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An Economic Analysis of the New Copyright Law in Germany

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More Rights, Less Income? An Economic Analysis of the New Copyright Law in Germany

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Abstract

The German copyright law was reformed in the end of 2016 with the purpose of ensuring reasonable pecuniary compensation to authors. It proposes an option which entitles authors to negotiate copyright transfers with an additional publisher after a vesting period of ten years. The results of a two-stage bargaining model show that the proposed copyright system may actually harm authors, as publishers may internalize a potential impairment on profits from increased competition within contract negotiations. This paper also demonstrates that the publisher's willingness to invest into an author's career is strictly decreasing as the level of expected rivalry increases.

Keywords: Institutional Regulation, Copyright Law, Bargaining, Creative Industries, Efficient Contracting

JEL classification: C78, K23, L82, L88, O34, Z18

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1. Introduction

In the end of 2016 the German copyright law was amended, granting authors more individual rights. The major goal of the legislators was to increase the chance of "fair agreements", with the explicit intention of improving the financial situation of authors (BMJV 2016). The deficiencies of the previous copyright system are identified as follows: first, asymmetric market power forces authors to permanently sell the rights to their creations in perpetuity for an inappropriately low lump sum (called "Total Buy-Outs"), and second, weak bargaining power deters authors from using legal means to force appropriate remuneration since publishers may de facto boycott several authors in the future (called "Blacklisting") (German Bundestag 2016).

The policy makers target the new copyright system as an artificial remedy against these concerns. The new system inalienably entitles authors with the option to transfer the rights of usage of their creation to another publisher after a vesting period of ten years.[1] A publisher who purchased the exclusive rights of usage initially may continue producing, however, forfeits the exclusivity claim (BMJV 2016; German Bundestag 2016). A second publisher may then produce concurrently with the initial publisher.

History has already shown that the attempts of law makers to redistribute resources to disadvantaged parties do not always align with initial intentions. In many cases the results have the opposite effect, and parties which should benefit suffer due to the other market players adapting their expectations. During contract negotiations, a publisher will consider the expected future profits of the creation, and share this expected surplus with the author[2] (Caves 2003). Thus, the author's remuneration is contingent on the publisher's view of the profitability of the product (Towse 1999). Caves (2003) states that an author may exchange decision rights for pecuniary compensations. The new law may give rise to such an exchange: a unilateral option to terminate the exclusivity of copyright transfer may burden the expected profitability due to an increase in competition after ten

[1] To simplify matters we summarize all types of intermediaries or licensees from the music industry, print media industry, movie industry, software sector, etc. to the term "publisher".
[2] This assumption can be extended to examples where publishers negotiate with delegates of authors or author unions. Without loss of generality, we consider direct negotiations here.

years, which may be reflected in a lower-paying initial contract. An additional contract could of course regain some of the reduced compensation. It is however questionable whether this artificial shift of authors' remunerations to the future may really increase their lifetime incomes because a second contract would internalize the competitive situation as well.

Such unintended effects may result in serious consequences for the creative industries and cultural consumption (Koboldt 1995; Liebowitz & Watt 2006). Although authors are generally intrinsically motivated to produce creative works, and tend to prefer a broad distribution of their creations, it is evident that the more outside parties exploit authors' works, the less incentive there is for authors to create (Frey & Oberholzer-Gee 1997). Since publishers require valid products to satisfy consumer demand, a copyright system requires incentive-compatible contracts to adequately induce the creation of valid products (Landes & Posner 1989; Koboldt 1995; Liebowitz & Margolis 2005). Without these incentives, a creative industry is sustainable to a limited degree, or not sustainable at all (Shavell & Van Ypersele 2001; Towse 2002; Liebowitz & Margolis 2005; Liebowitz & Watt 2006). Thus, unsuccessful attempts to compensate authors more appropriately may decrease authors' incentives to produce creative works and result in an insufficient supply for a market with a very high demand (Caves 2000; Liebowitz & Margolis 2005; Liebowitz & Watt 2006).

There exists a vast body of literature dealing with the optimal degree of copyright protection with respect to the incentive-access paradigm. However, there is a clear gap in the literature when it comes to using economic theory to explain the effects of changes in copyright structure or copyright law on the interaction between authors and publishers (Kretschmer et al. 2010).

To the best of our knowledge, the paper by Michel (2006) is the only related contribution which takes up the author-publisher relationship in a bargaining model. In his model, a copyrighted good may be bought or copied by consumers, and the transaction costs for copying determine their preference relation between buying and copying. Michel demonstrates how variations in transaction costs affect the authors' profit share, determined in the initial contract negotiations with

publishers. Richard Watt (in Kretschmer et al. 2010) re-interprets Michel's model in a very sensible manner by transferring the transaction costs argument to a copyright system approach. He states that high transaction costs may be equivalent to a strict copyright system because this would increase the necessity to rely on the protected good. Due to Watt, a stricter copyright system would then increase market prices and consequently the remuneration of authors.

Watt's "reading between the lines" approach helps us to position the case at hand within the existing literature. Watt concludes that copyright law itself (or a change of the copyright system) may only have an indirect effect on the author-publisher relationship because, in the first instance, it relates to consumer's rights. However, both the model by Michel and our model clearly show that copyright law has an indirect impact on the interrelation between authors and publishers. This is because the publisher-consumer relationship determines the extent of the joint surplus resulting from the author-publisher cooperation, which is essential in defining contractual terms.

Our framework adopts the model by Michel (2006) insofar that a change of the copyright system affects the negotiations over the joint surplus in the initial contract. However in contrast to Michel, the change of system is not induced by different product preferences, but by considering competition effects between publishers. Therefore we compare a previous copyright system under which there only exists one publisher with a new system where authors may allow another publisher to enter the market. Based on the argumentation of Watt (in Kretschmer et al. 2010), we interpret the new system as an indirect decrease of copyright scope because, as we will demonstrate, the consumers will face lower prices and the distribution of the creation will increase. In other words, consumers will have easier access to creations under the proposed copyright system.

There exists literature with respect to the termination right under U.S. Copyright Law (17 U.S.C. §203) which offers additional views of experts about the effects of authors' individual rights on the author-publisher relationship. This right entitles authors to terminate their contracts with publishers after a certain vesting period. Although the problem of this paper differs structurally, both copyright

systems are related because a unilateral decision of authors after contract may affect the cooperation rent. Thus, publishers, being in the stronger position and attempting to get the most out of their investment, may adjust their expectations and offer worse deals to authors (Rub 2013; Brown 2014; Darling 2015; Karas & Kirstein 2017).

Section 2 introduces the assumptions of our model. Section 3 introduces the details and the optimal solutions of the benchmark system, and section 4 does the same for the reform system. The solutions are juxtaposed in section 5 to compare investment incentives, author's lifetime income, and social welfare effects. Section 6 discusses the findings before the paper concludes in section 7.

2. The model

Before analyzing the two systems separately, we explain the assumptions which are relevant for both regimes. We formally describe two copyright systems: the benchmark system (*BS*) and the reform system (*RS*). In both systems there are two periods and two players: an author[3] (denoted A) who owns a creation, and a publisher (denoted P) who bargains in period one over the license to distribute the creation in both periods. In the *RS*, an additional player, publisher Q, may be present in period two and bargain with A over the same license. If A and Q come to an agreement, Q distributes concurrently with P in period two. For simplicity, we assume both publishers to have equal cost structures and all players to be perfectly informed.

Assume A is risk averse and let both publishers be risk-neutral.[4] A is interested in maximizing the lifetime income for her creation[5], and the two publishers wish to maximize their profits. Let $l(\alpha)$ be the remuneration agreed with P in the *BS*, and let $0 \leq \alpha \leq 1$ denote A's bargaining power in period one. In addition, $m(\alpha)$ denotes the remuneration by P and $n(\beta)$ the remuneration by Q in the *RS*, where $0 \leq \beta \leq 1$

[3] This simplifying assumption may be extended to a collective of authors or a delegate which negotiates on behalf of authors. As we believe, this simplification has no impact on our results because the starting position is equal in both systems.

[4] It is often observed that authors are at least "more" risk averse than publishers because they generally have few alternatives, whereas publishers are broadly diversified (Towse 2006).

[5] We put aside all intrinsic motivations of the author (e.g. fame, reputation, etc.) since we are solely interested in the analysis of the financial situation of authors.

indicates A's bargaining power in period two. $l(\alpha)$, $m(\alpha)$ and $n(\beta)$ define the source of conflict and are contractible in the respective period. Finally, assume each remuneration to be the only payment to A for her creation in the respective period.[6]

The payments result from the two person bargaining situations, modeled here with the asymmetric Nash Bargaining Solution. This concept requires individual rationality and Pareto efficiency (Nash 1950; Binmore et al. 1986), both of which are satisfied if a player's payoff (or as we will discuss later the "expected payoff") exceeds her outside option in the respective negotiation stage. Even though Pareto efficiency is fulfilled, there exists a source of conflict regarding the compensation of A, namely that the lifetime income maximizing desire of A has a contrary effect on the profits of P or Q, and vice versa. However, an added profit through agreement now exists since only then is a publisher obliged to distribute to the market. Note that since there is no asymmetric information in our model, each bargaining result will perfectly reflect the players' expectations about future payoffs (Rubinstein & Wolinsky 1985; Binmore et al. 1986).

