APPENDIX A

AND

APPENDIX B

FOR

PRODUCTIVITY GROWTH IN PERSONAL SERVICES FROM LAGGING TO LEADING: HOW MOTION PICTURES INDUSTRIALISED ENTERTAINMENT

APPENDIX A: ESTIMATING TFP-GROWTH

This section briefly discusses the data estimates made to calculate TFP-growth, the estimation of factor elasticities, value of human capital and the effect of international trade.

I. DATA ESTIMATES

Since the sectoral data are at times sparse and incomplete, especially for 1900, approximate estimates had to be made in some cases. Appendix B lists in detail how these estimates were arrived at. Most of the 1938 data is from the US Department of Commerce, the US Bureau of Labor Statistics and the Bureau of Economic Analysis (1977). The 1900 labor data are calculated from census figures, the 1900 consumer expenditure data is arrived at by combining the US Department of Commerce 1909 expenditure data with John Owen's (1970) growth rates on real US consumer expenditure on recreation. The 1900 price and capital estimates are based on expert estimates of theater historians and the contemporary trade press and directories. They have been made as conservatively as possible, by rounding them up or down in the direction that would diminish TFP-growth and social savings between 1900 and 1938, not unlike the way Robert Fogel (1964) estimated the social savings of US railways.

II. FACTOR ELASTICITIES

For motion pictures, between 1929 and 1947 the share of wages in national income was 0.78 on average and for other amusements and recreation 0.81 (table A-1). The latter category comprised

far more than live entertainment, which was just a small share of it, but further disaggregated national income data are not available. The 1930s data suggests a labor elasticity of about 0.80, but this value was affected considerably by the depression, which decreased the income share of capital. The shares in 1929 and 1930 and in the 1940s warrant a somewhat lower estimate of long-run income-share of 0.70.

For 1900, unfortunately no industry national income figures are available. If we multiply the employment with average national wages (as opposed to wages of entertainment workers), we arrive at a labor share of industry revenues of 0.66 in 1900, versus 0.52 in 1938. Given the estimated 1929-1947 capital costs and taking into account the effect of the depression it does not seem unreasonable to assume that the factor price of capital was 0.15 in 1900. Using 1900 benchmark estimates (Appendix B)—the labor share was then 0.81 in 1900. Both estimated suggest that the share of labor was somewhat higher in 1900 than in the 1930s. An average share of 0.75 for the whole period therefore does not seem unreasonable.

III. QUALITY OF HUMAN CAPITAL

The over-all average quality of US labor increased substantially between 1900 and 1938. Education, for example, improved from 6.38 years to 10.03 years per worker.[1] Further, with the film industry's ageing labor quality probably improved, because of an increasing number of employees who had been trained on the job. Since this is rather difficult to measure, the national increase in labor quality is used as a lower bound proxy.

[1] Calculated by geometric interpolation from the benchmark years 1890, 1913 and 1950. Maddison (1995): 37, 253.

TABLE A1
NATIONAL INCOME GENERATED BY THE MOTION PICTURE INDUSTRY AND 'AMUSEMENTS AND RECREATION' AND FACTOR INCOME SHARES

Year		Compensation of		Corporate	Other capital	L/NI
	NI	Employees	Capital	profits	income	
			MOTION PICTURES			
1929	440	310	130	59	71	0.70
1930	438	313	125	51	74	0.71
1931	361	307	54	2	52	0.85
1932	194	241	-47	-83	36	1.24
1933	210	227	-17	-40	23	1.08
1934	283	253	30	2	28	0.89
1935	329	282	47	13	34	0.86
1936	391	317	74	29	45	0.81
1937	437	360	77	33	44	0.82
1938	426	346	80	39	41	0.81
1939	434	353	81	41	40	0.81
1940	448	353	95	51	44	0.79
1941	513	386	127	78	49	0.75
1942	652	425	227	155	72	0.65
1943	830	477	353	253	100	0.57
1944	882	531	351	246	105	0.60
1945	929	573	356	238	118	0.62
1946	1129	703	426	304	122	0.62
1947	1046	719	327	224	103	0.69
Average						0.78
			AMUSEMENTS AND RECREATION — EXCEPT MOTION PICTURES			
1929	379	323	56	1	55	0.85
1930	336	299	37	-9	46	0.89
1931	268	256	12	-20	32	0.96
1932	177	191	-14	-30	16	1.08
1933	154	161	-7	-23	16	1.05
1934	197	176	21	-9	30	0.89
1935	211	180	31	-5	36	0.85
1936	253	205	48	2	46	0.81
1937	305	239	66	5	61	0.78
1938	266	216	50	2	48	0.81
1939	288	230	58	4	54	0.80
1940	310	246	64	9	55	0.79
1941	368	270	98	18	80	0.73
1942	388	281	107	18	89	0.72
1943	436	291	145	34	111	0.67
1944	507	337	170	42	128	0.66
1945	613	384	229	71	158	0.63
1946	816	524	292	93	199	0.64
1947	797	566	231	64	167	0.71
Average						0.81

