The Economics of Real Superstars:

The Market for Rock Concerts in the Material World

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Like others, I get by with a little help from my friends. This time I thank Gary Bongiovanni, James Grier, Lowell Milken, Orley Ashenfelter, Susan Athey and Bobby Willig for particularly helpful discussions, and Arul Karttikeya, Lauren Sun, Grace Wong and Brad Wynne for excellent research assistance. I have also benefited from comments from seminar participants at Princeton, the OECD and Columbia. All mistakes are my own. An unwritten version of this paper was presented as the keynote speech at the Society of Labor Economists' Annual Meeting in Baltimore, MD, May 4, 2002. I would like to dedicate this paper to the memory of Sherwin Rosen, who was the father of the economics of superstars and a superstar in his own right.

ABSTRACT

The Economics of Real Superstars:
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Beginning in 1997, the price of concert tickets took off, and ticket sales and the number of concerts performed by top artists declined. From 1996 to 2003, for example, the average concert price increased by 82 percent while the CPI increased by just 17 percent. This paper summarizes and seeks to understand trends in the concert industry from 1981 to 2003. Explanations that are examined include: 1) the possible crowding out of the secondary ticket market; 2) rising superstar effects; 3) Baumol and Bowen's disease; 4) increased concentration of concert promoters; and 5) the erosion of complementarities between concerts and album sales because of file sharing and CD copying. The paper tentatively concludes that the decline in complementarities between concerts and album sales is the main cause of the recent surge in concert prices and decline in ticket sales.

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There are two possible approaches one can take to delivering a keynote lunch speech like this one. One approach is to present a serious paper with serious overtones, like one would present at a regular university seminar. The other is to provide entertainment, as one is competing with lunch-time chatter and the clanging of coffee cups. I will try to create a convex combination of the two: a talk on an entertaining subject with a serious message. I should also mention parenthetically that this subject makes for a great undergraduate lecture. Few subjects are of more intrinsic interest to students than popular music. So one reason to pay attention is that you can painlessly teach your students some basic economics by downloading the Powerpoint slides (replete with music clips) from my lecture from *www.irs.princeton.edu*.

Before I start I owe you an explanation. How did I become interested in this topic? The truth is that about a year ago, I accidentally fell into it. After I wrote an article for the *New York Times* called, "Seven Lessons from Super Bowl Tickets," I was invited to give the keynote speech at the Concert Industry Consortium in Hollywood, CA in February 2002. I explained to the organizer that I knew very little about the economics of rock & roll concerts. In fact, I explained that the only time I had gone to a concert in the last several years was when I took my children to see **NSYNC*, and the only thing I learned from that experience was that I should bring ear plugs if I ever go to another concert! He assured me not to worry. His organization, *Pollstar*, had collected a database on more than 200,000 concerts dating back to 1981, and they would be happy to share it with me. This naturally peaked my interest to study the economics of rock &

roll, a subfield of economics I now call *Rockonomics*.[1]

In case anyone believes that the music industry is only about art and has nothing to do with economics, consider the following quotations from two well-known Paul's (quoted from Eliot, 1993, p. viii):

> "Somebody said to me, 'But the Beatles were antimaterialistic.' That's a huge myth. John and I literally used to sit down and say, 'Now, let's write a swimming pool.'"
>
> Paul McCartney

> "The fact of the matter is that popular music is one of the industries of the country. It's all completely tied up with capitalism. It's stupid to separate it."
>
> Paul Simon

Of course, many do think that rock & roll is more than just an industry. For example, that great New Jersey native, Bruce Springsteen, once remarked, "[I]n some fashion, I help people hold on to their own humanity, if I'm doing my job right." And undoubtedly he is correct that music can produce positive externalities. In addition, many artists and their agents may have grander objectives than income maximization. Springsteen, for example, sets his ticket prices well below their market value. And Tom Petty recently commented, "We don't do the Golden Circle/VIP thing. I don't see how carving out the best seats and charging a lot more for them has anything to do with rock & roll."[2] It is nevertheless unavoidable that fundamental economic forces – supply, demand, market structure, *and* technology – profoundly shape the music industry.

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[1] To my chagrin, the musicologist James Grier pointed out to me that Marc Eliot had already written a book titled, *Rockonomics: The Money Behind the Music* in 1989 (2nd edition published in 1993). Eliot's book, however, is mainly about the sordid business deals in the industry, not economics.

[2] Quoted from Wild (2002).

As documented further below, the rock & roll industry has undergone profound economic changes in recent years. After growing mildly faster than overall consumer price inflation – and in unison with other entertainment events – the price of concert tickets exploded from 1996 to 2003. The average ticket price increased 82 percent from 1996 to 2003, while the CPI increased 17 percent. Moreover, the number of tickets sold, fraction of seats in the venue sold, and number of shows performed by star performers have all trended slowly downward for more than a decade. These trends are consistent with the industry becoming more monopolized. The question is, why?

In principle, an economic analysis of rock & roll concerts should be straightforward with standard tools. Tickets should be priced to maximize profits over the relevant horizon, taking into account any effects on the sale of complementary goods, such as merchandise and record sales (see Rosen and Rosenfield, 1997). A concert is an *experience good*, as consumers do not know the utility they would derive from a concert unless they go to it. As a result, image and reputation are very important.

Rock & roll music is also a quintessential market in which to apply the economics of superstars. As shown below, concert revenue became much more skewed in the 1980s and 1990s. But the economics of superstars can only take you so far in understanding why prices and revenues for superstar musicians have soared the last five years. To fully understand the market for rock & roll stars, one needs to link Industrial Organization to the market. This is the serious theme of my talk, and I would make it more general: to understand labor markets, Labor Economists need to be more attentive to industry structure, technology, product market rents, and managerial incentives.

I. Contractual Arrangements

The market for rock & roll musicians has many players and complex contracts. First, of course, are the musicians, who form a band. The bands have managers who represent them and take a share of their earnings in exchange for their managerial services. Bands make contracts with promoters to promote live concerts. Successful bands also have contracts with recording companies to produce and market albums. Record companies could also be involved in promoting concert tours, but I have the sense that this is becoming increasingly unlikely, and was probably never very common.

Contractual arrangements between bands and promoters are heterogeneous, but the typical contract resembles a book contract, with an advance and royalties if sales exceed a certain level. The typical contract is most easily illustrated with a hypothetical example. Suppose the band *Angrist's Instruments* (AI) contracts with *Ron's Promotions* to perform a single concert. AI receives a "guaranteed advance" – e.g., equal to the first $100,000 of ticket sales, and then, before additional revenue is distributed, the promoter, Ron, recovers his expenses and a "guaranteed profit" – say $50,000 for expenses and $22,500 for profit. The expenses could include advertising, rent for the venue, costs of unloading the equipment, etc. The promoter and the band then split any ticket revenue above the guarantee plus expenses and minimum profit (above $172,500 in this case), usually with the band receiving 85 percent and the promoter receiving 15 percent of these revenues.[3] This arrangement probably describes around three quarters of contracts. The band's guaranteed advance and percent of revenue after expenses is higher for bands with greater bargaining power.

[3] These hypothetical figures were used by the head of a major management firm to illustrate to me how the "typical" contract is designed.

In the negotiation, the band (or its manager) agrees to the concert price, which naturally affects the amount of revenue collected.[4] In addition, the band usually receives 100 percent of merchandise sales (e.g., T-shirts) that take place at the concert.[5] The venue usually receives the beer and parking revenue. A manager of several prominent bands told me that the merchandise revenue a band receives equals roughly 25 percent of ticket sales -- which is convenient because I only have data on ticket revenue, and I don't know how the revenue is divided between the promoter and the band. Nonetheless, if merchandise sales approximately equal a quarter of ticket revenue, then ticket revenue is approximately equal to the income the band receives from the concert.

In various combinations, tickets are distributed by a ticket broker (e.g., Ticketmaster), the venue's box office, and, in some cases, directly by the band to its fan club.

Record companies tend to sign long-term agreements with bands that specify an advance on royalties and a royalty rate. The typical band has very little negotiating power with record labels, and the advance may not cover much more than the recording costs, which are often charged to the band. Caves (2000; p. 61) comments that "casual evidence suggests that roughly 80 percent of albums and 85 percent of singles released fail to cover their costs." Because fixed recording costs vary little with band quality, only the most popular artists earn substantial revenue from album sales.

Caves (2000) analyzes the contractual arrangements in the music industry in terms of the efficient division of risk, incentives and rewards. He emphasizes that

[4] This is apparently news to some musicians. David Crosby, for example, told a reporter for the *Dallas Morning News*, "The ticket price isn't up to us, man." Quoted in Christensen (2002).
[5] Sometimes the band will be required to give a proportion (e.g., 30 percent) of the merchandise sales to the venue for the right to sell there, however.

reputation and the prospect of repeated contracts are essential for contract enforcement. Eliot (1993) emphasizes that malfeasance is common in music contracts. Caves notes that, "From the artist's viewpoint, a problem of moral hazard arises because the label keeps the books that determine the earnings remitted to the artist."

An analogous problem arises with live concerts. The following remark by Sharon Osbourne (2002; p. 56) underscores the difficulty of contract enforcement in the concert industry: "My husband's whole career, people stole from him. They walk off with thousands of dollars that's yours. So the only way, unfortunately, for me is to get nasty and to get violent. At least you feel better." Caves argues that contract enforcement in this industry relies heavily on repeated transactions among parties who value their reputations. There is also the Osbourne contract enforcement mechanism.

II. Data

The main source of data used in this paper is *Pollstar*'s Boxoffice Report database. *Pollstar* is the trade magazine of the concert industry, broadly defined. Since 1981, the magazine has collected and published data on concert revenue, venue capacity, ticket sales and prices. The data are provided voluntarily by venue managers to *Pollstar*. (The *Boxoffice Report Form* is available from www.pollstaronline.com/report.asp.) Venues have an incentive to report their data because *Pollstar* disseminates the information to potential clients. Managers report data on a wide range of musical concerts, and occasionally on other entertainment events, such as comedians, professional wrestling matches and traveling Broadway shows. The data are most complete for concerts, and an effort was made to exclude the non-concerts from the sample. Before

restrictions, the database contains 260,081 box office reports. After eliminating non-concerts, benefit concerts, and events that occurred outside the United States, the sample contains 232,911 reports.[6] A report could pertain to multiple performances in the same venue. Thus, the 232,911 reports encompass 270,679 separate performances.

