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Artistic Originals as a Capital Asset

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Artistic Originals as a Capital Asset

By Rachel Soloveichik*

In 2007, I estimate that US artists, studios and publishers produced artistic originals worth $77.1 billion. By category, production was $12.2 billion in theatrical movies, $6.3 billion in original music, $7.2 billion in original books, $47.8 billion in long-lived television programs and $3.5 billion in miscellaneous artwork. The numbers for television programs are preliminary and may change significantly in future work.

The cost of producing this $77.1 billion in original artwork could be treated either as a current expense (method 1) or a capital investment (method 2). Under method 1, artistic production costs are treated as intermediate inputs in the same way as advertising costs, manufacturing costs and shipping costs. Final revenue from sales or rentals to households of reproductions of artistic originals is all that matters for measuring gross domestic product (GDP). This is the method BEA currently uses for artistic originals.

On the other hand, under method 2, artistic production costs are treated as private investment and added to the pre-existing capital stock of artistic originals to get the total capital stock of artwork. This capital stock of copyrighted artwork then earns money from the sale of reproductions such as books and DVDs, and from licensing of broadcasts or showings. These payments are counted in GDP as capital services. Finally, the depreciation (which is known as consumption of fixed capital or CFC) is deducted in calculating the total capital stock of copyrighted artwork. The international guidelines for national accounts, the System of National Accounts 2008 (SNA 2008), recommends that countries use this method. In this paper, I

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calculate GDP, capital stocks and CFC for the United States when production of artistic originals is treated as an investment activity.

Switching from method 1 to method 2 may change some short-term estimates of GDP growth significantly. Suppose that all movie actors go on strike for a single quarter. When artistic production is treated as a current expense, GDP doesn't drop until **sales or rentals to households** of theatrical movies drop a year later. On the other hand, the strike reduces GDP immediately if production is treated as an investment.

My research on capitalizing artistic production is part of a broader research project on capitalizing intangible assets. In the 1990's, BEA reclassified computer software production from a current expense to a capital investment and revised the national income and product acounts accordingly (Bruce Grimm and Robert Parker 2000). Other researchers at the BEA have developed satellite accounts measuring investment and capital stock of R & D (Carol Robbins and Carol Moylan 2007). These intangible capital stocks have been used to explain growth in productivity (Carol Corrado, Charles Hulten and Daniel Sichel 2006).

In order to measure artistic production and capital stocks, I need three separate pieces of data: nominal production, price indexes and depreciation schedules. I can then calculate real production and real capital stock for Year t:

$\text{Real Production}_t = \text{Nominal Production}_t / \text{Price Index}_t$

$\text{Real Capital Stock}_t = \text{Real Capital Stock}_{t-1} - \text{Depreciation}_t + \text{Real Production}_t$

The first section of this paper reports nominal production for theatrical movies, music, books, television programs and miscellaneous artwork from 1929 to 2007. Price indexes and real production for each category from 1929 to 2007 are then calculated and reported in section two. Depreciation schedules and aggregate capital stocks are shown in the third section. (For details

on the estimation procedures and results, please see Soloveichik 2010a, 2010b, 2010c, 2011a and 2011b).

I. Nominal Production

The primary source of data for this project is the preliminary 2007 Economic Census. In 2007, total revenue from all artistic originals was $166 billion. By category, revenue was $35 billion from movies; $13 billion from music; $25 billion from books; $63 billion from long-lived television programs and $30 billion in miscellaneous artwork. I assume that revenue equals the flow of artistic capital services plus sales costs such as advertising, printing books, stamping DVDs, etc.[2] Artistic capital is long-lived, so the flow of artistic capital services may be larger or smaller than new production spending. I estimate that the cost of producing artistic originals amounted to 35% of industry revenue for theatrical movies; 49% of industry revenue for music; 28% of industry revenue for books; 92% of industry revenue for television and 12% of industry revenue for miscellaneous artwork. Details on the industry literature and datasets used to estimate these production shares are given in my working papers (Rachel Soloveichik 2010a, 2010b, 2010c, 2011a and 2011b). Therefore, I calculate that production spending by category was $12.2 billion in theatrical movies, $6.3 billion in original songs, $7.2 billion in original books, $47.8 billion in television programs and $3.3 billion in miscellaneous artwork — $77 billion in total.