SOURCE.—Bureau of Economic Analysis 1977.
NOTES.—NI = national income
Other capital income = proprietors' income, rental income, net interest.
L/NI = share of wages in national income. All other values in millions of current dollars.

IV. INTERNATIONAL TRADE

The net dollar revenues from US films abroad should be included in the national income, as calculated by the Bureau of Economic Analysis. Industry output, however, has been calculated by dividing domestic revenues by price. It is difficult to do this for export revenues, because precise data lack and also because ticket prices varied substantially across the world. If one assumes that about a third of US box office revenue went to distributors and one uses the expert ballpark estimate that the Hollywood studios' foreign earnings were about one third to one quarter of domestic revenues, then foreign income in 1938 would be about 1/9th to 1/12th of domestic expenditure, between $55 and $74 million.

The final output generated abroad, however, uses mainly foreign labor and capital and these are not included in the US figures. The only US share would be those from employees working in film production, about 33,000 in 1938, and those in international distribution, relatively negligible. Given the number of assumptions to be made, it seems most appropriate to ignore the foreign issue. Given that, for US producers, those foreign spectator-hours had marginal costs approaching zero, that the US economy did not consume that additional output, and given that that the dollars received for it were national income, it does not seem unreasonable to exclude foreign output. It will certainly make our TFP-estimate more conservative.

APPENDIX B: DATA USED FOR THE ESTIMATES[2]

This appendix provides the sources for the estimates on labor, capital and output. Since the available data are sparse, approximate estimates had to be made in some cases. The estimates have been made transparent and replicable by stating all the steps. They also have been made as 'conservative' as possible; they have been rounded up or rounded down in the direction that would diminish overall TFP growth between 1900 and 1938. For 1900 estimates for prices, labor and capital will have a downward bias, those for output an upward bias and vice-versa for 1938.

Table B-1 gives an overview of all the data used and estimates made.

I. ENTERTAINMENT IN 1900

A. Labor in 1900

1. The US census lists 57,777 persons classified under entertainment. These are only management and creative inputs, not the practical workers that worked in the entertainment industry.
2. In the 1910 census, which contains a disaggregated breakdown of these categories, 15.89 percent of the persons above were listed under classifications that largely involve non-theatrical entertainment, and which were not present in the 1900 census. It is simply

[2] This paper's estimates differ in five respects from those of Gerben Bakker (2004): the current paper takes into account the changes in hours worked; it has better price estimates based on more precise data; it has better capital data; and, finally, it is more accurate in the data on total consumer expenditure and in the size of the total entertainment labor force in 1938.

assumed that this percentage was the same in 1900, we arriving at 0.8411 x 57,777 = 48,596 persons classified under entertainment.

3. In 1930, for the first time, both practical workers classified in the census under entertainment (Census of Population, 1930) and practical workers working in entertainment but classified in the census under other industries (US Bureau of Economic Analysis, 1977) are available. Therefore this year will be used as a benchmark year. The census contained 203,251 persons working in spectator entertainment (249,177 – 6,097 aviators – 10,718 'keepers of pleasure resorts, race tracks etc.' – 29,129 'keepers of billiard rooms, dance halls, skating rinks etc.' = 203,251 persons). 31.1 percent of these had practical occupations. If we make the bold assumption that this percentage was the same in 1900, we arrive at (57,777/68.9)*100 = 70,532 persons working in the industry in 1900.