3. Benchmark system

3.1 Set-up

A detailed sequence of events for the benchmark system *BS*[7] is illustrated in Figure 1. The game starts with the negotiations between A and P, which are symbolized by the box labeled "A, P". If A and P do not agree, they have the outside options T_A and T_P respectively. In the case of agreement (labeled "agree $(l^*(\alpha))$") we introduce an investment opportunity I_s for P where $s \in \{BS, RS\}$. The investment is a fixed cost and $I_s \geq 0$. It comprises costs, spent to increase the

[6] Indeed, the payment structures vary throughout creative industries and publishers may also pay a mixture of lump sum and royalty (Caves 2000; Rub 2013). For simplicity, we normalize the payment to a lump sum because we are only interested in the author's share of the cooperation rent and not in which way this share is paid out.

[7] Of course, the proposed benchmark system is not the only observable system in copyrights. But as we discuss a remedy against total buyouts, this type of system is feasible. Imagine a system where A and P agree upon a contract which lasts only for one period; the results between *BS* and the *RS* would not differ.

overall probability of product success, such as marketing costs to promote A's work.

Let $x_j(p_j)$ be the units to be distributed by the copyright holder in situation $j \in \{0, 1, 2, 3, 4, 5, 6P, 6Q\}$, where p_j denotes the price. Then, P may specify the quantity x_0 in period one. Assume that a publisher may determine the sales units flexibly in any period if she holds the copyright.

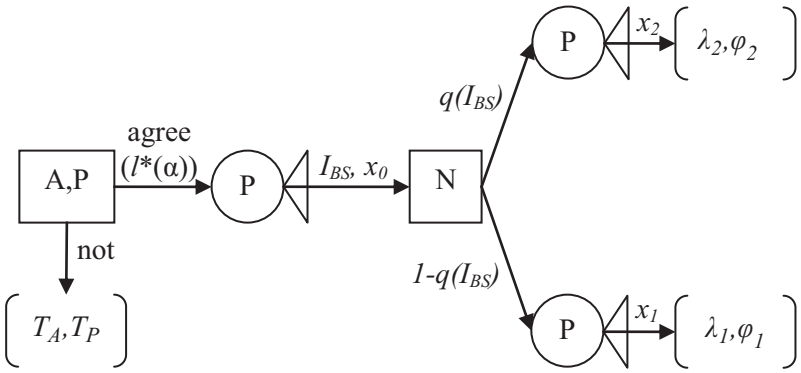

Figure 1: Sequence of events in the benchmark system (BS)

The box labeled "N" depicts the choice of nature whether or not the marketing of the creation will be a success in period two, an outcome dependent on chance. The success probability is labeled $q(I_{BS})$ where $0 \leq q(I_{BS}) \leq 1$, $q'(I_{BS})>0$ and $q''(I_{BS})<0$. We assume that the investment effect on the probability is characterized by $lim_{I_{BS}\to\infty} q'(I_{BS})=0$ and $lim_{I_{BS}\to 0} q'(I_{BS})=-\infty$. With probability $1-q(I_{BS})$, P will specify x_1. Let λ_j, φ_j and ψ_j be the payoffs of player A, P and Q in situation j. Then A receives λ_1 and P earns φ_1. With probability $q(I_{BS})$, P chooses x_2 and the players earn λ_2 and φ_2. Note that P is the only copyright holder in both periods.

3.2 Payoffs

Before analyzing the model predictions, we describe the players' payoffs. These are essential to deriving the bargaining equilibria since the players slip their expectations about benefits from cooperation into the negotiation process (Nash 1950; Rubinstein & Wolinsky 1985; Binmore et al. 1986).

As assumed, A only receives a fixed payment for her efforts. In the *BS* there is only one negotiation opportunity for A; therefore the only income she has is $l(\alpha)$. If we assume A's cost of production equal to zero[8], then following backwards induction we can define $\lambda_1=\lambda_2=l(\alpha)$. Let δ_i be the discount factor of player i where $i\in\{A, P, Q\}$, $0<\delta_i<1$, $\delta_A<\delta_P$, and $\delta_Q=1$.[9] We have learned that under both systems the payoffs are risky in period two. Hence, under the *BS*, A's expected payoff is $E\lambda_{BS}=(1-q(I_{BS}))\lambda_1+q(I_{BS})\lambda_2=l(\alpha)$.

Regarding the payoffs of the publishers, suppose $\mu_j(x_j)$ to be the profit which may be made by the copyright holder depending on her choice of distributed units in j. We assume the payoffs $\varphi_1=\mu_0(x_0)+\delta_P\mu_1(x_1)-I_{BS}-l(\alpha)$ and $\varphi_2=\mu_0(x_0)+\delta_P\mu_2(x_2)-I_{BS}-l(\alpha)$. This implies that P expects the payoff $E\varphi_{BS}=(1-q(I_{BS}))\varphi_1+q(I_{BS})\varphi_2=\mu_0(x_0)+\delta_P((1-q(I_{BS}))\mu_1(x_1)+q(I_{BS})\mu_2(x_2))-I_{BS}-l(\alpha)$. Q has no expectations in the *BS* since she is never the copyright holder.

3.3 Solution

We first analyze P's investment incentives. Following our backwards induction approach, the optimal contract in period one may depend on the investment decision I_{BS} which is effected after the agreement has been signed (see Figure 1). The investment level then determines the likelihood of the creation's success $q(I_s)$. Because the investment level is dependent on expected total profits, we can derive the optimal level by making use of $E\varphi_{BS}$. The rearrangement of the first order condition $\partial E\varphi_{BS}/\partial I_{BS}=\delta_P((1-q(I_{BS}'))\mu_1+q(I_{BS}')\mu_2) \overset{!}{=} 0$ yields the optimal investment level

[8] Of course, authors invest time and effort (cost of expression) and sometimes hire agents which may be considered here as a fixed cost. However, because this fixed cost is equal in both scenarios there is no effect on our further results at all and it is reasonable to neglect A's costs.

[9] The discount factor depicts the present value of future gains. A $\delta_i<1$ implies that the players evaluate future gains lower compared to gains today. The assumption $\delta_A<\delta_P$ takes two characteristics into account: First, A is risk averse and, unlike the risk neutral P, reluctant to risky payments in the future. Second, P is an established market player with a more stable background and better connections and may therefore have better access to capital markets compared to A. Q´s gains do not require a discount factor because she collects these in the same period in which she enters the game and, from her viewpoint, evaluates these as "received today".

$$I_{BS}^*(\mu_1, \mu_2)=\sqrt{\delta_P(\mu_2-\mu_1)}. \quad (1)$$

Now let us turn to the bargaining result in the first period. Remember that under this system, A and P negotiate over the fixed wage $l(\alpha)$. Furthermore, since the payoffs in the second period are risky, the contestants throw in their expected payoffs $E\lambda_{BS}$ and $E\varphi_{BS}$. The Nash product is $NP_l=argmax[E\lambda_{BS}-T_A]^{\alpha}[E\varphi_{BS}-T_P]^{(1-\alpha)}=argmax[l-T_A]^{\alpha}[\mu_0+\delta_P((1-q(I_{BS}))\mu_1+q(I_{BS})\mu_2)-I_{BS}-l-T_P]^{(1-\alpha)}$ and the first order condition for an internal maximum of the Nash Product is $\partial NP_l/\partial l=\alpha(l-T_A)^{-1}-(1-\alpha)(\mu_0+\delta_P((1-q(I_{BS}))\mu_1+q(I_{BS})\mu_2)-I_{BS}-l-T_P)^{-1} \overset{!}{=} 0$. Then, the optimal initial contract which maximizes the Nash product is

$$l^*(\alpha,q(I_{BS}))=\alpha(\mu_0+\delta_P((1-q(I_{BS}))\mu_1+q(I_{BS})\mu_2)-I_{BS}+(\frac{1}{\alpha}-1)T_A-T_P). \quad (2)$$

Since (1) determines the optimal investment for this system, the optimal initial contract can also be written as

$$l^*(\alpha)=\alpha(\mu_0-2\sqrt{\delta_P(\mu_2-\mu_1)}+\delta_P\mu_2+(\frac{1}{\alpha}-1)T_A-T_P). \quad (3)$$

For simplicity, assume the outside options T_A and T_P to be zero.[10] The remuneration for A increases in her bargaining power as we can see by $\partial l^*(\alpha)/\partial\alpha=\mu_0-2\sqrt{\delta_P(\mu_2-\mu_1)}+\delta_P\mu_2>0$. Note that $l^*(\alpha)$ increases as $\delta_P\rightarrow 1$ if we consider $\partial l^*(\alpha)/\partial\delta_P=\alpha(\frac{\mu_2-\mu_1}{\sqrt{\delta_P(\mu_2-\mu_1)}}+\mu_2)>0$. This is straightforward if we consider that the less P discounts future payoffs, the higher the joint surplus and consequently the higher A's remuneration for a given share. We can further see from (3) that δ_A has no influence on the bargaining result; A receives the payment immediately in the first period, cancelling out the risk aversion and discounting problem.

[10] We demonstrate the outside options for completeness purpose, but leave them out in the ongoing analysis as our results have shown that these are from minor importance for the results.

4. Reform system

4.1 Set-up

The sequence of events for the *RS* is illustrated in Figure 2. The game starts with the negotiations between A and P, which are symbolized by the box labeled "A, P". Without agreement, the players have their outside options T_A and T_P respectively. If the contestants agree (labeled "agree $(m^*(\alpha))$") P has the investment opportunity I_{RS}. In addition, P may specify the quantity x_3 in period one.

