85	0.081	5556.26	2183.77	0.011
Sequel/Spinoff	-1177.89	1369.89	0.390	30.56	1436.51	0.983
Genre dummies						
action	490.53	1939.66	0.800	3194.20	1706.90	0.061
adventure	-3891.82	2311.69	0.092	15.83	1914.18	0.993
comedy	2702.71	1757.67	0.124	1177.44	1254.00	0.348
drama	7284.20	1864.85	0.000	4956.54	1309.13	0.000
fantasy	5832.39	2579.76	0.024	-1025.15	1449.99	0.480
horror	-3211.03	4070.84	0.430	2383.03	6377.48	0.709
magic	-1751.40	2032.97	0.389	433.06	2873.48	0.880
mystery	-1596.84	2442.79	0.513	-2382.19	3500.21	0.496
psychological	4528.13	2359.71	0.055	9510.01	4001.75	0.017
romance	-2105.02	2125.84	0.322	1164.51	1357.98	0.391
scifi	-1666.67	2491.93	0.504	-2416.91	2284.39	0.290
life	8845.77	4407.57	0.045	4369.65	1976.69	0.027
supernatural	3168.72	2479.08	0.201	-1270.32	2124.01	0.550
thriller	22311.59	9319.90	0.017	6115.58	5055.01	0.226
tournament	-3410.21	2415.93	0.158	-841.99	1682.40	0.617
Year dumies						
2001	1107.75	4896.21	0.821	5165.88	5524.11	0.350
2002	14117.83	6743.57	0.036	2326.72	3014.14	0.440
2003	13682.69	8147.53	0.093	10459.88	4598.13	0.023
2004	8195.43	4868.19	0.092	7654.31	5968.44	0.200
2005	14211.36	5399.33	0.008	4133.47	3566.65	0.246
2006	15148.61	7549.99	0.045	8750.40	3516.29	0.013
2007	6542.48	4440.35	0.141	4782.29	4519.85	0.290
2008	2774.92	4078.50	0.496	2815.33	3245.61	0.386
2009	4543.27	4829.82	0.347	1141.99	3468.20	0.742
2010	1238.80	5162.72	0.810	1592.37	3040.18	0.600
2011	3023.52	4213.88	0.473	-2241.49	3189.09	0.482
2012	2419.36	4399.24	0.582	-2239.85	2994.19	0.454
2013	-1179.65	4070.95	0.772	-3867.96	2941.00	0.188
2014	-375.46	4065.68	0.926	-1735.38	3103.52	0.576
2015	-1530.66	4281.65	0.721	-2724.81	2925.23	0.352
2016	-6634.08	4631.21	0.152	-1198.33	3350.02	0.721
2017	-2683.55	4942.20	0.587	-771.41	3740.75	0.837
2018	1943.33	4813.96	0.686	1964.94	3629.18	0.588

Table A3 The estimation results of the logit model of the treatment

Dependent variable: Copyright = 1, No copyright = 0

	Coef.	Std. Err	p-value for z
Constant	-1.176	0.741	0.112
Studio creativity	0.119	0.041	0.004
Studio age	-0.024	0.014	0.074
Number of episodes	0.023	0.009	0.011
Derivative work	-1.070	0.306	0
Sequel/Spinoff	-0.186	0.260	0.476
Genre dummies			
action	0.462	0.249	0.064
adventure	0.382	0.307	0.212
comedy	-0.192	0.229	0.402
drama	-0.200	0.244	0.413
fantasy	-0.238	0.314	0.449
horror	0.099	0.435	0.821
magic	0.970	0.457	0.034
mystery	0.519	0.367	0.158
psychological	-0.037	0.376	0.923
romance	0.173	0.250	0.489
scifi	0.733	0.290	0.012
life	-0.878	0.400	0.028
supernatural	0.630	0.289	0.029
thriller	-0.748	0.610	0.22
tournament	0.744	0.431	0.084
Year dumies			
2001	0.990	0.751	0.188
2002	-0.718	0.814	0.378
2003	0.658	0.741	0.375
2004	1.056	0.723	0.144
2005	0.618	0.752	0.411
2006	0.418	0.717	0.56
2007	1.451	0.706	0.04
2008	1.256	0.700	0.073
2009	1.614	0.741	0.029
2010	0.655	0.759	0.388
2011	1.218	0.781	0.119
2012	1.700	0.759	0.025
2013	1.880	0.752	0.012
2014	2.192	0.783	0.005
2015	1.825	0.776	0.019
2016	2.228	0.845	0.008
2017	2.487	0.848	0.003
2018	2.318	0.861	0.007