An Analysis of Major League Baseball Franchise Valuation: Are Owners Rational When Buying Teams?

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Abstract

Baseball is a sport that receives a lot of attention from the general public, various media outlets and the government. As baseball continues to increase revenues as they set attendance records and turn baseball into a global game, along with television broadcasting revenue increasing substantially, it would appear that owning a baseball team would bring significant returns to the owners of these teams. This paper is going to look at baseball from a valuation standpoint, by using multiple variable regression models based off specific location factors in order to determine team valuations. It will look at historical returns, and whether owning a team produces better returns than comparable investments during the same time period.

Introduction

About once every off-season, a Major League Baseball team is sold and makes the headlines of newspapers around the world. Major League Baseball is only a $5.2[1] billion dollar industry, a medium sized industry in comparison to others, but transactions always land on the front page of newspapers and constantly talked about on sports radio. The sale process initially includes bids from multiple ownership groups and can require multiple bids and hundreds of millions of dollars in order for a transaction to occur. Even though a specific group is the highest bidder, they still need to obtain league approval before an actual transaction can be a reality. I thought about the entire process of owning a baseball team and ultimately decided it would be interesting to analyze these complex transactions from a purely economic perspective, instead of through the typical entertainment lens.

This paper is intended to delve into the mind of the owner and consider whether their decisions are financially motivated, or simply ego motivated. The greater fool theory states that there will always be a greater fool, no matter what price is initially paid, who will pay more than

[1]Bloom, Barry. "MLB, union announce new labor deal." Mlb.com. October 25, 2006. May 15, 2008. <http://mlb.mlb.com/news/article.jsp?ymd=20061024&content_id=1722211&vkey=ps2006news&fext=.jsp&c_id=mlb>.

the current owner will. Do baseball owners simply follow this greater fool theory? Are owners willing to buy teams at any cost? When an owner buys a team, does he expect to generate positive cash flows, or does the owner simply wait until the sale later on down the road, as they assume that the team will be worth way more than he bought them for? These are the types of questions that are going to be analyzed throughout this paper.

Over the course of the last century, there have been 123 different Major League Baseball Franchise Transactions[2]. I formulated my hypothesis around the idea that, baseball owners are financially intelligent individuals, as they have made a substantial amount of wealth by being the best in their respective industries. These individuals are some of the most gifted entrepreneurs and managers in the world. With this initial way of thinking in place, I figured there would be a large piece of economically motivated decision-making. There are probably even easier, more profitable hedge funds, or luxury goods that they could invest in instead of a team, and I would assume that, given these options, they would decide to invest in something that is going to yield a return that compensates them for this type of risk.

I would expect that the return on the S&P 500 would at least be equal to that of baseball, since these owners could just take their money and invest in this type of an index without much of a problem. I would assume that the return for baseball teams could possibly be even greater than the return on the S&P 500 during comparable periods of time, since this is an industry where there are high barriers to entry and ownership is not open to the general public. Many even consider major league baseball a monopoly, because there is excess demand for teams that

[2] This includes ownership consolidations and expansion teams purchasing rights from MLB.

goes unsatisfied each year. There are dozens of individuals out there who would really enjoy owning a baseball team, and they are willing to put hundreds of millions of dollars into the game.

I would estimate the return to be closer to that of art, another luxury good item that wealthy people enjoy investing in, even though the investors of art are probably very different from those who invest in baseball teams. I understand that for many of these owners, they have bought a baseball team because they enjoy the game and, while being able to say they own a major league team is quite impressive, I still believe that these owners are buying teams because they are looking to make some kind of return and view the transaction as an investment.

This paper is designed to look at the historical return on owning a Major League Baseball Franchise and what kind of return, based on regression analysis, one could expect over time. Is this type of an investment worth it for the owners? This paper will look at key factors that each city presents to a franchise through multiple variable regression analysis. These variables include population based on the city the team plays in, median household income of the major city and broadcasting estimates for the region covering the team. Each of these factors helps determine team value, as they serve as proxies for the different aspects that add value to a Major League Baseball team. As each of these variables change over time, the value of the team also changes.

In addition to simply regressing factors in comparison to the prices paid, this paper also looks at real returns for teams, on an individual basis, and from decade to decade, in order to understand how the numbers are working in the data set. Finally, I also looked at transaction values in comparison to other luxury good indices in order to analyze prices over time. Are prices paid for teams correlated to the prices for fine art or is it closely linked to the S&P 500? Is

owning a baseball team simply a hedge against the market? These questions and others will be explored throughout this paper.

Literature Review

The Baseball Industry

Andrew Zimbalist, author of Baseball and Billions, put franchise valuation into perspective when he perplexingly states, "sometimes owning a team benefits another business, sometimes it makes the owner famous, and sometimes it is just plain fun. Insofar as baseball ownership is fun, part of the investment return takes the form of utility from consuming the pleasure of ownership.[3]" Basically, Zimbalist is saying that we cannot simply judge returns based on the financial figures because there is a personal gain that cannot be quantified for these owners. While this is a rather interesting assertion, Zimbalist goes on to claim, through personal communication, that "James Quirk estimates that an equity investment in every U.S. professional sport at its beginning would have yielded a rate of return up to 1990 three times as high as that on the Standard and Poor's 500 over the same period." While this sounds like a substantial return, when these professional sports originally started, they would be considered risky investments because the leagues had not been established. Therefore, it makes sense that an owner, who invested from the time the "beginning", would be compensated for this type of added risk.

[3] Zimbalist, Andrew. Baseball and Billions. New York, NY: Basic Books, A division of HarperCollins Publishers, Inc., 1992.

A few paragraphs later, Zimbalist makes the claim that "average franchise values in 1980 were 69.6 times greater than they were in the 1910s, indicating a compound yearly rate of appreciation of 6.3 percent over the seven decades." While it sounds like he is pointing to higher returns than an investor would expect from an index like the S&P 500, this number is a nominal rate, and once the 3.4 percent rise in Consumer Price Index over the same time period is taken into account, that 6.3 percent becomes a 2.9 percent real return per year. A return of 2.9 percent is rather paltry when compared to the market over the same period. It appears, just based on his analysis of the hard data, regardless of his personal communication with experts, that the growth rates for owning a baseball team falls below 3 percent from 1910 through the 1990's.

Zimbalists' chapter on valuation does a good job explaining the difficulties in estimating the inner workings of baseball teams, particularly about the back and forth games that commissioners, specifically Fay Vincent in the early 1990's, have done over the years with the government. Commissioners have been known to state before Congress that the teams were incurring significant losses and needed some sort of assistance, like subsidies for new ballparks in order to draw larger crowds, in order for them to continue operating. While it is true that owners have been claiming negative operating incomes for years, as mentioned in Gerald W. Scully's book, The Business of Major League Baseball, "in 1959, Bill Veeck became the first owner to notice and to exploit the tax shelter aspect of sports franchise ownership.[4]" The accounting games that these teams play, which are perfectly legal, doesn't tell the whole story. Paul Beeston, former President of the Toronto Blue Jays, once said, "under generally accepted accounting principles, I can turn a $4 million profit into a $2 million loss, and I can get every

[4]Scully, Gerald W. The Business of Major League Baseball. Chicago, IL: The University of Chicago Press, 1989.

national accounting firm to agree with me.[5]" This just shows that simply looking at operating income can be a dangerous way to explore baseball valuation. Even though Bud Selig has been relatively up front with the recent success of baseball, many teams are still reporting negative operating incomes.

In 1984, Major League Baseball claimed that they had lost $42 million dollars for the year. However, Roger Noll, an Economics Professor at Stanford University, was actually fortunate enough to get his hands on these financial statements, in order to understand some of the games that Major League Baseball was playing. Noll worked through the numbers and ultimately decided the industry really had an operating profit of around $9 million for the year[6]. And this was in 1984, before the big time broadcasting contracts came into play and numerous attendance records were set. Noll went on to say that "The leagues aren't in the financial trouble they say they are….Everybody is just fine financially as far as I'm concerned."[7]

Major League Baseball can basically be viewed as an organized monopoly. There are only 30 teams and every time that baseball looks to expand, there are multiple ownership groups, hailing from all parts of the United States, just begging for a team. I do not think that a team losing money on a consistent basis would yield this kind of attention. For instance, Portland, Oregon would really enjoy getting their hands on a team either through expansion or relocation of another team, as evidenced by Maury Brown's comments in the *Portland Business Journal*.

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[5]Millson, Larry. *"Ballpark figures: The Toronto Blue Jays and the Business of Baseball."* Toronto: McClelland & Stewart, 1987.

[6] Zimbalist, Andrew. Baseball and Billions. New York, NY: Basic Books, A division of HarperCollins Publishers, Inc., 1992.

[7]Attner, Paul. "How Professional Sports Governs Expansion Will Mean Success or Failure for 21st Century." *The Sporting News*, March 18, 1991.