Subsequently, the nature randomly chooses whether or not the marketing of the creation will be a success in period two, depicted by the box labeled "N". The parameter $q(I_{RS})$ denotes the success probability and we assume $0 \leq q(I_{RS}) \leq 1$, $q'(I_{RS})>0$, $q''(I_{RS})<0$, just as in the *BS*. There is an investment effect on the probability as well which is characterized by $lim_{I_{RS}\to\infty} q'(I_{RS})=0$ and $lim_{I_{RS}\to 0} q'(I_{RS})=-\infty$. With probability $1-q(I_{RS})$, P will specify x_4.

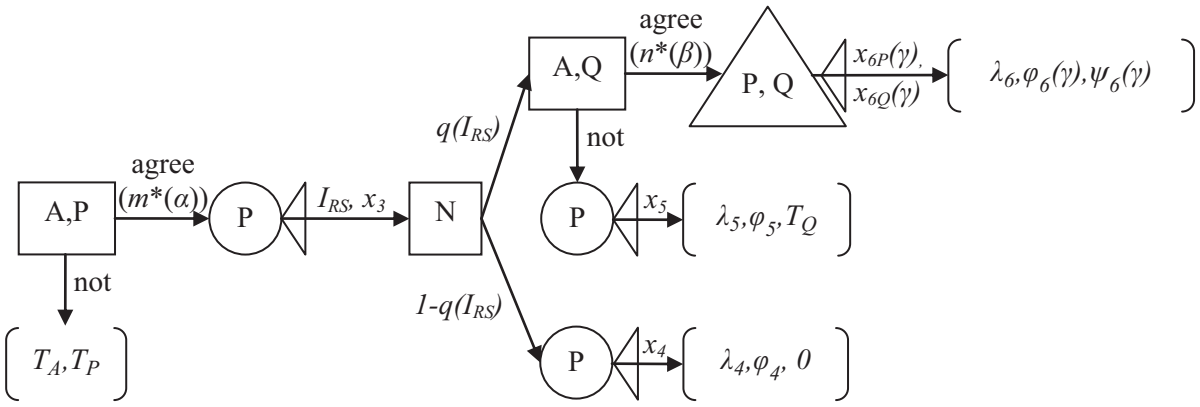

Figure 2: Sequence of events in the reform system (RS)

We further assume that Q has a "cherry picking" mentality and will not enter into negotiations with A if the product is to be a flop in period two.[11] This implies that P remains the only copyright holder in the "flop" scenario. Then A receives λ_4, P earns φ_4 and Q gets nothing because she is not a copyright holder. With

[11] A reason could be that Q's outside option T_Q is higher than estimated profits from distributing the product flop.

probability $q(I_{RS})$, the cherry picking Q is interested in the product and bargains over the copyright grant, labeled by the box "A, Q". Let $T_Q \geq 0$ be Q's outside option, then $n(\beta)$ will only be specified if

$$\psi_6(\gamma) > T_Q \wedge \lambda_6 > \lambda_5 \tag{4}$$

holds true.

Suppose that this condition is not fulfilled; then P decides upon x_5 and the players collect λ_5, φ_5 and T_Q. Given that the condition is fulfilled, the triangle "P, Q" in Figure 2 depicts the competition between the publishers in period two. We therefore introduce the parameter $0 \leq \gamma \leq 1$, which denotes the degree of competition if both publishers produce concurrently in an oligopolistic market. A very high γ signals a highly competitive market, and a very low γ signals low competition between the publishers.[12] For the ongoing analysis, we use the Cournot model to illustrate the problem of both publishers having to simultaneously decide what quantity to produce. Thus, P and Q choose $x_{6P}(\gamma)$ and $x_{6Q}(\gamma)$ as the best response to their opponents' choice. Finally, the players receive λ_6, φ_6 and ψ_6.

4.2 Payoffs

We initially describe the players' payoffs. As assumed, A only receives a fixed payment for her efforts. For the same reason, she would earn $\lambda_4=\lambda_5=m(\alpha)$ in the *RS* because there is only one negotiation opportunity for A since Q does not enter into negotiations. However if Q occurs then $\lambda_6=m(\alpha)+\delta_A n(\beta)$. The expected payoffs differ in whether or not condition (4) is fulfilled. Given (4) is untrue and letting # denote this scenario, then $E\lambda_{RS}^{\#}=(1-q(I_{RS}))\lambda_4+q(I_{RS})\lambda_5=m(\alpha)$. If (4) holds true, A expects to collect $E\lambda_{RS}=(1-q(I_{RS}))\lambda_4+q(I_{RS})\lambda_6=m(\alpha)+q(I_{RS})\delta_A n(\beta)$.

Q has no profit expectations in the *RS* if (4) is not true since she is not a copyright holder. As a result, P's payoffs are $\varphi_4=\mu_3(x_3)+\delta_P\mu_4(x_4)-I_{RS}-m(\alpha)$ and

[12] High competition may occur if both publishers distribute very homogeneous products to the same consumers. Low competition may result from the fact that Q has access to a niche market and offers a slightly different product, which attracts specifically the aforementioned market.

$\varphi_5=\mu_3(x_3)+\delta_P\mu_5(x_5)-I_{RS}-m(\alpha)$. This yields $E\varphi_{RS}^{\#}=(1-q(I_{RS}))\varphi_4+q(I_{RS})\varphi_5=\mu_3(x_3)+\delta_P((1-q(I_{RS}))\mu_4(x_4)+q(I_{RS})\mu_5(x_5))-I_{RS}-m(\alpha)$. If (4) is true, then $\varphi_6=\mu_3(x_3)+\delta_P\mu_{6P}(x_{6P},x_{6Q},\gamma)-I_{RS}-m(\alpha)$ and it follows that $E\varphi_{RS}=(1-q(I_{RS}))\varphi_4+q(I_{RS})\varphi_6=\mu_3(x_3)+\delta_P((1-q(I_{RS}))\mu_4(x_4)+q(I_{RS})\mu_{6P}(x_{6P},x_{6Q},\gamma))-I_{RS}-m(\alpha)$. With this condition fulfilled, Q is a copyright holder in period two and consequently collects $\psi_6=\mu_{6Q}(x_{6Q},x_{6P},\gamma)-n(\beta)$. This implies that she has the payoff expectations $E\psi_{RS}=q(I_{RS})\mu_{6Q}(x_{6Q},x_{6P},\gamma)-n(\beta)$.

Note that in $j=6P$ the initial publisher strategically determines her quantity as the best reply on her opponents choice, for a given degree of competition (and vice versa). In every other situation P may choose only considering her own properties. This suggests that P will act as a monopolist[13] in $j\neq6P$, if we leave out strategic behavior for the moment. The structure of the game reveals another characteristic which is summarized in the following Lemma:

Lemma 1. If condition (4) is not satisfied, the monopolistic P will choose her quantity in j such that $x_0=x_3$, $x_1=x_4$ and $x_2=x_5$. From this it follows that $\mu_0=\mu_3$, $\mu_1=\mu_4$ and $\mu_2=\mu_5$, which implies $\varphi_1=\varphi_4$ and $\varphi_2=\varphi_5$. Since the expectations of P about the total payoff will be equal as well, i.e. $E\varphi_{BS}=E\varphi_{RS}^{\#}$, we can conclude that $I_{BS}=I_{RS}^{\#}$ and $l(\alpha)=m(\alpha)$. In other words, there would be no difference between the two systems.

Proof. See Appendix. ■

The contracts which will be concluded between A and P under both systems will not differ if A and Q will not come to an agreement anyway. For this reason, we put aside this scenario in our further analysis and always assume that (4) holds true. This leads to the next result:

[13] In many markets publishers rather face an oligopoly (Caves 2000; Towse 2006). However, the monopoly assumption makes our analysis more transparent, and the relation between publishers of different goods plays no role in our analysis as we compare the competition effects for the same good.

Lemma 2. Under the *RS*, P will make lower profits in period two whenever $\gamma>0$. Moreover, an increase in γ diminishes the profits of both publishers in period two equally.

Proof. The proof follows from the outcome of the Cournot model. It shows that whenever two market players have to consider their opponents strategic choice in a simultaneous game, their individual distribution output, the prices and consequently the profits of the contestants decrease in the Cournot equilibrium compared to the monopolistic situation (Varian 2005). Due to our assumptions, the publishers are identical and therefore the impact of γ is equivalent (Singh & Vives 1984). The mathematical proof for the underlying argument can be found in the appendix. ■

4.3 Solution

Following backwards induction, we start in period two, where the renegotiation happens only in the *RS*. A and Q negotiate over payment $n(\beta)$ and agree whenever (4) is possible. Note that renegotiation occurs only once in period two. The actual payoffs to be considered are λ_6 and ψ_6. The outside options can be derived by considering condition (4): without agreement, A and Q would face λ_5 and T_Q, and consequently they use these alternatives as a threat in negotiations to determine their bargaining position.

Based on these definitions, the Nash product is $NP_n=argmax[\lambda_6-\lambda_5]^{\beta}[\psi_6-T_Q]^{(1-\beta)}=argmax[\delta_A n]^{\beta}[\mu_{6Q}(\gamma)-n-T_Q]^{(1-\beta)}$. Then, the first order condition for an internal maximum of the Nash product is $\partial NP_n/\partial n=\frac{\beta\left(-n+\mu_{6Q}(\gamma)-T_Q\right)^{1-\beta}(\delta_A n)^{\beta}}{n}-\frac{(1-\beta)(\delta_A-n)^{\beta}}{(-n+\mu_{6Q}(\gamma)-T_Q)^{\beta}}\overset{!}{=}0$ and the Nash bargaining solution predicts

$$n^*(\beta)=\beta(\mu_{6Q}(\gamma)-T_Q). \qquad (5)$$

Note that A's share increases in her own bargaining power due to both $\partial n^*(\beta)/\partial\beta=\mu_{6Q}(\gamma)-T_Q>0$ and our assumption that (4) holds true.[14] Furthermore, the bargaining result builds on Q's expected profits adjusted by her outside option. Considering our result from Lemma 2, this implies that whenever the competition factor γ increases, the remuneration paid by Q in period two decreases as a result of a lower joint surplus.