Figure 1 shows my estimate of annual production spending for theatrical movies, music, books and television programs from 1929 to 2007. The datasets and methodology used to produce each time series are briefly described below.

[2] I allocate overhead expenses proportionally to non-overhead expenses.

Theatrical Movies: I use industry data from the website IMDB.com to estimate real production costs. Based on my own research, I believe that IMDB contains every major theatrical movie and most minor theatrical movies produced in the US. For each item in their database, IMDB collects a list of actors and production crew, technical information like run-time, business information like production budgets, etc. IMDB allows researchers to download the complete raw data files for all movies, television programs, videos and video-games in their database. All of my estimates reported in this paper are based on the complete raw data files.

IMDB reports production budgets and filming dates for many movies in the sample. Coverage is better for movies with high box office revenue, live action films and recent releases. I use those budgets and filming dates to calculate quarterly production. For example, a $120 million movie might start filming on March 1rst and finish on April 29th. I calculate that the movie costs $2 million per day, so $62 million was spent in the first quarter and $58 million was spent in the second quarter. I imputed production budgets and filming dates for movies with missing data.[3] Finally, I added studio overhead and other non-filming costs to get total production costs.

My estimates of US production are sensitive to the treatment of joint production. Between 2000 and 2008, 37% of major movies were co-produced by a US studio and a non-US studio. Bigger movies are more likely to be co-produced, so the share of real production is even higher. I assume that production spending and ownership is proportional to a count of studios. For example, a movie produced by one US studio and two British studios is counted as 33% American.

[3] Minor movies have much lower production budgets and sales than their listed inputs would suggest. In a few cases, minor movies do report production budgets. In those cases, I ignore the reported budget.

Television Programs: The SNA 2008 says that only originals with a service life of more than one year should be treated as capital assets. Dramas and situation comedies clearly meet this criterion, while news and sport programs definitely do not. Reality television, documentaries and musical programs are ambiguous. In order to estimate market share, BEA purchased a custom data analysis from Nielsen Media Research. According to that analysis, US programs that are clearly long-lived account for 31% of broadcast viewership, 29% of regular cable viewership and 49% of premium cable viewership. US programs that are ambiguous account for 21% of national broadcast viewership, 7% of regular cable viewership and 3% of premium cable viewership.

Of course, not all the revenue earned by television networks is a return on the artistic original. Some of their revenue covers advertising costs, customer service costs and other non-artistic expenses. Based on the Service Annual Survey and Nielsen data, I estimate that US television networks pay licensing fees of $0.80 to studios for every $1 they earn from licensing theatrical movies for television. According to the preliminary 2007 Economic Census, US broadcasters earned $34 billion, regular cable earned $72 billion[4] and premium cable earned $15 billion. Furthermore, the 2007 Service Annual Survey reports that US studios earned about $0.38 from television exports, DVD sales and merchandise licensing for every $1 they earn from US television. Therefore, I calculate that clearly long-lived programs earned:

(31%*$34 billion + 29%*$72 billion + 49%*15 billion)*(0.81)*1.38 = $43 billion in 2007

By the same formula, ambiguous programs earned:

(21%*$34 billion + 7%*$72 billion + 3%*15 billion)*(0.81)*1.38 = $14 billion in 2007.

[4] This includes the value of ads pre-embedded in cable shows.

In the remainder of this paper, I assume that half of the ambiguous programs are truly long-lived. I am currently working to figure out which ambiguous genres are actually long-lived. My 50% breakdown may change significantly in future work.

I use data from IMDB to estimate television production from 1945 to 2007. Television programs rarely report production budgets, so I impute product budgets based on listed inputs. First, I calculate what the television episode would cost to produce **if** it was a movie produced using the same inputs? I then reduce the calculated budget to match the total revenue earned in 2007. Holding the listed inputs constant, television episodes cost 90% less than theatrical movies to produce. IMDB almost never reports filming dates for television programs, so I cannot measure quarterly production precisely. Instead, I assume that filming starts 3 months before an episode is released and ends one month before it is released. These results are very preliminary and may change significantly with future research.

