

Broadway Productions and the Value of a Tony Award

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Abstract

This paper investigates the effect of a Tony nomination or win on the demand facing a Broadway production using a panel of weekly revenues for Broadway

1 Introduction

The Broadway theaters, a group of thirty-nine performance venues on the West Side of Manhattan, are widely regarded as the center of the universe for American theater. Productions in these venues are known for their superior quality and constitute a large segment of the live theater market in the United States. In 2005, 12 million people paid to attend a Broadway production, and gross sales for all 39 theaters equaled \$825 million (Newman 2005).

are actually penalized by some Tony voters (many of whom are regional producers with a vested interest in the outcome),¹ then the awards may inefficiently

announcements. The announcements of the nominations are typically in early May with the Awards in early June, and depending on the year, the particular week of the year that the announcement occurs can vary by as much as three weeks.

We find that the effect of a nomination or win for a production is consistent with a story of informational cascades (Bikhchandani et al. 1992) where the transmission of information spreads gradually over time. The estimated effect of a Tony nomination or win is positive in the week of the announcement and gradually increases in successive weeks. This “bandwagon” phenomenon has been documented previously in studies on the demand for motion pictures (De Vany and Walls 1996 and 1997; Nelson et al. 2001; Deuchert et al. 2005). In contrast to awards in the movie theater industry (Deuchert et al. 2005), we find that the effect of winning a Tony Award is particularly long-lived. Productions that win an award experience a rise in demand four months later in the year (during the last quarter of the year) and approximately one year later (when the following year’s Tony Awards are being promoted). We hypothesize that pent-up demand resulting from the capacity constraint of each Broadway theater may contribute to the longevity of the effect. Finally, a positive effect exists for receiving a nomination; however, this dissipates after the winners are announced. In fact, nominees who do not win Tony Awards are penalized heavily in the weeks following the Tony Award announcements. Using our demand estimates, we find that for a “typical” production, winning a Tony Award will generate nearly 12% or \$61,000 in additional revenues for the week immediately after its announcement, and receiving a Tony nomination will generate an additional 3% or \$16,000 in revenues in the week immediately following its announcement.

Since the benefits of winning an award extend for many weeks beyond the initial announcement, we also estimate a survival model to examine which factors affect a production’s

longevity. As expected, we find that receiving a nomination or award decreases the likelihood of market exit.

Previous work on the Tony Awards and Broadway theater focuses on the determinants of the longevity of a show – whether measured through a production’s total length of run (Simonoff and Ma 2003; Nygren and Simonoff 2007; Maddison 2004) or total number of performances during its run (Reddy et al. 1998). These outcomes were modeled and estimated as a function of the production’s characteristics with its status as a nominee or winner included in certain instances. The previous papers find that winning a Tony Award is associated with increased longevity, though receiving a nomination may not be. Simonoff and Ma (2003) also find that favorable critic reviews in the *New York Daily News* are correlated with greater success while those in the *New York Times* are not. Our paper tackles a different question, investigating how weekly demand for a Broadway show evolves over its run. In addition, our model and data allow us to employ a different estimating strategy that can directly control for the strength of competition faced by each production in a given week as well as underlying changes in market size over the year.

Another related literature examines the effects of an Oscar (i.e. Academy Awards) nomination or win on motion pictures.³ Nelson et al. (2001) find that an Oscar nomination or win increases the market share per screen of a film. Deuchert et al. (2005) study how weekly box office revenue depends upon Oscar nominations and awards, and they find that winning an Oscar generates extra revenues for films, though receiving a nomination does not. Similar to Deuchert et al. (2005), we allow the effect of a nomination or win to vary by week. However, our model of demand allows for changes in competition and also includes production fixed effects to capture any unobserved production characteristics. Our method of estimating demand is similar to Einav

³ See Ginsburg (2003) for a detailed review of this literature.

(2007), Chiou (2007), and Moul (2007) who use a discrete choice model to separate underlying changes in market size from changes in competition over time for the movie theater and home video markets.

