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The Decline in Average Weekly Cinema Attendance: 1930 -2000

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Since the beginnings of the motion picture industry, with the one small Edison studio in New Jersey in the early 1900's, America has fallen in love with films. One could argue and debate the reasons why, employing everything from sociology to psychology to economics; but one thing is certain – this love affair has changed over the years. This change is perhaps most evident in the decline in the percentage of the United States population that goes to the cinema weekly. One interesting aspect of cinema attendance is that during the Great Depression, which swept the United States in the 1930's, a higher percentage of the population went to the cinema each week than during the times of economic expansion and great prosperity the U.S. has seen since (Finler 288, MPAA). What has brought about such a change in Americans' sentiments about going to the cinema that is reflected in such a decline in cinema attendance? In 1930 (the earliest year from which accurate and credible data exists), weekly cinema attendance was 80 million people, approximately 65% of the resident U.S. population (Koszarski 25, Finler 288, *U.S. Statistical Abstract*). However, in the year 2000, that figure was only 27.3 million people, which was a mere 9.7% of the U.S. population (MPAA, *U.S. Statistical Abstract*). If one simply considers the raw numbers (see appendix), that is a steep decline in seventy years, which is more astounding when one considers some of the other circumstances of the times.

Why exactly has there been such a decline in movie theater attendance? Is it the result of an increase in admission prices? Is it the result of an increase in the number of screens available nationwide and their accessibility? Or is it the result of an increase in the prevalence of other, alternative forms of entertainment, like television?

Ultimately, it would seem that there are a number of factors that are behind such a dramatic decrease in film attendance. Furthermore, the hope is to be able to make some determinations about the waning attendance in order to help the industry get a better sense of what is responsible for the decline and how they may take appropriate actions to slow or even reverse the decline in attendance. While a lot of these factors undoubtedly played a role in the decline in average weekly cinema attendance, the expectation is that the single most influential factor is the advent of television and the increase in the number of televisions in households across the United States.

2. Background

From the dawn of the moving image and the first films to the immensely popular films of subsequent decades, Hollywood quickly took its place among other forms of entertainment.[1] From its earliest days, the motion picture industry had huge "money making potential" and one of the most important aspects of that business was the distribution center or cinema (Wenden 88-89). During the Depression, cinemas provided an escape from life and the plague of problems that accompanied it in the tough time. A major function of the cinema was a source of entertainment and a way for people to forget their troubles with stories that almost always had "happy endings." (Bohn 208). After all, films at the local cinema very rarely depicted the unpleasant realities about life in America during those times (Cook 443).[2] Hollywood's role during the Depression continued on through the years of World War II and Post-War America. During World War II, Hollywood's tasks grew from just entertaining the home front to keeping people well informed; after all, aside from newspaper photographs, news reels shown at the cinema were often the only visual representation people had of the War (Bohn 223). Film attendance continued to grow and to be strong throughout this Era. Between 1942 and 1945,

Americans spent 23% of their total recreation dollar on films (compared to 2% today) (Bohn 223).[3] Weekly attendance in 1946 was more than 90 million (Bohn 236). However, these record setting years were not to last forever.

Many scholars of the film industry point to two major events that occurred shortly after World War II's end that caused cinema attendance to decrease dramatically – anti-trust action and the birth of television (Bohn 236).[4] Studios no longer were permitted to own huge theater chains and control both the production and distribution aspects of the industry, so more competition naturally evolved and the studios lost a major source of revenue which forced them to cut back on production (Bohn 236). However, the single most profound cause, according to many sources of the decline in cinema attendance was the birth of a comparatively small device called a television set.