Recorded Music: Unlike theatrical movies, musicians do not generally report how much they spent composing and recording each song. Nevertheless, I can observe the profits earned by a song over time. I assume that unobserved production costs for a song are, on average, equal to the net present value of revenue from that song. These unobserved production costs include the value of time and energy spent composing. Musicians also do not report the dates songs were composed or recorded. I use the song's release date to impute quarterly production.

I use industry data to estimate music revenue by sales channel from 1985 to 2006. The Recording Industry Association of America tracks revenue from CD's, (legal) downloads, ringtones, tape cassettes and other purchased products. ASMP and BMI track royalties for radio broadcast, television broadcast and live performances. Pollstar tracks ticket sales for live music

concerts. Taken together, these datasets allow me to estimate total revenue earned by musicians in the United States. I then adjust that revenue data to account for advertising and other sales costs; imports and exports of music; and classic songs sold for years after their initial release. I could not find any consistent industry data tracking music revenue before 1985. Instead, I use Census data on the number of musicians and their earnings to extrapolate music revenue back to 1929.

Books: As with music, I cannot observe production spending or writing dates for books. Therefore, I will use similar techniques to estimate quarterly production of books.

I use a combination of industry sources and Census surveys to track book revenue over time. Between 1929 and 1982, I use the Census of Manufacturers to track sales (interpolating between years with missing date).[5] Between 1982 and 2003, I use industry data produced by the American Association of Publishers to track sales. Finally, I use the Service Annual Survey to track sales from 2005 to 2008.

Miscellaneous Artwork: This category includes a variety of small products. The revenues in 2007 were:

a) performing art (plays, dance, symphony music, etc.) - $11.5 billion.

b)Greeting cards and other paper products - $6.8 billion.

c)Fine art reproductions - $10 billion

d)Commercial stock photography - $1.6 billion.

I use a combination of industry sources and Census surveys to track revenue for each product over time. In order to save space, I will not give further details.

[6] I include revenue from books licensed to magazines as serials. This revenue was substantial before 1945.

II. Prices and Real Production

In this section, I measure the real cost of art production without adjusting for artistic merit. I do not assume that the consumer's experience has remained fixed over time. For example, DVDs and plasma TV's offer a much better viewing experience than 1930s movie theaters. However, I believe that these quality improvements should be attributed to the consumer electronics industry rather than the artistic industry. After all, studios can and do re-release old classics on DVD for modern viewers. These re-releases cost a small fraction of the cost of filming new movies (Epstein 2005).

Figure 2 shows the price indexes for theatrical movies, music and books from 1929 to 2006. Figure 3 uses those price indexes and the nominal production data from Figure 1 to calculate real production from 1929 to 2008. The data and methodology used to construct the time series will be briefly described below.

Theatrical Movies: I use an input-based price index. My inputs are the # of actors, # of non-actors (producers, directors, costume-design, etc.), # of locations filmed at, # of special effects companies and whether the film is animated. All of this data is taken from IMDB. I estimated the following regression:[6]

$$\text{Budget} = \alpha(\#\text{Actors}) + \beta(\#\text{Non-Actors}) + \gamma(\text{Locations}) + \delta(\text{Companies}) + \eta(\text{Animated}) + \varepsilon$$

I then used the coefficients estimated to calculate what production budgets would be if they were produced in the same year. Finally, compared that real production budget to the reported production budget to get a price index.

[7] My regression only uses major movies released 2000-2009. Results are similar if I use another time period to calibrate the regression.

Television: I have not yet been able to develop a price index for television programs. For now, I will use the movie price index. Television programs are produced by the same companies that produce movies and they have similar inputs. Therefore, it seems reasonable that their prices move together.

Recorded Music: I use a item-based price index for music from 1984 to 2007. In other words, a CD that sells 1 million copies in 2007 = a CD that sells 1 million copies in 1997. First, I estimate a separate price index for CD's, printed music, live concerts and broadcast music. I then combine those four separate price indexes to get a single average price for music in any form. This price index only covers legal purchases. Because of piracy, consumer spending per song have probably fallen significantly.