The next section gives a brief background and description of the Broadway theater industry. We then describe our data and model of demand and demand estimates, and we estimate a survival model for purposes of comparison with the previous literature.

2 Broadway Theater

There are currently 39 venues in New York City that are recognized as “Broadway” theaters. Theaters qualifying for the Broadway designation must seat at least 500 patrons, and typically are located on the West side of Manhattan in the region bounded by 6th and 8th Avenues, from 41st to 54th Streets.⁴ The vast majority of these theaters are for-profit

Wednesday, Saturday and Sunday.⁵ Most theaters are “dark” on Mondays, meaning that there are no performances that day. When a Broadway production mounts, it might be a limited engagement with a set closing date, but more often the runs are open-ended (and even limited engagements will often extend if the show does well). For this reason, when Broadway producers set ticket prices, they face a complicated profit maximization problem in which the length of the run matters as much as the profits on any given night.

Box office prices are set using a form of price discrimination known as pricing tiers or “scaling the house,” so that seats in more favorable locations in the venue (e.g., the orchestra or front mezzanine) are priced higher than less attractive seats (e.g., rear balcony). The typical show advertises between two and four different price tiers, and musicals generally offer more tiers and are priced slightly higher, on average, than plays. Within the musical and play categories, there has historically not been much variance in box office prices across shows; between 2001 and 2005 most musicals priced their orchestra seats at \$100. Currently, in 2008, orchestra tickets range in price from \$110 (*Hairspray*) to \$122 (*Jersey Boys*).⁶ Once producers have set the box office price schedule (before the show opens) these prices tend to change infrequently, if at all, during the show’s run. Relatively low price variance exists for full-price tickets purchased at the box office (or through the producer’s official ticket vendor – typically either Telecharge or Ticketmaster). It has often been suggested that producers deliberately under-price at the box office, possibly with the goal of selling out the house early in the run in order to generate fro[(m)8[(w

As a result, any additional boost in demand from a Tony nomination or win may be represented by a modest sustained increase over a long period of time.

In addition to buying through the box office, consumers can also purchase tickets through other offline and online sources. Same-day discount (usually half price) tickets are available at TKTS, which has booths in Times Square and at South Street Seaport. For shows that are not sold-out, producers can bring in last minute re

Actor/Actress in a Musical/Play and Featured Actor/Actress in a Musical/Play), Best Choreography, Best Costume Design, etc.

The Tony Awards Nominating Committee, a rotating panel of approximately 30 members of the theater community, views each new Broadway production in a season⁹ and nominates productions for awards via secret ballot. The awards are then voted on by the approximately 750 Tony Award voters, a group that includes members of the governing boards of the major theatrical labor unions,¹⁰ voting members of the Broadway League, designated members of the American Theatre Wing, and designated members of the Casting Society of America.¹¹ Producers of nominated shows must provide free tickets to the Tony voters, and the voters must attend performances of all nominated productions.

3 Data

The primary dataset consists of weekly production data from June 1996 to September 2007 collected from Playbill.com. Every week the Broadway League compiles a chart of Broadway grosses which is available on the League's website (<http://www.broadwayleague.com>) and on Playbill.com. This chart lists the venue, weekly gross, total attendance, number of previews,¹² number of performances, total capacity, average ticket prices, and attendance as a percentage of total capacity for each production on Broadway.

⁹ A Broadway season typically starts in June immediately after the announcement of the previous season's Tony Awards and ends early the following May, on a date established by the Tony Awards Administration Committee.

¹⁰ These include Actors' Equity Association, Dramatists Guild of America (an association of playwrights, composers and lyricists), Society of Stage Directors and Choreographers, United Scenic Artists (the labor union for theatrical designers and artists) and the Association of Theatrical Press Agents and Managers.

¹¹ The CSA is a professional society of theatrical casting directors.

¹² Broadway shows typically run four to six weeks.

Supplementary information on Tony nominees and winners was collected from the official Tony website (<http://www.tonyawards.com>). The announcement dates of the winners and nominees were collected from newspaper and magazine sources. We dropped weeks for which data on attendance were missing for certain productions.¹³ For the remaining 576 weeks in the sample, the data contain complete information on every Broadway production presented during that week.