Reporting of concerts to *Pollstar* increased substantially in the 1980s, so one potential problem is that the dataset may not be representative of the entire concert industry in all years. Major acts are more likely to be included in the dataset. As a partial adjustment for changes in sample composition, in much of the analysis I restrict the sample to artists listed in *The Rolling Stone Encyclopedia of Rock & Roll*, hereafter called *Encyclopedia* bands. This *Encyclopedia* contains information on 1,786 artists, and 1,275 of these artists performed at least one concert represented in the *Pollstar* database.[7] The edition of the *Encyclopedia* I use was published in October 2001; two earlier editions were published in 1984 and 1995. Thus, the *Encyclopedia* contains something of a moving average of the leading bands in the period under study, which produces more of a consistent sample. Bands listed in the *Encyclopedia* are responsible for 75 percent of the dollar value of ticket sales in the *Pollstar* data from 1981 to 2003. I suspect that the representation of concerts in the *Pollstar* database is greater and more consistent over time for artists included in the *Encyclopedia* than for all bands.

To supplement the *Pollstar* database, I collected information from the *Encyclopedia of Rock & Roll* on the year each band was formed, the gender of the performers (male, female, mixed), the genre of music, and a novel measure of the "prominence" of the band – the number of millimeters written about the band in the

[6]Despite my efforts, it is possible that some of the remaining reports do not pertain to concerts. This is not an issue, however, when the sample is restricted to bands listed in the *Rolling Stone Encyclopedia*.

Encyclopedia.[8] This information was coded and then merged on to the *Pollstar* database, so another advantage of limiting the sample to *Encyclopedia* bands is that additional information is available.

Two other limitations of the data should be noted. First, the ticket price and revenue pertain to the list price. Any service fees charged by the ticket distributor are excluded. Because service fees have been grown rapidly in recent years, this omission probably serves to understate the acceleration in ticket prices in recent years. Second, I do not have information on secondary market, and it might be common for tickets to be resold in a scalper market. Nevertheless, the list price, not the resale price, is relevant from the standpoint of artists and promoters, as their ticket revenue is derived from tickets sold at the list price. Moreover, fragmentary evidence summarized below suggests that scalping is a less common phenomenon than widely believed.

III. Trends in Prices, Ticket Sales, and Revenues

Figure 1 displays the average price of a concert ticket (total revenue divided by total tickets sold each year) for all concerts from 1981 to 2003, and the (ticket-weighted) average high and low price of a concert ticket. The figure also shows what the average price would have been had it grown in lockstep with the CPI-U. From 1981 to 1996 concert prices grew slightly faster than inflation: concert prices grew a compound 4.6 percent per year while overall consumer prices grew 3.7 percent per year. From 1996 to 2003, concert prices grew much faster than inflation: 8.9 percent a year versus 2.3 percent a year. (While many economists believe that the CPI overstates the rise in cost of

[7] Some of the artist were deceased or retired before the *Pollstar* database was started.
[8] In some cases, this information was drawn from the *VH1 Encyclopedia*.

living because of unmeasured quality improvements, hardly any economist I know believes the quality of rock & roll music has improved.) And if the sample of concerts is limited to those performed by bands listed in the *Encyclopedia of Rock & Roll* in an attempt to hold constant changes in composition and quality, the acceleration in concert prices after 1996 is slightly greater: 11.1 percent a year growth from 1996 to 2003 versus 4.9 percent a year in the 1981-96 period.

The cost of the highest priced ticket in the house has grown even faster than the average ticket (see the top dashed line in Figure 1). Weighted by total ticket sales, the average high price ticket grew by 10.7 percent per annum from 1996 to 2003, while the average of the lowest price ticket grew by 6.7 percent a year. Thus, price dispersion increased across seats for the same concert.

To formally check on the impact of composition effects on the average price, I computed a Fisher Ideal price index using the artist as the unit of observation. The weights were updated each year. The Fisher index indicated growth of 8.2 percent per annum in the post-1996 period, so composition changes cannot account for the observed rapid price growth.

Figure 2 provides a related and more entertaining look at composition effects. The chart shows average concert ticket prices (total revenue divided by tickets sold) for 10 selected artists in years in which they gave concerts. The artists were all well established by the 1980s – what my students call dinosaur groups -- so there is no concern about increased popularity affecting their prices in the late 1990s. With the exception of Garth Brooks, who makes a point of keeping his concert prices low (and gives relatively few concerts), all of the bands' prices took off after the mid 1990s.

Again, there is little evidence that a shift in composition is responsible for the price acceleration. For the same, well-established artists, prices grew much faster than overall price inflation after the mid 1990s.

Instead of the overall price inflation rate, probably a more appropriate comparison for concerts is the price of other live entertainment events. Figure 3 compares concert prices to the CPI-U sub-index for movies, sporting events and theater.[9] To make the data as comparable to the CPI as possible, I computed a Laspeyres price index for concerts using the *venue* as the unit of observation. (Unlike the CPI, however, I updated the weights on an annual basis.) Price growth for these entertainment events exceeded overall price inflation throughout the period. Concert price growth tracked price growth for the other entertainment events remarkably well from 1981 to 1996, but beginning in 1997 the two series diverged. From 1997 to 2003, the concert Lasypeyres index rose 64 percent, whereas the CPI for other entertainment events increased 32 percent. Thus, the gap that needs to be explained is smaller, but still substantial.

Of course, a Princeton economist cannot address this topic with out acknowledging the insight of Baumol and Bowen (1966). In some sense, musical concerts are a slow productivity growth sector: it probably takes the *Dixie Chix* at least as much time, effort and labor input to perform *Landslide* today as it took *Fleetwood Mac* to perform it in the 1970s. As Baumol and Bowen point out, prices should rise faster than overall inflation in low-productivity growth sectors because of cost increases. Baumol and Bowen's disease may well account for the mildly faster price growth in live

[9] To be precise, the BLS produces a CPI for movies, sporting events, theater *and* concerts. A separate sub-index covering just movies, sporting events and theater is not available from BLS, so I adjusted the index as follows. In November and December 2001, concerts accounted for 8.4 percent of price quotes for this

entertainment events than overall price inflation in the pre-1996 period. Yet it is unlikely that there was a discrete jump in costs in the concert industry compared to other industries – let alone other entertainment industries -- after 1996. Indeed, reductions in the costs of audiovisual electronics equipment probably reduced the cost of concerts. Nevertheless, some concert promoters do point to cost increases as a rationale for the acceleration in prices. (They also have a tendency to say that they use more Mack trucks than anyone else.) Unfortunately, I have not been able to track down concrete cost information, and it is possible that insurance costs, labor costs, pyrotechnics and other innovations have increased costs considerably, but I am skeptical that cost growth can account for much of the acceleration in the price of concert tickets after 1996.

Shows, Sales and Revenues

Figures 4a, 4b and 4c summarize trends in the number of shows performed, tickets sold, and revenue collected from 1981 to 2003. The figures restrict the sample to artists in the *Rolling Stone Encyclopedia* because coverage should be more consistent for these artists. If the entire universe of concerts is used, the trends are likely to be distorted by the rising coverage of the *Pollstar* database.[10]

Several trends are noteworthy. First, the number of shows performed rose in the 1980s, plateaued in the first half of the 1990s, and has declined by 16 percent from 1996 to 2003.

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sub-index (email correspondence from Patrick Jackman, Feb. 7, 2002). Consequently, I netted out the concert component using my Laspeyres estimate of the concert CPI.

[10] As mentioned, I suspect *Pollstar* increased the coverage rate of small shows performed by lesser known performers over time. The trend in capacity utilization for the full universe is the same as that shown in Figure 5, but the number of shows and tickets sold have trended upwards.

Second, the number of tickets sold to concerts performed by these bands fluctuated around 30 million per year from the late 1980s until 2000, and has dropped since 2000. In 2003, 22 million tickets were sold to concerts performed by these bands.

Third, despite flat or falling tickets sales, total revenues (in 2003 dollars) trended upwards until 2000 because of price increases. Other things equal, these trends suggest the elasticity of demand was less than 1. Since 2000, however, there has been a 10 percent drop in ticket revenue for these artists.

Figure 5 shows the capacity utilization rate for concerts by top artists – that is, the fraction of available seats that are sold. (The number of available seats varies from concert to concert within the same venue, and is recorded in the *Pollstar* Boxoffice form.) The fraction of tickets sold fell from around 90 percent in the late 1980s to just over 75 percent in 2003. In results not reported here, I find that the drop in the capacity utilization rate was much steeper for concerts held in larger venues. This finding corresponds with the observation that large stadium tours (even Bruce Springsteen in the Meadowlands in 2003; see Healy, 2003) are playing to smaller crowds.

One possible interpretation is that these artists are becoming less popular. But this view is hard to reconcile with the sharp increase in ticket prices for *Encyclopedia* bands. Instead, it seems that price growth is affecting demand for tickets.

Scalper vs. List Price

So far, we have treated the list price as the market price for attending a concert ticket. If a concert is sold out and tickets are resold on a secondary market, however, then the price to the consumer may be very different than the list price. The list price is

still relevant to the artist because he or she does not receive revenue from the secondary market, but the surge in list prices may just reflect concert promoters and bands setting prices at a level that eliminates or reduces the secondary market. (This begs the question of why artists did not set a higher price to squeeze out the secondary market all along.)

Although I have no doubt that the secondary market is important in this industry, there are three reasons to suspect that a disconnect between the list price and price to consumers is not responsible for the major trends documented so far.

First, the total number of tickets sold has declined. If concerts are no more expensive to consumers than before, then one would not expect to see attendance fall.

Second, the decline in the capacity utilization rate also suggests that customers are finding concerts more costly. Moreover, even in the early 1990s, most concerts did not sell out, so it would have been possible to avoid the higher priced secondary market. And prices have surged in the late 1990s even I limit the sample to concerts that sold fewer than 90 percent of their tickets, events where scalping would have been unnecessary.

Third, and perhaps most important, from what I can tell scalping is not as common a phenomenon as many industry observers believe. One fragment of evidence comes from a survey of 858 fans I conducted with 12 students at *Bruce Springsteen and the E Street Band's* concert at the First Union Center in Philadelphia on October 6, 2002, part of the *Boss's* "The Rising" tour. The concert was a throwback: it was sold out and every ticket in the house was listed for $75, well below the market rate. If any concert would have a high scalping rate, this would be it. Yet only 20-25 percent of the tickets

were bought through a scalper or ticket broker or over the Web. The average ticket that was resold went for around $280, yet most fans paid the list price.

Elsewhere, I have argued that "the endowment effect" is one reason why only a minority of tickets is scalped (see Krueger, 2001). But regardless of the explanation, the list price would seem relevant to the vast majority of concert goers.

