Spillovers between property rights and transaction costs for innovative industries: Evidence from vertical integration in broadcast television

Abstract

Innovative industries typically have firms engaging in parallel research streams under different organizational structures. I investigate how changes in the property rights contractability of some projects can affect the transactional cost to vertical integrate other projects. New television shows can either be financed independently of the show's broadcast network or partially funded by the show's broadcast network; this variation in funding changes the owner of the television show and is therefore a form of vertical integration. Using a regulatory shock that restricted the contractability of television shows ownership rights, I find that evidence that a decrease in vertical integration is associated with less effort on the part of the downstream party, consistent with property rights theory. Moreover, the regulatory change led to a decrease in vertical integration for shows that were not directly affected by the contract restrictions, suggesting an interplay between property rights and transactional costs when there are projects that are executed in parallel.

1 | Introduction

A number of theories have been put forward to explain a firm's decision to integrate a product's development. Many theories follow either a property rights model dealing with incomplete contracts (Grossman and Hart 1986, Hart and Moore 1990, Holmstrom and Milgrom 1994, Baker et al. 2002) or a transaction cost economics model focused on optimizing the cost of a firm's activities (Coase 1937, Lucas 1978, Williamson 1979). Previous empirical work has tested which of these two models best explains the decision to vertically integrate in a particular setting. For example, innovative industries tend to have more uncertainty in product outcomes leading to incompleteness of contracts; empirical work has shown property rights drive the decision to vertical integrate in these uncertain environments (Lerner and Merges 1998, Azoulay 2004, Lerner and Malmendier 2010). In contrast empirical work on transaction cost economics has focused on environments with more certainty in product outcomes conditional on effort (Monteverde and Teece 1982, Anderson and Schmittlein 1984, Masten 1984, Joskow 1985, Masten et al. 1991, Levin and Tadelis 2010, Rawley and Simcoe 2010).

However research has also shown there are complementaries between the decision to vertically integrate different products (Novak and Stern 2009) as well as the performance of those products (Henderson and Cockburn 1996, Natividad and Rawley 2015). These complementaries could be especially important in innovative industries where multiple products are developed in parallel (Iansiti 2000). This paper asks the question whether property rights and transaction cost economics can influence each other within a portfolio of potentially vertically integratable products.

This paper uses the the US broadcast television industry circa 1970 as its empirical setting for three reasons. First, television shows exhibit variation in a form of vertical integration across multiple products. The big three networks (NBC, CBS and ABC) sometimes partially funded the development of the television shows they aired. When a network funded the show, it was in effect

both the upstream supplier of the product and the downstream distributor of that product. Each network has multiple new shows in development at any given time, some partially funded by the network and others independently funded.

Second, broadcast television is a setting where downstream action matters (Whinston 2001) to a product's joint payoff. The revenue for television shows consists of a short run component derived from its initial broadcast and a second long run component from secondary rebroadcast for shows that amass a sufficient number of episodes. The value of the long run component is crucially dependent on the renewal action made by the initial broadcast network; unless the show is renewed for multiple seasons there will not be enough enough episodes to trigger secondary rebroadcast. Under non-integration, the network only benefits from the short run component; it's profit is generated by selling advertising for the show's initial broadcast. Under integration, the network also shares in the long run component when syndication payments are paid to the show's owners for the rights to re-broadcast the show. Hence the decision to renew will be less optimal for joint payoff if property rights are not assigned to the downstream distributor.

Third, the broadcast television industry faced a shock that affected the incentives to vertically integrate. In 1970, the Federal Communications Commission ("FCC") prohibited the industry from holding ownership stakes in any of television shows broadcast during the evening hours from 7PM to 11PM ("primetime"). This constrained the ability to vertically integrate in a very specific way; the networks could still fund the show but they needed to sell off the long term component of the show's payoff prior to the show's airing. The network's renewal action is non-contactable for similar reasons to other innovative industries; moral hazard creates uninsurable risk (Arrow 1962). Thus the FCC shock caused the network to no longer had incentives that reflected both components of payoff when deciding the renewal action for primetime shows. The FCC shock had no such direct effect on shows broadcast outside of primetime; the network's portfolio of products was heterogeneously affected.

This paper shows this change in incentive structure resulted in changes in both the decision to vertically integrate and the non-contactable action taken by the downstream party consistent with property rights models. In addition, it shows that spillovers occurred consistent with transaction cost economics which reduced vertical integration in products unaffected by the contractual restrictions. This paper's main contribution is in highlighting the need for both theoretical and empirical work to consider the interplay between property rights and transactional cost economics when studying organizational structure across product portfolios.