The final sample consists of 16,150 observations. Table 1 contains summary statistics. The average weekly gross (i

some productions appear as the original run and then as a revival several years later.¹⁸ Over this time period, 36% of the productions were revivals. The average length of the run for a production was approximately 44 weeks.

Of the 428 productions in the sample, 49% received a Tony nomination

where μ_{jt} is the mean utility, and ϵ_{ijt} is an idiosyncratic individual error term with a Type I Extreme Value distribution. The mean utility of production j in week t

Following Berry (1994), we can manipulate and simplify the market share formula in equation (3) to obtain a relationship between a production's market share and the characteristics of the market and its competitors:

The effects of the Tony nomination and win are identified by exogenous changes in the timing of the announcements. The announcements of the nominations are typically in early May with the Awards in early June. Even so, depending on the year, the particular week of the year in which the announcement occurs can vary by as much as three weeks. The coefficients on production characteristics and week of year are identified by changes in a consumer's choice set over time. For instance, the effect of competition is identified by observing a production competing against different sets of rivals over the weeks. As the market size can fluctuate from week to week, the underlying seasonality in the market is identified by observing the same set of productions competing during different weeks of the year.

4.2 Results

Table 2 reports select results from estimating equation (3) using the logit model. Column (1) contains the results from the full sample. Column (2) drops observations from September, October, and November of 2001 as demand and production runs of Broadway theaters were adversely affected during the months subsequent to the September 11th attacks. As Table 2 indicates, the results are qualitatively similar across the different specifications and have the expected signs. The coefficient on *decay* is negative, indicating that older shows have a lower market share. The coefficient on *preview* indicates that productions experience a lower market share in weeks during which they show previews.

The *Nomination* coefficients reported in Table 2 are the effects of a Tony nomination in the weeks after the nominees are announced but before the winners are revealed at the Tony Awards. We find that a Tony nomination has a positive effect on a production's demand in the weeks leading up to the Awards. In the week immediately following the nomination

announcements, a production's market share (relative to the outside good) increases by 3.0% if it is nominated, as shown in column 2 of Table 2.²¹ The effect increases in the second week to 7.6% and falls slightly to 6.3% in the third week after the nomination. After the fourth week, any benefit of the nomination has dissipated. This is consistent with a story of informational cascades where word of mouth gradually spreads after the nominations.

In addition to the specification discussed above, we estimate equation (3) allowing the effect of a Tony nomination or award to vary by category as well as over time. We split Tony nominations and awards into two categories: "main" and "other". We designate the "main" category to include nominations for best production and best acting: best play, best musical, best revival (play and musical), best special engagement, best actor in a musical, best actress in a category to inc m

nomination or win is stronger for the “main” category than for the “other” category. At the 1% significance level, we reject the joint hypothesis that the coefficients for the effect of the nominations before the Awards are equal across the “main” and “other” categories. Similarly, we reject the joint hypothesis at the 1% significance level that the coefficients for the effect of the nominations after the Awards are equal across the “main” and “other” categories, and we also reject the joint hypothesis that the effect of a win is equal across categories.

Figures 1 and 2 graph the effects of a Tony nomination and win in the “main” category during the weeks after the Tony winners are announced.²² Figure 1 plots the estimated weekly coefficients for the Tony winners as a function of the number of weeks after the winners are announced. Recall that the coefficients on *Win* capture the effect of winning a Tony beyond a nomination. We find a statistically significant and positive impact of winning a Tony on a production’s demand beyond the effect of a nomination. In the week immediately following the Tony Awards, “main” category winners’ market shares increase by 11.5% relative to the outside good.