Distribution of Revenues

As we saw, concert revenues increased in the 1980s and 1990s. Figure 6 displays the share of revenue going to the top 1% and top 5% of all performers, ranked by their total annual concert revenue. That is, for each band I computed the total dollar value of ticket sales each year relative to the U.S. total.

Despite some blips, the figure shows that concert revenues became markedly more skewed in the 1980s and 1990s. In 1981, the top 1% of artists took in 26% of concert revenue; in 2003 that figure more than doubled to 56%. By contrast, the top 1% of income tax filers in the U.S. garnered "just"14.6% of adjusted gross income in 1998 (see Piketty and Saez, 2003). The top 5% of revenue generators took in 62% of concert revenue in 1982 and 84% in 2003. Surely, this is a superstar market if there ever was one.

Table 1 reports the revenue, number of shows performed, revenue per show, and average price for the top artists just before the run-up in prices (1994-95) and just after (2000-01). The artists were selected by virtue of being one of the top revenue generators in 1996-99, with revenues in the surrounding periods as well.

The number of shows performed by these superstar artists declined by 18% while revenue per show increased by 60%. The increase in revenue was driven by both an increase in price and increase in tickets per show.

The table also illustrates the breadth of the *Pollstar* data, as Luciano Pavarotti would not generally be considered a popular singer. He and the other tenors are excluded when the sample is restricted to artists in the Rolling Stone *Encyclopedia.*

Phenomenon to Explain

To recap, the data indicate that concert prices grew modestly faster than overall inflation until 1997. Beginning in 1997, concert prices took off and ticket sales and the number of concerts by stars declined. The evidence suggests that the price trends have affected the cost of concert-going, not just the size of the secondary market. Additionally, the share of revenue going to the top performers rose over the last two decades.

These trends are inconsistent with a demand-side shift in the face of a stable supply curve. The increasing skewness in the distribution of revenues, however, is consistent with a shift in demand toward superstar performers.

For the economics of superstars to account for the quantity and price trends, it must be that: 1) superstar effects increased sharply after 1996; and 2) superstar performers have a backward bending supply curve that caused a decrease in concerts despite the increase in revenues per show. We test the first prerequisite in the next section and find little support for it. Figure 6 also suggests that the superstar model will

have difficulty explaining the acceleration in prices, as the tendency toward greater concentration in revenues for top performers was no greater after1996.

Alternatively, and more likely, it seems that a discrete change in some supply-side factor caused concert prices to increase and a reduction in the quantity of tickets sold in the face of a steady expansion of superstar effects. In short, the trends are consistent with the market becoming more monopolized. Section V explores two hypotheses to explain why monopoly pricing may have increased in the late 1990s: concentration and technological change.

IV. The Market for Superstars

The economics of superstars was proposed by Sherwin Rosen (1981), building on the intuition of Marshall (1947), to explain why "relatively small numbers of people earn enormous amounts of money and seem to *dominate* the fields in which they engage." Rosen's formulation of superstar markets specifies performers as imperfect substitutes and assumes that technology enables the best performers to reach a wide audience with little decay in quality. Under these circumstances, small differences in talent at the top of the distribution will translate into large differences in revenue.

Rosen concludes his article by commenting on Alfred Marshall's explanation for why Elizabeth Billington, a gifted opera singer at the start of the 19th Century, was paid less than a superstar salary. Marshall reasoned: "But so long as the number of persons who can be reached by a human voice is strictly limited, it is not very likely that any singer will make an advance on the £10,000 said to have been earned in a season by Mrs. Billings at the beginning of the last century ...." Rosen shrewdly observed, "Even

adjusted for 1981 prices, Mrs. Billington must be a pale shadow beside Pavarotti. Imagine her income had radio and phonograph records existed in 1801! What changes in the future will be wrought by cable, video cassettes, and home computers?"

And what about by the Discman, internet, broadband, Napster, CD's, DVD's, MTV, flat screen TVs, iPod's, and MP3 players? One explanation for the increase in concert prices and revenue concentration, anticipated by Rosen, is that technological change led to increased superstar effects. Because of technological improvements and rapid price declines in consumer electronics, for example, superstar performers are known to a larger audience. In addition, anyone who has gone to a concert in the last couple of decades can attest to improvements in amplification, so singers are hardly limited by the reach of the unaided human voice.

Evidence

An objective measure of star quality for popular musicians is hard to define and even harder to quantify. In one attempt, Hamlen (1991) measures voice quality by a physical concept: the high frequency harmonic content that singers use when they croon the word "love" in one of their songs. Clearly, this misses many dimensions of star quality. Nonetheless, he finds that harmonic content is related to the value of record sales for a sample of 107 singers, with an elasticity of 0.14. Hamlen interprets the low elasticity as a rejection of the Marshall-Rosen model, although it is unclear whether the scaling of units of quality is appropriate (a different scaling could produce an elasticity

above 1) and consideration of other dimensions of star quality could possibly rescue the theory.[11]

Here I take a different tact. Star quality is measured by the number of millimeters of print columns (including photos) devoted to each artist in *The Rolling Stone Encyclopedia of Rock & Roll*. Although millimeters of print is a subjective measure of star quality, it has the virtue of reflecting the importance that the editors of the *Encyclopedia* implicitly attached to each artist. If nothing else, it is correlated with the band's prominence. To be clear, I should emphasize that star quality is measured at a single point in time and I am looking for a *change* in the return to that measure of quality, due to technological changes like the ones Sherwin Rosen conjectured about. The question I ask is whether a discrete increase in the return to star quality in the late 1990s can account for the growth in concert prices and revenues.

For the bands included in the *Encyclopedia* in the *Pollstar* sample, the mean and standard deviation of millimeters of print are 268 and 199, respectively. The least-written- about artist was *Classics IV* (52 mm) and the highest was *The Rolling Stones* (1579 mm). The 25th percentile group (*The Weather Girls*) had 201 mm. of ink, and the 75th percentile (*Beck* or *Lyle Lovett)* had 378.

The *Pollstar* data were aggregated to the artist/year level. Specifically, for each artist (i) in each year (t), I computed the (ticket-weighted) average price, total revenue, and revenue per show. These are the dependent variables in my analysis (in logarithms). I work with two samples: all artists and the subset listed in *The Rolling Stone Encyclopedia*. Artists that were not listed in the *Encyclopedia* are assigned 0 millimeters

[11] In case you are interested, the top four singers in his sample in terms of harmonic frequency are: Barbara Streisand, Bing Crosby, Frank Sinatra, and George B. Shea, in that order. Whitney Houston ranked 18th.

of print, which is technically correct (because that is how much ink they were given) but perhaps arbitrary. For the sample of *Encyclopedia* bands, I present results with and without covariates; only a limited set of covariates are available for the full set of bands.

The regression model is as follows:

$$(1) \qquad \ln Y_{it} = \alpha + \beta_p S_i + \boldsymbol{x}'_{it}\gamma + \delta_t + \epsilon_{it},$$

where $\ln Y_{it}$ is the log average price (or log revenue or log revenue per show), S_i is the measure of Star Quality, $\boldsymbol{x}'_{it}$ is a vector of covariates (number of supporting acts, years of experience of the band, and dummies for genre, gender and foreign status), δ_t is a set of 22 unrestricted year fixed effects, and ϵ_{it} is an error term. We compute standard errors that are robust to correlation in artist effects across years.

Notice that the coefficient on star quality, β, has a p subscript, indicating time period (1981-86, 1987-91, 1992-96, or 1997-2003). This allows the effect of star quality to vary across time periods. In the regressions, this is accomplished by interacting the amount of print with dummies indicating the four periods. The test of the rising-return-to-superstardom hypothesis amounts to a test of whether there is a discrete jump in β_p after 1996.

Results are presented in Table 2 for the full sample and in Table 3 for the subset of *Encyclopedia* bands. For presentation purposes, I have scaled the millimeters by dividing by 1,000, so this variable should properly be interpreted as measured in meters. The model for prices in the first column weights the data by the number of tickets sold by each artist in each year, and the model for revenue per show is weighted by the number of shows. The third model for annual revenue is unweighted. The weights (or in the last case, lack of weights) were selected so the weighted mean of the dependent variable

would correspond to the national mean, since it is the national trends we are trying to explain. Unweighted estimates are qualitatively similar, however.

First consider the results for the full sample. All three models indicate large and increasing superstar effects. For example, a 200 millimeter increase in print in the *Encyclopedia* is associated with 5% higher prices in the early 1980s, 11% higher prices in the early 1990s, and 15% higher prices in 1997-2003. The effects on annual revenue and revenue per performance is much larger. Although the return to star quality increased throughout this period, the increase was actually slower after 1996 than before.[12] For superstar effects to explain the acceleration in prices after 1996, it would be necessary for the effects to be growing at an increasing rate over time, but it is not.

Next consider the subsample of artists represented in the *Encyclopedia.* A similar pattern emerges for prices: the effect of star power increased throughout the period, but the largest jump occurred in 1992-1996, before prices took off. And the results for annual revenue and revenue per show are even more contrary to the accelerating superstar story. The effect of print in the *Encyclopedia* on these outcomes actually fell in the 1997-2001 period compared to the 1992-96 period. Because revenue per performance should be the driving force in the superstar model, these results strongly suggest that accelerating returns to superstardom are not the explanation for the rapid price growth after 1996, although I acknowledge that my measure of star quality is imperfect.

Before considering other explanations for the price trends, it is worth commenting

[12] If I include a linear time trend interacted with millimeters of print and an interaction between a post-1996 trend and print, instead of the period interactions with print, the same puzzle remains: the increase in the return to star quality is slower after 1996 then before.

on the other coefficients in Table 3. First, female performers charge a higher price and make more money per year or per show than male performers or than groups with both male and female lead performers. Interestingly, Hamlen (1991) also found that women singers earn higher revenue from record sales than male singers, other things being equal. One possibility, however, is that the Table 3 results reflect the selection requirements for inclusion in the *Encyclopedia*, rather than a true gender difference. To test this possibility, I collected data on gender for a randomly selected 217 artists who were not part of the *Encyclopedia*. Only 7.5% of these performers were women, compared with 14% in the *Encyclopedia*, and 14% were mixed gender compared with 7% in the *Encyclopedia*, providing mild evidence that the *Encyclopedia* did not under represent female artists. In any event, price regressions for this sample indicated that female groups charged a statistically significant 31 percent higher price than mixed-gender groups, but the male-female difference was insignificant and of inconsistent sign depending on covariates.

Second, the regressions reveal very little return to experience, defined as the length of time since the band started performing. I do find, however, that experience is positively related to the gap between the high and low price charged at a concert. Apparently, older bands are more likely to price discriminate, perhaps because they are less concerned about building good will for the future or because they have a more diverse group of fans.