Television would forever change the notion of entertainment in homes. This new form of entertainment had been around in experimental form since the early 1920's; however, World War II delayed its release for commercial use and greatly inhibited it from spreading quickly (Bohn 239). In just a short time, the number of households with televisions increased dramatically. In 1950, 3.9 million households had televisions and in just five years that number was 30.7 million households. That reflects an 87% increase in that short time span; and this figure has steadily increased since then. However, the decline in attendance began in the late 1940's – just a few years before television ownership became truly widespread and this leaves some with a good deal of confusion (Monaco 40). There are those who argue that this decline initially started with urban sprawl and suburbanization since most cinemas were in urban areas, and was only later fueled by the rise of television (Monaco 40). Many of those in the motion picture industry were very hostile to this new form of entertainment. It is easy to understand the

threat television posed to cinemas and thus the big motion picture studios did all they could to resist television, initially (Bohn 239). Television viewing in one's own home was much more convenient than going out to a theater, and once the television was purchased (in those days one cost between $400 and $500) the evening's enjoyment was 'free.' (Bohn 239). However, the motion picture industry was left scarred forever by this event.

Maybe one of the most radical things that changed about cinemas since the birth of television was the multiplex. Up until the late 1960's and early 1970's, cinemas typically had one screen and the occasional cinema had two. Clearly this limits the times at which people can see a given film. Consider that if a new movie came out that many people wanted to see but the local cinema had only one screen. Thus, a person had few options, as far as times, so it would take longer for people to see the film even though each showing probably had a significant size audience. It makes sense that such a scenario would keep the cinema full week after week until everyone who wanted to see the film did – extending the life of the film.

Ultimately, multiplexes were born out of this and cinemas could offer more showings of a given film.[5] Now cinemas began to have four screens, then six screens until ones with fifteen screens were built. Now it is common to see cinemas with over twenty screens so that multiple screens can show a given film at a variety of times (Pristin 1). Clearly, more screens would be more likely to impact on weekly cinema attendance. Particularly in the 1990's, multiplexes have been built at a "frenzied pace." (Pristin 1). In 1990, there were 23,689 screens nationwide; by 2000 there were 37,396. In ten years, 13,707 screens were added – no other decade saw an increase that large.

The cinema chains, as well as the rest of the motion picture industry, are feeling the negative impacts of the building boom. Cinemas are closing in record numbers because they are

not the new, state-of-the-art facilities with stadium seating and other new amenities and therefore cannot compete. As many as 10,000 locations are poised to close in 2001, which will cost the cinema chains enormous amounts of money (Levy 1). In order to keep up with competition, cinema chains are forced to build new multiplexes that cost millions while other sites are still operating and losing money but cannot close due to long-term leases and contracts. Eight of the major chains, including Loews, United Artists, General Cinemas, and Carmike Cinemas, have declared bankruptcy recently (Levy 1).

Industry analysts contend that these multiplexes are floundering because when a new movie opens, everyone who wants to see it, does so in the first few days, rather than the first few weeks, because a 20-plex will probably have three or four screens of the same movie, so rarely does a film sell out because a movie-goer has a plethora of times to choose from (Levy 2). This thwarts patrons from seeing other films and ultimately decreases cinema revenue. Furthermore, adding huge multiplexes creates higher overhead costs. It cost Regal Cinemas $425 million in 1999 to add a mere 867 screens (Grover 99). With incredibly high overhead costs, cinemas are dramatically increasing prices. Average admission prices have increased, from $2.69 in 1980 to $5.39 in 2000. These higher prices, particularly in metropolitan areas, are deterring people from the cinema altogether. The problem is further compounded by old Hollywood practices that stipulate that the studio gets as much as 90% of the revenue of ticket sales the first week with the percentage decreasing in future weeks to about 50% (Grover 99). Of course the problem for cinema chains is that attendance in future weeks is minimal. The bottom line is that cinema chains "have gone overboard trying to lure couch potatoes to the movies. Spending on multiplexes has jumped faster than the growth in moviegoers – and even much reviled ticket prices, as high as $9.50, don't pick up the slack." (Grover 99).