The results are consistent with a story of informational cascades. During the initial weeks after the win, the market shares of winners gradually increase as word of mouth spreads. As mentioned above, the longevity of the effects of the Tony Award may be amplified by capacity constraints of theaters, as individuals may be forced to purchase tickets weeks in advance due to currently sold out performances.²³ In our sample, however, the effect from such rationing is

likely to be small since very few shows operate at full weekly capacity.²⁴ During the week before nominations were announced, the average attendance for (eventual) nominees was 70% of capacity with fewer than 3% of productions selling out. During the week before the Awards, the average attendance for (eventual) winners was 80% with fewer than 10% of productions selling out.

In addition, the benefit of winning a Tony varies over time. A peak is reached around 4 months after the Tony Awards during the last quarter of year. The effect gradually tapers off, but winners from the previous year also receive a boost in market share approximately one year after the Tony Awards – i.e., when the next year’s Tony Awards are heavily promoted. The benefits of winning a Tony therefore accrue gradually over the weeks and experience two surges later in the year that are coincident with the last quarter of the year and the following year’s Tony Awards.²⁵

Figure 2 plots the estimated weekly coefficients for Tony nominees as a function of the number of weeks after the winners are announced; these estimated coefficients represent the gain in market share (relative to the outside good) of receiving a Tony nomination after the Awards. Once the Tonys have been awarded, any benefit of being a nominee (but not a winner) is eliminated. In fact, the negative coefficients on *NomAfter* indicate that a penalty exists for nominees who do not win. In addition, the penalty gradually increases over the initial weeks after the announcement. This result is consistent with previous work that indicates a penalty for losing in the theater industry. Simonoff and Ma (2003) find that losing a Tony nomination decreases a show’s post-award longevity. They postulate that the public may view losing a Tony Award as

²⁴ The weekly capacity includes the combined totals from weekday and weekend shows. To the extent that weekend shows may sell a greater proportion of available tickets, the weekly capacity will be an average measure.

²⁵ Our results are qualitatively similar when we include a lagged dependent variable in our estimating logit equation to capture any potential time-varying unobservable factors.

“negative information,” and this increases the risk of a show closing. Under our demand model, the penalty is consistent with a scenario in which revenues rise for all nominees before the Tony Awards, but following the Awards announcements the public pays more attention to the winners at the expense of the losers. In our utility maximization model, consumers have fixed time and budget constraints, and they must choose among shows. Consequently, the revenues of winners increase after the Awards while the losers’ revenues fall as consumers substitute from one production to another.

Our findings of the gradual impact of nominations and wins on productions’ market shares is consistent with informational cascades that have been found in other industries – such as the motion picture industry (Nelson et al. 2001; Deuchert et al. 2005). Previous work by Deuchert et al. (2005) finds that audiences punish Oscar nominees that do not win, similar to the phenomenon we observe for Broadway productions and the Tony Awards. Broadway productions differ significantly from movies, however, in that the length of a Broadway run can extend for years. Moreover, while movie theaters can expand the number of screens in the long run, Broadway theaters face capacity constraints. One difference in our results is that we find that the effect of a Tony win and nomination is much more long-lived than the impact of an Oscar win. In fact, Tony winners can reap the benefits of their win as late as one year after the win when next year’s Tony Awards are being promoted.

Our estimated coefficients (from Figure 1) indicate that winning a Tony in the week immediately following the announcement leads to an 11.5% increase in the market share of a production relative to the outside good. Given that the total weekly attendance of a production on average is 8000 (and assuming the share of the outside good does not change substantially), this 11.5% increase in a production’s market share will translate into an extra 920 tickets sold

(=0.115*8000) for the winning production. With an average ticket price of \$66, winning a Tony Award will generate nearly \$61,000 in additional revenues for the week immediately after. Using a similar calculation, receiving a Tony nomination will generate an additional \$16,000 in revenues in the week immediately following its announcement (=0.03*8000*\$66).

5 Survival Analysis

In the previous section, we found that Tony nominations and wins benefit Broadway productions for extended periods beyond the announcement. A natural question that follows is what factors influence a production's length of run on Broadway. While our previous model estimates demand and conditions on the decision of a producer to enter and exit the market, we examine these entry and exit decisions using a survival model in this section. If surviving for an extended period in the market is necessary for reaping the full rewards from a Tony nomination or win, what factors influence the longevity of a production? We estimate a duration model to examine the probability of a production exiting.