Before 1984, I could not calculate prices for individual types of music. Instead, I used Census data to measure average wages for musicians in the Census years.[7] I then interpolate to get annual musician wages and use those wage estimates as a proxy for music prices.

Books: I also use an item-based price index for books. My data for book prices is taken from the Bureau of Labor Statistics pre-existing Producer Price Index after 1980, the BEA's own price deflator for books for 1959-1979 and industry sources before 1959.

Miscellaneous Artwork: I estimate a separate price index for each each product. I then combine the price indexes to get an average for the entire category. Please contact me for further details.

[7] Earnings are not available before 1940. I assume musician wages track the general economy 1929-1940.

III. Depreciation Schedules and Capital Stocks

I cannot observe market prices for used artistic originals because they are rarely sold in the open market. Instead, I will impute prices for used artistic originals based on future revenues and sales costs. For example, suppose that a song earns $\$X_0$ in Year 0, $\$X_1$ in Year 1 and $\$X_2$ in Year 2. The recording studio also pays sales costs of $\$Y_0$ in Year 0, $\$Y_1$ in Year 1 and $\$Y_2$ in Year 2. Given a discount rate, ρ, the value of a song for each year is:

$$\text{Net Present Value at Release} = (X_0 - Y_0) + (X_1 - Y_1)/(1+\rho) + (X_2 - Y_2)/(1+\rho)^2$$

$$\text{Net Present Value at Year 1} = (X_1 - Y_1) + (X_2 - Y_2) \,/\, (1+\rho)$$

$$\text{Net Present Value at Year 2} = (X_2 - Y_2)$$

In this paper, I set ρ at 10% real per year. I chose a high discount rate because the artistic industry is very risky.[8] The data and methodology used to estimate each depreciation schedule will be described below.

Theatrical Movies: I used a variety of industry sources to estimate revenues and costs for each quarter after theatrical release. My data on box office revenue is taken from the website The-numbers.com. My data on home video rentals and sales is taken from a survey by Alexander and Associates. My data on television licensing revenue is calibrated from Nielsen ratings data. Finally, I used Kantar Media's 'Adspender' to estimate advertising costs.

[8]For books and music, I use the net present value at release as a proxy for production expenditures by artists. Accordingly, my estimates of annual investment change when I use a different discount rate. For theatrical movies and television programs, I observe production expenditures by studios directly.

Television: BEA purchased ratings data from Nielsen for television episodes. I am currently in the process of analyzing that data. My depreciation schedule is extremely preliminary and may change significantly. For now, I calculate that I am still in the process of analyzing that data. I also plan to subtract advertising costs to get profits for individual episodes. For now, I assume that television shows lose 25% of their value in their first month. After the first month, shows lose 1% of their value each month.

Recorded Music: I used a variety of industry sources to estimate revenues over time. My data on CD sales is taken from the Billboard's weekly charts of the top 250 CD's. My data on live concert sales is taken from the website Setlist.com and Onlinegigs.com. My data on broadcast revenue was purchased from the company MusicMonitor. In my current version of this paper, I used the industry literature to estimate advertising costs over time. I am in the process of analyzing Kantar Media's advertising data to refine my depreciation schedule.

Books: I used sales data from Nielsen's Bookscan to estimate revenue over time. My data on printing costs and advertising costs is taken from the American Association of Publisher's annual reports. I am in the process of analyzing Kantar Media's advertising data to refine my depreciation schedule.

Miscellaneous Artwork: I attempted to estimate a separate depreciation schedule for each product. I could not find any data for greeting cards and fine art reproductions. For this paper, I assume that greeting cards have the same lifespan as books and fine art reproductions depreciate by 10% per year. Please contact me for further details.

Figure 4 shows my estimates of the depreciation schedule for theatrical movies, books, music and television programs. I do not show miscellaneous artwork because each product has a different lifespan. Figure 5 combines the real production estimates given in Figure 3 with the depreciation schedules given in Figure 4 to get aggregate capital stocks from 1929 to 2007.

Overall, I find that artistic originals have a long useful lifespan. Ten years after the first release, theatrical movies retain 51% of their initial value, television programs retain 23% of their initial value, music retains 19% of its initial value and books retain 14% of their initial value. I also find that depreciation schedules are not geometric. In the first year of life, artistic originals lose a substantial proportion of their value. After the first year, depreciation slows dramatically. In my empirical work, I use two geometric curves added together to match the observed patterns.