Third, the number of supporting acts that appear with the headliner is only weakly related to the price, but strongly related to revenue. Fourth, revenues are highest for Pop artists, while prices are highest for Jazz and Pop artists.

Finally, foreign bands charge a slightly higher price and make more revenue in the U.S. than home-grown bands.

V. Explanations: Cartelization and *Bowie Theory*

A. Cartelization

A popular explanation for the acceleration in concert prices is that the concert industry has become monopolized by Clear Channel Communications, the giant multimedia conglomerate. There is an air of plausibility to this story. After the Telecommunications Act of 1996 relaxed constraints on radio station ownership, Clear Channel acquired nearly 1,200 stations. It also owns amphitheaters, billboards and TV stations. Clear Channel entered the concert promotion business in a major way by acquiring SFX Entertainment in 2000, and, as shown in Figure 7, the share of concert revenue that it promotes rose dramatically from 1999 to 2001 and then fell sharply in 2002 and 2003. Despite the recent dip, concentration in the industry has risen at the national level (see the four-firm concentration ratio in Figure 7).

Many critics have accused Clear Channel of using its vertical and horizontal concentration to monopolize the concert industry. Congressman Howard L. Berman, for example, has urged the Justice Department to investigate whether "Clear Channel has 'punished' recording artists, including Britney Spears, for their refusal to use its concert promotion service, Clear Channel Entertainment, by 'burying' radio ads for their concerts and by refusing to play their songs on its radio stations." The on-line magazine *Slate* declared, “Clear Channel is an illegal monopoly”(see Boehlert, 2001).

Although anecdotal evidence abounds -- and the rising prices and declining ticket sales documented in Section III are certainly consistent with the exercise of greater monopoly power after the mid 1990s – I have found it surprisingly difficult to find clear evidence linking Clear Channel to the exorbitant growth in concert prices.

For starters, I assembled data from Arbitron on FM radio audiences by station ownership for 98 major cities in 2002. Clear Channel's "radio share" was calculated by summing the percentage of their listeners over the stations they owned in each market reached by the stations. Clear Channel's radio listening share, which ranged from 0 to 42 percent across these markets and averaged 20%, was then related to the share of ticket revenue for concerts promoted by Clear Channel in those markets in 2000 and 2001. The unweighted correlation between Clear Channel's concert share and radio share across the 98 markets was essentially zero (r=.01). When the data were weighted by the size of the population in each market, the correlation was positive (r=.08) but statistically insignificant. The correlation was on the margin of statistical significance (t-ratio=1.72) and positive (r =.17) when the data were weighted by the number of concerts held in each market, but if we restrict the sample to concerts in venues with a capacity of at least 2,000 seats – because smaller concerts are unlikely to be promoted on the radio – we find a weak and insignificant (weighted) correlation between Clear Channel's radio share and concert promotion share.

I also tried aggregating the data to the state level. Again, the correlations were weak and insignificant. Even when I weighted the state data by the number of concerts performed in the state, the correlation was insignificant and low (r=.11).

Next I examined the relationship between concentration and the growth of ticket prices. At either the city or state level, Clear Channel's share of concert promotion dollars was insignificantly or negatively related to the growth in prices. Likewise, I found no correlation between the change in the concentration of concert promoters in an area from 1994 to 2001 and the corresponding growth of prices or ticket sales.

It is possible that Clear Channel uses its muscle to sign up concerts for national or international tours, obscuring the city- and state-level correlations, but one would have expected the regional data to leave some trace of Clear Channel's influence if it was the main force behind accelerating prices.

Three further pieces of evidence cast doubt on the importance of the increased concentration of concert promotion in the U.S. First, ticket prices have also risen sharply in Canada and Europe since the mid-1990's, suggesting that deregulation of radio in the United States is not driving the trend, although it is possible that prices are arbitraged across markets and the U.S. is a big market.

Second, concert promotion has not yielded supernormal profits for Clear Channel, and has often resulted in losses (see Pollstar, 2002). The company blames artists for demanding higher fees, which it says cause higher ticket prices. Although paying higher fees may reflect predatory behavior intended to drive out competitors, it is nonetheless surprising that Clear Channel has not managed to profit from promoting concerts in areas where it dominates the radio market. Moreover, the fact that Clear Channel cut back its concert promotions in 2002 and 2003 suggests it was not a very profitable enterprise.

Third, concert promotion has always been a highly concentrated business at the city level, which might be most relevant for exercising monopoly power because most

audience members are unlikely to travel very far to attend a concert. The regional concentration is borne out in Figure 8, which shows the average four-firm concentration ratio in the largest 24 cities. The four-firm concentration ratio within cities has hovered around 90% for two decades. The average Herfindahl-Hirschman Index (HHI) for promoters actually fell from a lofty 4,200 in 1986 to a still high but less lofty value of 2,800 in 2001. (An industry with an HHI above 1,800 is considered highly concentrated according to the Justice Department Merger Guidelines.) Thus, the industry has gone from having regional monopolies to having a large national firm, but within cities competition could possibly have increased.

Although I was initially inclined to believe that Clear Channel's horizontal and vertical concentration was a major reason for the hike in concert prices, after reviewing more evidence I have become skeptical of that position.

B. Bowie Theory

My final hypothesis, and the one I consider most promising at the moment, is that concert prices have soared because recording artists have seen a large decline in their income from record sales, a complementary product to concerts. Many observers have argued that record sales are down because many potential customers frequently download music free from the Web or copy CD's, either legally or illegally. Millions of people have downloaded music from Napster, Morpheus and KaZaA -- and probably bought fewer records as a result. Album sales slumped from 1999 to 2002, and were flat for 5 years before then, putting downward pressure on artists' royalties.[13]

[13] See Weinraub (2002).

Each band has some monopoly power because of its unique sound and style. So my hypothesis is that, in the past, when greater concert attendance translated into greater artists' record sales, artists had an incentive to price their tickets below the profit-maximizing price for concerts *alone*. New technology that allows many potential customers to obtain recorded music without purchasing a record has severed the link between the two products. As a result, concerts are being priced more like single-market monopoly products.[14] Moreover, only the very best artists received royalties anyway, so this phenomenon can explain why dispersion has increased.

Formally, the problem is one of a firm with two complementary outputs, concert seats and record albums, denoted good 1 and good 2, and monopoly power in both markets (see Tirole, 1988 or Rosen and Rosenfield, 1997). Because of the complementarities, we represent the band's demand curve for each product, $D_1(p_1,p_2)$ and $D_2(p_1,p_2)$, as depending on both prices. Costs are independent of each other and depend only on the quantity of each specific good produced, $C_1(D_1)$ and $C_2(D_2)$. The firm maximizes profit by selecting both prices, p_1 and p_2, as follows:

$$\underset{\{p_1,\, p_2\}}{\text{Max}} \quad p_1D_1(p_1,p_2) + p_2D_2(p_1,p_2) - C_1(D_1) - C_2(D_2)$$

The proportionate markup of concert tickets over marginal cost is:

$$\frac{p_1 - C_1'}{p_1} = \frac{1}{\varepsilon_{11}} - \frac{(p_2 - C_2')D_2\varepsilon_{12}}{p_1D_1\varepsilon_{11}}$$

where the ϵ_{ij}'s represent the value of the own- or cross-price elasticities of demand.

[14] Note, however, that there are still some other complementary products, such as shirts and souvenirs. In addition, many artists care about besmirching their reputations as greedy. Thus, prices are unlikely to rise to their full single-market monopoly level.

My argument is that the magnitude of the second term of the markup equation has declined, because an increase in concert attendance -- or popularity more generally -- has a much weaker effect on record sales beginning in the late 1990s. Therefore, artists and their managers do not need to feel as constrained when they set concert prices.

This model was anticipated by the rock & roll singer David Bowie, who predicted that, "Music itself is going to become like running water or electricity" and he advised performers, "You'd better be prepared for doing a lot of touring because that's really the only unique situation that's going to be left." (Quoted from Pareles, 2002.) Hence, I call this hypothesis *Bowie Theory*.

I should acknowledge that the timing for Bowie Theory is not perfect, but it is not terrible either. Napster was launched in May 1999 and imitators and MP3 players quickly followed. CD's could be copied in the late 1990s, however. Although concert price growth began to diverge from price growth for other entertainment events in 1997, the biggest jump was in 1999.

There is also some fragmentary empirical support for the hypothesis. Relative to album sales, Jazz fans are much less likely to download music from the Web than are fans of rock and pop (see Oberholzer and Strumpf, 2004). From 1996 to 2003, concert prices increased by only 20 percent for jazz, but by 99 percent for rock and pop. The declining complementarities argument can also account for the price growth in Canada and Europe. On the other hand, I have to admit that the direct evidence for filing sharing crowding out record sales is more mixed than I anticipated (see Liebowitz, 2003 and Oberholzer and Strumpf, 2004).

VI. Conclusion

Concert revenues for top rock & roll performers, along with ticket prices, took off in the late 1990s and early 2000s. The economics of superstars can help explain the longer-term trends in the industry, but not the recent surge in prices and revenues. My leading hypothesis for these developments is Bowie theory: a technology-induced erosion of the complementarity between record sales and concert tickets. Even if Bowie theory is premature, it is likely that downloading of music will put upward pressure on concert prices and revenue in the near future.

In addition, interests of performers apart from income maximization play a role in the economics of the rock & roll industry. By my calculation, Bruce Springsteen gave away $3 million of producer surplus to his fans in Philadelphia by setting his (uniform) ticket price below the market price. This figure is double the ticket revenue the concert actually took in! A similar point was made by Tom Petty:

> My top price is about sixty-five dollars, and I turn a very healthy profit on that; I make millions on the road. I see no reason to bring the price up, even though I have heard many an anxious promoter say, 'We could charge 150 bucks for this.' I would like to do this again and maybe come through and not leave a bad taste in people's mouths. … It's so wrong to say, 'OK, we've got them on the ticket and we've got them on the beer and we've got on everything else, let's get them on the damn parking.' *You got to care about the person you're dealing with.* (Quoted from Wild, 2002. Italics added.)

Some artists care about their customers' well being as well as their own income. It is hard to rule out the possibility that concert tickets were under priced in the 1980s and early 1990s, perhaps because of "fairness" considerations. Nevertheless, the market still responds to economic forces. It is telling that both Bruce Springsteen and Tom Petty have more than doubled their ticket prices since the early 1990s. Super Bowl ticket

prices, which are undoubtedly grossly under priced, have increased much faster than concert prices the last 25 years. For experience goods, prices may be kept below their market-clearing level because the price is part of the experience, especially if performers are trying to build a long-term audience. Eventually, however, it seems that the prices of experience goods approach their market clearing level, perhaps because fans come to divorce the price from the experience.