In our survival analysis, the hazard function $\lambda(t)$ approximates the probability that a production will exit in week t given that it has survived until week $t-1$. We estimate a Weibull duration model, since the hazard function is not constrained to be constant. In addition, this also facilitates comparison with previous work done in the live theater and motion picture industries. Under the Weibull duration model, the hazard function for production j is monotonic and given by:

$$(5) \quad \lambda(t) = \alpha t^{\alpha-1}$$

with $\exp(-\lambda(t))$

where X is a vector of time-varying characteristics of production j in week t . The parameters α and β are to be estimated. If $\beta = 1$, then the hazard function is constant over time; if $\beta > 1$, then the hazard function is monotonically increasing, and if $\beta < 1$, then the hazard function is monotonically decreasing.

We allow a production's probability of ending its run to depend upon its type (musical or play),²⁶ whether it is non-profit, the year that it began its run, whether it received a Tony nomination or win, and whether the production is a limited or open run.²⁷ While two previous studies have examined the duration of Broadway productions, our analysis differs in several ways. First, in contrast to Simonoff and Ma (2003), we have a large sample of shows (over 700 productions) that appear on Broadway from 1996 to 2007. Secondly, relative to Maddison (2004), we collect updated data from more recent years, and more importantly, we allow the covariates to vary over time. We consider a simplified model relative to our demand model where the effect of receiving a Tony nomination is allowed to differ before or after the Tony Awards, depending upon whether the show wins or loses.

Table 3 reports the results of the estimates. The independent variables include a dummy equal to one if a production is a musical and zero if it is a play, and indicators for whether the production is a revival, a non-profit and/or a limited run. The variable *TonyNom* is a dummy variable that equals one in the weeks following a Tony nomination and 0 otherwise, and similarly, the variable *TonyWin* is a dummy variable that equals one in the weeks following a Tony win and 0 otherwise. Columns (1) and (2) contain the results for the full sample of

²⁶

We have translated our results for the hazard model into a graph of the survival function for a “typical” production released in 2005. Figure 3 plots the survival functions for a Tony winner and non-nominee with identical characteristics over a period of 40 weeks (the average run of a production). The representative show is an original, for-profit musical with an open-ended run. For each week t , we calculate the probability that the production will “survive” to at least t weeks. We assume that Tony nominations are announced in the 12th week of the run (the average number of weeks between the first performance and a Tony nomination announcement for eventual nominees), and we allow 5 weeks between the announcement of the nomination and the Tony ceremony (so the win happens in the 17th week). As seen in the graph, the probability of survival increases at each of the announcements for a winning show. The non-nominated show has a steeper hazard function in the weeks following the Awards.

6 Conclusion

The Annual Tony Awards ceremony is the highlight of the Broadway season, recognizing excellence in professional American theater. Producers celebrate the receipt of Tony nominations, and they expect a Tony win to significantly impact a show’s popularity and longevity. Quantifying such an impact is important from an economic policy standpoint, since the influence of an award on the demand facing a production also potentially determines the efficiency of the market for Broadway theater.

We estimate the impact of a Tony Award nomination and win on the demand for a Broadway production and on the duration of a production’s Broadway run. Our model of demand is a discrete choice model that accounts for the strength of competition in a given week, and it allows the impact of a Tony nomination or win to vary across the weeks of the Broadway

season. We find that the effect of a nomination or win for a production is consistent with a story of informational cascades, where the transmissi

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Table 1. Summary Statistics

variable	mean	standard deviation	minimum	maximum
gross revenues	548,980	305400	1138	1,851,212
attendance	7898	3239	24	21,631
number of previews	0.55	1.87	0	16
number of performances	7.27	2.16	0	16
capacity	1255	358	499	1935
% attendance	79	17	3.4	109

Notes: The number of observations is 16,150. All variables are measured at the weekly level. Gross revenues are reported in 2007 dollars. Previews and performances are accounted separately; performances refer to non-preview showings. Capacity is the total number of tickets available for any given show. Percentage attendance reported in excess of 100% is due to the sale of standing-room only tickets.