4. Data on workers classified in other industries but working for the entertainment industry are only available from 1930. Using the same method as will be used to calculate 1938 labor (see below), we arrive at 71,122 live entertainment fte in 1930, making a total of entertainment fte of 153,000 for film and 71,122 = 224,122 fte, suggesting that 20,871 persons, or 10.3 percent of the census total, were classified under non-entertainment occupations. Assuming that this percentage was the same in 1900, we arrive at 1.1026 * 70,532 = 77,774 persons working in the entertainment industry in 1900.

5. This is a rough estimate, and sources lack to make a more precise estimate. Yet, the directions and the magnitude of the findings are not that sensitive for an estimation error of say plus or minus 10,000 persons (see text).

TABLE B1
PRODUCTIVITY INDICATORS FOR ENTERTAINMENT IN THE UNITED STATES, 1900-1938

	LIVE + FILM	DISAGGREGATED	
		Live technology	Film technology
Labor (hours)			
1900	200,212,948	200,212,948	
1938	360,296,080	52,994,324	307,301,756
Capital ($)			
1900	176	176	
1938	1,086	137	949
Sold output (million sh)			
1900	249	249	
1938	7,038	155	6,883
Expenditure (million 1938$)			
1900	151	151	
1938	721	58	663
Price (1938$)			
1900	0.608	0.608	
1938	0.102	0.374	0.096
Labor productivity (sh/hour))			
1900	1.24	1.24	
1938	19.53	2.92	22.40
Capital productivity (sh per 1000$)			
1900	1,412	1,412	
1938	6,479	1,131	7,251
Labor costs ($/hour)			
1900	0.28	0.28	0.28
1938	1.09	0.75	1.15
Capital Costs ($ per $ of K)			
1900	0.1268	0.1268	0.1268
1938	0.0963	0.0341	0.1052
Capital factor income in $million			
1900	17.65	17.65	
1938	74.65	2.75	71.91
Labor factor income (wage bill)			
1900	55.81	55.81	
1938	394.09	40	354
Capital consumption			
1900	4.73	4.73	
1938	29.93	1.93	28.00
Capital/(hour)			
1900	0.9	0.9	
1938	3.0	2.6	3.1
Population (millions)			
1900	76	76	76
1938	130	130	130
Output/capita (sh)			
1900	3.3	3.3	0.0

1938	54.2	1.2	53.0
Expenditure/capita (1938 $)			
1900	2.0	2.0	0.0
1938	5.6	0.4	5.1

SOURCES.—Appendix; education: Maddison (1995).
NOTE.—All amounts at 1938 prices; sh = spectator-hour (see text). Labor productivity (in spectator-hours per hour worked) is uncorrected for increases in labor quality.

6. Since data on full time and part-time proportions is lacking for 1900, the 1938 ratio of fte over the total number of employees, 0.8762, has been used to convert these persons into ftes, arriving at 68,146 fte.

7. As industry-specific working hours are lacking, these persons have been multiplied by the average annual working hours (2938) taken from Huberman and Minns (2007), to arrive at a grand total of 200.2 million hours.

B. Wages in 1900

For 1900, the national average wages (from Dewhurst, 1955) have been used, as reliable industry wages series are not available.

C. Consumer expenditure in 1900

1. Entertainment expenditure in 1909 was $167 million (US Department of Commerce, 1975) which amounts $260.937 million in 1938 dollars, using the consumer price deflators in Mitchell (1998). All amounts that follow are changed into 1938 dollars using these same deflators.

2. This figure is back-projected to 1901 by using Owen's growth rates for real total consumer expenditure for 1906-1913 (7.99 percent) and 1901-1906 (5.85 percent) (Owen, 1970), yielding an expenditure of $155.930 million in 1901.

3. This figure is then further back-projected by assuming 1900-1901 had at least half the growth rate (to make the estimate more conservative) as 1901-1906, yielding 1900 expenditure of $151.499 million (in 1938 dollars).