This foray into the concert industry labor market highlighted the importance of Industrial Organization because of industry concentration, complementary products and rent sharing. I would argue that in labor markets more generally, it is in the interest of Labor Economists to explore the links between Industrial Organization and Labor Economics more thoroughly. Rent sharing probably accounts for a large share of the industry wage differentials that arise for similar workers (Dickens and Katz, 1987; Krueger and Summers, 1987); market concentration affects the hiring of female employees within industry (Ashenfelter and Hannan, 1986); deregulation has affected wages and employment (Peoples, 1998); technological change appears to have been a major reason for the rise in wage dispersion and skill differentials in the 1980s and 1990s (Autor, Katz and Krueger, 1998); and norms can affect the distribution of income (Piketty and Saez, 2003). Our understanding of labor markets will be incomplete unless we better appreciate the interactions among product markets, technology and labor markets, and recognize how fairness considerations are moderated by market forces – in the rock & roll industry and elsewhere.

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Figure 1: Average Price per Ticket, High and Low Price Tickets, and Overall Inflation Rate, 1981-2003

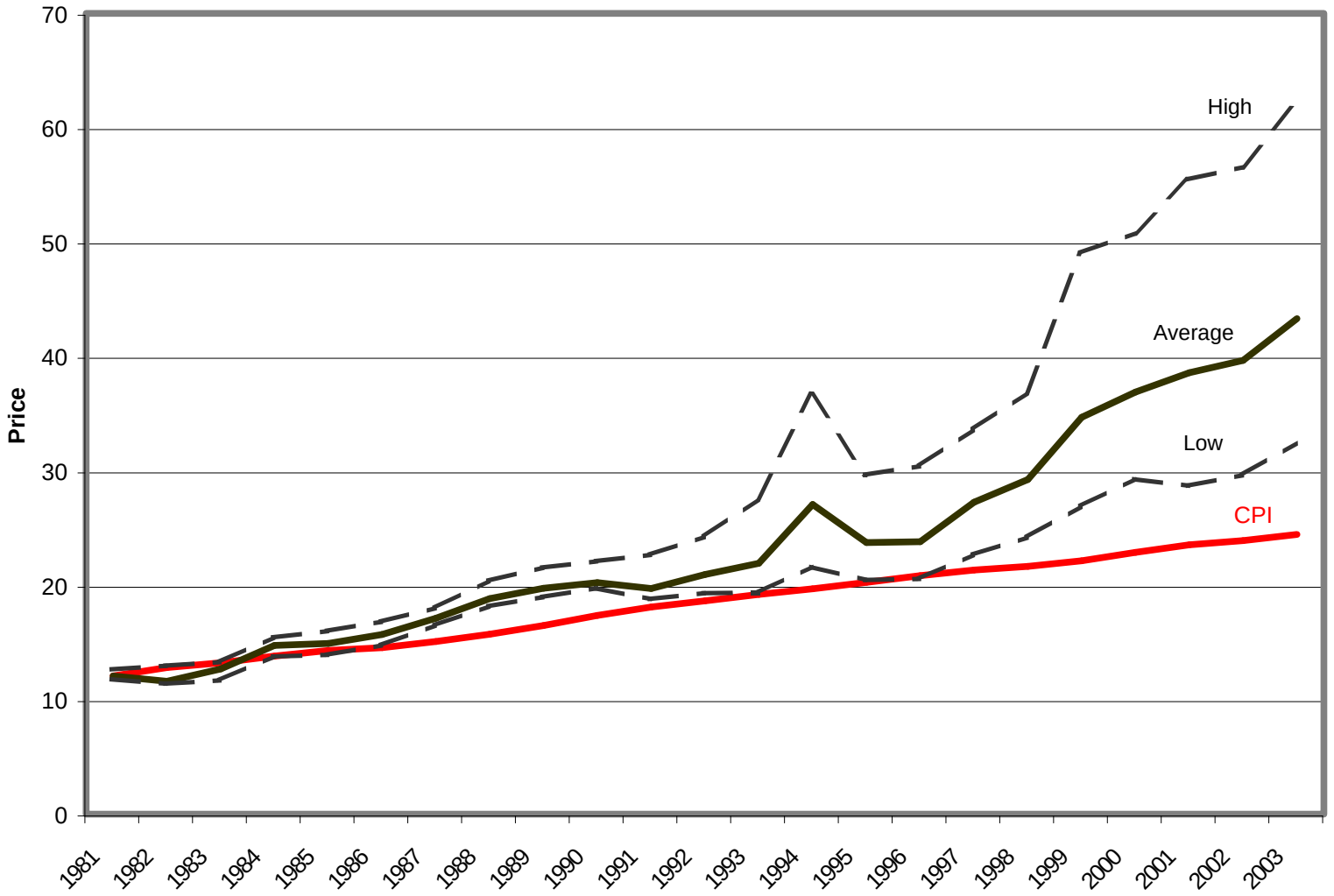


Figure 2: Average Concert Ticket Price, Selected Artists

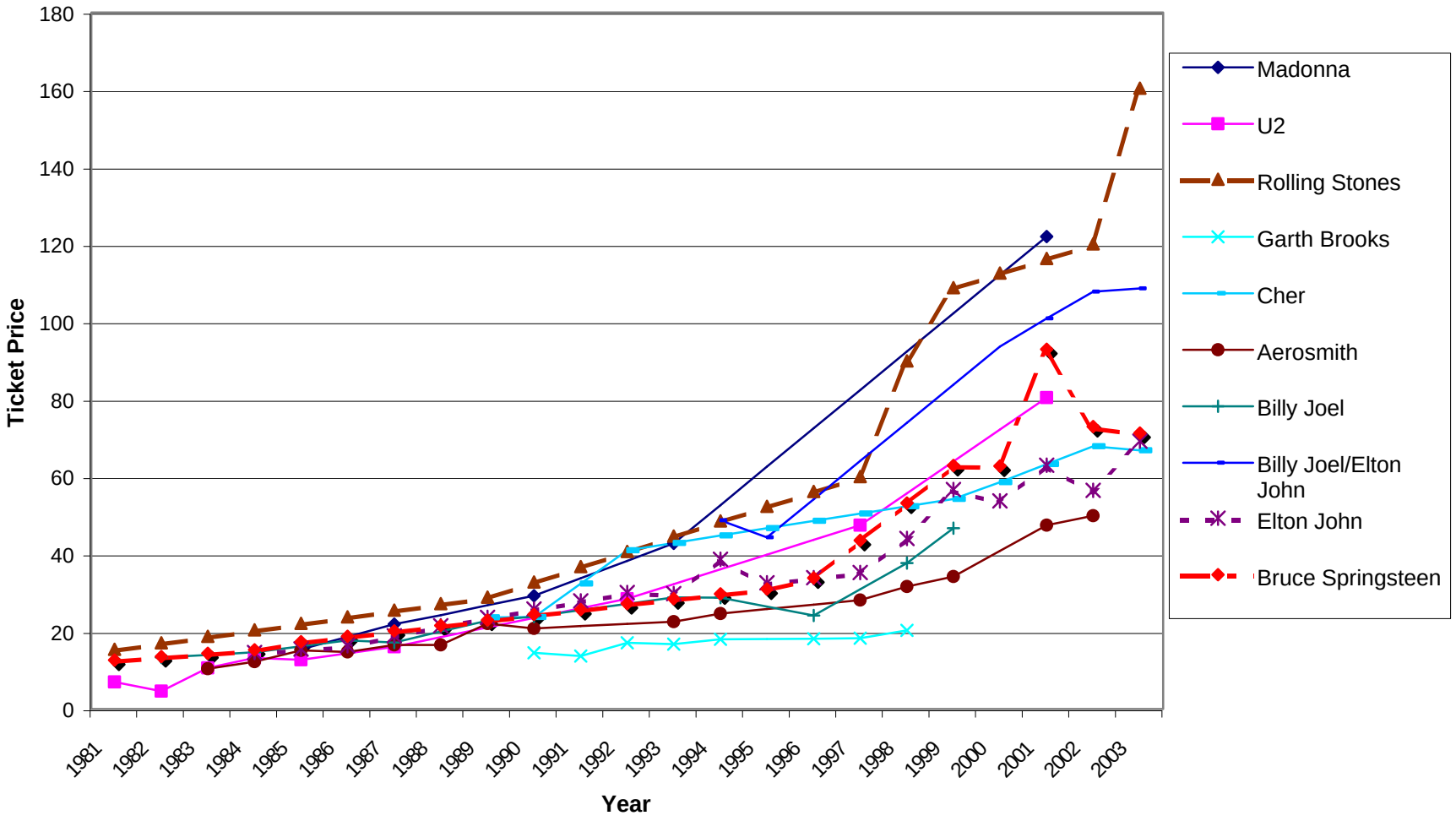


Figure 3: Concert Prices Tracked Movie, Theater and Sports Tickets Well Until 1997
Venue Laspeyres Price Index versus CPI-U for Movies, Theater and Sports Events

