5-2012

The Influences of Syndication on Broadcast Programming Decisions

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THE INFLUENCES OF OFF-NETWORK SYNDICATION ON BROADCAST PROGRAMMING DECISIONS

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Economics

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by
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May 2012

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ABSTRACT

Syndication is a major factor in the market for television programming. These papers analyze the effects of the off-network syndication market on prime time programming decisions that are made by broadcast networks. The first paper investigates the effects of the off-network syndication (rerun) market on the optimal number of seasons for a prime time television series. The theoretical model predicts that syndication could potentially either increase the number of seasons if the price elasticity of demand for syndication is elastic or vice versa. The empirical analysis consists of a duration model and estimates the effects of first run ratings and syndication on the probability that the show will not be cancelled in that season. The second paper proposes that the removal of the Financial Interest and Syndication Rules in 1995 changed the incentives for the networks to air more reality programming even if these programs are less popular and receive lower ratings than dramatic programs. This hypothesis is evaluated using a model borrowed from Wildman and Robinson (1995), a profit maximization model as well as a stock and flow model to help explain the timing of the shift. A simple t-test does show that the average amount of reality programming is significantly different (and higher) after the Fin-Syn Rules were revoked. In addition, the regression analysis indicates that there is a shift in the number of seasons that the average syndicated program is aired during the first run.

DEDICATION

I would like to dedicate my dissertation in loving memory of my amazing father and best friend, James E. Redmon, Jr. His unconditional love and support were vital to the completion of this degree. Not only did he contribute emotionally, intellectually, and financially as any father would but also directly by spending many hours with me at the University of Georgia library assisting me with data collection and discussing my research. Without him, this would not have been possible.

ACKNOWLEDGMENTS

I am very grateful for all of the support and inspiration that I have received from family, friends and faculty during this journey. Specifically, I would like to thank my advisor Michael Maloney for his continual guidance, support, and encouragement as well as his generosity of time and insight. In addition, I would also like to thank my committee members, Raymond Sauer, Robert Tollison, and Charles Thomas, for all of their expertise and the time they committed to my dissertation. Robert Tamura and Bentley Coffey also contributed time and assistance for which I am very grateful. I would also like to thank Mitchell Shapiro from the University of Miami for taking the time to assist me with gathering the necessary data to complete my dissertation.

I thank Marian L. Harris, John E Walker, the Charles G Koch Foundation, PeopleMatter and The John E. Walker Department of Economics for their generous financial support throughout my graduate career.

I am also eternally grateful to my family and friends. Specifically, I could not have done this without the loving support and sacrifices of my husband, Jared, and my son, Sullivan, the emotional and financial support as well the generosity of time of my parents, Jim and Lynn Redmon, and the support of Jerry and Debby Whitehead and Sandy and Todd Batt. I also express gratitude to Lori Dickes who provided emotional guidance, intellectual insights, and a second home when I needed it. I am also grateful for Ann Zerkle and Hillary Morgan, who were not only great study mates but also great friends. In addition, I am very blessed to have too many friends to name them all here but to whom I am forever grateful.

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CHAPTER ONE

TO CANCEL OR NOT TO CANCEL:

SYNDICATION AND THE OPTIMAL LENTGH OF A PROGRAM

Introduction

The television industry is a complex and dynamic world, involving many players. Networks interact with producers, advertisers and local stations to entertain, inform, and educate people in a modern world. Diverse television content can be found 24 hours a day on an ever growing number of channels. Each time period and channel has different goals and therefore, different content. Because of the complexity of the overall market, the focus here is narrowed to programming on the major broadcast networks during the time period referred to as prime time[1] and the possibility of those programs to be syndicated on local stations outside of prime time.

A television show starts with a producer, who creates the show and sells it to a network, who schedules it to be aired during a particular time slot on their affiliated stations[2]. When producers set out to create a television series, particularly dramatic programming[3], evidence shows that the first season of a show will probably not bring in a profit. In fact, it will likely bring a loss, because of the high fixed costs of creating a new show. The producers may not recover the costs of the show at all during its first run[4], unless the show is very popular. Until recently, producers hoped that the series would make it to about 100 episodes (usually between 4 and 5 seasons), when it would have the best potential to be syndicated on other networks.

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[1] Prime time is considered to be Sunday 7pm until 11pm and 8pm until 11pm for the rest of the week.
[2] See Appendix A for a diagram the primary market structure during the time period of the data used in this paper.
[3] Dramatic programming includes situation comedies as well as drama series.
[4] A first run is the original airing of the show as a new episode.

What exactly is syndication? In the television industry, syndication is defined as the process of selling programs to individual local television stations. The local stations use these programs to help fill time when there is no network programming provided. There are two specific types of syndication that are relevant to the television industry. One is first run syndication, which includes shows that are made specifically to sell to individual television stations and are never aired nationally by a network. First run syndication includes shows such as Oprah and Jeopardy. The other type of television syndication is called off network syndication and is the type of syndication that will be referred to as syndication for the rest of this paper. Off network syndication is the process of selling reruns of a network show that originally aired during network prime time to the local stations. Off network syndication is the way that many television series make most of their money. Syndication, including first run as well as off network, is an almost $3 billion a year business (Berman 2007). One of a producer's biggest hopes is to get a piece of this rather large pie.

The theory presented in this paper is that syndication may change the number of seasons that producers choose to make if the number of seasons affects the lifetime profits of the show. People may argue that it is ultimately the networks decision whether to keep the program or not. However, the producer can influence the decision of the network by adjusting the price that they would accept from the network for the show. Syndication could affect the number of seasons in two ways. One way depends on the price elasticity of demand for syndication and the other depends on shifts in demand. The price elasticity of demand is the focus of the analysis of this paper.

If the price elasticity of demand is low, or inelastic, syndication could decrease the number of seasons that are made because as new seasons are created the producers dilute the market for their reruns, and therefore, they drive down the price that they can charge for syndicating the show. In this case, an additional season actually reduces lifetime profits because it drives the price of syndication down so much that their profits from syndication fall by more than the profits they receive from the new season. However, if more seasons do not drive down the price significantly or if demand is elastic, they are able to make more seasons than would be profitable without syndication and increase their lifetime profits by making additional seasons.

The other possibility is that shifts in the demand for syndication could change the ideal number of seasons that a producer should make. In this case, high demand for syndication would increase the number of seasons that would be profitable. Decreases in demand would decrease the number of seasons that are made. The demand for syndication or reruns is dependent upon the type of show and the popularity; so different shows may optimize by creating more seasons than others.

Wildman and Robinson (1995) did a thorough analysis of the market for syndication and what makes a show successful in syndication. One of their main findings is a negative and statistically significant coefficient on the number of episodes squared in a regression with syndication ratings as the dependent variable. This supports their theory that there is a declining marginal syndication profit from new episodes. They also claim that this will possibly cause the cancellation of a show before the ratings for the show start to fall. The theory and model presented in this paper is an extension of the theory presented by Wildman and Robinson.

Analysis of the theoretical model presented here gives the same results for diminishing marginal profits or an inelastic price elasticity of demand. However, there could be a more complex result. It is possible that for low numbers of episodes the marginal contributions will be increasing to profits, such that up to a certain point syndication will cause a show to run longer and that after this point the opposite will happen. In other words, the proposed theory is that the price elasticity of demand for syndication is elastic for low numbers of episodes and becomes more inelastic for larger numbers of episodes. Based on market observations, the expected break point will likely be around the 100 episode mark (approximately 4 to 5 seasons).

Duration models are often used to analyze the probability of a particular event happening over the course of time. Therefore, a duration model is a good fit for analyzing this problem, where the event, or death as it is often referred, would be the cancelation of the show. The probit model is used to predict the probability that a show will not end in any given period depending whether it has been syndicated or not. Two probit models are analyzed, one for syndicated series and one for non-syndicated series. The cumulative probability of being canceled in any given season is calculated based on the estimated probit models and compared. The results show that syndicated shows are less likely to be canceled in seasons one through six. Then after season seven a syndicated show is more likely to be canceled. Thus the theoretical models predicts that shows that are syndicated have a more elastic demand for seasons at a lower number of seasons and a more inelastic demand at a higher number of seasons.

In the next section of the paper, a brief history of the market for syndication is covered. Then in the following section, the model is presented and solved. Then the

preliminary data and analysis is discussed, which is followed by the empirical. The paper concludes in the final section.

History

Although there was some television programming prior, the real start of regular network programs was in 1946 (Brooks and Marsh 1995). Originally, television shows were broadcast live, but in the late 1950s stations switched to filmed programming (Museum 2007). This is when second showings and syndication were discovered by the networks (Museum 2007). Therefore, until this time, there was no market for syndication at all.

Most non-dramatic shows, including game shows, news programs, and reality shows, have not seen much action from the syndication market. The market for syndication is usually the largest for television shows aired during the prime time viewing hours, particularly sitcoms (Caves 2005). The Financial Interest and Syndication Rules, from the late 1960s to the mid 1990s, actually ensured that the rights to the program went back to the producers after so many network runs (Museum 2007). Therefore, the "extra" income generated from syndicating television programs may give producers the incentive to create shows that are not profitable in the first run. In fact, it is not unusual for only 80-85% of the costs to be recovered from the original network licensing fee (Vogel 2001).

Syndication is generally reached after 4 or 5 seasons of original network air time. This is because the most popular type of syndication is strip or daily syndication, which is where they run the show, typically, five days a week at the same time. This requires

more episodes than airing the show once a week, and therefore, they want a minimum number of episodes for this type of syndication.

Strip syndication was particularly useful for cable networks. When many of the cable networks were new, it was easier for them to run syndicated programs rather than produce their own (Caves 2005). The growth of the number of cable networks thus increased the demand for syndication over the years starting around the late 1970s and early 1980s.

When a network buys the license to syndicate a series, they usually buy the rights for all of the episodes (Caves 2005). The first syndication contract for a series is usually entered into after about four seasons, as mentioned previously, but before the series is finished with its first run (Caves 2005). Therefore, when producers are making the decision about how many seasons to make they have at least some information as to what the show is worth in syndication. The price for these contracts is usually listed per episode; as either a monetary amount or the right to sell ad time during the show, stated in minutes (Caves 2005). This and the fact that dating on contracts for syndication is not widely available make the price of syndication hard to identify empirically.