Conclusion

Classifying artistic production as capital investment would change our measures of GDP and capital stock. Artistic production was $77 billion in 2007, 0.57% of nominal GDP. Artistic capital was $454 billion 2007, 1.43% of total fixed capital. Therefore, GDP and capital stock would increase slightly if artistic production was reclassified as an investment activity.

However, average GDP growth would not change significantly if artistic production was reclassified as an investment activity. In 1929, artistic production was 0.47% of real GDP. In 2007, artistic production was 0.57% of real GDP. Therefore, reclassifying artistic production as an investment raises GDP in 1929 and 2007 by almost the same amount. On the other hand, the

share for individual categories has changed dramatically. Figure 6 shows each category relative to nominal GDP.

In a recent paper, Corrado, Hulten and Sichel (2006) studied the production of computer software, scientific R&D, product development, brand equity and other intangible assets. They estimated that the US spends approximately $1 trillion producing intangible assets — about the same amount as it spends producing tangible assets like houses and factories. In previous papers, BEA researchers have measured production of computer software (Grimm and Parker 2000) and R&D (Robbins and Moylan 2007). Those assets account for approximately half of the intangible capital production studied in Corrado, Hulten and Sichel's paper. My paper studies a new intangible asset: artistic originals. I show that artistic originals account for another 6% of intangible capital.

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Figure 1: Nominal Production by Art Category