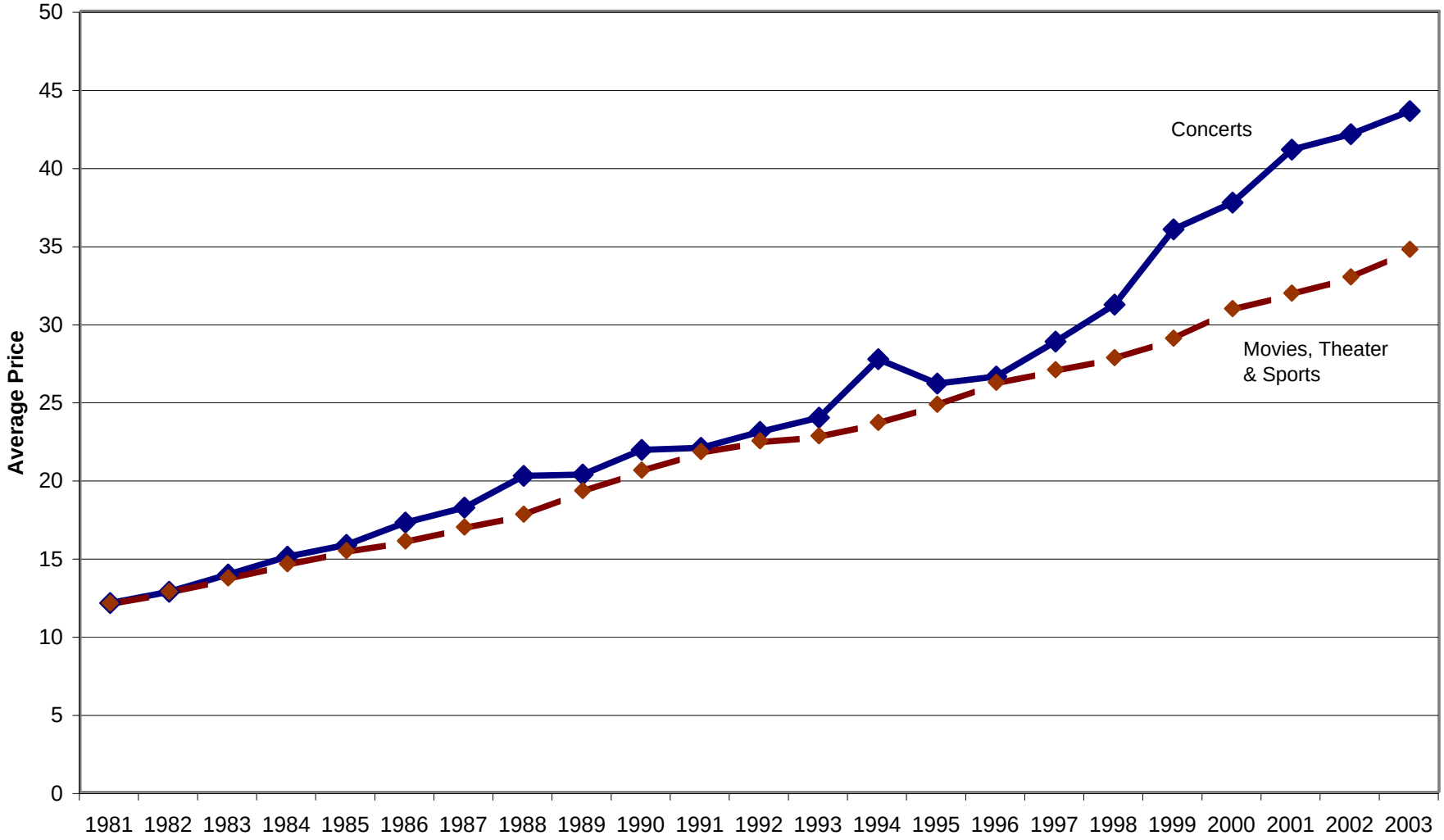


Figure 4a: Number of Shows Each Year
***Rolling Stone Encyclopedia* Artists**

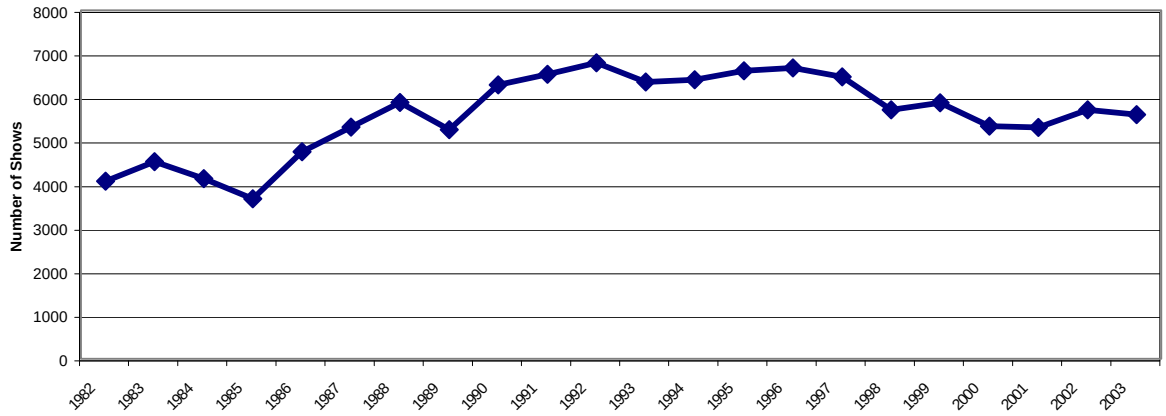


Figure 4b: Number of Tickets Sold Each Year
***Rolling Stone Encyclopedia* Artists**

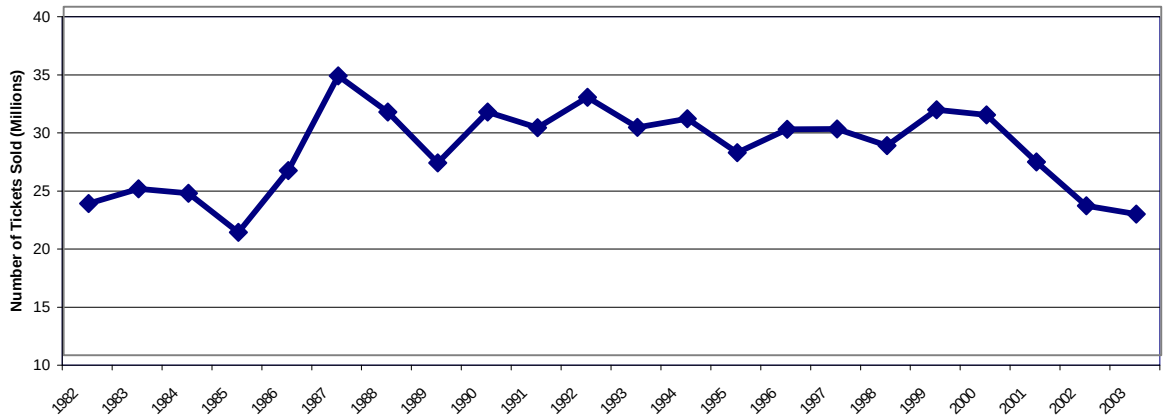


Figure 4c: Total Ticket Revenue in 2003 Dollars
Rolling Stone Encyclopedia Bands

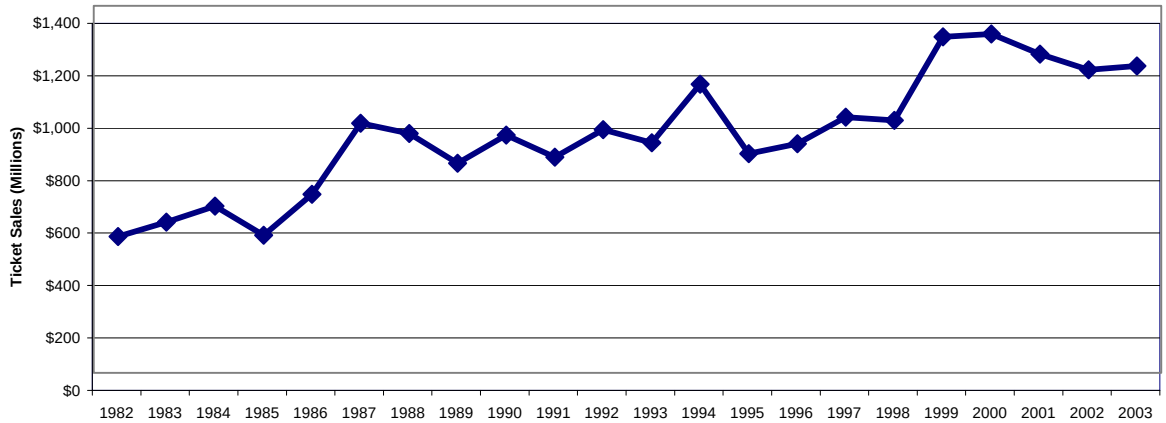


Figure 5: Proportion of Seats That Are Filled for Concerts held by Artists Listed in *Rolling Stone Encyclopedia of Rock & Roll*