Now consider what types of shows are most likely to be syndicated. Because shows often run daily during syndication, it is more likely that a viewer may miss an episode. This makes self contained plot lines good for syndication. If the plot lines carry over significantly from episode to episode, it may be hard for occasional viewers to enjoy the show. This could be one reason that a show similar to *Seinfeld*, the self-proclaimed show about nothing, does so well in syndication. Although there may be some carry over of plot lines, most of the humor comes across even if you have never seen any of the

preceding episodes. Sitcoms, in general are known for being good at this. Another type of show that has done well with reruns is crime dramas, such as *Law & Order*, likely, because they also have self contained plot lines. On the other hand, shows like *24* which rely heavily on understanding previous episodes may not do quite as well in the syndication market.

Theoretical Model and Solution

The hypothesis of this paper is analyzed with a lifetime profit function for a television series. It consists of two main parts: first, the profits from the first run of the program and second, the profits from syndication in other markets. The profits from the first run are made up of the revenues from the initial broadcasting network licensing fee minus the costs of producing the show. Syndication is assumed to have no extra costs and is therefore pure profit. This is due to the fact that the costs of syndication are minimal in relation to the production costs of the series.

The revenue from creating a new season of the series has been simplified to a function of quality in that season, q_t, and price, p_t, which is being defined as the amount that the networks are willing to pay for quality, where t denotes the season number. The quality of the show might include such things as the notoriety and quality of the actors, as well as the quality of the writers, set designers and wardrobe staff. The price in this model is exogenous for simplification. Therefore, revenue for an individual season is the following:

(1) $R_t = p_t q_t$.

The cost function is quadratic in quality and includes a significant fixed cost. Therefore, the marginal cost is increasing in quality (i.e., higher quality is more

expensive, and it is more expensive to hire better writers, actors, etc.). In the model, α represents a shifter for the cost of quality of different types of shows. It is cheaper to increase the quality of reality shows compared to dramatic programming. Therefore those two types of shows may have different α's. There is also a high fixed cost, c_t, to producing the season, which may include renting the studio space and filming equipment as well as many other items. The cost function is represented as the following:

(2) $C_t = \frac{1}{2}\left(\frac{1}{t(\alpha - t)}\right)q_t^2 + c_t$.

Equations (1) and (2) combined yield a profit function for an individual season that simplifies to the following:

(3) $\pi_t = \left(\frac{1}{(1+r)^{t-1}}\right)\left(p_t q_t - \frac{1}{2}\left(\frac{1}{t(\alpha - t)}\right)q_t^2 - c_t\right)$.

This includes a discount rate for a season in the future, which is an interest rate represented by *r*.

The inverse demand function for syndicated seasons is

(4) $s_t = k(t-1)^{-\beta}$, for $5 \le t < T$, where $\beta \ge 0$ and $k \ge 0$,

and

(5) $s_t = kT^{-\beta}$, for $t \ge T$,

where s_t is the price for which producers can sell syndicated seasons. The inverse demand function shifts around depending on the value of *k* and β, which may vary for different types of shows, *k* is a scalar or demand shifter and β is the inverse of the price

elasticity of demand for syndicated seasons. Only previously aired seasons are considered eligible for syndication, therefore the number of seasons sold is *t-1*, while the final new season is denoted as *T*.

Putting all of this together yields the following lifetime profit function for the producer of a show:

$$(6)\quad \Pi = \sum_{t=1}^{T}\left(\frac{1}{(1+r)^{t-1}}\right)\left(p_t q_t - \frac{1}{2}\left(\frac{1}{t(\alpha - t)}\right)q_t^2 - c_t\right) + \sum_{t=5}^{T}\left(\frac{1}{(1+r)^{t-1}}\right)s_t(t-1) + \sum_{t=T+1}^{\infty}\left(\frac{1}{(1+r)^{t-1}}\right)s_t T\ .$$

In this model, it is assumed that producers can begin selling the series in syndication after the fourth season. Therefore, revenues from syndication are considered starting in the fifth season and the future revenue from syndication is also discounted.

This simplified model enables a closed form solution, and it is still useful in analyzing the optimal ending point for a series. First the optimal number of seasons is determined when syndication is not a factor and then compared to the optimal decision when syndication is included.

In the case where syndication is not considered, the lifetime profit function for creating the series and the first run airing is

$$(7)\quad \Pi_n = \sum_{t=1}^{T}\left(\frac{1}{(1+r)^{t-1}}\right)\left(p_t q_t - \frac{1}{2}\left(\frac{1}{t(\alpha - t)}\right)q_t^2 - c_t\right),$$

where *t=1,2,3…T* is the time period, and the first season is the current period. The subscript *n* indicates that this is for first run only. There are two choice variables in this profit function; one is the quality of the season, and the other is the number of seasons that they produce.

First, to find the optimal level of quality for a season, the first derivative of equation (3) with respect to q_t is considered:

$$(8)\quad \frac{\partial \pi_t}{\partial q_t} = \left(\frac{1}{(1+r)^{t-1}}\right)\left(p_t - \frac{1}{t(\alpha - t)} q_t\right).$$

By setting the derivative equal to zero and solving for q_t, optimal value for the quality of a season is determined to be given by the following:

$$(9)\quad q_t = p_t(t\alpha - t^2).$$

The quadratic nature of the quality of the show as time passes suggests that there is a learning curve, so to speak, meaning that it takes some time to develop characters on the show, establish relationships between characters, and generally make the show "work". However, over time the quality diminishes. This may be because the writers run out of ideas and the viewers get tired of the same old plot lines.

Substituting for q_t and simplifying, lifetime profits from new seasons are the following:

$$(10)\quad \Pi_n = \sum_{t=1}^{T}\left(\frac{1}{(1+r)^{t-1}}\right)\left(\frac{1}{2} p_t{}^2(t\alpha - t^2) - c_t\right).$$

In time period t the seasonal profits are

$$(11)\quad \pi_t = \left(\frac{1}{(1+r)^{t-1}}\right)\left(\frac{1}{2} p_t{}^2(t\alpha - t^2) - c_t\right).$$

In order to determine how seasonal profits change over time, the first and second derivative are presented for the seasonal profit function with respect to *t*, as follows:

(12) $\frac{\partial \pi_t}{\partial t} = \frac{1}{2} p^2 \alpha - p^2 t$

and

(13) $\frac{\partial^2 \pi_t}{\partial t^2} = -p^2 < 0$.

Therefore the seasonal profit function can be determined to be concave over time. Profit is the highest for the season closest to $\frac{\alpha}{2}$. Assuming that the fixed cost is the same in every period, if the revenue in this season is not greater than the fixed cost, the series will not generate a profit during any season, which is often true for dramatic series. Even if the series does make a profit in some seasons, it is still possible and likely that the profits from those seasons are not large enough to cover the loss from the first few seasons, which would typically be recovered during syndication of the show. However, because of the current assumption that there is no syndication, a lifetime profit will also be assumed. After the show starts making a profit, the show will maximize its lifetime profit by creating new seasons until the profits from the last season are equal to zero.

Setting equation (11) equal to zero and solving for *t*, results in the following:

(14) $t = \frac{\alpha}{2} - \frac{1}{2p}\sqrt{\alpha^2 p^2 - 8c}$

and

(15) $t = \frac{\alpha}{2} + \frac{1}{2p}\sqrt{\alpha^2 p^2 - 8c} = T$.

The season number given by equation (14) is the breakeven season, where revenue from that season is exactly equal to the costs from that season. After that point the series begins making a profit until the final season given by equation (15), where profits are again approximately equal to zero.

Adding syndication does not change the potential profit that comes from creating the new season, but creates additional revenue from the series. It can create a tradeoff though between profits from the new season and profits from syndication. The profit function including syndication is the following:

$$(16)\quad \Pi = \sum_{t=1}^{T}\left(\frac{1}{(1+r)^{t-1}}\right)\left(\frac{1}{2}p_t{}^2(t\alpha - t^2) - c_t\right) + \sum_{t=2}^{T}\left(\frac{1}{(1+r)^{t-1}}\right)s_t(t-1) + \sum_{t=T+1}^{\infty}\left(\frac{1}{(1+r)^{t-1}}\right)s_t T$$

Where the derivative of s_t, given by equation (5), with respect to T is the following:

$$(17)\quad \frac{\partial s_t}{\partial (T)} = -\beta k T^{-\beta-1} < 0\,.$$

Therefore, the price at which the producers can sell the seasons in syndication is decreasing as the number of seasons that they have to sell increases. The second derivative is the following:

$$(18)\quad \frac{\partial^2 s_t}{\partial T^2} = \beta(\beta+1)kT^{-\beta-2} > 0\,,$$

showing that the price decreases at an increasing rate as the number of seasons increases.

By assuming that the revenue from syndication of a television series is only dependent on the number of seasons available rather than the quality of the seasons, the quality choice for the producers is unaffected by the ability to syndicate. However, the

decision to produce additional seasons is still affected by the syndication market. The series' β (or inverse demand elasticity) will determine whether syndication increases the optimal number of seasons or decreases it.

The effect of β can be seen by examining how the revenue from syndication changes with different β's, particularly the effect of a β equal to one, less than one and greater than one. To start, revenue from syndication after the final season has been produced is given by

(19) $S_t = kT^{-\beta+1}$.

The derivative of the revenue function with respect to the number of seasons is used to determine how revenues change with the total number of seasons produced as follows:

(20) $\frac{\partial S_t}{\partial T} = (-\beta + 1)kT^{-\beta}$.

The effects of a unit elastic demand curve on the syndication revenue are first examined by substituting for $\beta = 1$ in the first derivative,

(21) $\frac{\partial S_t}{\partial T} = (-1 + 1)kT^{-\beta} = 0$.

Since the derivative is zero, the revenue does not change as *T* changes. In this case, the revenue in a period is *k* regardless of how many seasons they sell in syndication, because the price elasticity of demand is unit elastic. Therefore, the optimal number of seasons would not change from the case where there is no syndication.

If β is less than one, equation (20) would be greater than zero. Therefore, when β is smaller than one or when the demand is elastic, revenue is increasing in a period when

another season is added. In this case, the producers would actually increase the number of seasons that they create compared to the case without syndication to maximize their lifetime profits.

If β is greater than one, equation (20) would be less than zero. Therefore, when β is greater than one or demand is inelastic, revenue is decreasing in a period when another season is added. In this case, the producers might decrease the number of seasons that they create compared to the case without syndication to maximize their lifetime profits.

Data

For this paper, data was collected from *The Complete Directory to Prime Time Network and Cable TV Shows: 1946-Present*, Ninth Edition, including genre, and start date and end dates, which were used to calculate the *Season Number*. In addition, the first run Nielsen Rating[5] and the day of the week and time the program aired was collected from *Network Programs by Designated Market Area* published by Nielsen for each November from 1980-1998. Finally, whether the show was syndicated in that year, the equivalent national rating in syndication, and the number of households watching were collected from the *Report on Syndicated Program Audiences* also published by Nielsen for for each November in 1980 to 1988 and 1990 to 1997.