Table 3. Hazard model: coefficients of hazard function describing a production's probability of exiting

	(1) Weibull: All	(2) Weibull: All	(3) Weibull: 1997 to 2006
nomination	-1.382** (0.132)	-1.064** (0.147)	-1.137** (0.154)
win	-1.225** (0.170)	-0.805** (0.179)	-0.712** (0.186)
musical		-0.988** (0.146)	-0.924** (0.151)
revival		0.100 (0.123)	0.080 (0.130)
non-profit		-0.023 (0.177)	-0.035 (0.181)
Limited run		0.515** (0.169)	0.541** (0.174)
Number of productions	393	366	319

Notes:

Standard errors in parentheses

* significant at 5%; ** significant at 1%

The coefficients of the hazard function (i.e., a production's probability of exiting) are reported.

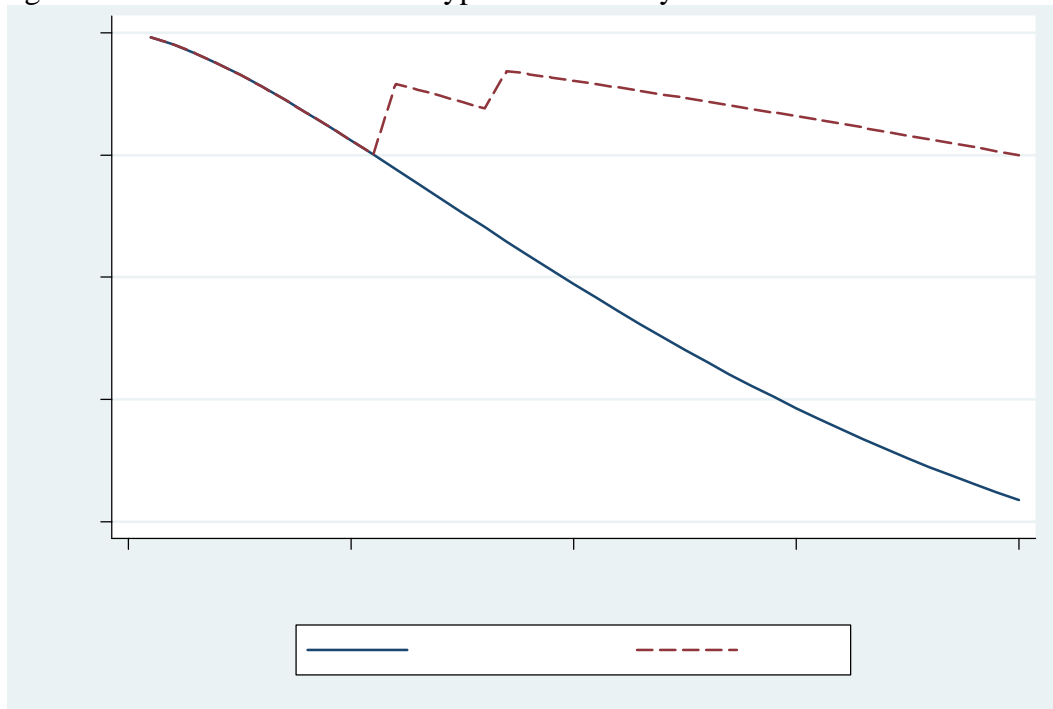
Columns (1)-(2) contain the full sample.

Column (3) contains all productions that opened on Broadway from 1997 to 2006.

Figure 1. The effect of winning a Tony in the “main” category on a production’s market share during the weeks following the Tony Awards



Figure 3. Survival function for a “typical” Broadway musical



Notes: This is the estimated survival function for a “typical” musical released in 2005. The vertical axis measures a production’s probability of survival, and the horizontal axis measures the number of weeks the production has been running. Please see text for accompanying calculations. The Tony nominees are announced in the 12th week of this production’s run, and the Tony Awards occur in the 17th week of the run.