All in all, current weekly cinema attendance is hurt due to the huge influx in the number of screens and the average admission price. Hollywood claims that revenues are up substantially in the last five years, but that is studio revenue and not theater revenue (Alexander 1). After all, the greatest share of revenue for the studio comes from home video sales and rentals, not the cinema. The additional revenue that studios are boasting that comes from the cinemas is not due to an increase in attendance anyway; it is due to an increase in ticket prices (Alexander 1). Furthermore, with attendance lower, fewer people purchase concession items, which is the main source of revenue for cinema chains.

Essentially, there have been three phases for the cinema: the birth of the cinema, the age of television, and the multiplex era. Only during the first era did cinema attendance increase. During the latter two eras, cinema attendance has decreased – particularly substantially when one considers the percentage of the U.S. population. The birth of television explains the decrease in the 1950's and 1960's while the multiplex and other windows of distribution explain the decline in recent decades. Despite the fact that the data analysis does not clearly support the argument about the total number of screens, it seems more than believable that this factor is largely responsible for the decrease in attendance, in combination with televisions and VCRs, recently. Intuitively, this overview of cinema's history provides some explanation, however, such an explanation requires data analysis to be validated.

3. The Model

The first step in coming to any understanding of this complex question is to determine which of the factors should be considered and then obtain data for each. Due to a variety of constraints, including the difficulty in finding accurate data on some things, the following variables were selected for review between 1930 and 2000: total number of screens in the U.S.,

the number of feature films released each year, the average admission price adjusted for inflation, real gross domestic product (GDP), and the number of households with one or more televisions. [6,7] Essentially, through the examination of these different variables, the hope is to be able to estimate a demand function for weekly cinema attendance and determine what variables have truly impacted the decline in cinema attendance.

(1) *Average Weekly Cinema Attendance = f(total screens, number of features released, average admission price, real GDP, number of households with televisions)*

First, consider each of the variables selected for examination and how each could affect cinema attendance. The total number of screens is important because it factors in the availability of cinemas. As previously discussed, multiplexes have lead to the dramatic increase in the number of screens in the United States. Essentially, if there are more screens around, it is theoretically easier for people to go to the cinema because there are simply more available. Therefore, with the increase in the number of screens, the expectation is that there would be a positive relationship between average weekly cinema attendance and the number of screens.

The next variable under consideration is the number of feature films released each year. By including this variable, one is able to take into account the number of films each person has the potential to attend. Think of it this way, if there is a smaller pool of films for a moviegoer to pick from, they are probably going to attend the cinema proportionately less because there is a smaller selection for them to pick from. Thus, one would predict that there is a positive relationship between the number of films released and average weekly attendance – essentially the more films that are released would increase attendance because of the sheer number of films to pick from.

Another important variable is the average admission price (in U.S. dollars).[8,9] Particularly in recent years there has been a lot of discussion about the increasing price of admission. What is interesting to consider, however, is that when the average admission price is adjusted for inflation, it is actually not as high now as it was in the 1970's, for instance. In terms of the regression results, one would expect a negative relationship between average weekly cinema attendance and average admission price, keeping with the law of demand.

Real gross domestic product (GDP) (in billions) is used as a measure of the overall state of the economy and to account for income fluctuations. It is obvious that income and the state of the economy could easily have an impact on cinema attendance. If the economy is doing well, on average more people are likely to be better off and may spend more of their money and time on recreation, including the cinema. Essentially, this variable will account for the income effect. Therefore, the relationship between real GDP and average weekly attendance is expected to be positive.

The last variable that is considered is the number of households that have at least one television (in millions of households).[10] Clearly, as discussed earlier, television since its release, has been a competitor with the cinema and can easily be considered a substitute form of entertainment.[11] Therefore, it is important to consider how the rise in household television ownership may affect cinema attendance. Essentially, as television ownership grows, one would expect to see cinema attendance fall – thus there would be a negative relationship between the two. Furthermore, the expectation is that this variable will be the most significant of all the variables. Given the hypothesis regarding the dramatic impact of television on average weekly cinema attendance, the results of the regression equation should yield a significant relationship between the percentage of the US population that on average went the cinema each week and the

number of households with at least one television. Furthermore, this relationship should be negative indicating that as the number of households with televisions went up, cinema attendance decreases.