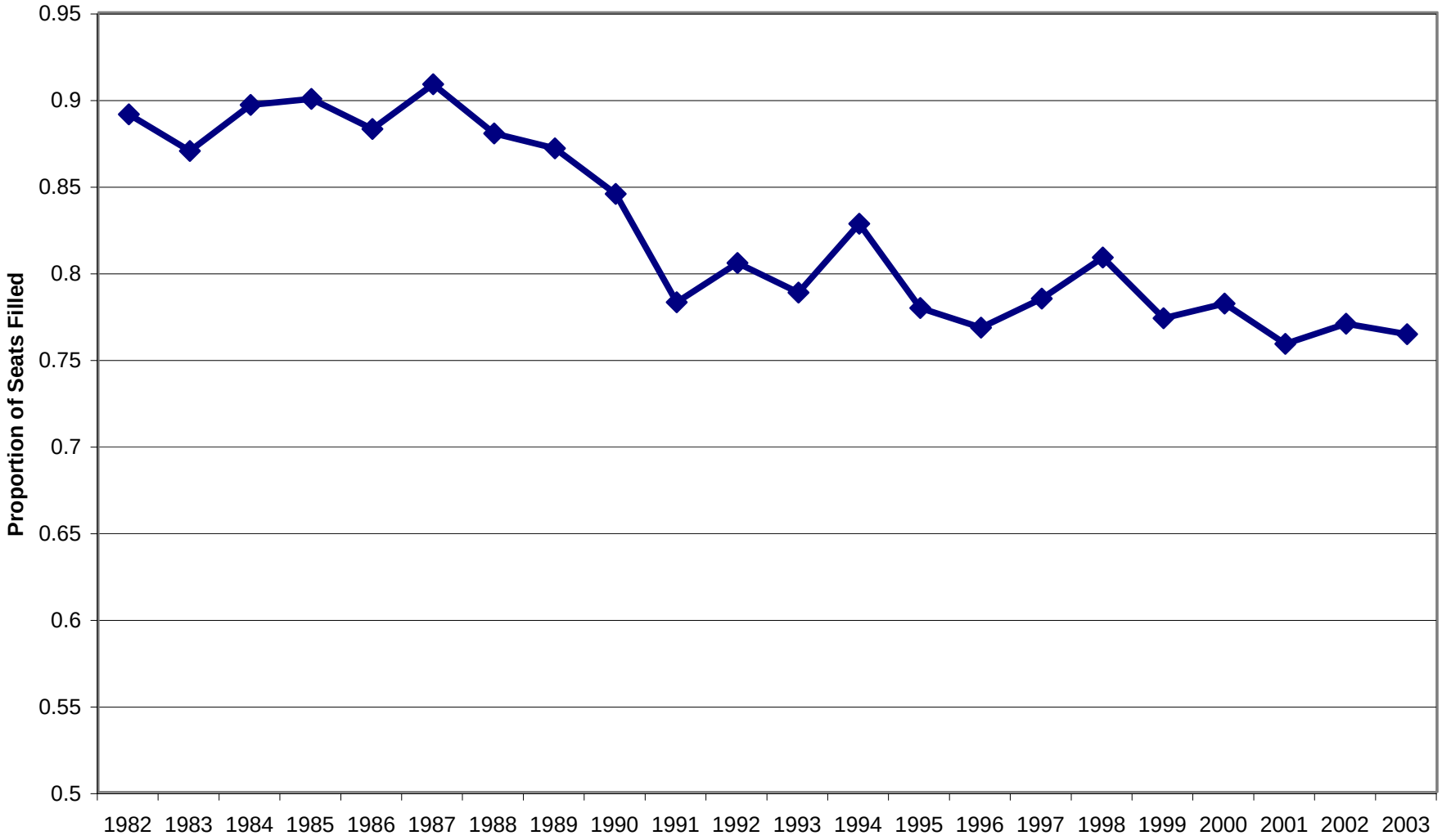


Figure 6: Share of Total Ticket Revenue Accruing to Top Performers, 1982-2003

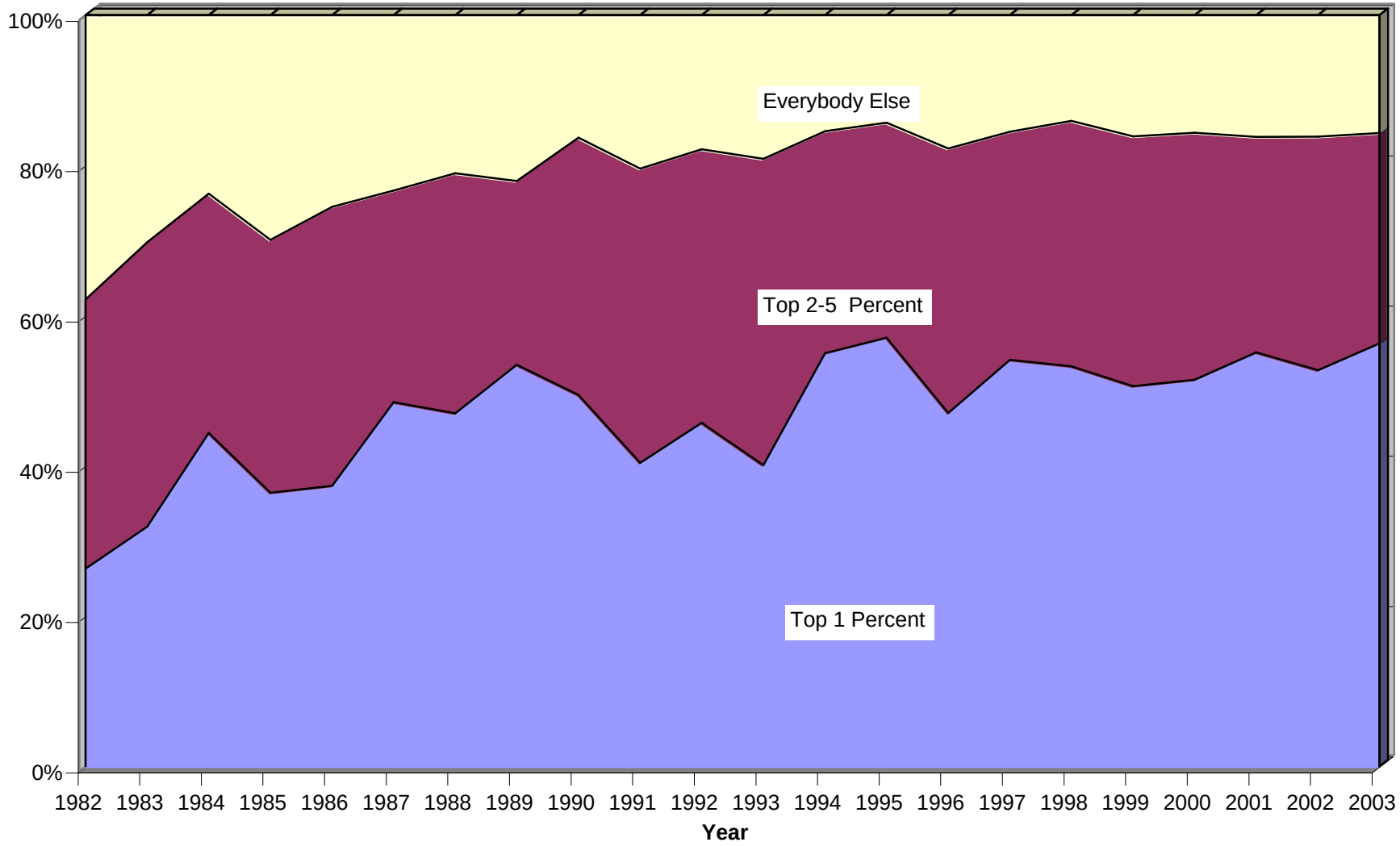
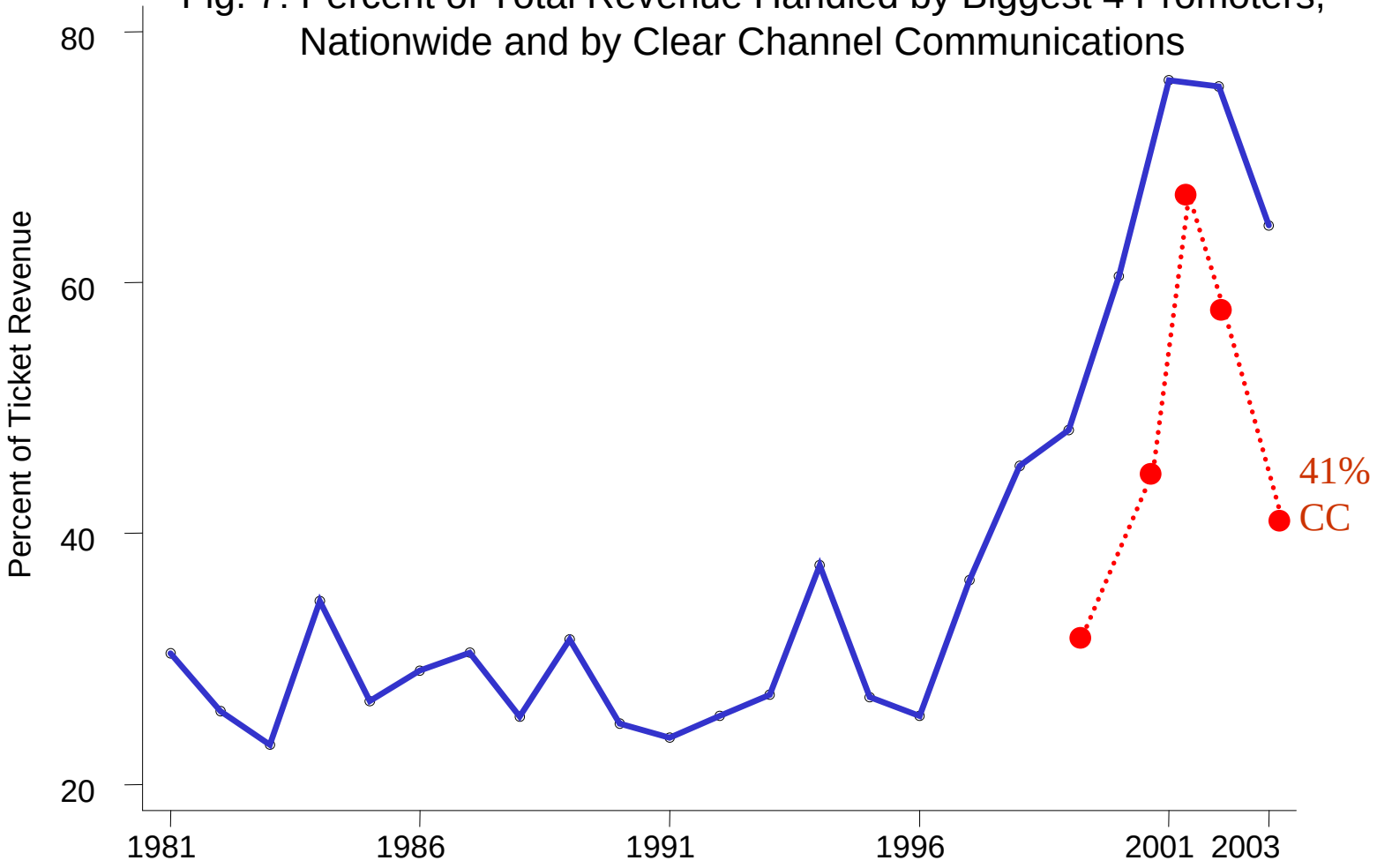
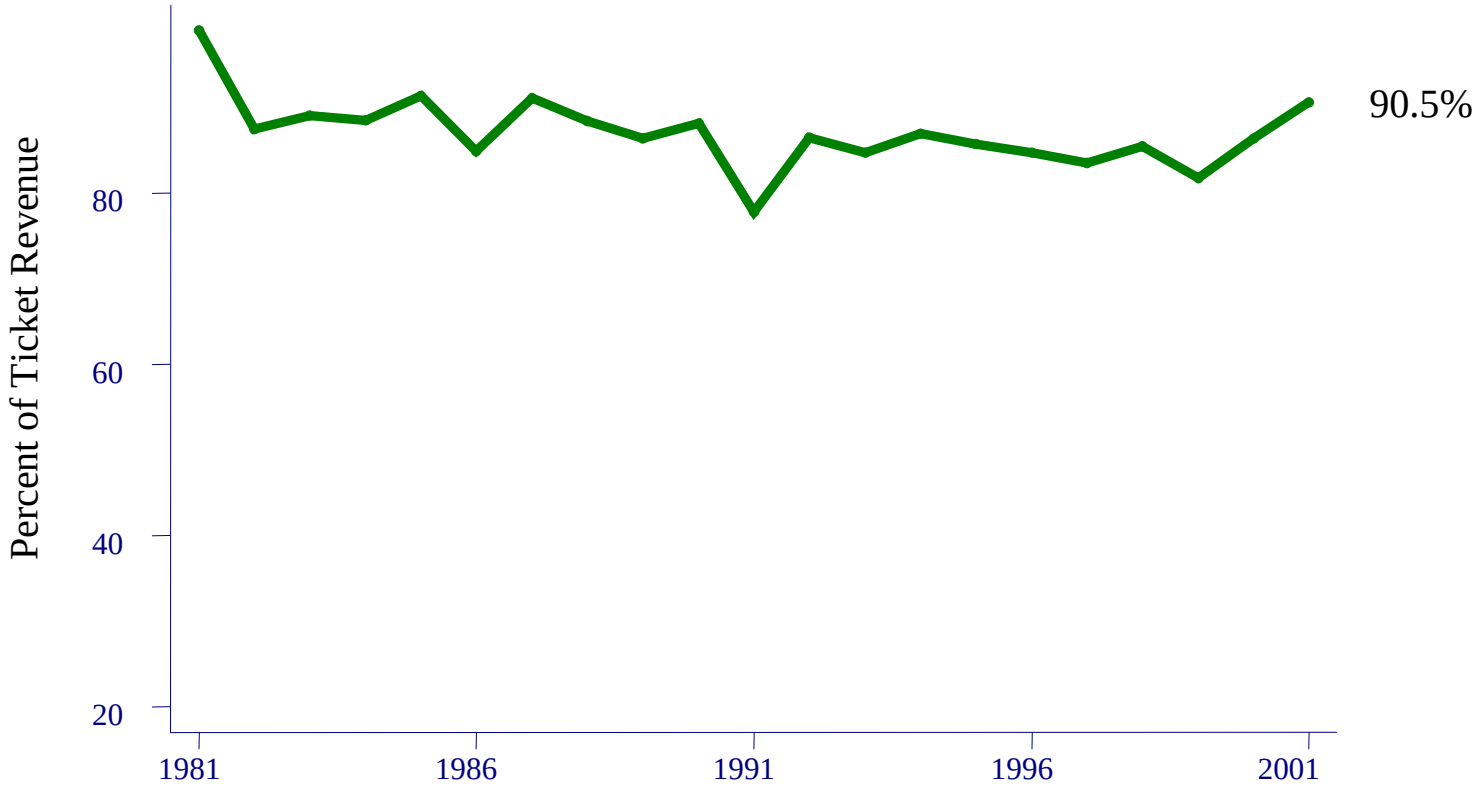