The next step is to derive the optimal investment level by making use of $E\varphi_{RS}$. The first order condition is $\partial E\varphi_{RS}/\partial I_{RS}=\delta_P((1-q(I_{RS}'))\mu_1+q(I_{RS}')\mu_2) \overset{!}{=} 0$ and rearrangement yields

$$I_{RS}^*(\mu_4, \mu_{6P}(\gamma))=\sqrt{\delta_P(\mu_{6P}(\gamma)-\mu_4)}. \qquad (6)$$

We may now use the previous results to finally determine how the initial contract looks like in the *RS*. Analogous to the *BS*, A and P negotiate on the basis of their expected payoffs, deducted by their respective outside options. The Nash product then is $NP_m=argmax[E\lambda_{RS}-T_A]^{\alpha}[E\varphi_{RS}-T_P]^{(1-\alpha)}=argmax[m+q(I_{RS})\delta_A n-T_A]^{\alpha}[\mu_3+\delta_P((1-q(I_{RS}))\mu_4+q(I_{RS})\mu_{6P})-I_{RS}-m-T_P]^{(1-\alpha)}$ and the first derivative reveals the first order condition $\partial NP_m/\partial m=\alpha(m+q(I_{RS})\delta_A n-T_A)^{-1}-(1-\alpha)(\mu_3+\delta_P((1-q(I_{RS}))\mu_4+q(I_{RS})\mu_{6P})-I_{RS}-m-T_P)^{-1} \overset{!}{=} 0$. If we rearrange this equation and solve for m, we get

$$m^*(\alpha,q(I_{RS}),n)=\alpha(\mu_3+\delta_P((1-q(I_{RS}))\mu_4+q(I_{RS})\mu_{6P})-I_{RS}-(\tfrac{1}{\alpha}-1)(q(I_{RS})\delta_A n-T_A)-T_P). \qquad (7)$$

The optimal contract with all optimality conditions can be determined if we insert the values from I_{RS} and n which are available in (5) and (6). The rearranged equation then is

[14] Using equation (5), equation (4) implies that $\mu_{6Q}(\gamma)>T_Q$ because $\mu_{6Q}(\gamma)-\beta(\mu_{6Q}(\gamma)-T_Q)>T_Q$ must be fulfilled.

$$m^*(\alpha)=\alpha(\mu_3-2\sqrt{\delta_P(\mu_{6P}-\mu_4)}+\delta_P\mu_{6P}-(\frac{1}{\alpha}-1)((1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}})\delta_A\beta(\mu_{6Q}-T_Q)-T_A)-T_P). \quad (8)$$

5. Comparison

5.1 Investment incentives

Our results in equations (1) and (6) reveal that the optimal investment level $I_{RS}^*(\mu_4, \mu_{6P}(\gamma))$ is dependent on the competition factor γ, whereas $I_{BS}^*(\mu_1, \mu_2)$ is not. If we juxtapose both optimality conditions we may define the next result:

Proposition 1. The investment level is strictly lower in the *RS* than in the *BS* whenever $\gamma>0$, and decreasing strictly monotonously with respect to γ.

Proof. The proof follows immediately from (1), (6), Lemma 1 and Lemma 2. Because $\mu_1=\mu_4$ and $\mu_2>\mu_{6P}$ are true, it is apparent that

$$I_{BS}^*(\mu_1, \mu_2)-I_{RS}^*(\mu_4, \mu_{6P}(\gamma>0))=\sqrt{\delta_P(\mu_2-\mu_1)}-\sqrt{\delta_P(\mu_{6P}(\gamma>0)-\mu_4)}>0.$$

Furthermore, $\partial\mu_{6P}/\partial\gamma=-\frac{2(c_P-a)^2}{b(2+\gamma)^3}<0$ shows that μ_{6P} is strictly decreasing in γ, implying that equation (6) is smaller the greater γ is. ■

As we have shown, the investment incentives mainly depend on the competition factor in the *RS*. This is because more competition reduces the expected profits of the initial publisher in period two. As a result, the publisher simply needs lower levels of investment to compensate for these lower profit expectations, as compared to the expectations in the *BS*. Indeed, higher investments still increase the probability of product success; however, they do cause higher fixed costs in period one. Thus, the probability of product success will be greater in the *BS*, an intuitive result if we consider $q(I_{BS})>q(I_{RS})$.

5.2 Lifetime income

Taking a closer look at the remuneration itself, and considering the interaction between the bargaining result from periods one and two in the *RS*, we present the next result:

Lemma 3. The higher the remuneration from the second contract, the lower the initial remuneration. Moreover, the remuneration in the initial contract is higher under the *BS*.

Proof. We can already see from the partial derivative in equation (7) $\partial m^*(\alpha,q(I_{BS}),n)/\partial n=(\alpha-1)q(I_{RS})\delta_A<0$ whenever $\alpha<1$ and $q(I_{RS})\delta_A>0$ that n has a negative impact on m. Furthermore, if we consider (3) and (8) we can formally describe our statement with

$$l^*(\alpha)-m^*(\alpha)=$$

$$\alpha(\delta_P(\mu_2-\mu_{6P})-2(\sqrt{\delta_P(\mu_2-\mu_1)}-\sqrt{\delta_P(\mu_{6P}-\mu_4)}))+(1-\alpha)(1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}})\delta_A\beta(\mu_{6Q}-T_Q)>0$$

which is true if we assume from now on $\delta_P(\mu_{6P}-\mu_4)>1$. The rearranged inequality is $\delta_P(\mu_2-\mu_{6P})-2(\sqrt{\delta_P(\mu_2-\mu_1)}-\sqrt{\delta_P(\mu_{6P}-\mu_4)})>-(\frac{1}{\alpha}-1)(1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}})\delta_A\beta(\mu_{6Q}-T_Q)$. Then, the right hand side is always negative and we can consider the left hand side separately. The left hand side is positive if $\delta_P(\mu_2-\mu_{6P})>2(\sqrt{\delta_P(\mu_2-\mu_1)}-\sqrt{\delta_P(\mu_{6P}-\mu_4)})$, which is nothing else than $(0.5\delta_P(\mu_2-\mu_{6P}))^2>\delta_P(\mu_2-\mu_{6P})$, keeping in mind our result from Lemma 1. This can be rearranged to $2>\frac{ln(\delta_P(\mu_2-\mu_{6P}))}{ln(0.5\delta_P(\mu_2-\mu_{6P}))}$, confirming that the left hand side of the rearranged inequality is always positive. ■

Corollary 1. Based on our assumptions, there exist contingent bargaining results for m^* if, and only if, $\mu_{6P}-\mu_4>1/\delta_P$.

Proof. See appendix. ■

There are two intuitions behind our results. First, the bargaining rent is shared based on the expectations of the negotiating parties about their expected payoffs. Thus, whenever the initial agreement enables A to earn in the future, this will be already considered in the initial contract because it is anticipated by the contestants. Here, any risk and time-adjusted earning diminishes the initial remuneration. For this reason, $m^*(\alpha)$ increases as $\delta_A \rightarrow 0$, because the lower A perceives her future payment, the less this payment burdens her part of the Nash product. This is shown by $\partial m^*(\alpha)/\partial \delta_A=(1-\frac{1}{\alpha})\alpha\beta(1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}})(\mu_{6Q}-T_Q)<0$. Note that the above results are all independent for every degree of competition, and by intuition, hold true as long as $n>0$.

Second, the competition in period two decreases the expected payoff of P because the oligopolistic competition decreases her expected profits in the "success" scenario. This has a negative impact on the bargaining rent, and there is thus less to be shared in the initial contract. Consequently, P internalizes this effect in the *RS*, which becomes noticeable in the initial contract.

For completeness purposes, we can add that, analogous to the *BS*, A's bargaining power has a positive effect on her share. This is proven since the partial derivative $\partial m^*(\alpha)/\partial \alpha=\mu_3-2\sqrt{\delta_P(\mu_{6P}-\mu_4)}+\delta_P\mu_{6P}+(1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}})\delta_A\beta(\mu_{6Q}-T_Q)>0$.[15]

The question which remains unanswered is whether or not A will benefit from the new system. Indeed, she receives two payments, but it was not shown yet under which circumstances the additional contract with Q may outweigh the losses from internalized harm in the initial contract with P. Only this circumstance would increase A's lifetime income in the *RS*. To examine this, we need to consider the sum of payments in the *RS* and compare it to the onetime payment from the *BS*.

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[15] We can rearrange the inequality to $\mu_3+\delta_P\mu_6+\delta_A\beta(\mu_{6Q}-T_Q)>2\sqrt{\delta_P(\mu_{6P}-\mu_4)}+\frac{\delta_A\beta(\mu_{6Q}-T_Q)}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}}$. Then $\partial m^*(\alpha)/\partial \alpha>0$ is true since $\mu_3>2\sqrt{\delta_P(\mu_{6P}-\mu_4)}$, $\delta_A\beta(\mu_{6Q}-T_Q)>\frac{\delta_A\beta(\mu_{6Q}-T_Q)}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}}$ and because $\delta_P\mu_{6P}>0$.

