

Artistic Originals as a Capital Asset

By Rachel Soloveichik*

In 2007, I estimate that US artists, studios and publishers produced artistic originals worth \$49.7 billion. By category, production was \$14.0 billion in theatrical movies, \$5.6 billion in original songs and recordings, \$5.5 billion in original books, \$21.9 billion in long-lived television programs and \$2.6 billion in miscellaneous artwork. These artistic originals were first sold to the public in 2008 and will be sold on DVD, replayed on the radio, reprinted in paperback and broadcast on television for decades to come. Because of their long working life, the international guidelines for national accounts, System of National Accounts 2008, recommends that countries classify production of entertainment, literary and artistic originals as an investment activity and then depreciate artistic assets movies over time. However, BEA does not capitalize this category of intangible assets at the present time. As a first step in considering the treatment of this category of intangibles as a fixed asset, I collect data on long-lived artwork production and calculate what GDP statistics would be if artistic originals were classified as a capital asset.

To preview, my empirical results are: 1) Artistic originals have a long useful lifespan. In 2007, the aggregate capital stock of artwork was worth approximately \$300 billion, six times annual production; 2) Artwork production accounts for approximately 0.3% of nominal GDP. This share has remained relative constant from 1929 to 2009. Accordingly, long-run GDP growth does not change significantly when artistic originals are reclassified as a capital asset.

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Introduction

In 2007, I estimate that US artists, studios and publishers produced artistic originals worth \$49.7 billion. By category, production was \$14.0 billion in theatrical movies, \$5.6 billion in original songs and recordings, \$5.5 billion in original books, \$21.9 billion in long-lived television programs and \$2.6 billion in miscellaneous artwork.

The cost of producing this \$49.7 billion in original artwork could be treated either as a current expense (expensing) or a capital investment (capitalizing). If production of artistic originals is treated as a current expense, then they play no explicit role in the calculation of GDP. Under expensing, production costs are treated the same way as advertising costs, manufacturing costs and shipping costs. If these costs are paid from one business to another they are considered intermediate expenses and are not counted in GDP or capital stock. BEA uses this method described above for artistic originals.

On the other hand, under the capitalizing method, 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 returns a flow of value to its owner. That flow of value is then used by its owner to produce consumer goods or services such as DVDs. GDP does not explicitly count the flow of value from artwork, but it does count consumer spending, investment and government services. Therefore, the flow of value is implicitly counted in GDP along with the initial investment. Finally, depreciation (which is known as consumption of fixed capital or CFC) is deducted to calculate the new capital stock of copyrighted artwork. The international guidelines for national accounts, the System of National

Accounts 2008 (SNA 2008), recommend that countries use this method. In this paper, I calculate GDP, capital stocks and CFC for the United States when production of artistic originals is treated as an investment activity.

Switching from expensing to capitalizing may change 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 accounts 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).

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 2009. Price indexes and real production for each category from 1929 to 2009 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, 2010d and 2011a).

I. Nominal Production

The primary source of data for this project is the 2007 Economic Census. In 2007, total revenue from all artistic originals was \$135 billion. By category, revenue was \$37.2 billion from theatrical movies; \$14.2 billion from music; \$26.1 billion from books; \$40.7 billion from long-lived television and \$15.9 billion in miscellaneous artwork. I estimate that production costs account for 38% of industry revenue for theatrical movies; 40% of industry revenue for music; 21% of industry revenue for books; 54% of industry revenue for television and 17% of industry revenue for miscellaneous artwork. The remaining revenue is spent on non-sales costs such as advertising.³ These percentages are based on government survey data, industry literature and academic research. Details on the research behind my production shares are given in my working papers (Rachel Soloveichik 2010a, 2010b, 2010a, 2010b and 2010c). Therefore, I calculate that production spending by category was \$14.0 billion in theatrical movies, \$5.6 billion in original songs, \$5.5 billion in original books, \$21.9 billion in television programs and \$2.6 billion in other artistic originals — \$49.7 billion in total.