Brown stated, "while Major League Baseball is not looking to relocate any franchises in the future, the Portland market should be seen as an attractive location should MLB decide to expand beyond its 30 teams in the future.[8]" Baseball is clearly a sport that has excess demand, and in general, this means additional profits for the current owners because they are ones who were able to obtain a franchise.

Forbes.com was really the inspiring resource for this thesis when they came out with their baseball valuations starting in 1998. In their analysis on team valuation, they chose to derive value by looking at the value of Major League Baseball as a whole, the specific market that they were in, the current value of their stadium, and a variable they called "brand management." For example, the Boston Red Sox were estimated to be worth $816 million in 2008, the sum of the market value ($367 million), the stadium value ($177 million), brand management ($152 million), and the sport value ($120 million)[9]. I chose to do a similar style valuation, but decided to use factors with information that is more readily available. It is difficult to specify that the market value is precisely $367 million to the Boston Red Sox, so I decided to take a somewhat different approach when constructing my analysis, by using data that is reported on a yearly basis and acts as similar proxies to the values that Forbes.com has used.

In addition to valuing the entire team, Forbes took an interesting look at local media revenue and how much a part of the game that has become. Forbes reports, "in 2006, local media revenues accounted for 41% of overall media revenue." For the New York Yankees, this

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[8] Brown, Maury. "Expansion, not relocation, is Portland's ticket to MLB." *Portland Business Journal.* November 16, 2007. April 20, 2008.< http://portland.bizjournals.com/portland/stories/2007/11/19/editorial3.html>.

[9] Forbes.com. "The Business of Baseball." *Forbes.com*. 4/16/08. 4/16/08. <http://www.forbes.com/lists/2008/33/biz_baseball08_The-Business-Of-Baseball_Rank.html>.

resulted in a reported $91 million dollars, with the YES Network paying the Yankees $67 million and other local broadcasting contributed another $24 million to the Yankees. This is on top of the approximately $22.3 million that each of the 30 teams receive from Major League Baseball's national television rights coming from Fox and Turner Broadcasting.[10]

Regression Literature

In addition to these two relatively dated books and Forbes.com, there have also been some other useful studies published on baseball and other luxury industries that I used in order to understand how to tackle the valuation question in baseball. These texts were more useful for the methodology and understanding of my multiple factor regression analysis, than for an overall understanding of the baseball industry.

Coming from academia, Jianping Mei and Michael Moses' journal article about "Art as an Investment and the Underperformance of Masterpieces[11]" was very useful for trying to build my own model. These two NYU Stern professors did a similar study in the art industry and tried to figure out whether art was a good investment in comparison to the S&P index. They built their own index that they have tracked since 1900. They wrote many papers on this topic that I read in order to understand how the art industry works, so that I could extrapolate that to the baseball industry. There are obviously a lot more transactions that take place in the high-end art industry than baseball, but their analysis allowed me to consider how I would look at the baseball industry.

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[10]Sports Business News. "Going Inside MLB's latest $3 billion TV agreements." *Sports Business News.* 7/13/2006. 4/20/2008. <http://www.sportsbusinessnews.com/_news/news_347260.php>.

[11] Mei, Jianping and Michael Moses. "Art as an Investment and the Underperformance of Masterpieces." *The American Economic Review* (1992), Volume 92, No. 5, pp.1656-1668.

The paper "An Analysis of Major League Baseball Attendance 1969-1987," by Robert A. Baade and Laura J. Tiehen built a model that predicted season attendance for a given year[12]. This analysis provided useful information on their methodology. Even though this is a similar topic, I only ended up using a couple of their factors in my model because they included some other variables such as, average ticket price and the number of star players, and these would not be as applicable for a team valuation regression model. Attendance is a very different variable to look at and I ended up using population instead of a more specific variable like attendance because I am assuming that the broadcasting industry is driving the valuation of many teams. While the people who are attending games produce revenues for the team, there is a larger group of people who are watching the game from their homes. This larger group of people, as a whole, is more representative of the total market for the team during a given year.

The textbook Sports Economics, by Rodney D. Fort, provided useful insight into sports as an economic entity rather than purely an entertainment arena. The textbook was really my first source of information to obtain a base level understanding of broadcasting in sports, along with the supply and demand function as it pertains specifically to sports. The book makes an intriguing claim when Fort states, "it isn't always just the greatest population or the highest income that leads to the highest demand.[13]" This observation held true during my analysis simply by looking at Canadian cities, as they have relatively high populations, but comparatively low revenues based on their size.

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[12] Baade, Robert A. and Laura J. Tiehen. "*An analysis of Major League Baseball Attendance, 1969- 1987*." Journal of Sport and Social Issues, 14 (1990), pp.14-32.
[13] Fort, Rodney D. Sports Economics. (Pearson Education, Inc., 2003) Chapter 1, pp..22-23.

A combination of all of these resources was used to develop my thought process in order to build my own model. The factors I ultimately decided to use were a result of reading through these texts and others, as they provided valuable information and assistance throughout the process.

Research Methodology and Data

Data Collection

Since my regression involves multiple variables, each variable presented different problems in order to keep consistency in my analysis. The following pages describe both why and how I went about obtaining the figures in my regression and correlation analyses.

Team Transactions

The prices that have been paid for major league teams are the main piece of analysis for this thesis. Transaction prices actually presented an obstacle, since there are not any data sets out there with this information all compiled into one spreadsheet. I ended up taking most of my data from the book Pay Dirt: The Business of Professional Team Sports by James Quirk and Rodney Fort.[14] This book had many of the transaction prices for the team histories, but for the prices that they didn't have, along with the transactions that occurred after the book was published, I went to old newspaper articles and Forbes.com in order to find the reported prices that each owner paid. The New York Times, Chicago Tribune and The Boston Globe all have articles printed the

[14] Quirk, James and Rodney Fort. Pay Dirt: The Business of Professional Team Sports. Princeton, NJ: Princeton University Press, 2002.

day after transactions occur, so simply searching through the archives of these papers yielded many of the transaction prices.

In addition to simply taking the prices paid, if the new owner only bought a specific percentage of the team, I extrapolated that as if they bought the entire team in order to keep prices at a consistent franchise level valuation. For example, in 2000, Rogers Communications bought 80% of the Toronto Blue Jays for $140 million, so in my analysis, the price I used for the transaction is $175 million ($140/.8), in order to derive the implicit price that Rogers Communications feels the Blue Jays are worth.

Median Household Income

In order to obtain figures for median household income, I used Census data dating back to 1949. At least once each decade, the U.S. Census Bureau publishes the median household income figure in the County and City Data Book, and it breaks out the statistic by major cities.

The books are published in 1952, 1962 etc. but the figures printed in these books actually represent the status three years earlier, so 1949, 1959 etc. In order to interpolate between years, I needed to convert these figures into 2008 dollars and then calculate an estimate for the specific year needed. For example, in 1953, Anheuser-Busch bought the Saint Louis Cardinals for $3.75 million. In order to obtain a median family income estimate, I went to the 1952 County and City Data Book and pulled the figure, $3,998, the number represents St. Louis' median household income in 1949. I also took, from the 1962 book, the 1959 figure, $7,527. I then converted both of those figures into 2008 dollars, obtaining $36,217 for 1949 and $55,767 for 1959. I then took (4/10) of the 1949 figure and (6/10) of the 1959 figure in order to arrive at my 1953 figure,

$47,947. This number represents the figure for median family income in the city of St. Louis, Missouri, in 1953.

I then decided to multiply the household income figure by population, so I could obtain a figure that can be compared from city to city. If I simply used the median household income figure, this would present problems to the regression. For example, the Los Angeles Dodgers play in a much more desirable location than the Kansas City Royals and this would not be taken into account simply by taking the median household income of the two cities and comparing them over time. When population is multiplied by median family income, the product is better representative of the overall market.

Median household income by city is an important variable when understanding the prices that potential owners are willing to pay. By looking at median household income, it allows the owner to understand the potential growth in fan base because the total wealth of the area can decide how profitable the team will be. Fans that are more wealthy are willing to pay more money to visit the stadium, in addition to buying merchandise. In addition, broadcasting revenues are determined by the size of the market, so if there are more households that are willing to pay higher prices for cable services, this in turn increases the value of the team. These three pieces are very valuable for estimating the value of a team.

Population

The population that surrounds a franchise is also a very important factor to consider when owning a team, as discussed in the previous section. Some of the most prestigious franchises, like the New York Yankees and Los Angeles Dodgers, also have the highest populations. This

would indicate that population is a determinant of value and is the reason that I used the population variable in my analysis. Population figures, like median household income, are obtained through the U.S. Census Bureau. I also interpolated the figures in a similar fashion to median household income.