2 | Data and Methods

2.1 | Data Set

This paper's primary date consists of observations of all shows on broadcast, cable and streaming television worldwide from the Internet Movie Database ("IMDB") with Wikipedia used to as a secondary data source. Table 1 provides a summary of key statistics for US shows during the period of this study.

Broadcast year refers to the calendar year the first episode of a show was broadcast. Sea-

Table 1: Summary Statistics of New Shows on US Major Networks

Variable	Mean	(Std. Dev.)	Min.	Max.	N
Intitial Broadcast Year	1968.93	(3.25)	1964	1974	582
Season Rating	7.35	(0.94)	1.3	9.70	477
Renewed	0.34	(0.48)	0	1	582
Primetime Broadcast	0.55	(0.5)	0	1	582
Integrated	0.25	(0.43)	0	1	582
Syndicated	0.36	(0.48)	0	1	582
Genres Per Show	2.83	(1.44)	0	13	582
Has New Production Company	0.41	(0.49)	0	1	550
Has Production Company with Hit	0.74	(0.44)	0	1	550
Has New Creator	0.5	(0.5)	0	1	565
Has Creator with Hit	0.52	(0.5)	0	1	557
All New Production Companies	0.07	(0.26)	0	1	550
All Production Companies have Hit	0.34	(0.47)	0	1	550
All New Creators	0.17	(0.38)	0	1	565
All Creators have Hit	0.29	(0.46)	0	1	557

son ratings are the average IMDB rating across a show's first season episodes where available, otherwise the IMDB rating for shows lasting only one season. Renewed indicates whether the show survived to a second season. Primetime indicates whether the show was original broadcast during primetime hours on ABC, NBC or CBS. Integrated indicates whether the firm of the original broadcast network also was listed as a production company for show which suggests the show was funded by the network. Syndicated indicates whether the show was eventually broadcast on either another US or foreign network. The production company variables indicate whether the show had new production companies or production companies with a previous show that made Nielson's top 30. The creators variable is similar but pertains to the show's main executive producers.

2.2 | Empirical approach

The paper tests a set of hypotheses using a difference-in-difference methodology on predicated control and treatment groups based on show observables prior to the shock.

Hypothesis 1A: *Syndicatable, vertically integrated shows should exhibit a drop in renewal rate after the shock.*

Hypothesis 1B: *Shows that are syndicatable should see a drop vertical integration after the shock.*

The Hypothesis 1A derives from the reduction in a network's incentives to renew a show after the shock; the network becomes solely focused on the short term payoff from the initial airing of a show's second season rather than the joint payoff that includes syndication revenue. Hypothesis 1B captures that network payoffs are indifferent between integration and non-integration after the shock, reducing the incentives to integrate.

Empirically although the data reveals which shows eventual become syndicated, data is absent on what were the set of shows that were syndicatable. Instead a prediction of syndication is generated using the pre-shock shows from 1955 to 1969 that were syndicated and genre data which has been documented to be closely linked to a show syndicatablity (Wildman and Robinson 1995). This helps control for changes in the syndication behavior of shows due to the shock. 1955 was chosen as the lower bound year since it was not until the late 1950's that ABC was viewed as a major network.

$$Syndicated_{int} = \beta_0 + \sum_{g \in Genres} \beta_g \gamma_g + \sum_{g1 \in Genres} \sum_{g2 \in Genres} \beta_{g_1 g_2} \gamma_{g_1} \gamma_{g_2} + \epsilon_{int} \tag{1}$$

Hypothesis 1B is then testable by running equation 2 on a subset of shows whose predicted $\widehat{Syndicated}_{int} >= 0.5$ using equation 1 where i is a show initially broadcast in year t on network n.

$$VertInt_{int} = \alpha_0 + \alpha_1 Primetime_{int} + \alpha_2 PostShock_t + \alpha_3 Primetime_{int} \times PostShock_t$$
$$+ \delta_t + \nu_n + \mu_{int} \tag{2}$$

Hypothesis 1A suffers more clearly from a potential change in individual observations before and after the shock; the kinds of shows that were vertically integrated after the incentive change are likely to be different from the kinds of shows that were vertically integrated before. Since vertical integration decisions are strongly related to the bargaining power of both the upstream and downstream parties (Bielby and Bielby 2003) measures of such bargaining power are interacted with genre to estimate vertical integration for shows prior to the shock.