4. Data Analysis

Multiple regression analysis was used to assess whether any of these variables alone, or coupled with others in various combinations explains the decrease in cinema attendance. Based upon the results of the regressions, it can be determined if the variables in question are even significant explainers of the decline in the percentage of the population that went to the cinema weekly. From there, if the factor is significant, one can make a determination about the relationship and whether or not it is positive or negative – that is to say whether or not when one goes up the other goes up and when one goes up the other goes down. These are just a few of the factors that will be examined when considering the regression data.

The first regression took the raw data and attempted to decipher any sort of relationship between the variables. The sample regression function, yielded the following results:

Table 1

Variable	ß	t-value
intercept	49.3339	5.67
total screens	0.0004	1.13
number of feature films released	-0.0139	-2.51
real GDP	0.0054	3.05
average admission price	-2.779	-2.22
households with Televisions	-0.750	-9.41

n=71

All of the variables, except total number of screens, proved to be significant at a 95% confidence level. While these results looked promising, examination of the adjusted R-squared value led one to worry. Adjusted R-squared reflected that 93% of the variation in weekly attendance was

explained in this regression and even though logic would indicate that this is good, it makes one concerned about whether or not autocorrelation may be impacting these results and indicating that they are more significant than they actually are. The results of a Durbin Watson test for autocorrelation clearly indicate that there is a significant problem with autocorrelation in this regression.[12] Therefore, modifications were needed in order to correct for this problem and get accurate results.

There were a number of steps taken to correct for autocorrelation. First the natural log of all the variables was taken with the exception of the number of households with televisions.[13] After taking the natural logs of the variables and utilizing the Cochrane-Orccutt procedure, autocorrelation was no longer a problem, however, results from a Goldfeld-Quant test indicated that heteroskedasticity was a problem.[14]

At this point in the research, the decision was made to utilize generalized least squares to hopefully correct for heteroskedasticity. The suspected cause of heteroskedasticity was the number of feature films released, so the natural logs of the variables, including the dependent variable, were taken and then all the variables were divided by the square root of the number of feature films released.[15] The Cochrane-Orccutt procedure was used to correct for autocorrelation as well. The generalized least squares regression yielded:[16]

Table 2

Variable	ß	t-value
Intercept	-9.7	-2.03
ln (total screens)	0.5849	4.62
ln (number of feature films released)	-0.3053	-2.03
ln (real GDP)	0.1554	1.42
ln (average admission price)	-0.6744	-5.27
Households with Televisions	-0.0184	-9.86

n=71 $R^2=0.9991$

One thing that is interesting to note with the results in Table 2 is that if nothing else changes, attendance will decline, indicating that there is a downward trend in the percentage of the US population that attend the cinema weekly. In the regression function from Table 2, the only variable that was not found to be significant at a 95% level was real GDP.[17,18] The Durbin-Watson test for autocorrelation indicated that it was no longer a problem in this regression.[19] Furthermore, a scatter plot of the residuals against the number of feature films released (see appendix) clearly demonstrates that the residuals are stochastic and heteroskedasticity is no longer a problem either. A Jarque-Bera test was conducted to determine whether or not the residuals were normal and the residuals were found to be normal.[20]