Broadcasting

I designed the broadcasting variable to estimate the increasing amount of team value derived from the overall broadcasting market. With the rapid expansion of national telecasts, and even teams that own significant stakes in their own television channels, this variable is an important driver when valuing a team. According to Forbes.com, many teams have operating income that are very low and sometimes negative, but judging by their reported double digit increases in overall firm value, I would expect that the real value in many teams comes from the broadcasting rights that teams own. For example, the New York Yankees had an estimated operating revenue of $-47.3 million in 2007, but their estimated overall value increased by 15%, according to Forbes.com.[15]

Since I needed a historical estimate of the broadcasting market, I chose the broadcasting variable as the number of ADI households. ADI stands for the Area of Dominant Influence and is, "in the measurement of television audience data, geographic area composed of all the counties influenced by originating stations in a particular television market. For example, the New York ADI is composed of all the counties in New York and New Jersey where the New York City

[15] Forbes.com http://www.forbes.com/lists/2007/33/07mlb_New-York-Yankees_334613.html

television stations are viewed.[16]" As specific ratings for each baseball game are very hard to measure, this statistic has been tracked for decades and serves as a solid proxy for the broadcasting market. I collected data from 1960-1980 through the Television Factbook,[17] and from 1980 until present, the information was found in the Broadcasting & Cable Yearbook.[18] Data is available for each year, so it can show the growth and contraction for different cities over time.

Analysis and Results

Data Analysis

Once I compiled all of the data, I chose to conduct a couple different kinds of analyses. On the pages that follow, I have explored general returns in Major League Baseball, performed a regression analysis, in addition to looking at the correlation between transaction prices and key industry indices.

General Return Analysis

Even before I conducted my regression analysis, I decided to slice the information set into different pieces, so that I could see if there were any general trends in the marketplace for Major League Baseball teams. I looked at data over a series of decades, along with team specific data. While this is a somewhat crude analysis, I figured it would still be a worthwhile exercise in order to understand the data.

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[16] "Area of Dominant Influence (ADI)." Dictionary of Marketing Terms. 3rd Edition. Barron's Educational Series, Inc., 2008.
[17] Television Factbook. Volumes 25-50. Washington, D.C.: Television Digest, Inc., 1959-2006.
[18] Broadcasting Cable Yearbook. 1980-2006. Washington, D.C.: Broadcasting Publications, Inc., 1980-2006.

I first looked at trends from decade to decade. In Table 1., I have constructed the number of transactions, the average sale price in nominal terms, and the average sale price in real terms, in order to gain a sense of the market over time. Aside from the 1910's, the number of transactions has steadily increased, and the 2000's are well on their way of continuing this trend. It appears that teams are being held for less time, as evidenced by the higher number of transactions and it appears ownership groups are moving in and out of teams more quickly.

In terms of sale price in 2008 dollars, the average price in the 2000's is only about 34 times larger than the average sale price in the 1910's. This implies around a 4.0 percent compound annual growth rate, a figure less than the approximately 5.5 percent the S&P Index has returned during that same time period.

Table 1.

Growth in Franchise Valuations (all financial figures are in thousands)			
	Number of Transactions	**Average Sale Price (Nominal)**	**Average Sale Price (Real)**
1910's	12	$534	$9,540
1920's	6	$812	$9,752
1930's	5	$1,175	$18,477
1940's	9	$1,539	$17,011
1950's	9	$3,337	$26,721
1960's	17	$5,104	$39,897
1970's	13	$11,558	$44,899
1980's	18	$38,563	$77,209
1990's	22	$132,338	$188,075
2000's*	16	$279,688	$321,274

For the team specific data, I looked at each transaction and computed the compound annual growth rate for the number of years in between each transaction. One of the worst returns was by Charles Weeghman, who bought the Chicago Cubs in 1916, only to sell the team two years later to William Wrigley for a 24 percent loss in real terms. The single best return was

actually achieved by Major League Baseball, when they sold the Washington Nationals (formerly the Montreal Expos) in 2006, to Ted Lerner, for $450 million dollars. MLB had bought the team for only $120 million in 2002, when they were still in Montreal, Canada, which represents a 35% compound annual growth rate in real terms. It appears that a team in Washington D.C. is much more desirable than a team in Montreal, Canada simply based off of these returns. This just illustrates how important location can be for the value of a team, which will be addressed in the regression analysis. Sale prices and compound annual growth rates varied greatly between these two numbers, with the average return for all sale prices at 5.9%. This is actually a significantly higher return than my decade-to-decade analysis of 3.5%.

I then looked specifically at the different teams and the returns for each over time. For example, the Detroit Tigers have had five sales since 1910. The compound annual growth rate for these sales has been approximately 2.7 percent (see Table 2). The last sale of the Tigers, when Mike Ilitch bought the team for $82 million dollars, only provided the former owner, Tom Monaghan, a 1.05% real return. In addition to simply the return, the average holding period for the Tigers is 20 years, although Tom Monaghan brought this average down a bit when he sold the team just 9 years after becoming owner.

Table 2.

Detroit Tigers		
Year of Sale	**Real Return**	**Years Held**
1912		
1935	3.54%	23
1961	0.89%	26
1983	4.95%	22
1992	1.05%	9

The Tigers are on the lower end of Major League Baseball. The average holding period for each transaction is around 15 years and the compound annual growth rate to the owners is around 5.5 percent. This is on a team level and averages the teams' returns as opposed to each transaction, as previously mentioned.

Regression Analysis

The multiple linear regression model that I built uses the factors median household income, population, and total ADI households, in order to explain the prices paid for teams. The equation that I used was:

Equation 1.

$$Yi = a + B1\,(Time) + B2\,(Pop. * Income) + B3\,(Broadcasting)$$

Yi = Log of Sale Price (in 2008 dollars)
Time = Number of years since benchmark year (1910,1959,1985,1990)
Pop. = Population of given city in year of transaction
Income = Log of Median Household Income (in 2008 dollars) at given city in year of transaction
Broadcasting = ADI Broadcasting estimates at given city in year of transaction
a = error term

I used the log of team transaction prices and the log of median household income in order to normalize the distributions, so that they can easily be compared over time. The variable, years since a specific benchmark year, depends on what my timeframe is for the specific analysis and is simply a count variable. For example, the year 2000 would be represented by 90 (2000-1910 = 90 years since 1910) in my years since 1910 analysis. In addition, all financial figures were

converted into 2008 dollars using the Consumer Price Index[19]. In total, there were 123 transactions between 1910 and 2008.

Regression 1: All Data Available

I first looked at all of the data that I could compile to see what kind of return teams have seen over the years. I figured that broadcasting estimates and median household income aren't available prior to the 1950's and aren't really relevant to early team valuation so those variables only start in 1959. Television obviously was not really much of a factor prior to the 50's, especially in sports, and median household income was not part of the data that the U.S. Census Bureau collected prior to 1949.

Appendix #6 has the Minitab Statistical Software output for this regression. By looking at the F statistic, I have tested whether the relationship between the independent and dependent variables are significant. Since the F statistic in my regression is 153.85, with a p-value equal to zero, we reject the idea that there is no relationship between the variables.

The coefficient of determination, or the R-Square in the case of this analysis, is 79.5 percent, indicating that 79.5 percent of the variation in the log of transaction prices is explained by the log of population multiplied by median household income, broadcasting estimates, and years since 1910. The adjusted R-square, the coefficient of determination adjusted for sample size, is also 79 percent, indicating that 79 percent of the variation in the log of transaction prices in 2008 dollars is explained by the variation in the log of median household income times population and broadcasting estimates.

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[19] U.S. Bureau of Labor Statistics, Division of Consumer Prices and Price Indexes. Bls.gov. April 10, 2008. <http://www.bls.gov/CPI/>

The implied return for all transactions is only 1.6 percent during the time period 1910-2008. A 1.6 percent return is obviously lower than the returns that have been achieved by most indices, including the Mei Moses Art Index, the S&P 500 and the Dow Jones Industrial Average.

Regression 2: 1959-2007 All U.S. Transactions

Since I was not satisfied with a mere 1.6 percent return, I needed to perform a regression with the data in a different way, in order to see if there were any useful developments in the data over time. Contained in Appendix #7 is the multiple linear regression output for all transactions between the years 1959 and 2007. I decided to perform this analysis because all of the relevant data was available for all transactions and I wanted to see what the return on baseball in the past fifty years has looked like.

Again, by first looking at the F statistic, I have tested whether the relationship between the independent and dependent variables are significant. Since the F statistic in my regression is 142.09, with a p-value equal to zero, we reject the idea that there is no relationship between the variables. This means that the model has been designed in a way that is statistically useful, to a certain extent.

The coefficient of determination, or the R-Square, tells us the percentage of explained variation from the regression. In the case of my analysis, 78.2 percent of the variation in the log of transaction prices can be explained by the variation in the explanatory variables. The adjusted R-square, the coefficient of determination adjusted for sample size, is .776, indicating that about 78 percent of the variation in the log of transaction prices in 2008 dollars is explained by the variation in the log of median household income times population and broadcasting estimates.