Figure 1 shows my estimate of annual production spending for theatrical movies, music, books, television programs and miscellaneous artwork from 1929 to 2009. The datasets and methodology used to produce each time series are briefly described below. I

³ Artistic originals are long-lived, so old artwork can earn revenue for decades after production. In 2007, the artistic industry spent less on production than it earned from pre-existing artwork.

have not yet completed my work on historical production of television programs.

Accordingly, the estimate for historical television production may change but the 2007 numbers are relatively set.

Theatrical Movies: Between 2005 and 2009, I use data from the 2007 Economic Census and Service Annual Survey to measure annual revenue for the movie industry. Based on the advertising costs and DVD production costs reported in ‘The Big Picture’ (Epstein 2005), I estimate that production spending accounts for 38%⁴ of revenue.

Before 2005, I use IMDB.com data to estimate annual production spending. The IMDB data gives filming dates and production budgets for individual movies from 1900 to 2011.⁵ Please see my paper “Theatrical Movies as Capital Assets” (Soloveichik 2010d) for details on the estimation procedures used.

Recorded Music: Unlike movie studios, musicians do not generally report how much they spent composing and recording each song. Nevertheless, I can observe the total revenue for the music industry from the 2007 Economic Census. I then estimate non-music costs such as advertising, stamping CDs and administering royalty contracts from the industry literature. Based on the revenue and costs, I calculate the net present value of music revenue after sales costs. 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, so

⁴ The exact share depends on the product mix. Movie theaters and DVDs have higher non-artwork costs than television licensing.

⁵IMDB reports this data for most major movies, with better coverage of recent movies and more expensive productions. I impute missing data.

out of pocket costs are significantly lower. Musicians also do not report the dates songs were composed or recorded. I assume that songs are composed anywhere from 0 to 24 months before they are released on CD. Therefore, I can impute annual production by the net present value of new songs released.

For 2007, I use the Economic Census to measure annual revenue from purchased music, royalties, live music concerts and printed music. For other years, I use trade association data to estimate music revenue. The Recording Industry Association of America tracks revenue from CD's, (legal) downloads, ringtones, tape cassettes and other purchased products.⁶ ASCAP and BMI track royalties for radio broadcast, television broadcast and live performances.⁷ Pollstar tracks ticket sales for live music concerts.⁸ The National Music Publishers Association tracks printed music sales.⁹ I then supplement the industry data with academic research on music revenue before 1980. Taken together, these sources allow me to estimate annual music revenue from 1929 to 2009. 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.

Books: As with music, I cannot observe production spending or writing dates for books. Therefore, I will use the 2007 Economic Census to estimate book revenue and survey data from the American Association of Publishers to estimate non-writing costs such as printing and advertising. Like music, I assume that production costs are equal to

⁶ This data can be downloaded from riaa.com for a fee of \$25.

⁷ ASCAP and BMI both publish this data in their annual reports. The most recent annual reports are available on their websites. Before then, I use 'American Popular Music and its Business' (Sanjek 1984) and 'Music, Money and Success' (Brabec and Brabec 2008) to get summary data.

⁸ Another academic has done research on the concert industry. He generously shared his Pollstar data from 1981-2003. After 2003, I use media reports that cite Pollstar data.

⁹ Recent data can be downloaded from <http://www.nmpa.org/media/survey.asp>

revenue net of non-writing costs. I also impute annual production from the first publication date for each song.

For 2007, I use the Economic Census to measure total book revenue. For other years, I use a variety of datasets. Between 1929 and 1982, I use the Census of Manufacturers to track sales (interpolating between years with missing data).¹⁰ 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 2009.

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 sit-coms are frequently re-run, so they qualify as capital assets. In contrast, news programs, sporting events, game shows and soap operas are rarely re-run. Accordingly, they are too short-lived to be counted as a capital asset.¹¹ In addition, premium television networks often show theatrical movies. That licensing revenue has already been counted in the movie industry. Therefore, I will only count a portion of television industry revenue when valuing long-lived television programs.

In order to estimate the market share for long-lived television, BEA purchased a custom dataset from Nielsen Media Research. That dataset gives viewership for individual programs on ten randomly selected days. In ‘Television Programs as a Capital Asset’ (Soloveichik 2011), I analyze the Nielsen data. Based on the Nielsen data, I estimate that long-lived programs account for 40% of total television viewership.