5. Interpretations and Implications

These analyses have helped gain a better understanding of the dramatic decline of average weekly cinema attendance in the United States since 1930. The regression equation was formulated based on a selection of variables thought to have some impact on cinema attendance. The results from Table 2 indicate that the variables selected have, for the most part, a huge impact on the in attendance. As the number of screens increases by one percent in the US, film attendance increases by 0.58 percent. This relationship makes sense based on the theory and background previously discussed in that more screens means more availability for people to have the opportunity to see films. The number of feature films released has a negative impact on attendance, which is contrary to initial thought. If the number of films increases by one percent, there is a 0.30 percent decrease in the percentage of the population that attends the cinema weekly on average. Thus, it would seem that the increase in the number of films to choose from could end up hurting attendance because of the fact that there are simply too many films to choose from at the cinema. Real GDP has no significant impact on cinema attendance. Average

admission price was shown to have the strongest negative relationship with attendance figures and this too makes sense given that as prices rise, weekly attendance declines. Lastly, when the number of households with televisions increases, the attendance rate decreases which makes sense considering that televisions are alternative forms of entertainment and would conceivably detract from cinema's audience. Most of the results, at least this point in the interpretation, make logical sense based upon the background discussed previously.

The results indicate that there were a number of variables that proved to significantly affect weekly attendance. They indicate that television was not mostly responsible for the decline in cinema attendance. Clearly this is in contrast to the hypothesis that was initially made based upon other sources. The regression results indicate that multiple factors impacted the decline in cinema attendance including average admission price, total screens, the number of feature films released, and households with televisions. However, the number of households with televisions still has a significant impact on the decline of cinema attendance, as does the number of feature films released.

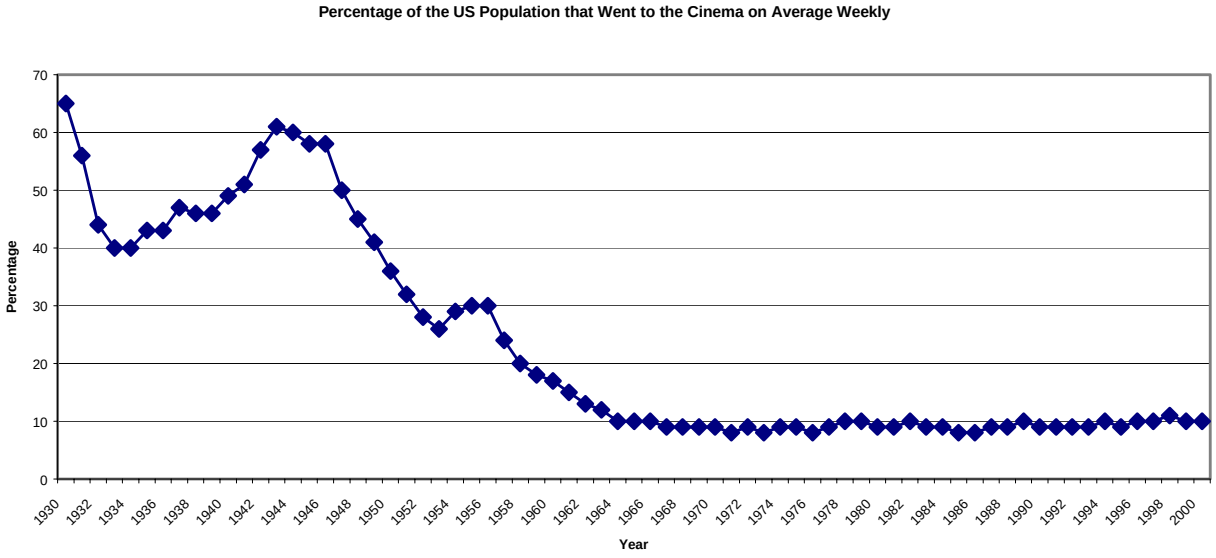
Results also indicate something somewhat surprising – that there is price inelasticity for admission to the cinema. Obviously this means that there is no incentive for cinema chains to keep admission prices stable. This is interesting because admission price is one of the factors that have significantly lead to the decline in attendance. What is even more fascinating is that Hollywood studios are seeing rises in revenue while cinema chains are declaring bankruptcy. The reasons for this are simple; the old Hollywood pricing structure. When a film is released, the studio that produced that film gets a percentage of the revenue from the cinema and the percentage is usually very high in the initial weeks of release and then the percentage decreases as the weeks the film is in release progress (Grover 99). The cinema gets a higher percentage of