The standard error of the co-efficient, also called the standard error of the regression coefficients, provides information on the average sampling error resulting from my estimation of the different betas. In the case of this output, the estimated beta for all variables have an error term on their betas of less than one percent.

The implied return for all transactions is only 3.0 percent during the time period 1959-2008. This figure is considerably lower than my decade to decade analysis and my team by team figure. For comparison purposes, a 3.0 percent return is lower than the 6.8 percent return observed on the S&P 500 index, a considerable discount during the same time period.

Regression 3: 1985-2007 All U.S. Transactions

After running the previous regression with all transactions where I was able to obtain complete data, I then had to think strategically about when, logically, the broadcasting element really started to have an effect on transaction prices. Contained in Appendix #8 is the multiple linear regression output for all transactions between the years 1985 and 2007. I decided to perform this analysis because I figured that somewhere in the 1985-1990 is where broadcasting revenues really started to elevate team prices and values. I wanted to look at the return during this window to see how it fared in comparison to the longer time periods previously regressed.

By first looking at the F statistic, I have tested whether the relationship between the independent and dependent variables are significant. Since the F statistic in my regression is 83.1, with a p-value equal to zero, we reject the idea that there is no relationship between the variables. This means that the model has been designed in a way that is statistically useful, to a certain extent.

The coefficient of determination, or the R-Square, tells us the percentage of explained variation from the regression. In the case of my analysis, 67.7 percent of the variation in the log of transaction prices can be explained by the variation in the explanatory variables. The adjusted R-square, the coefficient of determination adjusted for sample size, is .669, indicating that about 67 percent of the variation in the log of transaction prices in 2008 dollars is explained by the variation in the log of median household income times population and broadcasting estimates.

The standard error of the co-efficient, also called the standard error of the regression coefficients, provides information on the average sampling error resulting from my estimation of the different betas. All variables have error terms on their betas of less than one percent.

The implied return for all transactions is about 4.2 percent during the time period 1985-2008. A 4.2 percent return isn't a bad return, but compared over the same time period, the S&P 500 returned over 9 percent so this still indicates a discount to the return on the market.

Regression 4: 1990-2007 All U.S. Transactions

Contained in Appendix #9 is the multiple linear regression output for all U.S. transactions between the years 1990 and 2007. I wanted to see if the broadcasting revenue figure started to really increase prices closer to the 1990 mark so I ran the regression from 1990 instead of 1985. I wanted to look at the return during this window to see how it fared in comparison to the longer time periods.

By looking at the F statistic, I have tested whether the relationship between the independent and dependent variables are significant. Since the F statistic in my regression is 69.75, with a p-value equal to zero, we reject the idea that there is no relationship between the

variables. This means that the model, even with a smaller data set, has been designed in a way that is statistically useful, to a certain extent.

The coefficient of determination, or the R-Square, tells us the percentage of explained variation from the regression. In the case of my analysis, 63.7 percent of the variation in the log of transaction prices can be explained by the variation in the explanatory variables. The adjusted R-square, the coefficient of determination adjusted for sample size, is .628, indicating that about 63 percent of the variation in the log of transaction prices in 2008 dollars is explained by the variation in the log of median household income times population and broadcasting estimates.

The standard error of the co-efficient, also called the standard error of the regression coefficients, provides information on the average sampling error resulting from my estimation of the different betas. All variables have error terms on their betas of less than one percent.

The implied return for transactions occurring in the years following 1990 is about 4.8 percent. As was the case with my analysis from 1985, no investor would complain about a 4.8 percent return, but compared over the same time period, the S&P 500 returned over 8 percent. This is through the technology boom and bust along with the more recent credit crunch. This still indicates, even over the last 17 years, that investors are receiving a discount on the market by investing in baseball teams.

Regression 5: Mock Transactions

After I found out that teams were obtaining better and better returns over time, I decided to further my analysis by pretending that any team that hasn't transacted in the last five years, actually transacted in 2008 by using the team valuations from Forbes.com. While these estimates aren't perfect, this will allow me to take out the sampling bias that is currently in my

data since some teams haven't transacted since the 70's and 80's. Hopefully, this will allow me to capture a better picture of the value of baseball teams by removing this sampling bias.

Contained in Appendix #10 is the multiple linear regression output for all U.S. transactions between the years 1910 and 2007 with the mock transactions I have created in 2008 for all teams. Looking at the F statistic, I have tested whether the relationship between the independent and dependent variables are significant. Since the F statistic in my regression is 242.56, with a p-value equal to zero, we reject the idea that there is no relationship between the variables. This means that the model has been designed in a way that is statistically useful, to a certain extent.

The coefficient of determination, or the R-Square, tells us the percentage of explained variation from the regression. In the case of my analysis, 83.7 percent of the variation in the log of transaction prices can be explained by the variation in the explanatory variables. The adjusted R-square, the coefficient of determination adjusted for sample size, is .833, indicating that about 83 percent of the variation in the log of transaction prices in 2008 dollars is explained by the variation in the log of median household income times population and broadcasting estimates.

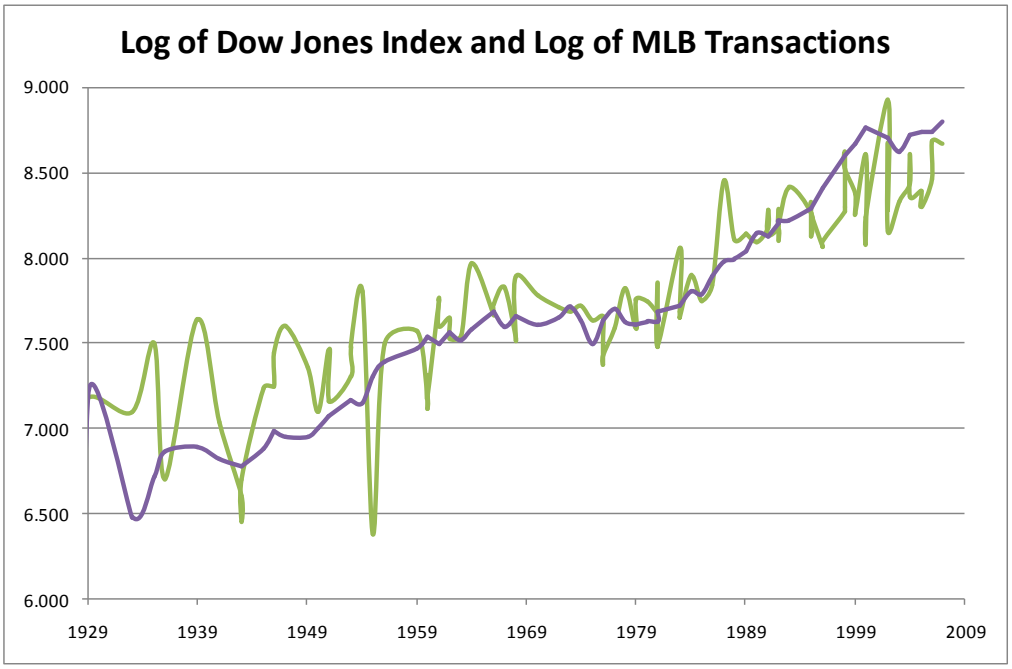
The implied return for all transactions is 1.7 percent during the time period 1910-2008. This figure is marginally higher than my initial analysis with only the real transactions that have occurred. As a result, it appears that there is some sampling bias in my analysis holding down the return and probably causing my analysis to undervalue baseball teams to some extent.

Correlation Analysis

One theory as to why owning a baseball has a lower return than many of the major indices is that owning a major league team could be an investing strategy, implemented by the

owners, as a hedge against the market. Since they are extremely wealthy individuals, they would want to hedge against a sharp fall in market prices by investing in an asset that isn't going to decrease in value when the market crashes. While this is a logical thought process, after running correlation tests with the Mei Moses Index, the S&P 500, and the Dow Jones Industrial Average, this doesn't appear to be the case. The correlation between these indices is actually positive in all three cases, with the Mei Moses Index having a correlation coefficient of .857 and the S&P Index having a correlation coefficient of .746. If these owners were implementing a hedging strategy, this coefficient would be negative, since an increase in the market would result in a decrease in team value. The chart below illustrates that, while each line has a different slope, they are all positively correlated with each other. See appendices for more charts in comparison to indices.

Figure 1.



Further Research

It will be interesting to see where Major League Baseball valuation goes in the next decade or two. With Disney selling their interest in the Anaheim Angels, Newscorp selling their interest in the Los Angeles Dodgers, and CBS taking a sizeable loss when they sold the Yankees, it appears that the media companies decided that these teams didn't have the kind of synergies that were once thought to exist. As the broadcasting industry starts to settle itself in valuing broadcasting rights and Major League Baseball attempts to squeeze as much out of television as humanly possible, it should be interesting to see what kind of prices are paid for these teams.