$$Integrated_{int} = \beta_0 + \sum_{g \in Genres} \beta_g \gamma_g + \sum_{g1 \in Genres} \sum_{g2 \in Genres} \beta_{g_1 g_2} \gamma_{g_1} \gamma_{g_2}$$
$$+ \beta_{hhc} hasHitCreator_{int} + \sum_{g \in Genres} \beta_{g,hhc} hasHitCreator_{int} \times \gamma_g$$
$$+ \beta_{hpc} hasHitProductionCo_{int} + \sum_{g \in Genres} \beta_{g,hpc} hasHitProductionCo_{int} \times \gamma_g$$
$$+ \beta_{ahc} allHitCreators_{int} + \sum_{g \in Genres} \beta_{g,ahc} allHitCreators_{int} \times \gamma_g$$
$$+ \beta_{apc} allHitProductionCos_{int} + \sum_{g \in Genres} \beta_{g,apc} allHitProductionCos_{int} \times \gamma_g$$
$$+ \nu_n + \sum_{g \in Genres} \beta_{g,n} \nu_n \times \gamma_g + \epsilon_{int} \tag{3}$$

Hypothesis 1A is then testable by running equation 4 on a subset of shows whose predicted $\widehat{Syndicated}_{int} >= 0.5$ and using equation 3 to predict $\widehat{Integrated}_{int}$.

$$Renewed_{int} = \alpha_0 + \alpha_1 \widehat{Integrated}_{int} + \alpha_2 PostShock_t + \alpha_3 \widehat{Integrated}_{int} \times PostShock_t$$
$$+ \delta_t + \nu_n + \mu_{int} \tag{4}$$

3 | Empirical Results

Table 2 provides OLS estimates of equation 4. Prior to the shock, 85% of shows predicted to be both syndicatable and integrated were renewed. Afterwards, renewals dropped closer to 50%, supporting Hypothesis 1A.

Table 2: Change in renewal rates for integrated shows

	Renewed	Renewed	Renewed
Pr(Integrated)	0.377*** [0.133]	0.367*** [0.123]	0.709*** [0.249]
Post Shock	-0.125 [0.0951]	-0.0163 [0.196]	
Pr(Integrated) * Post Shock	-0.378*** [0.133]	-0.367*** [0.123]	
Pr(Integrated) * 1964			-0.497 [0.326]
Pr(Integrated) * 1965			-0.213 [0.311]
Pr(Integrated) * 1966			-0.106 [0.343]
Pr(Integrated) * 1967			-1.012*** [0.306]
Pr(Integrated) * 1968			-0.0861 [0.349]
Pr(Integrated) * 1970			-0.728*** [0.249]
Pr(Integrated) * 1971			-0.709*** [0.250]
Pr(Integrated) * 1972			-0.707*** [0.249]
Pr(Integrated) * 1973			-0.717*** [0.249]
Pr(Integrated) * 1974			-0.710*** [0.249]
Constant	0.506*** [0.0708]	0.427*** [0.160]	0.363** [0.177]
Pr(Syndication) > 0.5 subset	X	X	X
Year FE		X	X
Network FE		X	X
Observations	129	129	129
Degrees of Freedom	125	113	104
Adj. R-Squared	0.06	0.10	0.10
F-Test	5.28	.	.

Robust standard errors in brackets

Table 3 provides OLS estimates of equation 2. About 35% of primetime shows were vertically integrated prior to the shock and none were integrated afterwards, supporting hypothesis 1B.

Table 3: Change in integration for syndicatable shows

	Integrated	Integrated	Integrated
Primetime	0.350*** [0.0766]	0.379*** [0.0873]	0.517* [0.266]
Post Shock	0.182*** [0.0590]	0.155 [0.114]	
Primetime * Post Shock	-0.486*** [0.107]	-0.510*** [0.115]	
Primetime * 1964			-0.116 [0.322]
Primetime * 1965			-0.215 [0.314]
Primetime * 1966			-0.309 [0.304]
Primetime * 1967			-0.0525 [0.376]
Primetime * 1968			-0.0601 [0.364]
Primetime * 1970			-0.719** [0.308]
Primetime * 1971			-0.863** [0.344]
Primetime * 1972			-0.514* [0.268]
Primetime * 1973			-0.834** [0.319]
Primetime * 1974			-0.529* [0.317]
Constant	1.30e-15 [1.43e-09]	0.00485 [0.0830]	-0.0423 [0.0506]
Pr(Syndication) > 0.5 subset	X	X	X
Year FE		X	X
Network FE		X	X
Observations	133	133	133
Degrees of Freedom	129	117	108
Adj. R-Squared	0.11	0.07	0.02
F-Test	10.46	.	.

Robust standard errors in brackets

4 | Conclusion

Next steps include further development of empirical results on transactional cost economics and theory linking property rights to transaction cost economics.

5 | References

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