4. A rough cross-check is made by taking the average household expenditure on 'amusements and vacations' from the US Commissioner of Labor Survey (as reported in Bakker, 2001). This was 1.1 percent. It is then assumed that half of this, 0.55 percent, was spent on spectator entertainment. Using the 1917/1919 expenditure on spectator entertainment (Bakker, 2001), of 0.63 percent, it is tentatively assumed that in 1900, on average 0.59 percent of labor income was spent on spectator entertainment. If we take the share of labor income in national income in 1900 to be 0.54 (Rosenbloom, 2005), we arrive at consumer expenditure on spectator entertainment in 1900 of $66 million, which is $112 million dollars of 1938. This rough estimate confirms that estimate (3) is in the right ballpark, but about a quarter lower, and thus may lead to underestimating productivity growth.

5. Since (3) is the more careful estimate, and also the more conservative one (i.e. the one that would tend to over-estimate productivity in 1900 and thus lower the TFP-estimate, estimate (3) is taken.

D. Prices in 1900

1. It is difficult to obtain reliable estimates of entertainment prices in 1900, but one for high-quality live entertainment in 1913 is $2 per ticket (Poggi, 1968: 71). In the 1900s, also lower priced live entertainment existed and cheaper tickets. Robert C. Allen (1980: 296), for example, found that standing place tickets for vaudeville ranged from 15 to 50 cents, while Felicia Hardison Londré and Daniel J. Watermeier (1998: 265) describe how low-priced resident stock theater companies emerged between 1900 and 1920, whose prices usually varied between ten and thirty cents, and rarely exceeded 75 cents. Glen Hughes (1951: 305) writes how an early vaudeville theater in the 1880s charged 10 cents for standing places and 15 cents for seats. Using rough estimates like these, and assuming ticket prices rose in line with inflation during the 1900s, we arrive at an average price of $1.25 for the most expensive live entertainment, $0.35 for the entertainment in between, and $0.20 for the cheapest live entertainment in 1900. These are deliberately lower bound estimates, to make our calculation more conservative.

2. It is then assumed that in the most expensive places, a performance lasted 2.5 hours, in the intermediate places 2 hours, and in the cheapest places 1.5 hours. Combining this with (1) yields average prices per spectator-hour of 50, 17.50 and 13.33 cents, respectively.

3. Given that no systematical price data is available, an estimate has to be made. It is assumed that in 1900, about half of all tickets sold was for ‘first-class’ live entertainment. Using contemporary sources, Londré and Watermeier (1998: 185) identify 1,700 theaters nation wide available for touring and about 1,000 unlisted theaters. If it is assumed that the unlisted theaters were of a lower quality and charged lower admission prices, this would yield a ratio of 63 percent. To keep our estimate conservative, we set the ratio at

fifty percent, and assume that this ratio was the same for the vaudeville, burlesque, and others theatrical entertainments. We then simply assume that another 25 percent of tickets were for intermediate entertainment, and another 25 for the cheapest form of entertainment.

4. Correcting for differences in output, the weight of the three forms of entertainment becomes then 58.82 percent (0.5*2.5/(0.5*2.5+0.25*2+0.25*1.5)), 23.53 percent and 17.65 percent respectively.

5. Combining (2) and (4) we arrive at an average price per spectator-hour in 1900 of (0.5882*50) + (0.2353*17.50) + (0.1765*13.33) = 35.88 cents in 1900 prices. This amounts to 60.81 cents in 1938 dollars.

6. Particularly good data on spectator entertainment prices and quantities for the period when cinemas already were omnipresent enables us to check whether the estimate above is roughly in the right ballpark. The data is for Boston in 1909, is reported in Gart S. Jowett (1974), and is based on an investigation by the Boston Committee on Amusements (see also table 1 and figure 2 in the main text). It contains ticket prices and estimated ticket-selling capacities for each category of spectator entertainment, from opera, at $2.00 a ticket to cinema, at $0.10 a ticket. If we ignore the two lowest priced categories, motion picture theaters (52 percent of total capacity) and theaters showing ‘vaudeville and motion pictures’ (10 percent of total capacity, price $0.15), we arrive at weights of 49 percent for high-priced entertainment (opera, first-class and popular theater), 23 percent for medium-priced entertainment (‘stock houses’ and ‘vaudeville houses’) and 28 percent for low-priced entertainment (‘burlesque houses’), with average ticket prices of $1.10, $0.58 and $0.25, yielding an average ticket price of 76.25 cents and an average duration (using the durations mentioned in (4) above) of 2.105 hours. This results in an average current ticket

price of 35.27 cents. This price is nearly equal to the current 1900 price of 35.88 cents. In real terms, the price is somewhat lower, 53.43 cents of 1938. If both our estimates would be entirely accurate (a big if) then this would suggest that during the 1900s, the live entertainment price decreased with 1.43 percent per annum relative to all other prices, leaving the nominal price unchanged. This does not seem unreasonable, given the increasing competition of cinema from 1905 onwards. Given that by 1909, about three to four years after the first cinemas emerged, 52 percent of Boston capacity existed of cinemas, an average price of 35.27 cents in the face of strong cinema competition suggests that the price could have been far higher in 1900.