In addition to simply television sets, Major League Baseball has also released a new type of broadcasting called MLB.TV. This allows users to view games from out of market teams right from their computers. This service charges around 80 dollars a year and is relatively new for MLB. There are many kinks that need to be worked out in this arrangement, as many local games are subject to blackout, a situation that has made subscribers relatively upset. This type of "new media" could result in significant profits for these teams if they work out a way to keep customers happy. This type of media needs to be closely monitored, as it is likely to play an important part in the future of Major League valuation.

The international aspect of baseball is becoming increasingly important and will probably need to be considered in the next decade if someone is going to run another regression type analysis. Merchandising revenue from Asia has gone through the roof with marquee players leaving their native Asian leagues for big pay checks in the United States. An increasing amount of Major League Baseball revenue will be derived from these overseas sales and needs to be accounted for in some fashion for the valuation.

One question that still remains on my mind, is how to measure this "fun factor?" Is there some kind of qualitative analysis that could be conducted in order to understand why owners are willing to take a lower return than the market when investing a substantial piece of their wealth in these teams. It's a difficult question to answer, but still one that seems answerable.

It would be nice if Roger Noll, or anyone else for that matter, could take another look at the financial statements for all of the teams to see how things have changed since he looked at them 30 years ago. It would be beneficial, if the government truly cares about the baseball industry, to add some transparency to the business of baseball. Many people just want to understand the inner workings of baseball teams, and with the steroids scandal still looming over the game of baseball, asking to see how much money the teams made from the scandal isn't an outrageous request. We will just have to wait and see if Major League Baseball is willing to make these kind of releases going forward.

Conclusions

Through my analysis of Major League Baseball transactions, I have discovered that, on average, the prices paid by owners underperforms the market. For an industry that receives a lot of attention when a sale takes place, the teams actually don't appear to be any better of an investment than other luxury goods or indices, and in some cases, even lag the market. I sliced the data in many ways; my multiple factor regression model yielded a 1.6 percent return from 1910-2007, the decade analysis yielded a 4.0 percent return, individual transaction analysis yielded a 5.7 percent return, and team analysis yielded 5.4 percent return. However, as I ran different regressions starting from various time periods, I noticed that the return on owning a

baseball team has steadily increased over the years. From 1990 until present, owners have earned 4.8 percent, a figure that still lags the market.

It's also important to consider that, in addition to those who have already cashed in their chips, there are savvy investors like George Steinbrenner, owner of the New York Yankees, who still haven't sold their team in order to realize hefty profits. Steinbrenner bought the team for $10 million in 1973, and has yet to sell the team even though they are worth a reported $1.3 billion[20] today. This would yield a real compound annual growth rate of approximately 10 percent, substantially higher than the market over the same time period. I took account for this in my last regression and it does appear that there is some sampling bias in my regression. This is why it will be interesting to see what happens over the next few decades with baseball valuation, as these teams will really transact and create a better data set.

Prices have rose over time when adjusted for inflation, but the increase in value over time turns out to be slower than the market indices along with the indices for luxury goods. This return is not a hedge for an owner's portfolio either, as demonstrated in the strong positive correlation coefficients.

Like Zimbalist said, it really does appear that owners are at least partly in it for the fun of owning a baseball team because it doesn't make sense, financially, for these owners to be expecting a substantial return on their investment. There are, of course, exceptions to the rule that have made substantial returns by investing in a baseball team, but on the whole, owning a baseball team appears to underperform the market.

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[20] Forbes.com. "The Business of Baseball." *Forbes.com*. 4/16/08. 4/16/08. <http://www.forbes.com/lists/2008/33/biz_baseball08_The-Business-Of-Baseball_Rank.html>.

Works Cited

Attner, Paul. "How Professional Sports Governs Expansion Will Mean Success or Failure for 21st Century." *The Sporting News,* March 18, 1991.

Baade, Robert A. and Laura J. Tiehen. "*An analysis of Major League Baseball Attendance, 1969- 1987*." Journal of Sport and Social Issues, 14 (1990), pp.14-32.

Bloom, Barry. "MLB, union announce new labor deal." Mlb.com. October 25, 2006. <http://mlb.mlb.com/news/article.jsp?ymd=20061024&content_id=1722211&vkey=ps2006news&fext=.jsp&c_id=mlb>.

Broadcasting Cable Yearbook. 1980-2006. Washington, D.C.: Broadcasting Publications, Inc., 1980-2006.

Brown, Maury. "Expansion, not relocation, is Portland's ticket to MLB." Portland Business Journal. November 16, 2007. April 20, 2008. <http://portland.bizjournals.com/portland/stories/2007/11/19/editorial3.html>.

Cave, Martin and Robert W. Crandall. "*Sports Rights and the Broadcast Industry*." The Economic Journal, February 2001, p.F4-F26.

Dictionary of Marketing Terms. "Area of Dominant Influence (ADI)." 3rd Edition. Barron's Educational Series, Inc., 2008.

Forbes.com. "The Business of Baseball." *Forbes.com*. 4/16/08. 4/16/08. <http://www.forbes.com/lists/2008/33/biz_baseball08_The-Business-Of-Baseball_Rank.html>.

Fort, Rodney D. Sports Economics. New Jersey: Pearson Education, Inc. 2003.

Hoovers.com. "Major League Baseball." Hoovers, Inc. 4/01/2008.

<http://www.hoovers.com/major-league-baseball/--ID__40293--/free-co-factsheet.xhtml>.

Mei, Jianping and Michael Moses. "*Art as an Investment and the Underperformance of Masterpieces.*" The American Economic Review, Volume 92 (Dec. 2002), No. 5, p.1656-1668.

Millson, Larry. *"Ballpark figures: The Toronto Blue Jays and the Business of Baseball."* Toronto: McClelland & Stewart, 1987.

Quirk, James and Rodney Fort. Pay Dirt: The Business of Professional Team Sports. Princeton, NJ: Princeton University Press, 2002.

Scully, Gerald W. The Business of Major League Baseball. Chicago, IL: The University of Chicago Press, 1989.

Sports Business News. "Going Inside MLB's latest $3 billion TV agreements." *Sports Business News.* 7/13/2006. 4/20/2008. <http://www.sportsbusinessnews.com/_news/news_347260.php>.

Television Factbook. Volumes 25-50. Washington, D.C.: Television Digest, Inc., 1959-2006.

United States. U.S. Department of Commerce, Bureau of the Census. County and City Data Book. Washington, D.C. 1952-2007.

U.S. Bureau of Labor Statistics, Division of Consumer Prices and Price Indexes. bls.gov. April 10, 2008. <http://www.bls.gov/CPI/>.

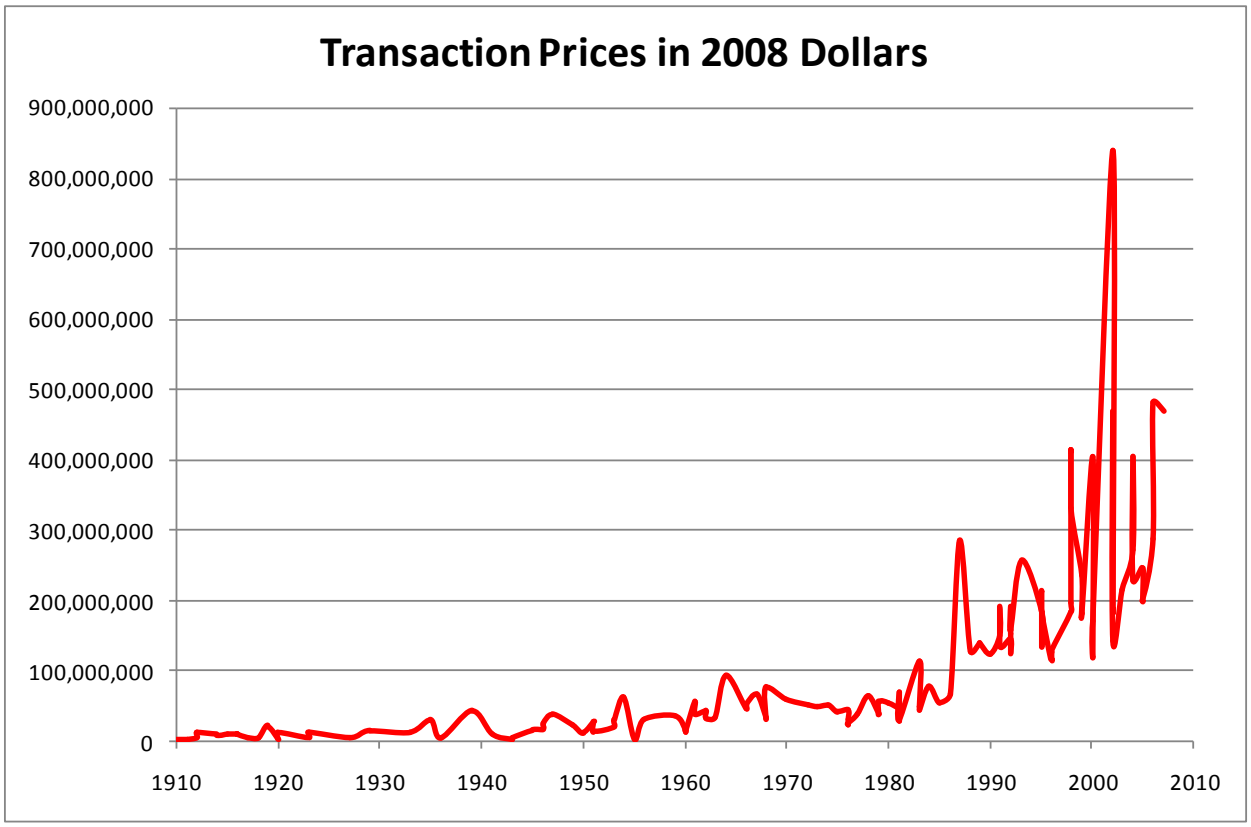
Walker, James R. and Robert V. Bellamy Jr. "*Baseball on Television*." NINE, Vol. 11.2, pp.1-15.