Table 1.1 presents the summary statistics for the variables of interest. The variable *Length* refers to the runtime of one episode of a series in minutes. The most common runtimes for episodes are 30 and 60 minutes and the longest running program is NFL Monday Night Football. On average episode length is about 47 minutes. The variable *Season Number* corresponds to *t* from the theoretical model and refers to how

[5] According to the Nielsen Media Research website, a rating is the percent of households with televisions who are watching a program.

many seasons the series has aired up to that point. In this data set, the average season number is about 4 seasons. The series that ran for the highest number of seasons is a Walt Disney anthology that played on Sunday evenings on ABC off and on for 35 seasons and was presented under several names including *The Wonderful World of Disney*. The next longest running series are *60 Minute,* with 30 seasons and *NFL Monday Night Football* with 29 seasons, followed by the newsmagazine series *20/20*, with 20 seasons by 1998. All other shows in this data set had 15 seasons or less.

Table 1.1 Summary Statistics for First Run Shows

Variable	*Mean*	*Std Dev*	*Minimum*	*Maximum*
Length	46.58	20.17	30	195
Season Number	4.06	4.36	1	34
Number of Telecasts	3.40	0.83	1	5
Rating share	12.83	5.85	1.3	42.8
Number of Households	11507.73	5045.24	21.76	37624
Number of Stations	182.24	13.66	113	194
Residual Rating	0.00	4.03	-11.7224	24.5464
Canceled	0.40	0.49	0	1
Ever syndicated	0.41	0.49	0	1
Number of seasons syndicated	5.67	3.24	1	17
Sum of syndication ratings	7.59	13.43	0	121.5

Notes: Observations: 578 for number of syndicated seasons; 1115 for number of stations; 1395 for all others.

The variable for the *Number of Telecasts* refers to the number of episodes that Nielsen used in a given year to calculate the ratings for that series in that year. The variable *Ratings Share* is the actual Nielsen Rating reported in November of a given year for the first run episodes of the prime time program. The average show season has a *Ratings Share* of 12.83. This ranges from a low of 1.3 for the series *DiResta* and *Legacy* both of which aired for only one season on UPN in 1998. The top rated show in this data

set is the *Cosby Show* in its 3rd (1986) season, with its 2nd (85), 4th (87), and 5th (88) seasons being ranked 4th, 2nd, and 7th in *Ratings Share,* respectively. Rounding out the top ten show seasons are the 4th (85) and 5th (86) seasons of Family Ties ranked the 6th and 3rd, respectively, the 4th (1980) season of Dallas ranked 5th, the 1st (87) season of A Different World ranked 8th, the 5th (86) season of Cheers ranked 9th, and the 12th (80) season of 60 Minutes, ranked 10th.

One problem with this measure of ratings is that over time the average ratings for a season has gone down due to the increased number of options during prime time, including the introduction of new broadcast networks including Fox, the WB, and UPN, as well as the number of cable stations that are available. In addition, the base of the percentage rating has increased over time as the number of households with televisions has increased. For example, the lowest rated show in 1986 has a Ratings Share of 4.6 which corresponds to a *Number of Households* equal to 3563 or approximately 3.5 million, while in 1998 a Ratings Share of 4.6 is equivalent to 4530 or approximately 4.5 million. The reason that this second issue must be considered is that the value to advertisers comes from the actual number of people that view the show and not necessarily from the percentage of people that see the show. Therefore, a show with the same Ratings Share in 1980 and 1998, actually have a different value to advertisers. In order to alleviate these problems the *Residual Rating* is used and presented below.

The *Number of Households* gives the average number of households that were reported to watch an episode of a program in each November during the Nielsen reporting period. This is the number used by Nielsen to calculate the *Ratings Share*. The *Number of Stations* is the number of local television stations reported by Nielsen that

aired the program during November. The *Residual Rating* is a normalized ratings calculation used to account for the fact that ratings on average have gone down over time due to the increased number of options available during prime time.

The variable *Canceled* is a binary variable, represented as a zero if the show continues after that season or a one if that is the show's final season in prime time. The average value is .4 which means 40% of the show seasons in the data set are the final season of the series. In fact, there are a large number of shows that are canceled after their first season.

The variables describing the syndication of the shows include *Ever Syndicated,* which is also a binary variable and is represented by a zero if the show is not found in the syndication data series and a one if the show has been syndicated in at least one year. About 41% of show seasons were syndicated in at least one year. The *Number of Seasons Syndicated* represents that number of years the show was observed in syndication, with an average number of years in syndication at approximately 5.67. The *Sum of Syndicated Ratings,* which is the sum of the ratings observed for each year the show is in syndication. The average is about 7.59 with a maximum of 121.5.

Empirical Analysis

The data for this paper is analyzed in several steps. The first step is to look at the likelihood of being syndicated by type of program. Then the effects of various factors on the show's ratings are analyzed. Finally, a hazard model for the likelihood of being cancelled is used to examine the effects of syndication on the decision to cancel the program.

In Table 1.2 the results of a Linear probability model show that all categories of television shows are more likely to be syndicated than a variety program except Public Service and Sports show, which do not have significant values. This is likely to be in part due to the fact that there are only 2 observations in each of these categories. Adventure dramas and Comedies are the most likely to be syndicated relative to Variety programs, with General Dramas and Police Dramas also more likely to be syndicated than variety programs.

Table 1.2 Likelihood of Syndication Ever by Program Type

Variable	Coefficient	*t*-value
Intercept	0.204	5.41
Adventure	0.305	4.14
Comedy	0.280	6.71
Drama	0.167	3.56
Police	0.179	3.59
Public Service	-0.204	-1.75
Sports	-0.204	-1.79
R^2	0.051	
Syndication Mean	0.404	

Notes: Number of Observations: 1488. Linear probability model estimates all relative to variety shows.

The next step of the analysis is a regression of the effects of the first run characteristics of a show on the ratings of a show. The results of this regression are shown in Table 1.3. This regression includes the program type, the network, the day of the week, the start time of the show, the episode length of the show, the year, the number of seasons, and the number of seasons squared. The variable *Year* is included because overall ratings have fallen overtime and this will help to capture that trend. The variables *Season* and *Season Squared* are used to capture the trend for increased for ratings to increase during the first couple of seasons and then start to decline.

Table 1.3 Estimated Ratings

Variables	Coefficient	t-value
Program Type		
Adventure	-0.035	-0.05
Comedy	1.271	2.52
Drama	0.955	2.14
Police	0.397	0.84
Public	0.531	0.5
Sports	1.470	0.94
Network		
ABC	6.404	7.49
CBS	6.951	8.11
Fox	2.646	3.01
NBC	7.795	9.15
UPN	-0.306	-0.25
Day of week		
Friday	-0.771	-1.94
Monday	0.948	2.2
Saturday	-1.489	-3.63
Sunday	0.303	0.7
Thursday	2.009	5.16
Tuesday	1.468	3.55
Start Time	-3.958	-1.12
Length	-0.018	-1.48
Year	-0.464	-20.83
Season	0.934	15.06
Season Squared	-0.024	-9.21
R^2	0.526	

Notes: Observations 1395. Program types relative to variety shows; networks relative to W; Day of week relative Wednesday. Ratings are shares.

Overall, the program type does not appear to have a significant effect on the ratings. Although, being a comedy or general drama may have a small positive correlation with ratings relative to variety programs. The network does seem to have an impact on ratings the three oldest and most established networks, ABC, NBC, and CBS seem to get the best ratings with Fox's ratings only slightly higher than the WB's and UPN's ratings not significantly different from the WB's. Day of the week has a small

impact on ratings although not as big of an impact as the network. Thursdays generally have the highest ratings relative to Wednesdays, and Saturdays generally have the lowest ratings. The effects of Start Time and the Length of the show on the Ratings are not significantly different from zero, and therefore, have little effect on ratings. The year of the show does have a significantly negative effect as discussed earlier due to the fact that there are an increased number of networks and therefore, options available.

A duration model is used for the analysis of this model. It will analyze the probability of a show being cancelled in a particular season based on first run ratings and the success in syndication, because the model assumes that producers can perfectly predict how well a show will do in syndication. More specifically, the probability that a show will be cancelled after episode *t*, conditional on the fact that episode *t* was made is evaluated.

The probit model is used to analyze the effects of show characteristics on the probability that the show will not be canceled in any given year. The models for Non-Syndicated and Syndicated shows were estimated separately due to the hypothesized differences on how syndication will affect cancelation. The results of this model are displayed in Table 1.4.

The Probit model gives the probability of not being canceled in any given season. From these estimates we calculate the cumulative probability of being canceled in each year. The benchmark just for purposes of simplicity is NBC, Thursday, middle of the programming evening, 1990. We assume average share and households for both non-syndicated and syndicated programs, and same for other variables.

Table 1.4. Probit Estimates of Non-Cancelation

	Non-Syndicated		Syndicated	
Independent Variables:	Coefficient	S.E.	Coefficient	S.E.
Intercept	-111.796	(26.689)	-127.035	(39.819)
Number of Seasons	0.109	(0.038)	-0.442	(0.071)
(Number of Seasons) ^{2}	-0.005	(0.002)	0.017	(0.005)
Network				
ABC	0.134	(0.141)	0.111	(0.194)
CBS	0.060	(0.146)	0.450	(0.224)
Fox	0.944	(0.206)	1.691	(0.346)
Day of Week				
Friday	-0.110	(0.185)	0.027	(0.279)
Monday	-0.255	(0.193)	-0.323	(0.301)
Saturday	-0.126	(0.198)	-0.108	(0.282)
Sunday	0.120	(0.204)	0.155	(0.307)
Thursday	-0.389	(0.186)	-0.466	(0.269)
Tuesday	-0.267	(0.201)	-0.305	(0.286)
Start Time	5.056	(1.628)	2.312	(2.430)
Length	0.007	(0.003)	-0.008	(0.006)
Year	0.054	(0.013)	0.063	(0.020)
Number of Telecasts	0.157	(0.069)	0.157	(0.117)
Quarter Hour Rating Share	0.128	(0.046)	0.174	(0.047)
Number of Households	9.169	(4.727)	7.016	(5.051)

Notes: Event estimated is probability of not being canceled. Observations: Non-syndicated programs (356 non-canceled show years; 415 canceled). Syndicated programs (466 non-canceled show years; 112 canceled). Network effects relative to NBC; Day of week effects relative to Wednesday.