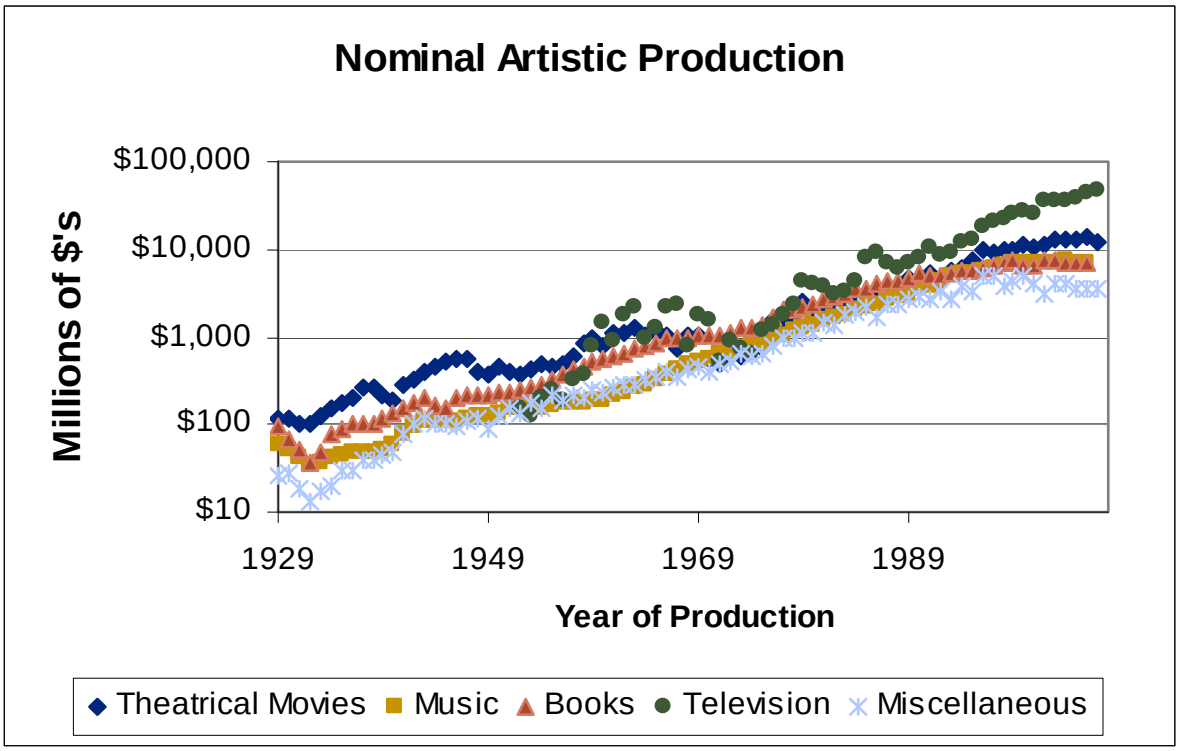

Figure 2: Price Indexes by Art Category

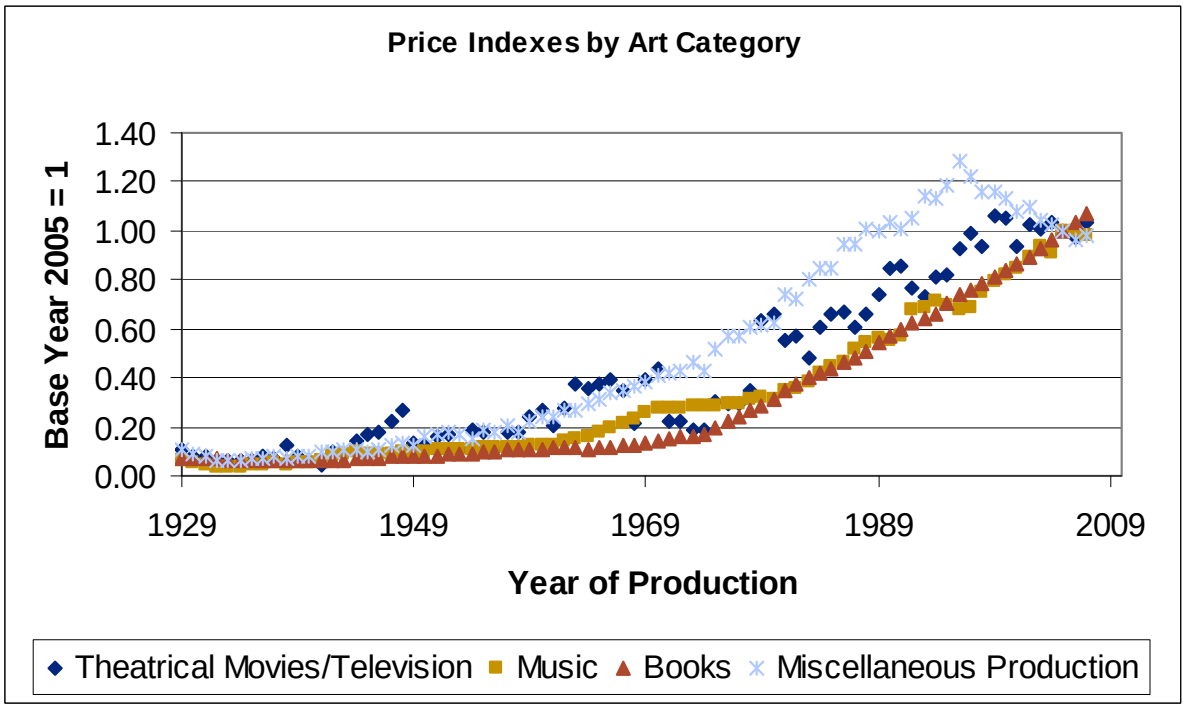