Zimbalist, Andrew. Baseball and Billions. New York, NY: Basic Books, A division of HarperCollins Publishers, Inc., 1992.

Appendices

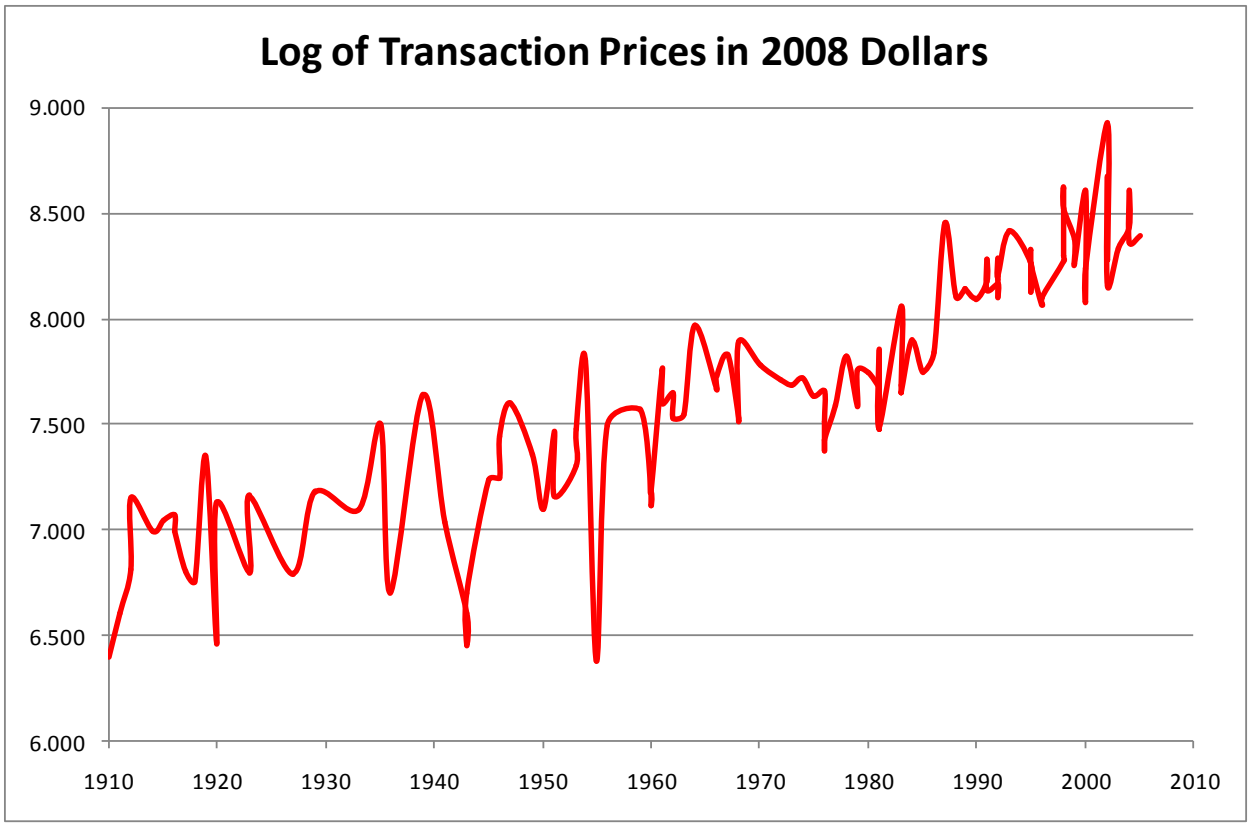
Appendix #1

Chart of transaction prices in 2008 dollars. (1910-2007)



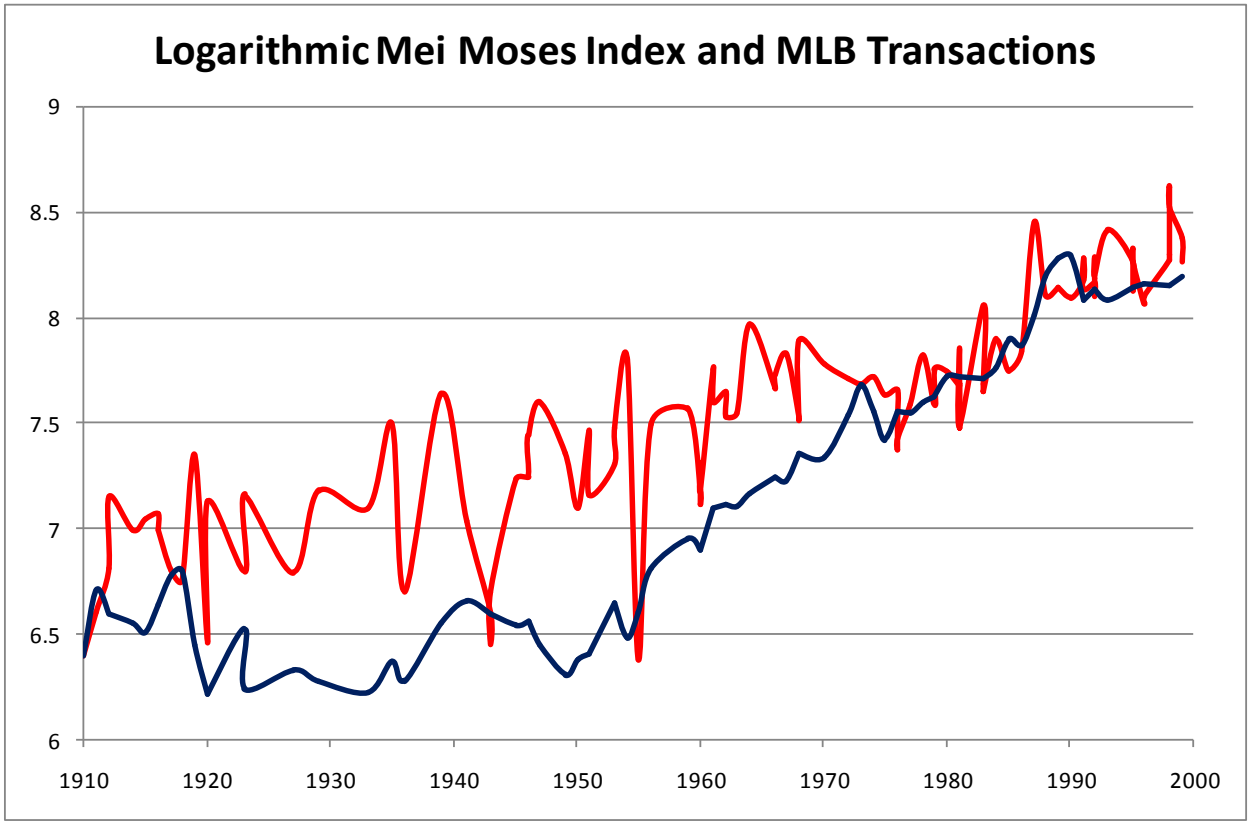
Appendix #2

Chart of the Log of transaction prices in 2008 dollars. (1910-2007)