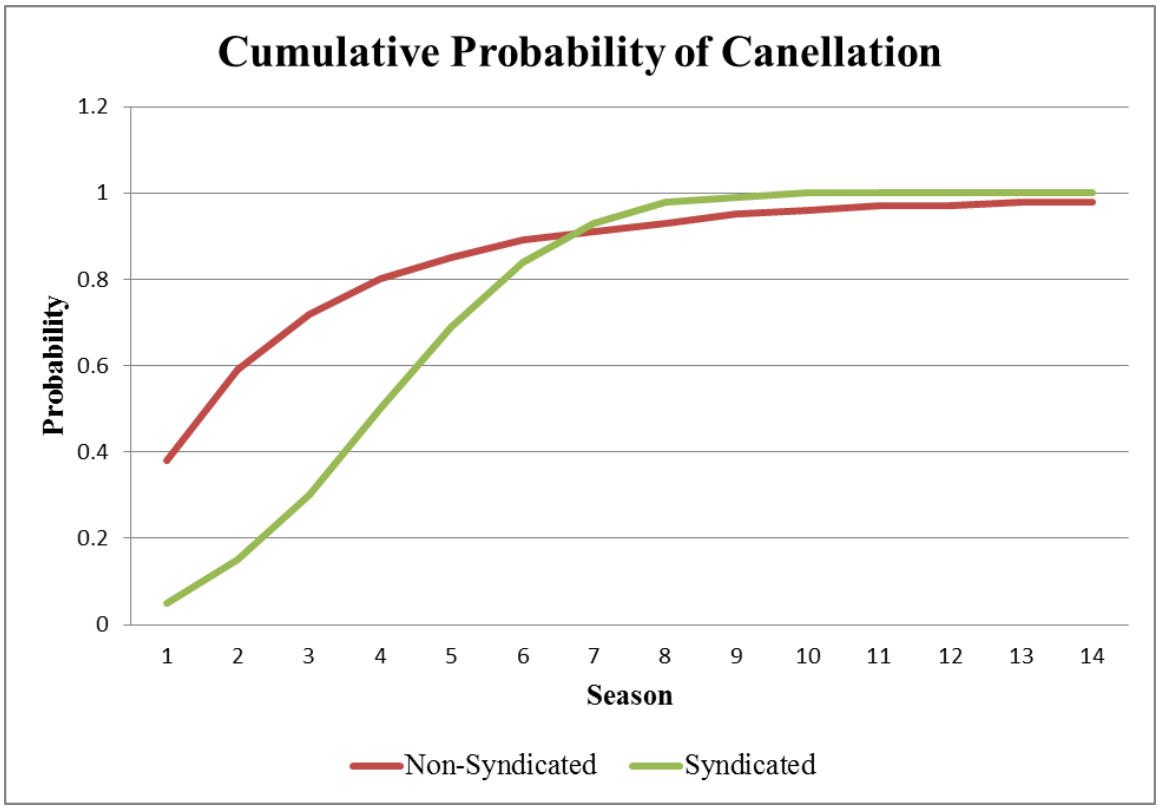
Because the coefficients of the probit model cannot be directly interpreted the cumulative probability of cancelation after the end of each season is calculated using the estimates and presented in Table 1.5.

Table 1.5. Cumulative Probability of Cancelation after end of Each Season

Season	*Non-Syndicated*	*Syndicated*
1	0.38	0.05
2	0.59	0.15
3	0.72	0.30
4	0.80	0.50
5	0.85	0.69
6	0.89	0.84
7	0.91	0.93
8	0.93	0.98
9	0.95	0.99
10	0.96	1.00
11	0.97	1.00
12	0.97	1.00
13	0.98	1.00
14	0.98	1.00

The results show that syndicated shows are less likely to be canceled in seasons one through six. Then after season seven a syndicated show is more likely to be canceled. Thus the theoretical models predicts that shows that are syndicated have a more elastic demand for seasons at a lower number of seasons and a more inelastic demand at a higher number of seasons. Figure 1.1 below shows a graph of the cumulative probabilities of Non-Syndicated and Syndicated shows being canceled after the end of each season. This graph shows the obvious difference in the probabilities of cancellation between the two types of shows.

Figure 1.1



Conclusions

Syndication is a major player in the market for television series and is the main reason that many dramatic programs are profitable. The extra revenues from this source help to improve the quality of the programming that is available on television because the higher costs can be covered with syndication even if they can not be covered by the sale of the rights to the first run. The effects of syndication are an important factor in the decisions of show producers.

The theoretical model in this paper predicts that if the demand for syndication is elastic, the producers would actually increase the number of seasons that they create compared to the case without syndication to maximize their lifetime profits. While if

demand is inelastic, the producers might decrease the number of seasons that they create compared to the case without syndication.

The empirical analysis includes a probit model that is used to calculate the cumulative probability of being canceled in any given season. The cumulative probabilities show that syndicated shows are less likely to be canceled in in the first six seasons. This indicates that shows that are syndicated have a more elastic demand for seasons in syndication at lower numbers of seasons. Then after season seven a syndicated show is more likely to be canceled, predicting that the demand for seasons in syndication is more inelastic in later seasons. Therefore, shows like *Sienfeld* and *Friends* may have been canceled before the maximum first run profit was actually achieved.

CHAPTER TWO

REGULATING REALITY:

EFFECTS OF THE FINANCIAL INTEREST AND SYNDICATION RULES

Introduction

Survivor, Big Brother, Celebrity Apprentice, I'm a Celebrity Get Me Out of Here and Dancing with the Stars are just a handful of the reality programs that have been plaguing the broadcast networks since the year 2000, while the 1990s were considered the decade of the Sitcom with shows like *Seinfeld, Frasier, Friends, and Everybody Loves Raymond*. Have you ever wondered what happened? Some may speculate that Americans have gotten dumber. Do Americans really prefer the mindless entertainment of reality shows? Not that a little mindless entertainment cannot be fun but what happened to the wit and satire of the well thought out plot line and the perfectly timed punch line? Is this shift to reality programs because these shows are so cheap to make or is there more to the story? Could this shift be a result of the removal of the Financial Interest and Syndication Rules (Fin-Syn Rules)?

The purpose of this paper is to analyze the effects of the Fin-Syn Rules, which were removed in 1995, on the programming offered by the broadcast networks. These rules may have increased the incentives for the major broadcast networks to air dramatic programming, including situation comedies (sitcoms) and dramas during the 70s, 80s, and 90s, while decreasing the incentives for the networks to air reality type programming, which includes game shows, news magazines, variety shows, and reality competitions. Then when the rules were removed, shifting the rights of syndication ownership to the

networks, they may have found it more profitable to shift to inexpensive programming such as reality programs and reduce the number of dramas that they air.

This change in the incentives may or may not have been welfare enhancing to society. The networks may be more efficient and profitable at making reality programming, and therefore, the Fin-Syn Rules may have been welfare detracting, because the rules may reduce the efficiency of the networks. However, it is also possible that even though the reality programming is often more profitable for the networks, the consumers may value it less than other types of programming. If this effect is large enough the rules could be welfare enhancing.

The Fin-Syn Rules were enacted by the Federal Communications Commission (FCC) in 1970 and phased out in the early 1990s being completely removed in 1995. The two main reasons the rules were enacted are (1) to help independent producers and independent television stations by limiting the power of the broadcast networks and (2) to increase content diversity during prime time. The FCC could not directly control content due to the First Amendment and thought that having many producers would help to indirectly increase the diversity of the programming (Einstein 2004). The rules restricted networks from taking a financial interest in the programs aired beyond the first run. One of the arguments against the networks having a financial stake in the syndication of their programs is that they would withhold these "high quality" programs from independent stations, forcing them to air programs of lesser quality (Wildman and Robinson 1995). Oba and Chan-Olmsted (2006) did find evidence that once the networks and producers

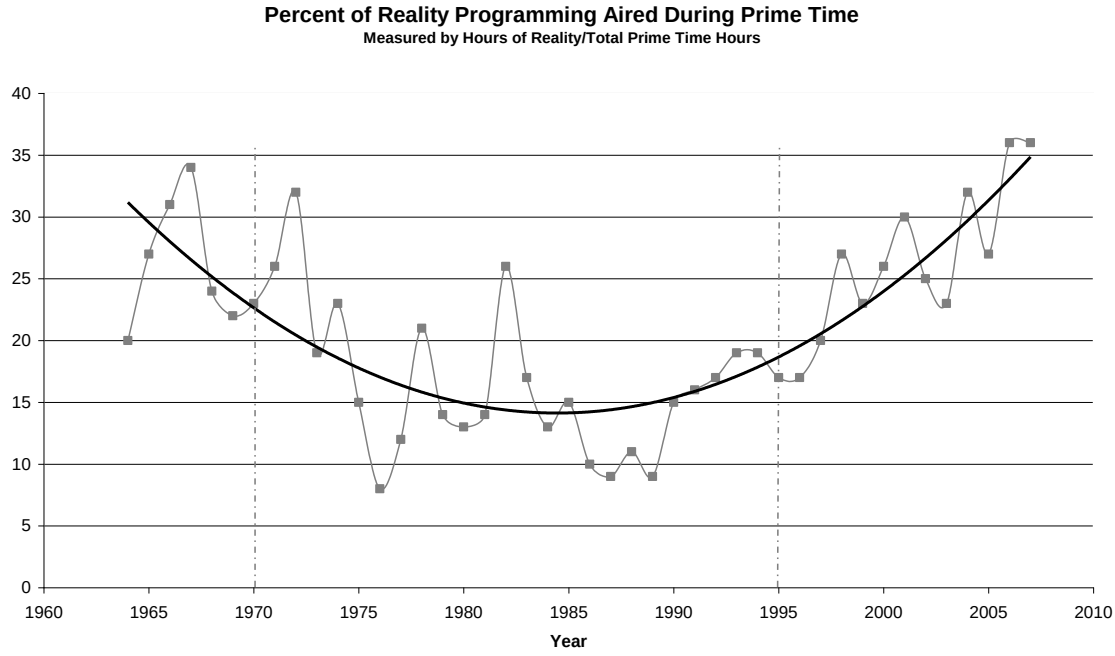
integrated, syndicated programs did tend to be favored by affiliated stations. They, however, did not find significant evidence of market foreclosure.