The total remuneration in the *RS* results from (5) and (7), whereby A earns $n^*(\beta)$ only with probability $q(I_{RS})$ and evaluates this risky future payment weighted by δ_A. Considering our result from (2), the inequality $l^*(\alpha)<m^*(\alpha)+q(I_{RS})\delta_A n^*(\beta)$ must hold true in order for authors to be better off under the new system. If we include the optimality conditions through our previous results we get the following outcome:

Proposition 2. Authors are better off under the *RS* if, and only if, the lifetime income condition

$$LIC: \delta_P[q(I_{RS})(\mu_{6P}-\mu_4)-q(I_{BS})(\mu_2-\mu_1)]+I_{BS}-I_{RS}+q(I_{RS})\delta_A\beta(\mu_{6Q}-T_Q)>0 \qquad (9)$$

is fulfilled. Then, no system is strictly superior in terms of lifetime income.

Proof. The proof for inequality (9) follows immediately from inserting the optimality conditions from our previous results into $-l^*(\alpha)+m^*(\alpha)+q(I_{RS})\delta_A n^*(\beta)>0$. To demonstrate the correctness of the second statement from Proposition 2 we need to take a closer look at the lifetime income condition. First, we learned from Proposition 1 that $I_{BS}-I_{RS}>0$. Second, we know from (6) that $q(I_{RS})\delta_A\beta(\mu_{6Q}-T_Q)>0$ for $\beta>0$. Third, let us consider the expression in squared brackets for a given δ_P. It follows that $q(I_{RS})(\mu_{6P}-\mu_4)-q(I_{BS})(\mu_2-\mu_1)<0$ is true for two reasons: we know from Proposition 1 that $q(I_{RS})-q(I_{BS})<0$, and from Lemma 2 that $\mu_{6P}-\mu_2<0$, both given that $\gamma>0$. Thus, the first two partial results have a positive and the latter a negative impact on (9). Additionally, the fulfillment of this condition depends on the parameter settings. It follows that no system strictly guarantees a higher lifetime income. ■

Note that the lifetime income condition is independent of the outside options, apart from our assumption that these are zero. If we compare the first derivatives of equations (2) and (7) we get the same results $\partial l^*(\alpha)/\partial T_A=\partial m^*(\alpha)/\partial T_A=(1-\alpha)>0$ and $\partial l^*(\alpha)/\partial T_P=\partial m^*(\alpha)/\partial T_P=-\alpha<0$, respectively. Because $q(I_{RS})\delta_A n^*(\beta)$ is not

affected by the initial outside options, these cancel out in (9). The same result can be observed for the profits of period one (μ_0 and μ_3), because these are equal according to Lemma 1.

Moreover, note that α also does not affect the lifetime income condition. Indeed, both systems suppose equal bargaining power in period one. But we have also shown in the proof of Lemma 3 that the impact of the period two bargaining result n on $m^*(\alpha,q(I_{BS}),n)$ is weighted with α. This internalization effect (P adjusts expectations by the second period remuneration) cancels out in the lifetime income analysis because we now add the second period remuneration.

The fulfillment of the lifetime income condition varies for different parameter settings, and we can identify five parameters whose effects are worth investigating (9): γ, β, δ_A, δ_P and T_Q. Let us first discuss the direction of impact by each parameter given that all remaining parameters are fixed.

We learned from Proposition 1 that a higher competition factor γ undermines incentives to invest, and from Lemma 2 that profits in period two decrease for both publishers. Thus, an increasing γ does not contribute to the fulfillment of condition (9) because there is less bargaining rent to be shared from period two in the *RS*, and we have $LIC \rightarrow 0$ as $\gamma \rightarrow 1$. Equally, $LIC \rightarrow 0$ as $T_Q \rightarrow \mu_{6Q}$, which is mathematically proven with $\partial LIC/\partial T_Q = -q(I_{RS})\delta_A\beta < 0$. The first derivatives $\partial LIC/\partial\beta = q(I_{RS})\delta_A(\mu_{6Q}-T_Q) > 0$ and $\partial LIC/\partial\delta_A = q(I_{RS})\beta(\mu_{6Q}-T_Q) > 0$ demonstrate that $LIC \rightarrow \infty$ as $\beta \rightarrow 1$ and as $\delta_A \rightarrow 1$.

Referring to the discount factor of P, we can see that $\partial LIC/\partial\delta_P = -[q(I_{BS})(\mu_2-\mu_1) - q(I_{RS})(\mu_{6P}-\mu_4)] < 0$, which mainly follows from our proof for Proposition 2. This yields $LIC \rightarrow 0$ as $\delta_P \rightarrow 1$, a seemingly counterintuitive result not in line with our previous findings as we usually determined a positive effect on the joint surplus with increasing discount factor. In the lifetime income analysis, however, the intuition is of a different nature: the confrontation of the two systems reveals a contrariness due to lower profits and underinvestment, and inhibits the initial remuneration in the *RS*. The expression in squared brackets demonstrates this circumstance. Such a negative effect is promoted whenever $\delta_P \rightarrow 1$ because it proportionally increases the gap between the systems.

The relation between the parameters which define the profits, for example saturation points a and d or the cost c_i, influence our results insofar as they determine the overall size of rent to be shared. Our assumptions that both systems share equal saturation points for the "success" and "flop" scenario, and that costs are constant and equal for the publishers, result in symmetric changes and for this reason show almost no effect in the lifetime income analysis. Thus our results are stable, and it is sensible to neglect changes in the ongoing discussion.

It remains to be shown how the residual parameters interact with respect to the lifetime income condition. We focus on the interrelation between β, γ and δ_A for two reasons: first, we suspect parameters that model publishers to be more stable than parameters that model authors. Thus, δ_P may be less volatile than δ_A, and T_Q only slightly volatile. The argument for this is that copyright publishers usually are established market players with both a portfolio of alternative opportunities and an easier access to capital markets. Furthermore, it is well observed that career progress, risk attitude, bargaining power and other related properties bring forth many diverse types of authors in the creative industries (Caves 2000; Towse 2006). Second, simulations reveal that changes in the competition factor meaningfully affect our presented results. For completeness purposes, we at least discuss the potential impact of the unattended parameters.

Figure 3[16] depicts the relationship between A's bargaining power β and the competition factor γ. Any position in the top right of the graph illustrates a weakly contested oligopoly where A earns a high share of the profits. In contrast, any position in the bottom left depicts the situation where P and Q have to rigorously compete to obtain customers, and where Q withholds a high share of the profits in period two. The two sinuous lines describe the border corresponding to inequality (9). Any hatched area to the top left then embodies parameter settings under which the *RS* yields a higher remuneration to authors, a situation we term lifetime income efficient. There are two borders because we additionally demonstrate how

[16] Figures 3 and 4 are composed of a discount factor $\delta_P=0.95$ close to one. We suppose this to be sensible because it reveals an approximate opportunity cost of capital of $r=0.053$ on alternative investments. The outside option is assumed to be $T_Q=0.25*\mu_{6Q}$, around 25% of the potential profit.

a high discount factor of A ($\overline{\delta}_A$) changes the lifetime income efficiency area as compared to a low discount factor ($\underline{\delta}_A$).

In our setting, a very low discount factor restricts the hatched area, as it undermines A's evaluation of the future payment and impedes the fulfillment of the lifetime income condition. This is in line with our previous argumentation as is the observation that the hatched area would enlarge with decreasing δ_P and diminish with increasing T_Q.

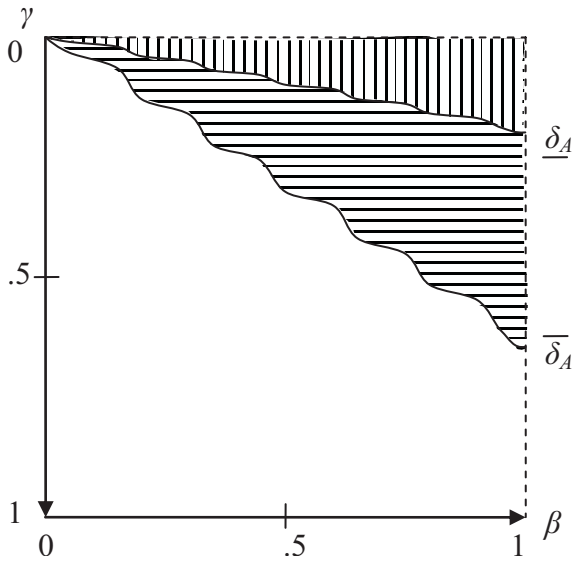

Figure 3: The *β*-*γ* relationship for diverse discount factors

Figure 4 takes up the previous findings, and provides a different view by incorporating the lifetime income in monetary values (denoted ¤). Any position to the top demonstrates higher lifetime income, and to the right higher bargaining power in the negotiations in period two. The left graph shows our results for a high discount factor of A, and the right for a low discount factor of A. In both, the bold horizontal line stems from the constant remuneration in the *BS* and depicts the border for which any position to the top is lifetime income efficient (similar to the hatched area of Figure 3). Finally, the dotted curves illustrate the lifetime income under the *RS*, increasing in β, for different levels of competition.

We can now clearly determine under which circumstances authors will benefit. If there is almost no competition between the publishers in period two, where γ is

close to zero, authors will always be better off. P will not suffer collapsing profits and simply adjust the payment to A. Additionally, A will earn from the contract with Q. On the contrary, we can see from both graphs that authors would almost always suffer from the new system if the competition is high. This holds true even if A would be a superstar and could demand a large proportion of the joint surplus in the renegotiated contract.