the proceeds the longer the film is in release. Therefore, cinema chains lose money if the film is only in release for a short period of time whereas studios are not financially hurt nearly as much. Based on this information, it would seem that cinema chains need to re-negotiate the profit structure of films in order to keep themselves in a more lucrative financial position.

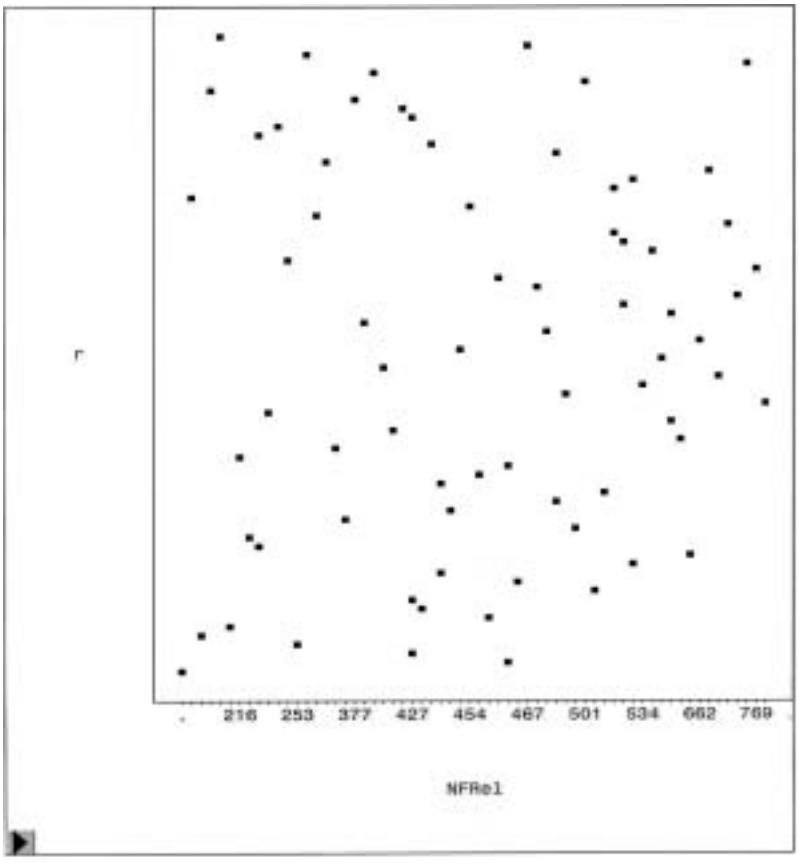
However, one must look at the decline in cinema attendance from a broad perspective so that one can see the numerous factors that have led to the decline in attendance. It is important to remember that while some of the factors that have impacted the decline are easily quantified, some are not – such as changes in attitudes regarding film, changing quality of film, and so forth. What this research shows is that there are a number of things that have tremendously affected average weekly cinema attendance in the U.S. and it is not as clear, which has had the most profound effect because many have significant effects.

While cinema attendance has clearly declined over the last seventy years in the U.S., the motion picture industry is still 'big business' and continues to set new records both in terms of production as well as box office sales – [21]clearly Hollywood knows how to keep going despite all of these factors that have negatively impacted attendance. "Though Hollywood was never to recover its immediate postwar status or to recapture its once vast audiences from television, in the decade of the fifties it adapted, counterattacked, and – as always – survived." (Cook 460). Undoubtedly, the motion picture industry, unlike so many others, knows how to keep going and continue to attract millions to the cinema each week.