Although the Fin-Syn Rules appeared to do little to increase content diversity, they did appear to effectively keep the independent producers in the market of producing prime time television programs. In 1970, eleven of the top 20 producers in prime time were independents. Then in 1989, nine of the top 20 producers were still independents. However, by 1995, when the Fin-Syn Rules were officially revoked, there were only 15 companies producing regularly scheduled prime time programs for the top three networks, six of whom were independent producers and the rest of which were the networks themselves and major film studios. In 2002, there were only four independents and a total of 10 companies producing programs for prime time, with ABC, NBC, and CBS producing 63.6% of their programs (Einstein 2004). There was some consolidation of the market over the more than 20 years that the Fin-Syn Rules were in affect; however, there was a significant movement toward consolidation in the 10 years around the time they were removed.

In the fall 1990 season, only 15% of the prime time schedules for the top three networks were reality type programming. In fall 2002, reality programming was up to 25% and in fall 2007 it was taking up about 36% of the prime time schedule. Figure 2.1 shows the percent of reality type programming in prime time from 1964 until 2007. A trend line is depicted in this chart as well and the dashed lines indicate the beginning and end of the Fin-Syn Rules. It can be seen that the amount of reality programs decrease

during the Fin-Syn era and increases steadily after it is over. However, it does appear that this shift to reality programming does not really take off until about 1998.

Figure 2.1



This change in the programming mix is an interesting phenomenon. Although this could easily be explained away by a change in consumer preferences, this is not an economically interesting explanation. The hypothesis of this paper is that the consolidation of the market after the Fin-Syn Rules were revoked gave the networks some market power, particularly in the syndication market, which indirectly gave the networks the incentive to produce more reality type programming and reduce the amount of dramatic programming aired. Therefore, the fact that the networks control almost 64% of what is produced during prime time gives them market power in the syndication market. Indeed it is hard to deny the fact that the major broadcasting networks do have

an increased interest in the syndication market. As of 2007, CBS Television Distribution Group owned eight of the top 10 rated syndicated shows (Berman 2007).

However, in order for networks to take advantage of this market power in syndication, they must actually own some stock of programs in this market. Therefore, this shift to reality programs is likely to happen sometime after the networks gain the rights to produce and syndicate their own programs, which could be why the major shift to reality programs actually began about 5 years after the change in the rules.

Although the television industry had not been widely analyzed by economists, there has been some very interesting and noteworthy research done. Wildman and Robinson (1995) thoroughly analyze the market for syndication. They find that dramas are the most likely to be syndicated but that comedies get the highest ratings in syndication. They also find that non-fiction and variety shows are much less likely to be syndicated. In general, it is also true that the market for syndication is usually the largest for television shows aired during the prime time viewing hours on broadcast television (Caves 2005). Therefore, if the networks own the rights to this syndication they would have a strong hold on the market.

Another important point to note is that most types of reality programs are produced at a much lower cost than dramatic programs (Caves 2005). This is because reality type programs are less scripted than dramatic programs and therefore, do not require the services of highly paid actors and as high quality or as many writers. They are also usually shot on a much less elaborate and inexpensive set. Because of these cheaper production costs, a reality program does not have to have as much advertising

revenue in order to be as profitable as or more profitable than dramatic programs in the first run.

A model proposed by Wildman and Robinson (1995) supports the hypothesis of the model that I present in this paper and predicts that if the networks are behaving competitively during the Fin-Syn Era, they will in fact increase the amount of "reality" programming that they air while decreasing the amount of dramatic programming that they air. While if the networks are acting together as a monopsonistic buyer during the Fin-Syn Era, the opposite will happen. Preliminary, evaluation of the data suggests that the networks were acting more competitively during that time period. Research by Barry Litman in 1979 indicates that the networks did move to a more competitive programming strategy during the late 1970s. If this phenomenon persisted this would support the findings in the data.

In the next section, the theoretical model is established and analyzed. The following section discusses the data necessary for empirically analyzing the hypotheses attained from the model. This is followed by a discussion of the methods for empirical estimation and the results. The final section concludes and summarizes the analysis.

Theoretical Model and Solution

Let us first examine and understand the model used by Wildman and Robinson (1995). This simple model demonstrates the potential incentive for networks to move to more reality programming even if this is not the preference of consumers and motivates the hypothesis of this paper. Next, a model based on a single network is presented, which shows that if the syndication market is monopolized by the network then the network will

choose to air fewer shows with a high value of syndication. The last model used is a stock and flow model, which reveals why the networks may not have made this move immediately after the change in the law but started making this shift after some time.

In this first model from Wildman and Robinson (1995), the networks have *m* time slots to fill and *n* programs from which to choose. For any program *i*, for $i=1,\ldots,n$, the present discounted value of the expected first run revenue is R_i, the present discounted value of the expected syndication revenue is S_i, and the present discounted value of the production budget is B_i. Therefore, the present discounted value of the expected profits for the lifetime of program *i*, are

(1) $D_i = R_i + S_i - B_i$.

Assuming a perfectly competitive market for syndication, where there are many producers, the networks and the producers will negotiate to broadcast the *m* programs with the highest total profits and split these profits between them.

However, if the networks own the rights to syndication and have some power in the syndication market, economic theory tells us that they may be able to increase their profits from syndication by reducing the quantity in the market. Traditionally, the argument by independent producers and other interested groups has been that networks would produce and air the program but withhold the program from the syndication market. This model, however, makes a slightly different prediction.

If the network knows that it plans to withhold a particular program from syndication the potential profits from the show becomes

(2) $D_i = R_i - B_i$,

which is likely to make shows with lower production budgets and even potentially lower first run revenues more profitable. This can be seen easily by comparing two programs with equal potential profits, but where one has a higher syndication value than the other. Consider the following:

(3) $R_i + S_i - B_i = R_j + S_j - B_j$, where $S_i > S_j$.

If the network ignores the syndication value, *S*, because it knows that it wants to withhold the program from the market then the comparison that they make is

(4) $R_i - B_i < R_j - B_j$,

where potential profits from show *i* are now less than the potential profits from show *j*. It is often the case, as in reality programming versus dramatic programming, that B_j is likely to be less than B_i**,** because most shows with high syndication values are more expensive to make than those that are not very valuable in syndication. Therefore, it is also possible that R_j is less than R_i. I assume here that the revenue from the first run is the revenue generated by selling ad spots during the airing of the show. Since advertisers are willing to pay more for larger audiences then it may be true that more consumers prefer program *i* to program *j*, or that program *i* attracts a larger audience than program *j*. However, the network will choose to air program *j*, thus making consumers worse off.

Next, a model of the lifetime profits of a single network under three different conditions is presented. The three conditions presented for lifetime profits include a

market with a single network during the Fin-Syn period that is acting as a monopsonist in market for prime time programs, a single network during the Fin-Syn period that is acting competitively, and a single network in the Post Fin-Syn period that has integrated with the producers.

A single network is the most extreme case but shows how market power in the syndication market could affect the choice of programming by the network. The parties involved are the network, who sells primetime programming to consumers via ad sales, the local television stations, who demand syndicated programming, and the producers, who make the programming. The local television stations are network affiliates and must show the network programming during primetime but may choose to air either syndication or local programming during non-primetime hours. During the Fin-Syn Era there are many producers, which are separate from the network, while during the Post Fin-Syn Era the network and the producers have integrated and are one unit.

First, the Fin-Syn Era is examined. The primary market is the market for primetime programming. The players in the primary market are the network and the producers of the programs, where the network buys programs from the producers to air during primetime. The producers can also sell the programs in a secondary market as well. This secondary market is the market for off-network syndication. The players in the secondary market are the producers and the individual television stations. However, for a program to have value in this secondary market it must first air on the network in primetime. This problem is analyzed from the network's perspective.

The network has *Q* time slots to fill during the primetime hours. They can fill those time slots with shows that have a high value in syndication, q_H , or with shows that have no value in syndication, q_N . For simplicity, all shows of type *H* are of equal quality and have an equal value in syndication and all shows of type *N* are of equal quality. Therefore, the total number of primetime slots, *Q* is

(5) $Q = q_H + q_N$,

which can be rewritten as

(6) $q_N = Q - q_H$.

Therefore, the subscript on q_H is suppressed going forward for simplicity. The inverse demand curves which the network faces are represented by the following:

(7) $\delta_H(q) = \alpha_{H0} - \alpha_{H1} q$.

(8) $\delta_N(Q-q) = \alpha_{N0} - \alpha_{N1}(Q-q)$.

Equation (7) is the inverse demand for primetime shows that have a high value in syndication, q , where δ_H is the per season revenue that networks receive for a show. Equation (8) is the inverse demand by the network for primetime shows that have no value in syndication and δ_N is the per season revenue that networks receive for these shows. The demand is derived from the revenue they can receive by selling ad time during primetime, which advertisers base on the number of people watching. These represent the demand curves for the primary market.

In addition to the primetime demand for shows, the individual television stations demand syndication with which to fill the time outside of primetime. This is the secondary market. These are the same shows, q_H, rerun at other times. The inverse demand curve for syndication is represented as

(9) $\delta_S(q_H) = \alpha_{S0} - \alpha_{S1} q_H$,

where δ_S is the per season price a television station pays for showing a show in syndication.

It is assumed that there are *n* identical producers in the market. Therefore, each producer, *i*, creates an equal protion, $\frac{1}{n}$, of the total quantities of each type of show. The industry has the following costs of production:

(10) $C_H(q) = c_0 q + c_1(q)^2$

(11) $C_N(Q-q) = c_0(Q-q)$

As seen in equation (10), the cost of producing programs with a high value in syndication, C_H, is increasing in the number of programs produced, while equation (11) shows that the cost of shows with no value in syndication, C_N, is not increasing. This is assumed because the talent, in particular the writers and actors that are needed to produce shows with a high value in syndication are relatively scarce, while the resources for producing shows with no value in syndication are abundant. It's not hard to find

someone willing to participate in a game show or reality program; people are ready and willing to get their 15 minutes of fame.

The marginal costs of production is

(12) $MC_H(q) = c_0 + 2c_1(q)$

(13) $MC_N(Q-q) = c_0$

Typically, the producer will simply set marginal cost of production equal to the market price. In the case of shows with high syndication value, however, the producers will consider both the price they can get from the network for the first run and the price they can get from the stations for the reruns. Therefore, the supply curve in the market for new programs with a high value in syndication is sum of the marginal costs to the producers minus the price for these programs in syndication, which is the following:

(14) $\rho_H(q) = c_0 + (2c_1)q - \delta_S(q)$

While shows with no syndication value have the following market supply:

(15) $\rho_N(Q-q) = c_0$.

The next step in analyzing this problem is to examine the network's behavior. Two cases are examined here, one where the network behaves as a monopsonist and recognizes their influence on the cost of television programs and another where the network behaves as if it were perfectly competitive. First, the networks problem is

analyzed as if it were a monopsonist. The network will maximize profits, which are represented by the following function:

(16) $\pi_M = \delta_H(q)q + \delta_N(Q-q)(Q-q) - \rho_H(q)q - \rho_N(Q-q)(Q-q)$.