7. Although the data analyzed under (6) suggests that our 1900 price estimate reported under (5) may be somewhat on the low side, the price estimate under (5), of 35.88 cents, or 60.81 cents in 1938 dollars is kept, to keep the estimate of TFP-growth conservative.

E. Capital in 1900

1. Exact data on capital invested in the entertainment industry in 1900 is not available. The number of theaters was estimated to be 2,700 in 1905; 1,700 first-class listed theaters and about 1,000 others (Londré and Watermeier, 1998). A different estimate for 1910 arrived at 1,520 first-class listed theaters (Bernheim 1932). It is thus estimated that in 1905 the total number was 2,700 and that on top of this, 1,000 vaudeville theaters existed, and 1,000 other entertainment venues, yielding a total of 4,700. It is then assumed that between 1900 and 1905 the number of venues grew at the rate of the real expenditure on recreation (5.58 percent per annum) found by Owen (1970). This yields 3,537 venues in 1900.

2. Because no systematic data is available, based on anecdotal historical construction costs and acquisition data for individual theaters from the theater history literature (see bibliography) a rough and ready ballpark estimate was made that the capital needed to build an average theater in 1900 was about $35,000.

3. It is assumed capital will depreciate in fifty years and that in 1900, the average age of an entertainment venue was ten years, given the boom in entertainment expenditure towards the end of the 19th century. This yields an average depreciated invested capital per theater of $28,000, and a total invested capital of $99.036 million, amounting to $176 million in 1938 dollars (using the GDP-deflator from Williamson (2006)).

F. Cost of capital in 1900

1. This is calculated as (capital factor income + capital consumption)/(capital stock).

2. Since no reliable industry data on capital income exist, an estimate had to be made; capital income been set at ten percent of stock, slightly higher as in 1938, given the effect of the depression, and capital consumption at the same percentage as in 1938 (2.68 percent of stock). This yields a cost of capital of 0.1268, or $17.65 million in 1938 dollars.

II. ENTERTAINMENT IN 1938

A.Labor in 1938

Cinema:

Employment was 171,000 full-time employment equivalent (fte). In addition, there were 7,000 self-employed.(Bureau of Economic Analysis, 1977: 206). The latter have been converted to fte using the ratio of fte/(full-time and part-time employees) for the employees and then assuming that that these self-employed worked for 5/8 of their time in entertainment, yielding a total of 175,001 fte.

Cinema wages:

From same source as above (Bureau of Economic Analysis 1977: 206) the total compensation paid was $354 million.

Live entertainment

1. In Amusements and Recreation employment was 163,000 full-time employment equivalent (fte). In addition, there were 49,000 self-employed.(Bureau of Economic Analysis, 1977: 206). The latter have been converted to fte using the ratio of fte/(full-time and part-time employees) for the employees, and assuming they worked for 5/8 in entertainment, yielding 24,835 fte self-employed and a total of 187,835 fte (table B-2).