Fig. 7: Percent of Total Revenue Handled by Biggest 4 Promoters, Nationwide and by Clear Channel Communications



Source: Calculated by Alan Krueger based on Pollstar data. Only concerts performed in the U.S. are included in the analysis. Sample consists of artists listed in *The Rolling Stone Encyclopedia*. CC refers to Clear Channel Communications share.

Figure 8: Average Within-Market Percent of Revenue Handled by the Biggest Four Promoters in Each City



Source: Calculated by Alan Krueger based on Pollstar data. Sample consists of artists listed in *The Rolling Stone Encyclopedia*. Figure shows average of percent in each of the top 24 cities.

Table 1: Concert Revenue and Prices in 1994-95 and 2000-01 for Artists with Highest Revenue per Show in 1996-1999

Artist	1994-5				2000-1				Percent Change			
	Total Revenue (in thousands)	Number of Shows	Rev. per show (in thousands)	Average Price	Total Revenue (in thousands)	Number of shows	Rev. per show (in thousands)	Average Price	Total Revenue (in thousands)	Number of shows	Rev. per show (in thousands)	Average Price
The Eagles	$151,000	102	$1,480	$67.50	$4,837	1	$4,837	$89.22	-96.8%	-99.0%	226.8%	32.2%
Barbra Streisand	54,200	20	2,710	201.65	27,700	4	6,925	483.61	-48.9%	-80.0%	155.5%	139.8%
Reba McEntire	50,200	147	341	29.49	11,800	43	274	42.76	-76.5%	-70.7%	-19.6%	45.0%
Jimmy Buffett	35,700	64	558	31.39	49,600	62	800	39.84	38.9%	-3.1%	43.4%	26.9%
George Strait	28,600	76	376	23.73	22,500	11	2,045	48.60	-21.3%	-85.5%	443.5%	104.8%
Aerosmith	24,200	54	448	29.64	45,900	59	778	47.34	89.7%	9.3%	73.6%	59.7%
Elton John	24,200	37	654	40.66	21,800	38	574	56.70	-9.9%	2.7%	-12.3%	39.4%
Phish	23,100	141	164	23.27	21,300	40	533	30.50	-7.8%	-71.6%	225.0%	31.0%
Eric Clapton	21,500	40	538	42.65	32,900	40	823	62.46	53.0%	0.0%	53.0%	46.4%
Metallica	20,800	40	520	27.74	37,500	18	2,083	60.45	80.3%	-55.0%	300.6%	117.9%
Rod Stewart	18,500	35	529	39.46	23,900	58	412	46.12	29.2%	65.7%	-22.0%	16.9%
Janet Jackson	14,200	33	430	36.54	38,400	51	753	64.37	170.4%	54.5%	75.0%	76.1%
Dave Matthews Band	10,700	131	82	21.55	129,000	110	1,173	43.72	1105.6%	-16.0%	1335.8%	102.8%
Pearl Jam	9,264	33	281	23.32	8,454	18	470	28.91	-8.7%	-45.5%	67.3%	24.0%
Beastie Boys	6,196	28	221	22.99	338	2	169	50.00	-94.5%	-92.9%	-23.6%	117.5%
Luciano Pavarotti	5,410	4	1,352	88.19	10,300	9	1,144	105.78	90.4%	125.0%	-15.4%	19.9%
Bruce Springsteen & The E Street Band	1,652	16	103	35.45	47,000	48	979	65.20	2745.3%	200.0%	848.4%	83.9%
Ozzy Osbourne	1,516	12	126	28.86	49,100	67	733	43.37	3139.3%	458.3%	480.2%	50.3%
Paul Simon	368	1	368	82.14	5,989	25	240	34.35	1529.4%	2400.0%	-34.8%	-58.2%
Mariah Carey	325	1	325	27.51	6,687	8	836	59.70	1960.5%	700.0%	157.6%	117.0%
KISS	141	1	141	11.94	60,100	118	509	50.07	42436.8%	11700.0%	260.5%	319.3%
Average	$23,894	48.4	$494	$40.41	$31,196	39.5	$789	$50.02	30.6%	-18.3%	59.8%	23.8%

Source: Computations based on Pollstar database. All dollar figures converted to 2001 dollars based on CPI-U.

Table 2: Price, Revenue and Revenue per Show Regressions for All Artists

Variable	Log Price (1)	Log Annual Revenue (2)	Log Revenue per Show (3)
Intercept	2.261*	9.493*	9.277*
	(0.053)	(0.121)	(0.143)
Star Quality * 1981-86	0.234*	3.513*	2.413*
	(0.058)	(0.228)	(0.175)
Star Quality * 1987-91	0.289*	4.555*	3.090*
	(0.043)	(0.220)	(0.189)
Star Quality * 1992-96	0.523*	5.222*	3.495*
	(0.065)	(0.240)	(0.240)
Star Quality * 1997-2003	0.700*	5.508*	3.571*
	(0.066)	(0.234)	(0.240)
Number of Support Acts	0.0003	0.094*	0.024*
	(0.0003)	(0.003)	(0.001)
R-sq	0.518	0.366	0.359
Sample Size	35,835	35,835	35,835

Notes: Robust standard errors in parentheses. All equations include year dummies. Column 1 is estimated by WLS, where weights are tickets sold; Column 2 is estimated by OLS; and column 3 is estimated by WLS where weights are the number of shows performed in the year.

Star Quality is millimeters of space devoted to the artist in the *Rolling Stone Encyclopedia*, divided by 1,000.

~ indicates $p<0.05$; * indicates $p<0.01$

Table 3: Price, Revenue and Revenue per Show Regressions for Artists Listed in *The Rolling Stone Encyclopedia of Rock & Roll*

Variable	Log Price (1)	Log Annual Revenue (2)	Log Revenue per Show (3)	Log Price (4)	Log Annual Revenue (5)	Log Revenue per Show (6)
Intercept	2.258*	9.572*	9.222*	2.241*	9.834*	9.519*
	(0.063)	(0.181)	(0.236)	(0.070)	(0.302)	(0.279)
Star Qual *1981-86	0.248*	3.314*	2.592*	0.237*	3.358*	2.468*
	(0.068)	(0.342)	(0.327)	(0.054)	(0.361)	(0.281)
Star Qual *1987-91	0.264*	3.862*	2.790*	0.260*	3.889*	2.662*
	(0.050)	(0.358)	(0.258)	(0.041)	(0.374)	(0.272)
Star Qual *1992-96	0.478*	4.047*	2.822*	0.455*	4.105*	2.646*
	(0.077)	(0.383)	(0.325)	(0.077)	(0.393)	(0.327)
Star Qual *1997+	0.632*	3.542*	2.346*	0.616*	3.637*	2.206*
	(0.097)	(0.341)	(0.307)	(0.10)	(0.350)	(0.305)
No. of Sppt Acts	0.0002	0.084*	0.022*	0.001~	0.084*	0.022*
	(0.0003)	(0.004)	(0.002)	(0.000)	(0.005)	(0.002)
Male				0.084	0.344	0.220
				(0.048)	(0.238)	(0.185)
Female				0.213*	0.627~	0.475~
				(0.057)	(0.259)	(0.197)
Experience				0.003	-0.008	0.003
				(0.002)	(0.005)	(0.005)
Foreign				0.065~	0.240~	0.194
				(0.026)	(0.112)	(0.103)
Genre						
Other				-0.307*	-0.985*	-1.178*
				(0.113)	(0.255)	(0.270)
Blues				-0.236*	-0.955*	-1.593*
				(0.054)	(0.342)	(0.437)
Country/Western				-0.189*	-0.267	-0.289
				(0.047)	(0.215)	(0.184)
Folk				-0.222~	-1.199*	-1.298*
				(0.091)	(0.251)	(0.210)
Jazz				0.044	-0.380	-0.504
				(0.083)	(0.298)	(0.294)
Rock & Roll				-0.169*	-0.785*	-0.587*
				(0.030)	(0.144)	(0.141)

- continued -

Table 3 – Continued

Variable	Log Price (1)	Log Annual Revenue (2)	Log Revenue per Show (3)	Log Price (4)	Log Annual Revenue (5)	Log Revenue per Show (6)
R&B				-0.105	-0.550*	-0.462~
				(0.076)	(0.197)	(0.222)
Rap				-0.180*	-1.155*	-0.761*
				(0.041)	(0.191)	(0.182)
Reggae				-0.320*	-0.949*	-1.278*
				(0.060)	(0.271)	(0.264)
R-sq	0.668	0.382	0.338	0.715	0.416	0.406

Notes: Robust standard errors in parentheses. All equations include year dummies. Columns 1 and 4 are estimated by WLS, where weights are tickets sold; Columns 2 and 5 are estimated by OLS; and columns 3 and 6 are estimated by WLS where weights are the number of shows performed in the year. Baseline genre dummy is pop music. Baseline gender is both men and women.

Star Qual is millimeters of space devoted to the artist in the *Rolling Stone Encyclopedia*, divided by 1,000.

Sample size is 10,043 artist/year observations.

~ indicates p<0.05; * indicates p<0.01