The derivative with respect to *q* yields

(17) $\frac{\delta\pi_M}{\delta q} = \alpha_{H0} - 2\alpha_{H1}q - \alpha_{N0} + 2\alpha_{N1}(Q-q) - c_0 - 4c_1q + \alpha_{S0} - 2\alpha_{S1}q + c_o$.

By setting the derivative equal to zero and rearranging the result is essentially

(18) $MR = MC$.

Thus the network will equate the marginal revenue of its programming to the marginal cost across the two types of shows in order to maximize their profits. The marginal revenue and marginal cost functions are the following:

(19) $MR_M = \alpha_{H0} - 2\alpha_{H1}q - \alpha_{N0} + 2\alpha_{N1}(Q-q)$.

(20) $MC_M = 2(2c_1 + \alpha_{S1})q - \alpha_{S0}$.

Solving the first order condition finds that the optimal number of shows with a high value in syndication in the case of a monopsonist is

(21) $q_M = \frac{\alpha_{H0} - \alpha_{N0} + \alpha_{S0} + 2\alpha_{N1}Q}{2(\alpha_{H1} + \alpha_{N1} + 2c_1 + \alpha_{S1})}$

If, however, the network behaves competitively in buying programming, their profit function is

(22) $\pi_C = \delta_H(q)q + \delta_N(Q-q)(Q-q) - \rho_H q - \rho_N(Q-q)$,

where the cost to the network does not depend on the quantities of programming that they choose. In this case the derivative, after substituting for ρ_H and ρ_N, is

(23) $\frac{\delta\pi_C}{\delta q} = \alpha_{H0} - 2\alpha_{H1}q - \alpha_{N0} + 2\alpha_{N1}(Q-q) - c_0 + \alpha_{S0} - (2c_1 + \alpha_{S1})q + c_o$.

The marginal revenue and marginal cost in this case are the following:

(24) $MR_C = \alpha_{H0} - 2\alpha_{H1}q - \alpha_{N0} + 2\alpha_{N1}(Q-q)$.

(25) $MC_C = (2c_1 + \alpha_{S1})q - \alpha_{S0}$.

The revenue portion of the profit function does not change in these first two cases. Therefore, MR_M and MR_C are exactly equal. It is the marginal cost that changes in these two scenarios.

In this competitive case, the optimal quantity of shows with high value in syndication is

(26) $q_C = \frac{\alpha_{H0} - \alpha_{N0} + \alpha_{S0} + 2\alpha_{N1}Q}{2(\alpha_{H1} + \alpha_{N1} + c_1) + \alpha_{S1}}$,

which yields the expected result that if they are acting as a monopsonist they chose a smaller quantity of shows with a high value of syndication than if they are not.

In the Post Fin-Syn Era, the only thing that changes in the model is that the network and the producers integrate and become one entity. Therefore, the network now has monopoly power in the syndication market and the profit function is

(27) $\pi_P = \delta_H(q)q + \delta_N(Q-q)(Q-q) + \delta_S(q)q - C_H(q) - C_N(Q-q)$.

In this case the network is directly selling off network syndication itself. Therefore, the demand for off network syndication moves to the revenue portion of the profit function. Also, the network is the producer and incurs the costs of production directly. Thus, the first derivative is

(28) $\frac{\delta\pi_P}{\delta q} = \alpha_{H0} - 2\alpha_{H1}q - \alpha_{N0} + 2\alpha_{N1}(Q-q) + \alpha_{S0} + 2\alpha_{S1}q - c_0 - 2c_1 + c_o$,

and the networks marginal revenue and marginal costs in this case are the following:

(29) $MR_P = \alpha_{H0} - 2\alpha_{H1}q - \alpha_{N0} + 2\alpha_{N1}(Q-q) + \alpha_{S0} - 2\alpha_{S1}Q$

(30) $MC_P = 2c_1q$

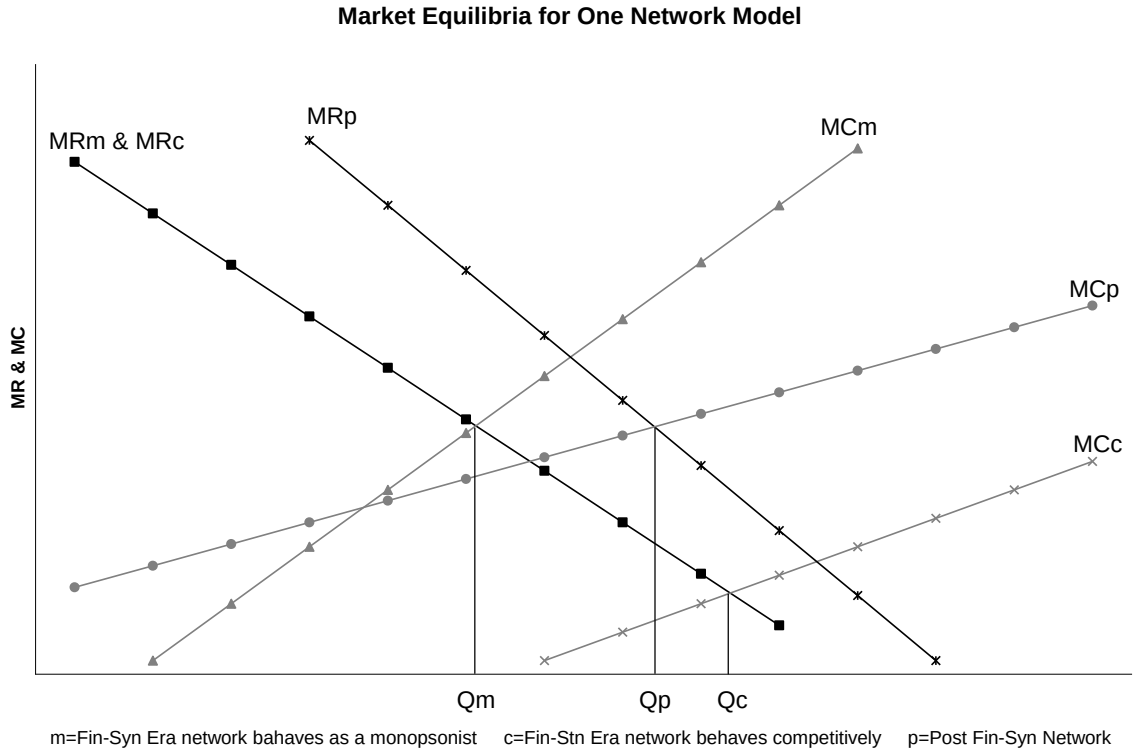
Solving for q yields

(31) $q_P = \frac{\alpha_{H0} - \alpha_{N0} + \alpha_{S0} + 2\alpha_{N1}Q}{2(\alpha_{H1} + \alpha_{N1} + \alpha_{S1} + c_1)}$,

which is larger than q_M but smaller than q_C. Figure 2.2 shows a graphical representation of these various equilibria. Therefore, if the network was utilizing its market power in buying programs during Fin-Syn then the amount of programming with a high value in

syndication will rise after the Fin-Syn rules are removed. However, if the network was acting competitively during Fin-Syn then the amount of programming with a high value in syndication will fall after Fin-Syn. In particular one might see fewer sitcoms and more game shows and reality programming. This result is regardless of the fact that there were no changes in the demand for either type of show by the audience.

Figure 2.2



The last model used for this analysis is a stock and flow model. This model is not fully developed yet but the idea is that there is some stock of syndication, K_t, available to the market at any given time, t. The stock of syndication owned by producer, p, for $p = 1,\ldots,P$, is k_{pt} and the stock of syndication owned by network, n, is k_{nt}, for $n = 1,\ldots, N$. Therefore,

(32) $K_t = \sum_{p=1}^{P} k_{pt} + \sum_{n=1}^{N} k_{nt}$

The value of this stock depreciates over time at a rate of δ.

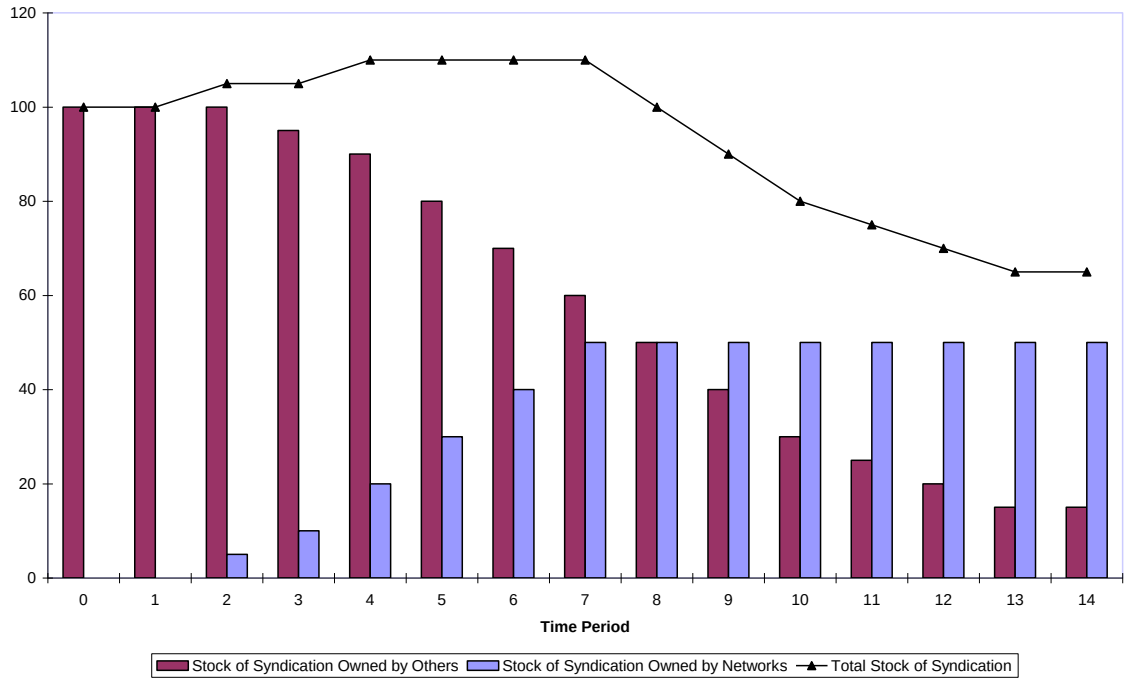
During the Fin-Syn period, this entire stock of syndication is supplied by the producers of the television programs in a more competitive market. Therefore, $K_t = k_{pt}$ and $k_{nt} = 0$. It is also assumed that at the beginning of the period, the stock is in steady state based on the competitive equilibrium, such that the replacement rate offsets the depreciation. Once the Fin-Syn Rules are removed, the networks begin to produce their own programming and they have to decide what type of programming to produce for themselves. They know that they are gaining market power in the syndication market and in order to take advantage of this they must produce shows with higher syndication value. Therefore, initially, the networks produce shows with high syndication value in order to build their stock of syndication. Over time the networks build their stock, while the stock of the producers is depreciating. Eventually, a new lower steady state stock of syndication is reached. Then as the quantity of syndication available in the market falls, they can charge a price higher than that of the competitive market.