TABLE B2

ENTERTAINMENT EMPLOYMENT AND COMPENSATION, 1938

	Employees	Self-employed	Total
		FILM	
Full-time and part-time employees	187,000	7,000	194,000
Fte	171,000	4,001	175,001
Total wages and salaries	332,082,000	7,769,298	339,851,298
Total compensation of employees	346,000,000	8,094,920	354,094,920
Wages and salary/fte	1,942	1,942	1,942
Total compensation/fte	2,023	2,023	2,023
Wages and salary/employee	1,776	1,776	1,752
Total compensation/employee	1,850	1,850	1,825
		AMUSEMENTS AND RECREATION	
Full-time and part-time employees	201,000	49,000	250,000
Fte	163,000	24,835	187,835
Total wages and salaries	207,010,000	31,540,703	238,550,703
Total compensation of employees	216,000,000	32,910,448	248,910,448
Wages and salary/fte	1,270	1,270	1,270
Total compensation/fte	1,325	1,325	1,325
Wages and salary/employee	1,030	1,030	954
Total compensation/employee	1,075	1,075	996
		LIVE	
Full-time and part-time employees	32,294	7,873	40,166
Fte	26,188	3,990	30,179
Total wages and salaries	33,259,224	5,067,481	38,326,706
Total compensation of employees	34,703,601	5,287,551	39,991,152
Wages and salary/fte	1,270	1,270	1,270
Total compensation/fte	1,325	1,325	1,325
Wages and salary/employee	1,030	1,030	954
Total compensation/employee	1,075	1,075	996
		FILM + LIVE	
Full-time and part-time employees	219,294	14,873	234,166
Fte	197,188	7,991	205,179
Total wages and salaries	365,341,224	14,804,995	380,146,219
Total compensation of employees	380,703,601	15,427,536	396,131,137
Wages and salary/fte	1,853	1,853	1,853
Total compensation/fte	1,931	1,931	1,931
Wages and salary/employee	1,666	1,666	1,623
Total compensation/employee	1,736	1,736	1,692

SOURCE.— United States Bureau of Economic Analysis (1977).

2. The problem arises that this figure aggregates several other activities with live entertainment and that disaggregated figures are not available. We can therefore only make a rough estimate of the number of people working in live entertainment.
3. Using the disaggregated consumer expenditure figures for 1938, including spectator sports, clubs, and commercial participant entertainment---the latter consisting of billiard parlors, bowling alleys, dancing, riding, shooting, skating, and swimming places; amusement devices and parks; golf courses; sightseeing buses and guides; and private flying operations----(U.S. Bureau, 1977: 337), and not weighing clubs and fraternities, we arrive at an upper bound estimate of live entertainment revenue share in 'Amusements and Recreation' of 58/361 = 16.07 percent. Assuming that live entertainment has the same revenue/labor ratio as other recreation, we arrive at 30,179 fte. This figure is not out of line with the 1930 and 1940 census figures, when adjusted for the pronounced dip in live entertainment expenditure during the 1930s. It suggests that cinema has over twice as much revenue per fte as cinema, which does not seem entirely implausible.

Live wages:

From same source as above: only available at the level of 'Amusements and Recreation' as a whole; $1,325 per annum per fte. For legitimate theater, wages may have been substantially higher than those of cinema (if we exclude film production). Detailed minimum wage data from the League of New York Theatres (Wharton 1961) report weekly wages from about ten dollars for an usher to $100 for house managers and $150 to advance agents. The data suggests that a $1325 average annual compensation per fte is not unrealistic.

Cinema + live

Total employment then was 205,179 fte (table B-2).

8. As industry-specific working hours are lacking, these persons have been multiplied by the average annual working hours (1756) taken from Huberman and Minns (2007), to arrive at a grand total of 360.3 million hours.

B. Consumer expenditure in 1938

This was $721 million, $663 million for cinema and $58 million for other spectator entertainment (US Department of Commerce 1975: 854-855).

C. Prices in 1938

Cinema:

1. According to the *Film Daily Yearbook*, in 1938 the average price of a cinema ticket was 23 cents (as quoted in Harold L. Vogel, 2004: 500). However, this estimate is not very precise (making the actual price vary between 22.5 and 23.5 cents, and it is unclear how it is arrived at).
2. More careful estimates for 1935 and 1939 prices have been made by Michael Conant (1960: 4), using data from the Department of Commerce and the Bureau of Labor Statistics. He arrives at nominal prices of 24.9 cents in 1935 and 26.5 cents in 1939, which translate into 25.67 and 26.768 constant cents of 1938. Using the 1935-1939 real growth rate we arrive at an average price of 26.489 cents in 1938. This price is taken as it is the most reliable and highest (most conservative) estimate.

3. The average duration of a cinema performance is taken to be 2 hours and 45 minutes, which is a conservative estimate, as most US theaters showed double features and of course shorts. This yields an average price per spectator-hour of 9.632 cents.