There is no such strict effect with regards to the discount factor of A. Indeed, the more A discounts future payoffs, the lower the chance that she may be better off under the *RS*. However, especially in the right graph of Figure 4, we can see that there still exist solutions for a low discount factor under which authors would benefit. However, this requires a predominantly low competition factor, which in turn may necessitate high bargaining power.

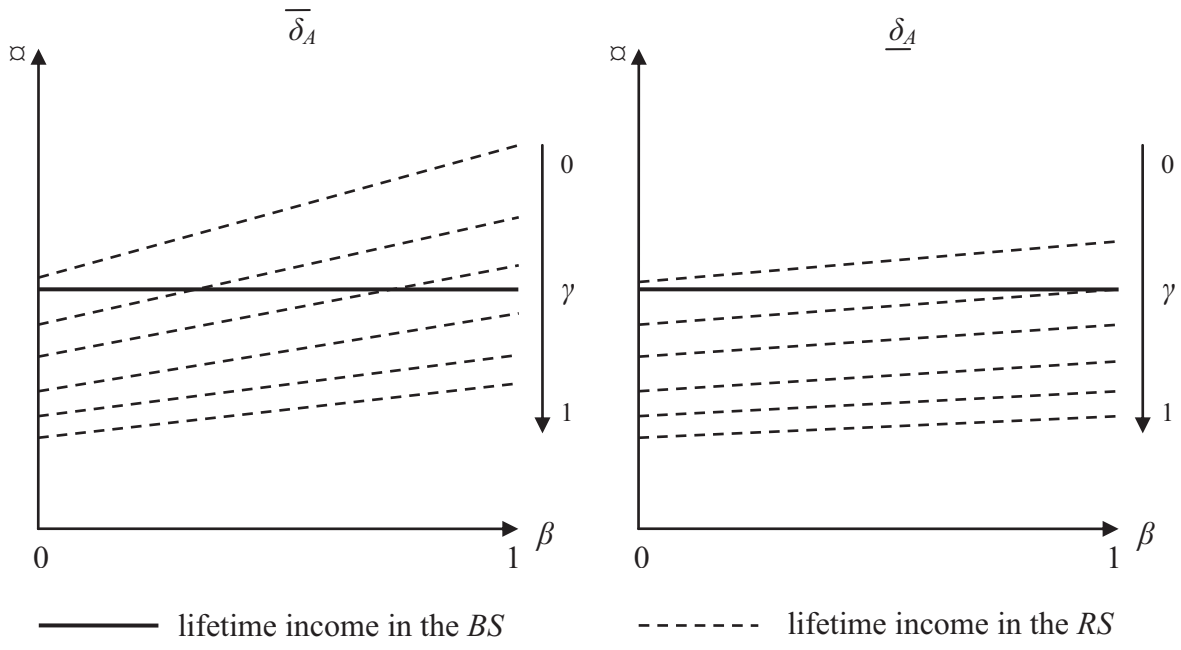

Figure 4: β, γ, and δ_A effects on the absolute lifetime income

Now imagine a young author who may be an aspiring star, but who evaluates all future income weakly because due to few alternatives. She highly depends on an immediate income and fears the future downfall of her career. Even optimistically assuming a sparkling career, she may be interested in selling the copyrights for a given work for a lifetime in order to optimize her expected income and avoid fear

of competition or low bargaining power in the future. This problem intensifies if we keep in mind that there rarely exists an author who has high bargaining power over her career life cycle (Caves 2000; Kretschmer 2005). Considering our results from the previous section and the dynamic promotional effect of publisher investments on career progress of authors (Caves 2000), the new system appears to be increasingly unattractive. Thus, if we assume a successful career, publishers would very likely compete in the market for consumers in the future if the copyrighted good was still attractive.[17]

On the other hand, established authors may be less dependent on the investments of publishers already being in a financial and prominent position that enables a wider choice of options. Consequently, they may not fear risky projects as much as their unestablished colleagues, and may already be more experienced in negotiations. However, even for them, the new system may offer lower lifetime earnings on their creations if there will be more competition between publishers. Recalling the analysis of Figure 3, even a low discount and a very high stake in period two may still be not sufficient to outweigh the effect of an already moderate competition factor.

5.3 Rents and social welfare analysis

So far we have restricted our analysis to the author-publisher relationship by analyzing the division of the emerging joint surplus from their cooperation. Note that the joint surplus can also be depicted as the producer rent. At this point we add the consumer side in order to complement the market situation. The consumer surplus is the difference between the maximum willingness to pay minus the actual price to be paid for the creation. We define the consumer rent as the aggregated surplus of all consuming individuals that obtain the creation. Social surplus is the total value of publishing the creation minus the cost of creating and marketing the creation. Social welfare is then the aggregated value of all utility that all involved individuals obtain from the creation.

[17] Of course, if there is no demand in the future this discussion makes no sense. However, evidence shows that there are many markets where creative goods last even longer than the authors lifetime (Caves 2000) . For example music labels from diverse countries are still predominantly reliant on back-catalog sales (Rohter 2011; Rub 2013).

To present the analysis in a simple way it makes sense to ignore the first period because P will choose equal quantity and prices under both systems (compare Lemma 1). Thus, the rents are equal and the following results can be derived independent of the first period. Let ECR_s denote the expected consumer rent and ESW_s the expected social welfare from period two in system s. According to our definition, the aggregated consumer surplus for each system is $ECR_{BS}=\frac{1}{2}[(1-q(I_{BS}))(d-p_1)x_1+q(I_{BS})(a-p_2)x_2]$ and $ECR_{RS}=\frac{1}{2}[(1-q(I_{RS}))(d-p_4)x_4+q(I_{RS})((a-p_{6P})x_{6P}+(a-p_{6Q})x_{6Q})]$. The expected social welfare is the sum of consumer and producer rent and therefore $ESW_{BS}=(1-q(I_{BS}))\mu_1+q(I_{BS})\mu_2+\frac{1}{2}[(1-q(I_{BS}))(d-p_1)x_1+q(I_{BS})(a-p_2)x_2]$ and $ESW_{RS}=(1-q(I_{RS}))\mu_4+q(I_{RS})(\mu_{6P}+\mu_{6Q})+\frac{1}{2}[(1-q(I_{RS}))(d-p_4)x_4+q(I_{RS})((a-p_{6P})x_{6P}+(a-p_{6Q})x_{6Q})]$. The comparison of both systems regarding the consumer rents and total rents yields the next two results:

Proposition 3. In the *RS*, *(i)* the consumer rent is higher if condition

$$CRC: (1+\gamma)q(I_{RS})(\mu_{6P}+\mu_{6Q})-q(I_{BS})\mu_2+(q(I_{BS})-q(I_{RS}))\mu_4>0 \quad (10)$$

is satisfied and *(ii)* the social welfare increases if the following condition is fulfilled:

$$SWC: (1+0.5(1+\gamma))q(I_{RS})(\mu_{6P}+\mu_{6Q})-1.5q(I_{BS})\mu_2+1.5((1-q(I_{RS}))\mu_4-(1-q(I_{BS})\mu_1)>0. \quad (11)$$

Proof. See appendix. ■

Note that both conditions only depend on the profit characteristics and P's discount factor δ_P reflected in I_s. The competition factor γ is included in both μ_{6P} and μ_{6Q}, and consequently integrated in I_{RS}. Figure 5[18] illustrates the impact of competition on the ECR_s, ESW_s and the expected producer rent (denoted EPR_s) for

[18] See supra note 16 for the remaining parameter settings.

increasing competition factor. Any position to the bottom right stands for a lower rent (or a lower sum of rents respectively) with increasing competition factor. There are two graphs: one with a meaningful variance in expected profits between the "success" and "flop" scenario, and one with a low variance.[19]

We can see in Figure 5 that even for a situation with low variance and high competition the consumers would likely be better off under the *RS*. There do exist parameter settings where (10) is not satisfied and consequently $ECR_{RS}<ECR_{BS}$. However, this would require almost no variance between the scenarios and a very low discount factor of P. In the previous section we have argued that at least the latter is rather unlikely. Note that the consumer rent in the *RS* is declining with increasing competition. Indeed, more competition decreases prices and increases quantity. However in our setting, $\gamma \rightarrow 1$ also increases the slope of the demand curve and a more competitive duopoly decreases rents.

Figure 5 shows that whenever γ is small or close to zero, inequality (11) is satisfied and the *RS* is welfare superior. The sum of producer and consumer rent is simply higher. However, Figure 5 also reveals that whenever $\gamma \rightarrow 1$, both producer and consumer rent decrease, and consequently so does social welfare. Both graphs show that whenever $EPR_{BS}<EPR_{RS}$, social welfare is always higher in the *RS* because consumer rent at this threshold value of γ is always higher in the *RS*. However if $EPR_{BS}>EPR_{RS}$, the *RS* is always welfare superior as long as $ECR_{RS}-ECR_{BS}>EPR_{BS}-EPR_{RS}$.

A low variance between profits in the "success" and "flop" scenarios fosters the negative effect of increasing γ on the rents and social welfare. The intuition is that the more similar the scenarios are, the less attractive it is for each market side to stand on the "success scenario". Following Proposition 1, P's incentives to invest under both systems decrease. Especially under the *RS*, as γ increases, μ_{6P} and μ_4 move towards the same value, and the "success" scenario thus becomes increasingly unattractive.

[19] The variance can be achieved by varying the distance between the saturation points.