Figure 2.3 depicts a simulation of the dynamic process described above and shows visually how the transition from independent producers to network ownership of syndication might take place. The purple bars represent k_{pt}, the stock of syndication owned by independent producers. The light blue bars represent k_{nt}, the stock of syndication owned by the networks. The black line represents the total amount of syndication available at a given time. The older stock of syndication depreciates, because

viewers get tired of watching the same show over and over again. However, new shows are added every season to replace the depreciated stock. Therefore, at the beginning of the time period, the independent producers are producing just enough new shows to offset the depreciation of old shows in order to keep them at the steady state level of syndication.

Figure 2.3

Stock of Syndication



However, when the networks start anticipating the law change, they start producing their own shows and stop buying as many shows from the independents. This is when the stock of syndication owned by the networks starts to grow and the stock owned by the independents starts to shrink to some minimal amount. In addition to this transition in the production of programs, it is also possible that the networks start buying

up the rights to old shows from the independents. The total stock of syndication may grow at first, but over time the networks will reduce the level of syndication to a new lower steady state, this is depicted in the graph as the flattening of the line. This process could explain why the transition to reality programming was not immediate and possibly why the late 1990s was seen as the sitcom era.

Data

The data necessary for the analysis of this theory include data collected from The Complete Directory to Prime Time Network and Cable TV Shows: 1946-Present, Ninth Edition, Neilsen's Report on Syndicated Programs (ROSP), from 1980-1997 and 2004 to 2007. The fall schedules for each year, the network, number of seasons, seasons ranked in the Top 30 for ratings, and genre have been collected from The Complete Directory to Prime Time. The genres are divided into either Scripted (sit coms, dramas, etc) or Non-scripted (reality, newsmagazine, etc). The reason for this division is the distinct differences in demand for syndication of sitcoms and dramas compared to other types of programs. Data on which shows were syndicated in a given year as well as the average syndication ratings, and the number of stations syndicating the program is being collected from the ROSP for each year.

Table 2.1 describes the summary information on the data collected on the first run programs. There are 1031 different shows in the data set, with only 812 of the shows having data for the first season. The variable *Total Seasons* represents the total number of seasons that a show aired in prime time. The variable *Truncated* is a dummy variable that indicates whether the show was still being aired in the first run after 2006, the last

year of the data set. *First Season* is the fall year of the first season of a show. *Scripted* is a dummy variable with a value of 1 if the show is scripted and a value of zero if it is not. *Ranked Ever* is a dummy variable that is a 1 if the show was ever ranked in the top 30 for the season's ratings. *Ranked 1st Year* is a dummy variable that is a 1 if the show was ranked in the Top 30 for the first season's ratings. The variable *Syndicated* is a dummy variable that is a 1 if the show was ever syndicated and 0 if it has not. *Nat Syn Rating* is the rating reported by Nielsen's based on viewing in all designated market areas. *Fin-Syn (1990)* is a 1 if the show was started prior to 1990, about 28.9% and *Post Fin-Syn (2000)* is a 1 if the show started after the year 2000, about 25.9%. The number of shows in the last six years of the data set is close in number to the number of shows in the first 10 years of the data set because there are only three networks in the beginning of the data set while there are as many as six networks in the last six years.

Table 2.1 Summary Statistics for First Run Shows

Variables	*Mean*	*Std. Dev.*
Total Seasons	2.229	2.571
Running {0,1}	0.087	0.283
First Season	1994.140	7.742
Scripted {0,1}	0.929	0.258
Ranked Ever {0,1}	0.159	0.366
Ranked 1st Year {0,1}	0.118	0.323
Syndicated {0,1}	0.156	0.363
Syndication Rating	0.186	0.594
Fin-Syn (1990) {0,1}	0.289	0.454
Post Fin-Syn (2000) {0,1}	0.259	0.438

Notes: Obs 812 first-run shows with data for 1st year; 1031 total

Table 2.2 provides some additional information on the shows that were syndicated. There are 899 show years that are observed in syndication. The variable *Year* is the year a show was syndicated. *National Rating* is again the rating reported by Nielsen's based

on viewing in all designated market areas. *DMA Rating* is the average rating across each designated market area that was carrying the program. *Prior to 98* reflects the percent of shows that are in the data set from 1980 to 1997.

Table 2.2. Summary Statistics for Syndication Data: 1980-1997, 2004-2007

Variables	*Mean*	*Std. Dev.*	*Min*	*Max*
Year	1993.82	7.68	1980	2007
National Rating	1.70	2.06	0.04	12.9
DMA Rating	2.61	2.07	0.1	13.4
Prior to 98	0.76	0.43	0	1

Notes: Obs 899 except 897 for DMA ratings

The average data for individual shows is summarized in Table 2.3. There are 182 shows that are observed in syndication. *First Year, Last Year* and *Middle Year* are the first, middle and last year respectively that a show is observed in syndication. *National Rating* and *DMA ratings* are defined as above however in this data set they have been averaged over each year that a show was syndicated. Again, *Prior to 98* reflects the percent of the data set that is from the period 1980 to 1997.

Table 2.3 Summary of Syndication Data Averaged by Show

Variables	*Mean*	*Std. Dev.*	*Min*	*Max*
First Year	1993.050	8.780	1980	2007
Last Year	1999.030	7.464	1980	2007
Middle Year	1995.790	7.592	1980	2007
National Rating	1.439	1.060	0.1	5.90
DMA Rating	2.162	1.167	0.1	5.94
Prior to 1998	0.639	0.443	0	1

Notes: Obs. 182

Empirical Analysis

The empirical analysis of the hypotheses in this paper is a multiple step process. The first step is to show that the trend in broadcast programming on the three major

networks has in fact changed over time to include more and more reality programming. Therefore, the fall schedules for each year are analyzed to see if the percent of reality programming on the networks does in fact increase and when it begins to change.

The next step of the analysis is a regression analyzing the effects the Fin-Syn and Post Fin-Syn periods on the length of a program. Each observation in the regression is the first season of each show. The regressors include dummy variables for *Fin-Syn* and *Post Fin-Syn* with the transition period as the omitted variable, with one set of regressions defining the Fin-Syn period from 1980 to 1989, the transition period from 1990 to 2000, and the Post Fin-Syn period as 2001 to 2006 and another set of regressions defining the Fin-Syn period from 1980 to 1992, the transition period from 1993 to 1997, and the Post Fin-Syn period from 1998 to 2006. In addition, there is either a dummy variable called *Ranked Ever* or *Ranked 1st Year* indicating whether the show was ever ranked in the top 30 shows for any season during its first run or whether the show was ranked in the top 30 shows for its first season. The variable *Syndication Rating*, defined as the average rating in syndication for all viewing designated market areas is used in some regressions. The variable *Running* is used to control for shows that have not completed their first run prior the end of the data set. The dummy variable *Syndicated* is used in each regression to control for whether the show was ever observed in syndication. Finally, the main variables of interest include the interaction variables between the *Syndicated* and *Post Fin-Syn* variables and the *Syndicated* and *Post Fin-Syn* variables.

The final step in the empirical analysis is to calculate the change in the number of seasons that a syndicated show runs between the Fin-Syn period and the Post Fin-Syn

period. This will indicate whether networks are reducing the number of seasons in syndicated series Post Fin-Syn. An F statistic is then calculated to provide the significance level of the changes calculated.

The first part of the analysis is a test to see if the difference in the percentage of reality prime time programming is significantly different during the non-Fin-Syn periods and the Fin-Syn period. The average percent of prime time television dedicated to reality programming in the Pre-Fin-Syn Era, between the years 1964 and 1970 was about 26%. During the Fin-Syn Era, 1971-1993, the average percent of reality programming was about 16%. Since the fall of the Fin-Syn Rules the percent of reality programming has gone up to an average of about 27%, measured currently only using data from 1996 until 2007. Using a simple t-test rejects the null hypothesis that the Fin-Syn Era mean and the Post Fin-Syn Era mean are equal with a probability of 2.41×10^{-5} or almost zero. This preliminary test gives motivation to continue a deeper analysis.

Table 2.4 presents the results of the six regressions. The first three columns of regression results are for the longer transition period from 1990 to 2000 and the last three columns are for the shorter transition period from 1993 to 1997. The t-stats are given in parenthesis below each coefficient. All of the regressions give similar results. However, the regressions that use the variable Ranked Ever and the Syndication Rating have the highest R-squared, while each regression in the set with the transition period from 1990 to 2000 has a slightly higher R-squared than each respective regression in the set with the shorter transition period.