Live:

1. Since the total number of live entertainment admissions is not given with the expenditure data, the average price cannot be calculated exactly. Therefore, an estimate of the average price is being made on information from the trade press.
2. For Broadway, reliable time series of top-ticket average price are available from 1926-1965, for both 'straight shows' and musicals (Moore, 1968: 151). In 1938, they were $3.22 and $4.16 respectively.
3. From 1949 onwards, also time-series on the average Broadway ticket prices are available (Moore, 1968: 151). Over this period, the range of the ratio top/average price for straight shows and musicals are 1.16-1.52 and 1.18-1.47, respectively. To keep the price estimate conservative, here the highest ratios are used to calculate average Broadway ticket prices for 1938. This yields $2.12 and $2.83 as average ticket prices. To make the estimate even more cautious, the average price for musicals is discarded.
4. It is then assumed that the average ticket price of all other live entertainment in the US was a third of the Broadway ticket price, 0.33 * 2.12 = $0.70, which is again conservatively low.
5. It then is assumed Broadway tickets accounted for 1/10 of all ticket sales in the US and other live entertainment for 9/10. ("Broadway" is here taken to represent most metropolitan entertainment, such as in Boston, Chicago, Los Angeles, etc.). This yields an average ticket price for live entertainment of $0.842.

6. It is then assumed that a live performance lasted 2 hours and 15 minutes on average, which yields an average price of $0.3742 per spectator-hour.

Cinema and Live

1. Total spectator-hours sold for cinema were 663,000,000/0.09632 = 6883.3 million, and for live entertainment 58,000,000/0.3742 = 155 million, making a total of 7038.3 million. The average price then, is (0.9780*$0.09632)+(0.0220*$0.3742)= $0.10244 per spectator-hour.

D. Capital in 1938

1. In a detailed study William I. Greenwald (1950: 228) calculated capital value for 1944 based on statistics of the US Bureau of Internal Revenue. He arrives at $1552 million invested in the motion picture industry, and $303 million invested in other live entertainment.
2. Because of the depression, in 1938 the industry was running below capacity. If we assume that one quarter of the growth rate in motion picture and live entertainment admissions between 1938 and 1944 (6.1 and 13.3 percent annually, respectively) was accommodated by improved capacity utilization, we arrive at 1938 capital of $949.3 million for motion pictures and $136.9 million for live entertainment, yielding a grand total of $1086 million, all in 1938 dollars.
3. No capital data is available for the self-employed, which made up 2.3 percent of all fte in film and 15.2 percent in amusements and recreation, of which live entertainment was part. Given the absence of data also for 1900, it is considered best to ignore this potential capital. If it was proportionately the same in 1900 and 1938 it would not affect the

findings. It is not expected that any major shift in this small category could affect this paper's findings.

E. Cost of capital in 1938

1. This is calculated as (capital factor income + capital consumption)/(capital stock).
2. To calculate the cost of capital, proprietors' income, rental income, corporate profits, net interest is calculated from the Bureau of Economic Analysis (1977). From national income are subtracted total compensation paid to employees and estimated (implicit) compensation paid for their own employment by the self-employed. The latter has been estimated using the estimated number of self-employed fte, times the average industry compensation per fte. Live entertainment national income had to be estimated from the aggregate Amusements and Recreation national income using the method in A above, where the estimated share of live entertainment in all amusements and recreation expenditure is used.
3. The above method results in $71.9 million + $2.7 million for live = $74.4 million dollars.
4. To this is added the capital consumption, $28.0 + $1.9 million, to arrive at a total cost of capital of 104.6 million, or 9.63 percent of the capital stock (for film this was 10.52 percent, for live 3.41 percent (cents per dollar of capital)).
5. To check this finding, the resulting 1938 value for the motion picture industry, 10.01 percent, is compared to the value in 1937, reported in a contemporary work (Huettig, 1944: 100, which bases itself on a survey by the Securities and Exchange Commission). This value was 10.67 percent. The two values are close enough to make the value estimated above credible. Based on an analysis SEC and Bureau of Internal Revenue

surveys, Huettig also notes that the motion picture industry in 1937 was the tenth most profitable US industry in terms of return on investment, and the 45th most profitable industry in terms of the absolute dollar amount of profits (Huettig, 1944: 56-57, 99-101).

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