Figure 3: Real Production by Art Category

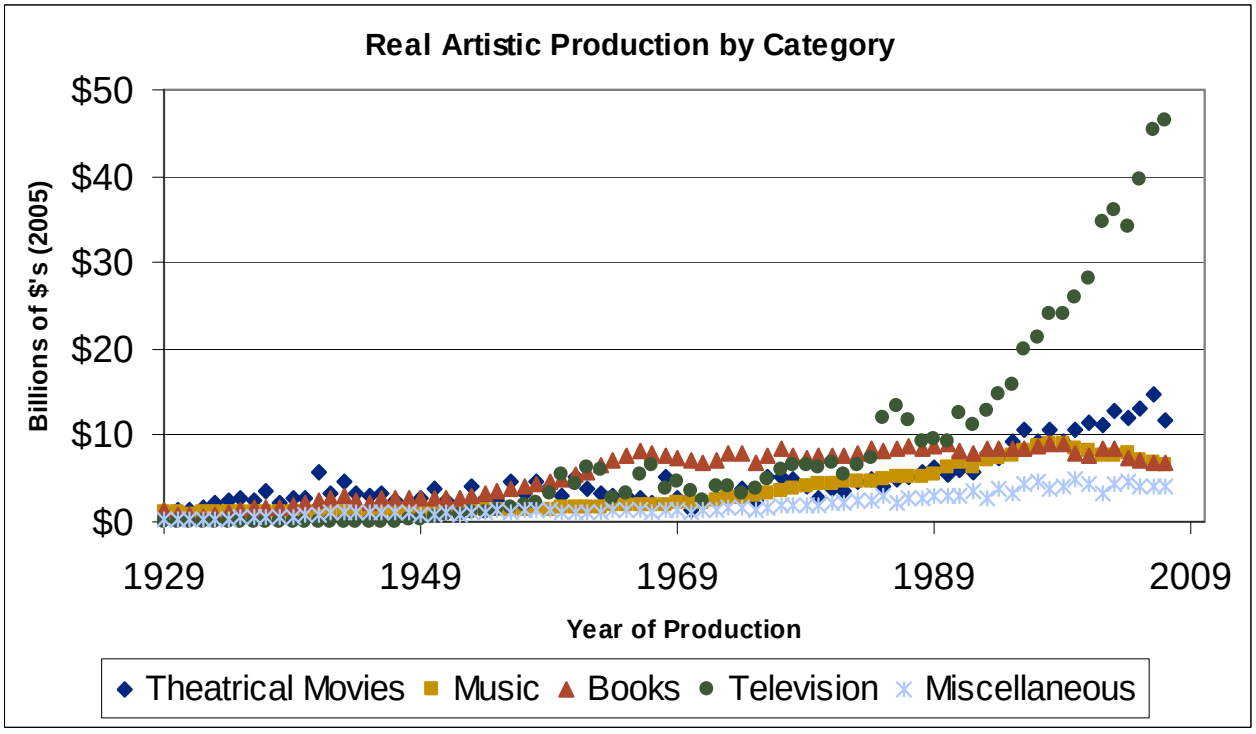

Figure 4: Depreciation Schedules by Art Category

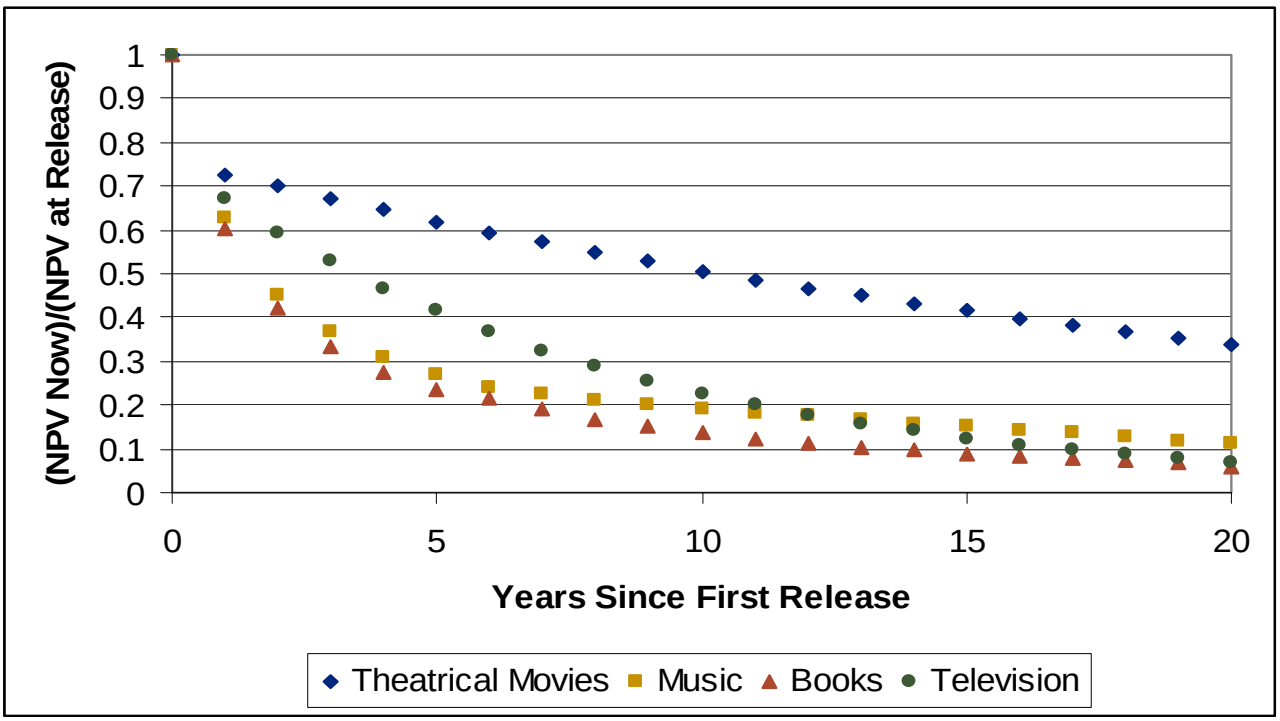