Appendix



Residuals Plot



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Notes

[1] In 1930, cinema's share of every one dollar spent on entertainment was 18.4 cents and from there it only dramatically increased (Finler 34).
[2] Some of the classic genres emerged during this time, such as the spectacular musicals of Busby Berkley, the gangster genre, and the "feel good" movies of director Frank Capra (Bohn 208).
[3] Another way of looking at it is that for every one dollar spent on entertainment in 1945, 23.6 cents went to the cinema (Finler 34).
[4] The studio system of the 1930's and 40s came to an end when the monopolies and vertical integration that was the Industry came to a staggering halt with a 1948 Supreme Court ruling known as the 'Paramount Decree' (Finler 287).
[5] The multiplex was a concept that came from Europe in the mid-1970's along with the advent of huge, suburban malls ("AMC in Row for…"). This type of cinema was initially started by AMC, one of the largest and most economically stable of the huge cinema chains in the United States.
[6] Data from before 1930 is considered to be *highly* unreliable and was therefore not included, however cinemas had been around quite some time before 1930.
[7] Data Sources: Average Weekly Cinema Attendance – *US Statistical Abstracts, The Hollywood Story,* Motion Picture Association of America (MPAA), and Screen Source; total screens - *The Hollywood Story*, MPAA, and Screen Source; number of features released annually - *The Hollywood Story*, MPAA, and Screen Source; average admission price - *The Hollywood Story, Entertainment Industry Economics,* MPAA, Screen Source, and US Bureau of Labor – Statistics Website; real GDP – US Department of Commerce, Bureau of Economic Analysis; number of households with televisions - *The Hollywood Story,* MPAA, and 1986-2000 estimated based on growth rates of previous years.
[8] Average admission price is an average of all the discounts plus regular adult admission (e.g. bargain matinees, children's prices, student discounts, senior citizen discounts, etc.)
[9] The average admission price data that was found was not adjusted for inflation so such adjustments were made in the process of this research project. Consumer Price Index (CPI) with a chained base year of 1996 was used to make such calculations.
[10] Data was not available for television household ownership for all the years under consideration so some estimations had to be made in order to have a complete data set. Based on the trend and the growth rates concerning television ownership in previous years, estimations were made for television households for 1981 and 1986 through 2000.
[11] Television was the only variable selected as a substitute for going to the cinema because it has the most observations within the time period under study. Other substitute forms of entertainment, such as VHS tapes, were not widely available until the mid-1980's and thus would only contribute observations to the last fifteen or so years of the time period whereas televisions have been widely available since 1950, providing 50 years of observations. Also, other forms of entertainment, such as music, were not considered because it was felt that they were not perfect substitutes for going to the cinema.
[12] The Durbin-Watson d=0.333, which clearly fell in the rejection region when k=5 which meant that d_L=1.464. Clearly this demonstrated first order autocorrelation.

[13] The reason that the natural log was not taken for this variable is because between 1930 and 1950 data does not exist for the number of households with televisions since the few households that had televisions at this early stage would not have been statistically significant so zero is used as the value up until 1950. The natural log of zero would yield inaccurate results.
[14] The conclusion that heteroskedacticity was a problem was made based on the computation of λ=2.5113 and the critical F value=2.07; therefore one rejects the hypothesis that λ=1.
[15] The reason number of films released was suspected to be the cause of heteroskedacticity was due to scatter plots.
[16] Variables were divided by square root of the number of feature films released.
[17] The critical t-value at a 95% confidence level was 2.00.
[18] A partial F test was used to confirm the results that indicated real GDP was not a significant variable.
[19] The Durbin Watson d=1.6564, k=5, n=71, therefore d_L=1.464 and d_U=1.768. Therefore, the d value found falls into the "gray region," so it is acceptable to say that autocorrelation is not a problem.
[20] The JB value=22.8265, X^2 value was used as a critical value=79.0819; therefore fail to reject hypothesis that residuals are normal.