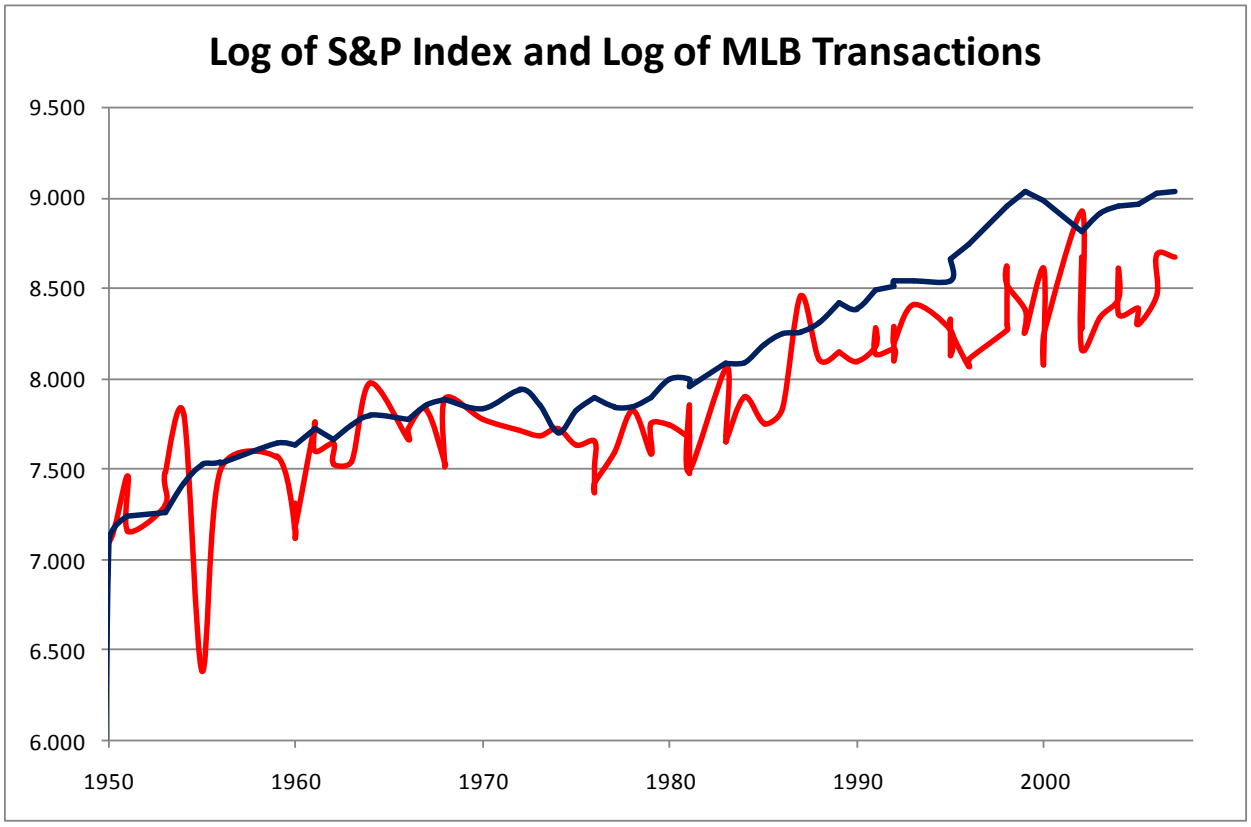
Appendix #3

Chart of the log of transaction prices and the Log of the Mei Moses Index. Transaction prices in red and the Mei Moses Fine Art Index in blue. (1910-1999)



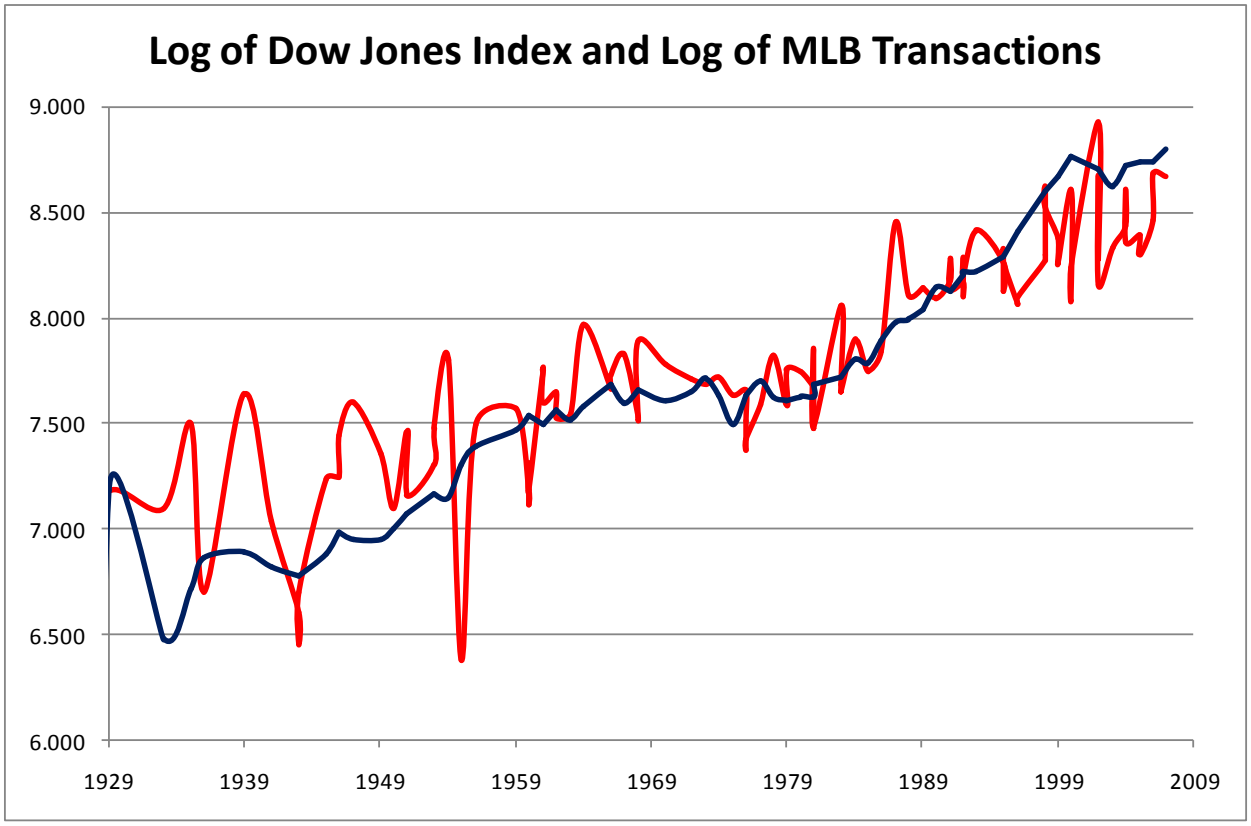
Appendix #4

Chart of the Log of transaction prices and the log of the S&P 500. Transaction prices in red and the S&P 500 Index in blue. (1950-2007)



Appendix #5

Chart of the Log of Dow Jones and the Log of transaction prices. Transaction prices in red and the Dow Jones Industrial Index in blue. (1929-2007)



Appendix #6

Below is the regression for the time period 1910-2008.

Regression Analysis: Log (Price i versus Years since , Log, Broadcasting

```
The regression equation is
Log (Price in 2008) = 6.69 + 0.0156 Years since 1910 + 0.0141 Log
                      + 0.000000 Broadcasting Estimates


Predictor                     Coef     SE Coef       T      P
Constant                   6.69490     0.05962  112.29  0.000
Years since 1910          0.015592    0.001262   12.36  0.000
Log                       0.014147    0.006439    2.20  0.030
Broadcasting Estimates  0.00000002  0.00000002    0.89  0.376


S = 0.265328   R-Sq = 79.5%   R-Sq(adj) = 79.0%


Analysis of Variance

Source           DF      SS      MS       F      P
Regression        3  32.493  10.831  153.85  0.000
Residual Error  119   8.377   0.070
Total           122  40.871


Source                  DF  Seq SS
Years since 1910         1  32.030
Log                      1   0.407
Broadcasting Estimates   1   0.056


Unusual Observations

             Log
     Years  (Price
     since      in
Obs   1910   2008)     Fit  SE Fit  Residual  St Resid
 24   33.0  6.6070  7.2094  0.0337   -0.6024     -2.29R
 25   33.0  6.4570  7.2094  0.0337   -0.7524     -2.86R
 38   45.0  6.3830  7.3965  0.0334   -1.0135     -3.85R
 41   50.0  7.1850  7.5804  0.1105   -0.3954     -1.64 X
 50   54.0  7.9710  7.6267  0.0929    0.3443      1.39 X
 59   63.0  7.6860  7.7739  0.1000   -0.0879     -0.36 X
 70   70.0  7.7420  8.0570  0.0928   -0.3150     -1.27 X
111   92.0  8.9240  8.3265  0.0395    0.5975      2.28R
113   92.0  8.6710  8.4151  0.0997    0.2559      1.04 X

R denotes an observation with a large standardized residual.
X denotes an observation whose X value gives it large influence.
```

Appendix #7

Below is the regression for the time period 1959-2007.