Figure 5: Real Capital Stock by Art Category

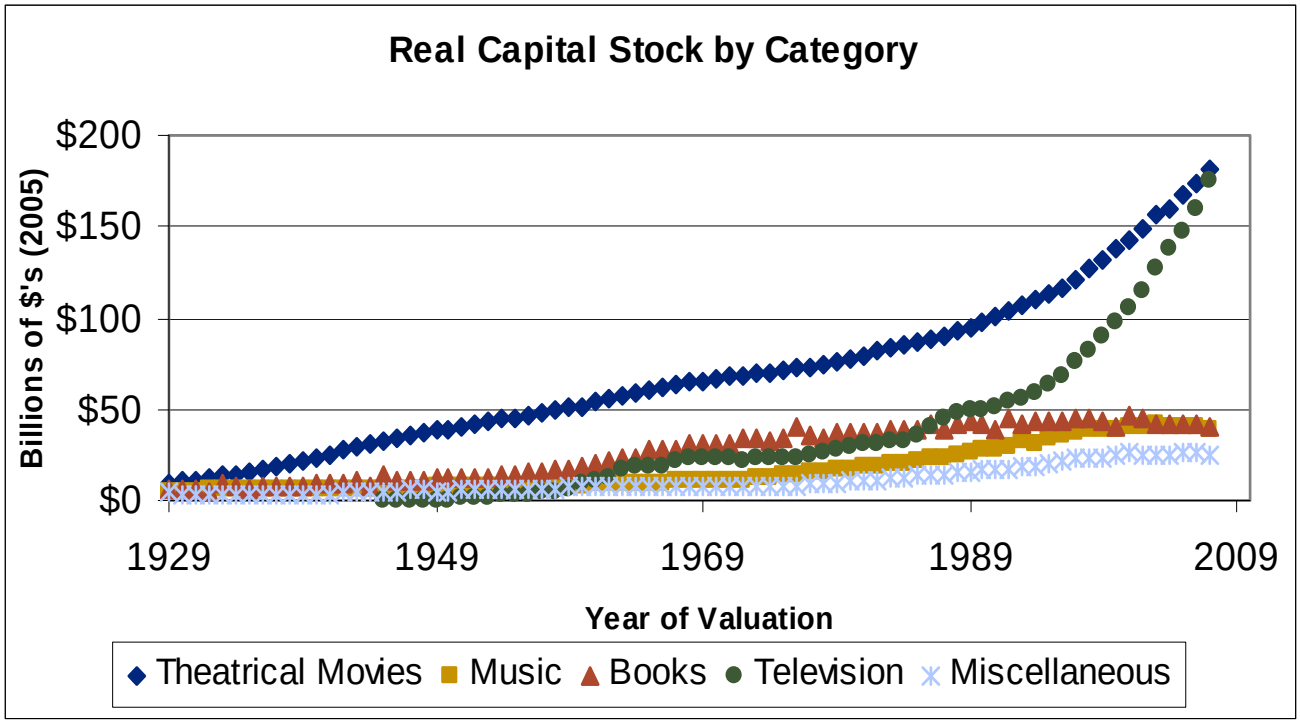

Figure 6: Artistic Originals vs. Nominal GDP