Table 2.4 Length of Program Run

	Coefficients/(*t*-stats)					
Variables:	*Transition Period 1990-2000*			*Transition Period 1993-1997*		
Intercept	1.448	1.473	1.600	1.427	1.459	1.635
	(14.010)	(14.530)	(15.010)	(9.82)	(10.230)	(10.900)
Fin-Syn	0.062	0.056	0.038	0.078	0.051	-0.028
	(0.360)	(0.330)	(0.210)	(0.43)	(0.290)	(-0.150)
Post Fin-Syn	-0.656	-0.606	-0.695	-0.410	-0.371	-0.487
	(-3.700)	(-3.480)	(-3.790)	(-2.24)	(-2.070)	(-2.580)
Ranked Ever	2.391	2.180		2.412	2.199	
	(11.480)	(10.510)		(11.52)	(10.550)	
Ranked 1st Season			0.878			0.887
			(3.930)			(3.940)
Syndication Rating		0.998	1.255		1.001	1.261
		(5.830)	(7.020)		(5.820)	(7.020)
Running	2.327	2.068	2.551	2.203	1.947	2.423
	(9.040)	(8.080)	(9.570)	(8.68)	(7.700)	(9.200)
Syndicated	3.461	2.232	2.574	3.594	2.350	2.702
	(10.600)	(5.820)	(6.380)	(11.21)	(6.180)	(6.760)
Syndicated × Fin-Syn	-1.369	-1.361	-1.161	-1.501	-1.467	-1.259
	(-3.260)	(-3.300)	(-2.670)	(-3.75)	(-3.740)	(-3.040)
Syndicated × Post Fin-Syn	-2.541	-1.833	-2.227	-2.856	-2.129	-2.552
	(-5.260)	(-3.750)	(-4.320)	(-6.11)	(-4.480)	(-5.110)
R-squared	0.492	0.513	0.456	0.488	0.509	0.452
Change in Length of Run	-1.172	-0.472	-1.066	-1.355	-0.663	-1.293
Prob(*F*) on Change	0.013	0.321	0.033	0.003	0.155	0.008

Notes: *Length of Program Run* is total number of seasons that the show aired. The syn-fin rules were phased out in the early 90s and completely removed in 1995. This allows for a transition period both before and after as the change in the rules was anticipated and the market continued to consolidate even more after 1995. This transition period is 1990-2000 in the first three columns and 1993-1997 in the second three. Thus, the syn-fin period is alternatively measured by shows first aired prior to 1990 in the former and shows first aired prior to 1993 in the latter. Syndication rating is zero for shows never syndicated. *Change in Length of Run* is the difference between the coefficient on the interaction *Syndicated* and *Post-syn-fin* and the interaction of *Syndicated* and *Syn-fin*. The hypothesis test is that this is zero. The probability of the *F* statistic for this test is shown in the last row.

The Intercept for each regression indicates that the average length of a show that starts during the transition period and is essentially not Ranked and not Syndicated lasts approximately 1.5 seasons. A show that is not syndicated during the *Fin-Syn* period is likely to last slightly longer than a show that is not syndicated during the transition period. Although the last regression that uses *Ranked 1st Season* instead of *Ranked Ever* and the shorter transition period gives the opposite result. While a show that is not syndicated during the *Post Fin-Syn* period is likely to be about half a season shorter than a show that is not syndicated during the transition period. The coefficients on the *Ranked Ever* variable shows that being ranked in the top 30 for at least one of the show's seasons increases the number of seasons by more than 2. However, being ranked in the first season of the show only increases the length of a show by about 0.9 seasons. The coefficient for *Syndication Rating* indicates that an increase in the average ratings in syndication of 1 percentage point increases the number of seasons by about one. The coefficient for Syndicated means that a show that is syndicated during the transition period is two or three seasons longer than those not syndicated during the transition period. The full effects of the interaction variable *Syndicated*Fin-Syn* are calculated by adding up the coefficients for the *Fin-Syn*, *Syndicated,* and *Syndicated*Fin-Syn*. Therefore a show that is syndicated during the Fin-Syn period is about one season longer than a show that is not syndicated during the transition period, while a show that is syndicated during the Post Fin-Syn period is about the same length as a show that is not syndicated during the transition period, which is calculated by adding up the coefficients for *Post Fin-Syn*, *Syndicated,* and *Syndicated*Post Fin-Syn*.

Finally the change between the Fin-Syn and Post Fin-Syn periods in the length of a show that has been syndicated is calculated. This change is about 1 to 2 seasons and is significant at the 5% level for 4 of the 6 regressions. This supports the hypothesis that programs headed to or in syndication were cut short in first-run during the Post Fin-Syn period.

Conclusions

This paper proposes that the removal of the Financial Interest and Syndication Rules in 1995 changed the incentives for the networks to air more reality programming even if these programs are less popular and receive lower ratings than dramatic programs. This hypothesis is evaluated using a model borrowed from Wildman and Robinson (1995) and a profit maximization model using one network as well as a stock and flow model to help explain the timing of the shift.

The Wildman and Robinson model shows that if a network wanted to withhold a show from syndication that it may be more profitable to make a show with a lower value in syndication that costs less to make, even if audiences value that show less in the first run than a show which has a higher value in syndication. This would make audiences worse off. The next model shows explicitly that if a network had monopoly power, the network would in fact produce fewer shows with a high syndication value.

An analysis of the fall schedules for the three major networks reveals that the mean percentage of reality programming on during prime time is significantly different before and after the Fin-Syn Rules were revoked. This supports the hypothesis that the rules gave the networks the incentives such that they increased the reality programming

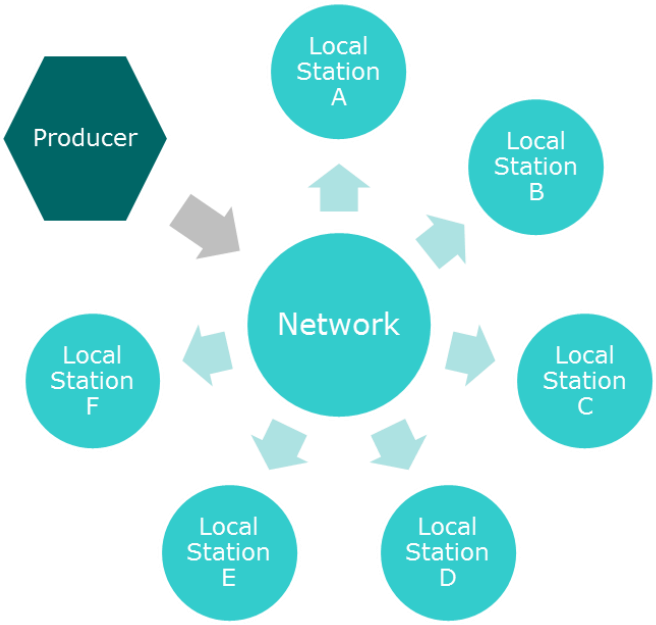
that they aired, now showing more games shows, reality shows, and news magazines. In addition, the regressions used to estimate the changes in the average length of a syndicated program shows that there is a significant change in the length of these programs between the Fin-Syn and Post Fin-Syn periods. This change supports the hypothesis that the networks shorten the length of the syndicated shows that they air during prime time.

Considering that the evidence found here does support the theory that the major networks may be taking advantage of their market power in the syndication market and that it affects not only the syndication market but also the prime time market as well. The potential welfare effects in both of these markets should be evaluated to determine if there is a net loss to society. The potential welfare loss in the syndication market would stem from a reduced quantity of programs and/or seasons of programs available for syndication. While in the prime time market the welfare loss would stem from lower viewer satisfaction and potentially lower advertising revenues. If there is a net loss to society, a policy change should be considered to help correct this welfare loss and maximize social welfare.

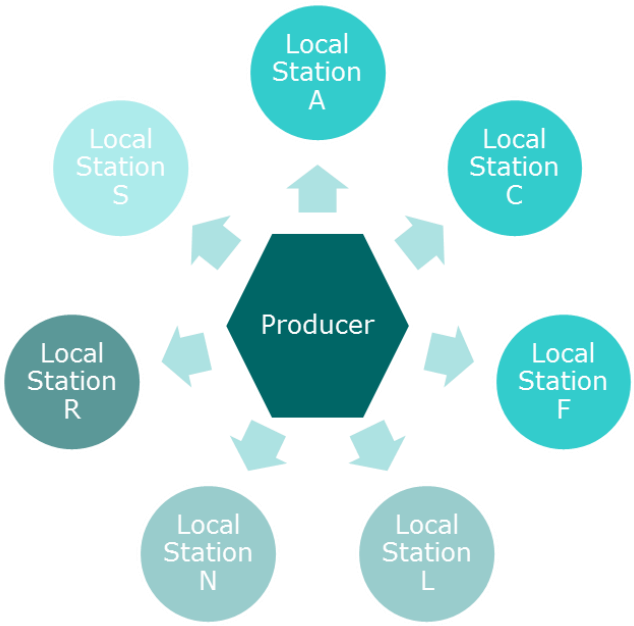
Appendix A

Market Structure Diagrams 1970 to 1995 (Fin-Syn Era)

I. First Run Market



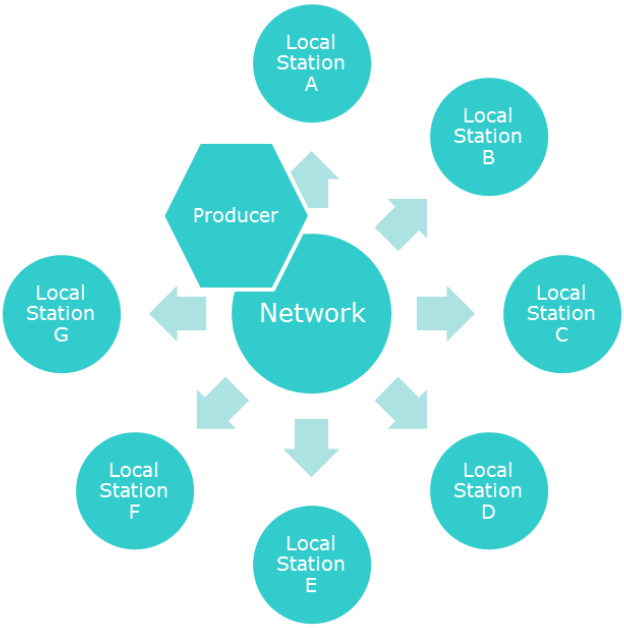
II. Off-Network Syndication Market



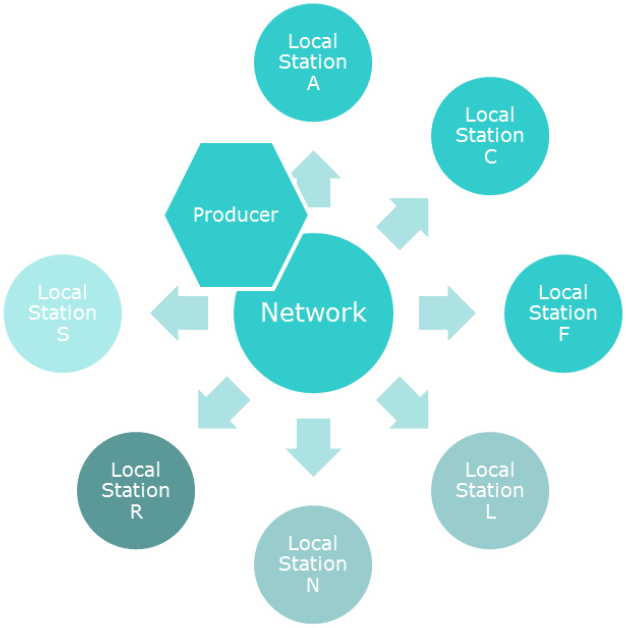
Appendix B

Market Structure Diagrams 1995 to Present (Post Fin-Syn Era)

I. First Run Market



II. Syndication Market



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