Regression Analysis: Log (Price i versus Years since , Log, Broadcasting

```
The regression equation is
Log (Price in 2008) = 7.13 + 0.0298 Years since 1959 - 0.00689 Log
                      + 0.000000 Broadcasting Estimates


Predictor                     Coef     SE Coef       T      P
Constant                   7.13059     0.03711  192.14  0.000
Years since 1959          0.029835    0.002556   11.67  0.000
Log                      -0.006885    0.008020   -0.86  0.392
Broadcasting Estimates  0.00000005  0.00000002    2.78  0.006


S = 0.273776   R-Sq = 78.2%   R-Sq(adj) = 77.6%


Analysis of Variance

Source           DF      SS      MS       F      P
Regression        3  31.951  10.650  142.09  0.000
Residual Error  119   8.919   0.075
Total           122  40.871


Source                  DF  Seq SS
Years since 1959         1  31.369
Log                      1   0.005
Broadcasting Estimates   1   0.578


Unusual Observations

             Log
     Years  (Price
     since      in
Obs   1959   2008)     Fit  SE Fit  Residual  St Resid
  1    0.0  6.3950  7.1306  0.0371   -0.7356     -2.71R
 13    0.0  6.4640  7.1306  0.0371   -0.6666     -2.46R
 25    0.0  6.4570  7.1306  0.0371   -0.6736     -2.48R
 37    0.0  7.8020  7.1306  0.0371    0.6714      2.48R
 38    0.0  6.3830  7.1306  0.0371   -0.7476     -2.76R
 41    1.0  7.1850  7.4938  0.1153   -0.3088     -1.24 X
 50    5.0  7.9710  7.5625  0.0963    0.4085      1.59 X
 59   14.0  7.6860  7.8528  0.1036   -0.1668     -0.66 X
 70   21.0  7.7420  7.9972  0.0984   -0.2552     -1.00 X
107   40.0  8.2610  8.3240  0.0931   -0.0630     -0.24 X
110   41.0  8.2340  8.3538  0.0955   -0.1198     -0.47 X
113   43.0  8.6710  8.6987  0.1021   -0.0277     -0.11 X
114   43.0  8.1580  8.4135  0.1003   -0.2555     -1.00 X

R denotes an observation with a large standardized residual.
X denotes an observation whose X value gives it large influence.
```

Appendix #8

Regression for the time period 1985-2007.

Regression Analysis: Log (Price i versus Years since , Log, Broadcasting

```
The regression equation is
Log (Price in 2008) = 7.28 + 0.0423 Years since 1985 + 0.0347 Log
                      + 0.000000 Broadcasting Estimates


Predictor                    Coef     SE Coef       T      P
Constant                  7.28265     0.04123  176.62  0.000
Years since 1985         0.042307    0.005791    7.31  0.000
Log                      0.034705    0.007479    4.64  0.000
Broadcasting Estimates  0.00000006  0.00000002    2.75  0.007


S = 0.333119   R-Sq = 67.7%   R-Sq(adj) = 66.9%


Analysis of Variance

Source           DF       SS      MS      F      P
Regression        3  27.6655  9.2218  83.10  0.000
Residual Error  119  13.2053  0.1110
Total           122  40.8708


Source                  DF   Seq SS
Years since 1985         1  22.8630
Log                      1   3.9653
Broadcasting Estimates   1   0.8372


Unusual Observations

              Log
     Years  (Price
     since      in
Obs   1985   2008)     Fit  SE Fit  Residual  St Resid
  1    0.0  6.3950  7.2826  0.0412   -0.8876     -2.69R
  2    0.0  6.6100  7.2826  0.0412   -0.6726     -2.03R
 13    0.0  6.4640  7.2826  0.0412   -0.8186     -2.48R
 24    0.0  6.6070  7.2826  0.0412   -0.6756     -2.04R
 25    0.0  6.4570  7.2826  0.0412   -0.8256     -2.50R
 38    0.0  6.3830  7.2826  0.0412   -0.8996     -2.72R
 41    0.0  7.1850  7.6829  0.1379   -0.4979     -1.64 X
 50    0.0  7.9710  7.6220  0.1168    0.3490      1.12 X
 59    0.0  7.6860  7.6482  0.1258    0.0378      0.12 X
 70    0.0  7.7420  8.0822  0.1226   -0.3402     -1.10 X
 88    6.0  8.2810  7.5365  0.0514    0.7445      2.26R
113   17.0  8.6710  8.8577  0.1288   -0.1867     -0.61 X

R denotes an observation with a large standardized residual.
X denotes an observation whose X value gives it large influence.
```

Appendix #9

Regression for the time period 1990-2007.

Regression Analysis: Log (Price i versus Years since , Log, Broadcasting

```
The regression equation is
Log (Price in 2008) = 7.30 + 0.0475 Years since 1990 + 0.0454 Log
                      + 0.000000 Broadcasting Estimates


Predictor                    Coef     SE Coef       T      P
Constant                  7.29790     0.04354  167.61  0.000
Years since 1990         0.047525    0.008077    5.88  0.000
Log                      0.045411    0.007379    6.15  0.000
Broadcasting Estimates  0.00000006  0.00000002    2.37  0.020


S = 0.352868   R-Sq = 63.7%   R-Sq(adj) = 62.8%


Analysis of Variance

Source           DF       SS      MS      F      P
Regression        3  26.0534  8.6845  69.75  0.000
Residual Error  119  14.8174  0.1245
Total           122  40.8708


Source                  DF   Seq SS
Years since 1990         1  18.3368
Log                      1   7.0193
Broadcasting Estimates   1   0.6973


Unusual Observations

              Log
     Years  (Price
     since      in
Obs   1990   2008)     Fit  SE Fit  Residual  St Resid
  1    0.0  6.3950  7.2979  0.0435   -0.9029     -2.58R
 13    0.0  6.4640  7.2979  0.0435   -0.8339     -2.38R
 25    0.0  6.4570  7.2979  0.0435   -0.8409     -2.40R
 38    0.0  6.3830  7.2979  0.0435   -0.9149     -2.61R
 41    0.0  7.1850  7.6644  0.1466   -0.4794     -1.49 X
 50    0.0  7.9710  7.6086  0.1242    0.3624      1.10 X
 59    0.0  7.6860  7.6327  0.1338    0.0533      0.16 X
 70    0.0  7.7420  8.1923  0.1262   -0.4503     -1.37 X
 88    1.0  8.2810  7.3454  0.0439    0.9356      2.67R
 89    1.0  8.1340  7.3454  0.0439    0.7886      2.25R
113   12.0  8.6710  8.8148  0.1363   -0.1438     -0.44 X

R denotes an observation with a large standardized residual.
X denotes an observation whose X value gives it large influence.
```

Appendix #10

Below is a regression for mock transactions, as if every team had transacted in the last five years. Analysis is for 1910-present.

Regression Analysis: Log (Price i versus Years since , Log, Broadcasting

```
The regression equation is
Log (Price in 2008) = 6.64 + 0.0168 Years since 1910 + 0.0151 Log
                      + 0.000000 Broadcasting Estimates


Predictor                     Coef     SE Coef       T      P
Constant                   6.64334     0.05682  116.92  0.000
Years since 1910          0.016823    0.001153   14.59  0.000
Log                       0.015121    0.006132    2.47  0.015
Broadcasting Estimates  0.00000002  0.00000002    1.29  0.198


S = 0.261618   R-Sq = 83.7%   R-Sq(adj) = 83.3%


Analysis of Variance

Source           DF      SS      MS       F      P
Regression        3  49.806  16.602  242.56  0.000
Residual Error  142   9.719   0.068
Total           145  59.525


Source                   DF  Seq SS
Years since 1910          1  49.166
Log                       1   0.525
Broadcasting Estimates    1   0.115


Unusual Observations

              Log
     Years  (Price
     since      in
Obs   1910   2008)     Fit  SE Fit  Residual  St Resid
 12    9.0  7.3510  6.7947  0.0485    0.5563      2.16R
 24   33.0  6.6070  7.1985  0.0329   -0.5915     -2.28R
 25   33.0  6.4570  7.1985  0.0329   -0.7415     -2.86R
 38   45.0  6.3830  7.4004  0.0320   -1.0174     -3.92R
 41   50.0  7.1850  7.6212  0.0996   -0.4362     -1.80 X
 50   54.0  7.9710  7.6677  0.0843    0.3033      1.22 X
 59   63.0  7.6860  7.8280  0.0912   -0.1420     -0.58 X
 70   70.0  7.7420  8.1329  0.0833   -0.3909     -1.58 X
 73   71.0  7.4790  8.0491  0.0372   -0.5701     -2.20R
 75   71.0  7.4890  8.0255  0.0381   -0.5365     -2.07R
113   92.0  8.6710  8.5224  0.0891    0.1486      0.60 X
137   98.0  9.1160  8.5970  0.0700    0.5190      2.06R

R denotes an observation with a large standardized residual.
X denotes an observation whose X value gives it large influence.
```