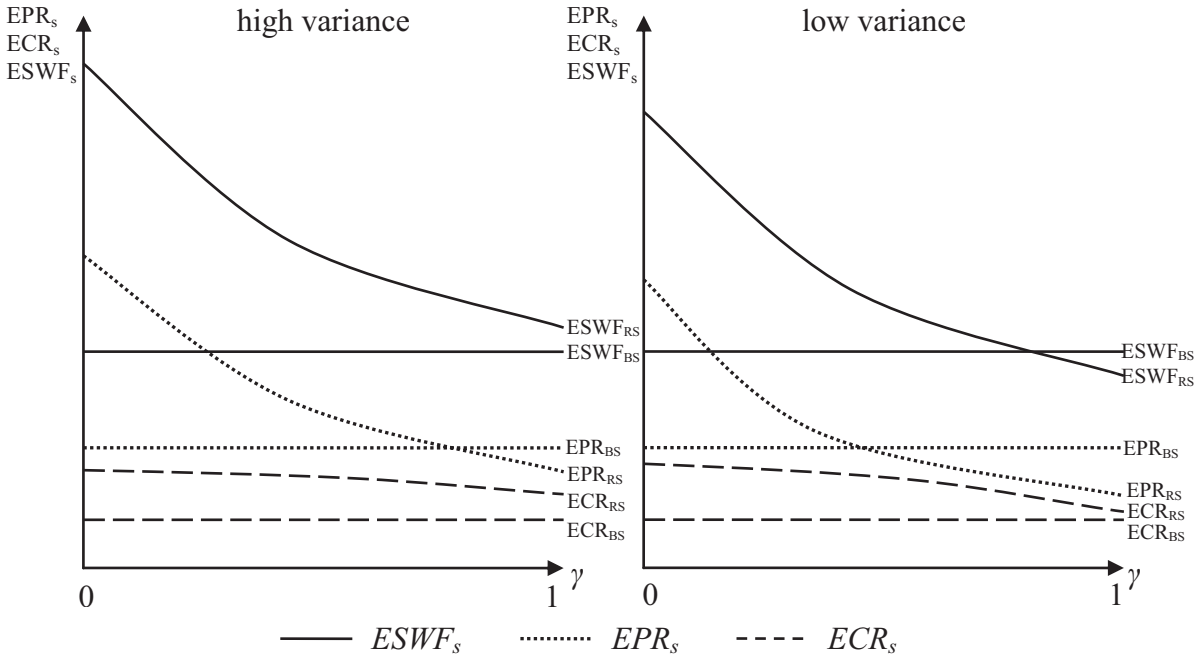

Figure 5: Rents and social welfare depending on γ

In both graphs of Figure 5 we can clearly see that similar to our findings in the previous section, the results strongly depend on the competition factor γ. Thus, whenever weak or no competition between publishers after the embargo period is expected, the new system makes sense for all involved parties. However, this outcome vanishes as expected competition increases. Our results show that the negative effect of more competition hits the initial publisher, but especially damages the authors, as their only income significantly decreases.

6. Discussion

Before turning to the conclusion of our paper, we briefly discuss our assumptions, which may be questionable from a practical point of view. First, we assume only two periods, and that profits in the second period are equal to the first period. Of course there may be following periods with more and more publishers, however this would not cause a deviation from the intention of our results. More competition would decrease expectations about future profits and this would be internalized in contracts from previous periods. The assumption that profits are

stable over the periods is rarely seen in the creative industries. For example a painting may become more and more valuable overtime, and a music creation may offer no profit margin a half-year after release. Without future profits, our analysis shows no difference between the two systems. However, whenever there is something to share in the future, the presented model is applicable.

Second, we modeled the publisher relationship with the Cournot oligopoly, but left out other types such as the Stackelberg or Bertrand approach. In the Bertrand model, the competition would completely undermine profits (Varian 2005) in the future and foster the undesirability of the *RS*. The initial contract would be settled based on the profit expectations from the first period, and there would not be much left to share in period two (with our assumption of symmetric publishers A would simply get nothing). This situation recalls the termination right for which related results on authors' income may be found in Karas & Kirstein (2017).

Using the Stackelberg model and assuming that P was the leader (probably an advantage in time as long as A and Q negotiate) would relax the negotiations between A and P in the initial contract as a leader makes higher profits compared to the simultaneous player in the Cournot oligopoly (Singh & Vives 1984; Varian 2005). Indeed, A would receive a lower payment in the future, but as a risk averse player, be probably better off. Assuming that P was the follower (probably A and Q negotiate already in period one) would burden the relationship between A and P in the initial contract as a follower makes lower profits compared to the simultaneous player in the Cournot oligopoly (Varian 2005). In summary, whatever oligopoly is underlying, the competition factor specifies the outcomes which determine the joint surplus, which in turn define the contract in each period. Thus, the direction of our results changes, but not their quality. The same rationale applies if the firms have differing cost structures.

Third, we left out an investment opportunity of Q in period two. In reality, high fixed costs are often observed in creative industries and entry barriers may exist (Caves 2000; Handke et al. 2016). Thus, Q may be forced to invest into marketing and production to assert herself in the market and to compete with P. On the one hand, this may increase the desirability of the new system because the additional

investment could increase overall demand and consequently rents. On the other hand this may offer strategic leeway in the form of predatory pricing or cartelization. From condition (4) we know that Q would be happy to enter the market whenever potential profits exceed her outside option. If she would have to bear high investment costs to enter, P may set a lower price to set up an entry barrier and try to prevent competition. Such strategic behavior would definitely make authors worse off because the profit expectations would always be lower compared to the *BS*. The problem of cartelization would increase the producer rents, but also decrease consumer rent. Moreover, it is questionable whether more arrangements between publishers would weaken the bargaining power of authors and thus make authors even worse off.

Fourth, we presumed that authors are only interested in money, an unrealistic assumption considering the various intrinsic motivations of authors. A consideration of these would set up a new trade-off: our results do show that it is likely that authors will be worse off under the *RS*. However, authors also prefer a high distribution of their creations and under the new system the aggregated output is higher. Depending on the utility function of A, she may be better off in the *RS* even if she earns less, as long as the distributional effect outweighs the negative effect on income. We left this motive out because this study is mainly interested in the income effect. For this reason, this assumption does not affect the quality of our results.

Fifth and finally, we discuss the assumption of perfect information, which may become the most relevant in the real world. Caves (2000) points out the "nobody knows" principle, which states that the success of creations is usually highly uncertain and difficult to assess in the contracting stage. Relaxing our assumption may likely affect the precision of our results, as these are build on the participants expectations about future profits. If these profits are highly uncertain, the players will use their expectations to define the contract, which however may over- or under-estimate the real value. It is apparent that publishers prefer to under-estimate and authors to over-estimate, as this increases their shares from the cooperation rent. If we keep in mind that publishers are usually the more powerful

market side, one can expect that information asymmetry may yield under-estimation more frequently. This dilemma may downgrade the situation for many authors, no matter whether they make use of their right or not.

7. Conclusion

In this paper we have analyzed the new German copyright law which allows authors to resell copyright licenses to additional publishers. We have derived the effects on investment incentives, author's lifetime income, rents, and social welfare. This system is relevant to all creative industries which have a product life cycle longer than 10 years, and is relevant for any situation where the author-publisher relationship would usually reveal perpetual buy-out contracts.

Our results show that such a system may undermine publishers incentives to invest into author's career whenever the publisher has to compete for her customers in the future. The model also predicts that most authors may suffer lower pecuniary compensations under the new system, and consequently not benefit at all if there is strong competition between the publishers. This is due to two reasons: the competition effect decreases and, thus, reduces joint surplus. Moreover, the internalization effect forces authors to renounce payments in their initial contracts in exchange for an option to renegotiate an additional contract in the future. Evidence shows that successful creations are likely contested, leading us to conclude that the new system is not likely to fulfill the policy maker's intention to benefit authors.

From the consumer's perspective, the new system is rather beneficial. Publishers will decrease prices, offer more to the market, and thereby increase consumer rent. Our analysis shows that this result would hold even in strongly competitive scenarios. The new system is attractive for low competitive markets and predominantly desirable in competitive markets if the difference between the "success" and "flop" scenarios is not too small.

Turning to future research, we suggest the investigation of the new system considering the dynamic effects from authors' contracts on their overall careers. Authors usually create several works, and such a unilateral option may indeed

reduce the earnings for a specific creation, but probably also foster the generation of subsequent creations and increase the aggregated lifetime income. Furthermore, we encourage more investigation on how the new copyright law changes the efforts to create. It would be interesting to test the predictions of our model and to see how authors react to possible changes. We often observe that authors mourn their financial situation, but also place a high moral value on individual rights. On average, German authors possibly value individual rights higher than reductions in earnings, and thus enthusiastically welcome the new legislation from a different point of view. This however requires further consideration.

Appendix

Proof of Lemma 1

For simplicity, assume that the demand for the good is equal between period one and two if the product turns out to be a success. Then, we can define the price quantity relationship such that

$$p_j(x_j)=\begin{cases} a-bx_j & ,j=\{0,2,3,5\} \\ d-bx_j & ,j=\{1,4\} \\ a-b(x_j+\gamma x_k) & ,j=\{6P,\ 6Q\} \end{cases} \qquad \text{(I)}$$

where a and d are the saturation points, and $a>d$. b is the slope of the demand curve, $k\in\{6P,\ 6Q\}$ and $j\neq k$. Remember that we already assumed equal cost structures for the publishers. Let us denote the variable cost $c_i(x_i)=c_i x_i \geq 0$ and remember that $i\in\{A, P, Q\}$. We already explained that $c_A=0$. Assume $c_i(x_i)=const$ over time.

P is a monopolistic supplier in the *BS* and the *RS* if condition (4) does not hold true. For profit maximizing purpose, she will choose her quantity such that marginal revenue is equal to marginal cost. Using the price quantity relationship from (I), we have the expected total profit $E\varphi_{BS}=x_0(a-bx_0-c_P)+\delta_P((1-q(I_{BS}))x_1(d-bx_1-c_P)+q(I_{BS})x_2(a-bx_2-c_P)-I_{BS}-l(\alpha)$ in the *BS*. The first order conditions for P's endogenous parameters x_0, x_1, x_2 and I_{BS} are $\partial E\varphi_{BS}/\partial x_2=\delta_P q(I_{BS})(a-2bx_2-c_P) \overset{!}{=} 0$, $\partial E\varphi_{BS}/\partial x_1=\delta_P(1-q(I_{BS}))(d-2bx_1-c_P) \overset{!}{=} 0$, $\partial E\varphi_{BS}/\partial x_0=\delta_P(a-2bx_0-c_P) \overset{!}{=} 0$ and $\partial E\varphi_{BS}/\partial I_{BS}=\delta_P((1-q(I_{BS}'))\mu_1+q(I_{BS}')\mu_2) \overset{!}{=} 0$. Solving the equation system yields $x_2^*=x_0^*=\frac{a-c_P}{2b}$, $x_1^*=\frac{d-c_P}{2b}$ and $I_{BS}^*(\mu_1,\ \mu_2)=\sqrt{\delta_P(\mu_2-\mu_1)}$. From this it follows that $\mu_2^*=\mu_0^*=\frac{(a-c_P)^2}{4b}$ and $\mu_1^*=\frac{(d-c_P)^2}{4b}$.

In the *RS* where (4) does not hold true, P's expected profit is $E\varphi_{RS}^{\#}=x_3(a-bx_3-c_P)+\delta_P((1-q(I_{RS}))x_4(d-bx_4-c_P)+q(I_{RS})x_5(a-bx_5-c_P)-I_{RS}-m(\alpha)$. From this, the first order condition for P's endogenous parameters are $\partial E\varphi_{RS}^{\#}/\partial x_5=\delta_P q(I_{RS})(a-2bx_5-c_P) \overset{!}{=} 0$, $\partial E\varphi_{RS}^{\#}/\partial x_4=\delta_P(1-q(I_{RS}))(d-2bx_4-c_P) \overset{!}{=} 0$, $\partial E\varphi_{RS}^{\#}/\partial x_3=\delta_P(a-2bx_3-c_P) \overset{!}{=} 0$ and

$\partial E\varphi_{RS}^{\#}/\partial I_{RS}=\delta_P((1-q(I_{RS}'))\mu_4+q(I_{RS}')\mu_5) \overset{!}{=} 0$. Then, $x_5^*=x_3^*=\frac{a-c_P}{2b}$, $x_4^*=\frac{d-c_P}{2b}$ and $I_{RS}^*(\mu_4, \mu_5)=\sqrt{\delta_P(\mu_5-\mu_4)}$. In addition, the profits are $\mu_5^*=\mu_3^*=\frac{(a-c_P)^2}{4b}$ and $\mu_4^*=\frac{(d-c_P)^2}{4b}$.

Clearly, $\mu_5^*=\mu_2^*$, $\mu_4^*=\mu_1^*$, $\mu_3^*=\mu_0^*$ and from this it follows that $I_{BS}^*(\mu_1, \mu_2)-I_{RS}^*(\mu_4, \mu_5)=\sqrt{\delta_P(\mu_2-\mu_1)}-\sqrt{\delta_P(\mu_5-\mu_4)}=0$. Note that the backwards induction approach is not necessary to derive the optimal quantity choice. This is implied by our assumption that a publisher may choose her quantity by each period. The proof for $l(\alpha)=m(\alpha)$ follows from intuition: α, T_A and T_P are equal in both systems and the profit expectations of P do not differ between the systems. Since there are no formal asymmetries and A relies only on her fixed remuneration by P in both negotiations, the joint surplus does not change and is shared according to α. This implies $l(\alpha)=m(\alpha)$.

Proof of Lemma 2

Considering that the underlying market is a Cournot oligopoly, each publisher will maximize her profits as the best reaction to her opponent. From (I), we can derive $\mu_{6P}=x_{6P}(a-b(x_{6P}+\gamma x_{6Q})-c_P)$ and $\mu_{6Q}=x_{6Q}(a-b(x_{6Q}+\gamma x_{6P})-c_Q)$. Heading for the optimal quantity we get the first order conditions $\partial E\varphi_{RS}/\partial x_{6P}=\delta_P(a-2bx_{6P}-b\gamma x_{6Q}-c_P) \overset{!}{=} 0$ and $\partial E\psi_{RS}/\partial x_{6Q}=a-2bx_{6Q}-b\gamma x_{6P}-c_P \overset{!}{=} 0$. Then, the reaction functions are $x_{6P}^*(x_{6Q},\gamma)=\frac{a-b\gamma x_{6Q}-c_P}{2b}$ and $x_{6Q}^*(x_{6P},\gamma)=\frac{a-b\gamma x_{6P}-c_P}{2b}$. Considering the fact that due to our assumptions the two publishers are identical, we can set $c_P=c_Q$ and $x_{6P}=x_{6Q}$. It follows that the optimal quantities are $x_{6P}^*(\gamma)=x_{6Q}^*(\gamma)=\frac{a-c_P}{b(2+\gamma)}$, which implies $\mu_{6P}^*(\gamma)=\frac{(a-c_P)^2}{b(2+\gamma)^2}$. If $\gamma>0$ we can see that $x_2^*-x_{6P}^*(\gamma>0)=\frac{a-c_P}{2b}-\frac{a-c_P}{b(2+\gamma)}>0$ and consequently $\mu_2^*-\mu_{6P}^*(\gamma>0)=\frac{(a-c_P)^2}{4b}-\frac{(a-c_P)^2}{b(2+\gamma)^2}>0$. Then, $\mu_2^*-\mu_{6P}^*(\gamma=0)=\frac{(a-c_P)^2}{4b}-\frac{(a-c_P)^2}{4b}=0$. One marginal unit of γ decreases the profit of P in j=6P by

$\partial\mu_{6P}^{*}/\partial\gamma=-\frac{2(c_P-a)^2}{b(2+\gamma)^3}$. Because both firms are identical, the latter is also true for the profit function of Q.

Proof of Corollary 1

We assumed $0\leq q(I_S)\leq 1$ which, if we consider (6), is equal to $0\leq 1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}}\leq 1$ in the *RS*. As long as (along with our assumptions holding true) $\mu_{6P}-\mu_4>0$ and $\delta_P>0$, the upper bound is always obeyed. However, this is a necessary but not sufficient condition for the lower bound since there exist two regions for the influence of n on m. Note that if $\delta_P(\mu_{6P}-\mu_4)<1$ then $1-\frac{1}{\sqrt{\delta_P(\mu_{6P}-\mu_4)}}<0$, and the initial assumption and consequently Lemma 3 are not fulfilled. Thus, we show that whenever Corollary 1 is fulfilled the results are stable and in line with our assumptions. To support our assumptions consider the following example: let r denote P's opportunity cost of capital and suppose the very excessive case that $r=0.4$. This results in an approximate discount factor $\delta_P=1/(1+0.4)=0.714$. For this discount factor, the difference between profits ought to be $\mu_{6P}-\mu_4>1/.83\approx 1.4$ in absolute values to satisfy stability and correctness of our results. Keeping in mind that we compare a "success" and "flop" scenario, where the differences in profits may be located in thousands or millions of absolute (monetary) values, clarifies the reasonability of Corollary 1.

Proof of Proposition 3

Part (i): $ECR_{BS}=\frac{1}{2}[(1-q(I_{BS}))(d-p_1)x_1+q(I_{BS})(a-p_2)x_2]$ and $ECR_{RS}=\frac{1}{2}[(1-q(I_{RS}))(d-p_4)x_4+q(I_{RS})((a-p_{6P})x_{6P}+(a-p_{6Q})x_{6Q})]$ are, considering the proof of Lemma 1 and 2, equivalent to $ECR_{BS}=\frac{1}{2}[(1-q(I_{BS}))\mu_1+q(I_{BS})\mu_2]$ and $ECR_{RS}=\frac{1}{2}[(1-q(I_{RS}))\mu_4+q(I_{RS})(\mu_{6P}+\mu_{6Q})]$. $ECR_{BS}<ECR_{RS}$ yields the *CRC*. The relation between $(1+\gamma))q(I_{RS})(\mu_{6P}+\mu_{6Q})-q_2(I_{BS})\mu_2$ is ambiguous and depends on the parameter setting but $(q(I_{BS})-q(I_{RS}))\mu_4$ is always positive since we have $q(I_{BS})>q(I_{RS})$.

Part (ii): In *part (i)* we already illustrated the profit relationship in the ECR_s, and rearrangement of $ESW_{BS}<ESW_{RS}$ reveals the *SWC*. Note that $1.5((1-q(I_{RS}))\mu_4-(1-q(I_{BS})\mu_1)$ is always positive because $(1-q(I_{BS}))<(1-q(I_{RS}))$. Besides, $(1+0.5(1+\gamma))q(I_{RS})(\mu_{6P}+\mu_{6Q})-1.5q(I_{BS})\mu_2$ is ambiguous.

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