¹⁰ I include revenue from books licensed to magazines as serials. This revenue was substantial before 1945.

¹¹ Even though individual episodes are short-lived, the game show format or soap opera storyline lasts a long time. Therefore, one might count the format as a capital asset. I do not capitalize sequel rights here.

For 2007, I use the Economic Census to measure television industry revenue. For other years, I use a variety of datasets. Between 1998 and 2009, I use the Service Annual Survey (2009, 2005 & 2004 editions). Before 1998, I use revenue data for cable distributors from Kagan Associate's 2006 report (Kagan 2006) to proxy for cable network revenue. I use advertising expenditures from the CS Ad expenditure dataset (Galbi 2008) to proxy for television broadcaster revenue. I use aggregate sales of licensed merchandise from the EPM's 2006 Licensing databook to proxy for merchandise licensing revenue.¹² I could not find any data on television studio revenue before 1998, so I assume that television studio revenue tracked network revenue (broadcast+cable).

I then translate the television revenue data into annual production of long-lived programs. Based on the industry literature, I estimate that non-television costs like selling advertising account for 25% of total revenue. I also estimate that studios spend about 79 cents on production for every dollar they earn from their pre-existing television programs. Furthermore, I estimate that long-lived programs account for 40% of total television viewership. Therefore, I calculate that television production is $40\% * 75\% * 79\% = 24\%$ of total television revenue. These numbers are preliminary and may change significantly in the final paper on television.

Miscellaneous Artwork: This category includes three types of long-lived artwork: theatrical play scripts, greeting card designs and commercial stock photography. I will discuss each category briefly.

¹² This dataset goes back to 1977. Before then, I assume merchandise licensing tracked the overall television industry.

Theatrical Play Scripts: In the 2007 Economic Census, US performing arts groups and independent artists¹³ earned \$9.8 billion from ticket sales, donations and performance fees. Based on price data from BroadwayLeague.com, I estimate that copyrighted plays pay about 25% of their revenue in royalties for the script.¹⁴ I also estimate playwrights spend 68 cents writing new plays for every dollar of licensing revenue. Therefore, I calculate that production of new plays is $\$9.8 \text{ billion} * 25\% * 68\% = \1.2 billion .

I use a variety of datasets to measure play revenue 1929 to 2009. From 1998 to 2009, I use the 2009 Service Annual Survey and 2001 Service Annual Survey. From 1972 to 1997, I use the 1997 Economic Census and Census of Services 1972-1992. Before 1972, I use BEA's pre-existing time series of consumer spending on live entertainment. I then interpolate to fill in missing years and benchmark my estimates to the 2007 Economic Census.

Greeting Card Designs: In the 2007 Economic Census, US publishing companies sold \$4.5 billion worth of greeting cards in 2007.¹⁵ Based on the industry literature, I estimate that publishers spent 9% of that revenue, or \$0.4 billion, designing new cards.

I use a variety of datasets to measure revenue 1929 to 2009. From 1998 to 2009, the Service Annual Survey gives greeting card sales. Before then, I use the 1992 Economic Census and the Census of Manufacturers 1935-1992. I then interpolate to fill in the missing years and benchmark my estimates to the 2007 Economic Census.

¹³ This does not count popular music concerts, which are already in music.

¹⁴ Ticket prices include payments to the play company, theater house and sometimes the promoter. Only a portion of that revenue is counted in the \$9.8 billion. Ticket prices for Shakespeare and other plays off copyrighted are 5%-10% lower. Assuming that non-script costs are identical for Shakespeare plays, I calculate that performing art groups earn 25% less on Shakespeare plays.

¹⁵ Individual greeting cards are short-lived products, but the design is re-used year after year.

Commercial Stock Photography: In 2007 Economic Census, US photography agencies licensed \$1.6 billion worth of photos to advertisers and other clients. Based on the industry literature, I estimate that non-photo costs like advertising account for 25% of total revenue. I also estimate that photographers spend 60 cents shooting new pictures for every dollar of licensing revenue. Therefore, I calculate that photographers spent \$1.6 billion * 75% * 60% = \$0.7 billion shooting new pictures.

I use a variety of datasets to measure revenue 1929 to 2009. From 1998 to 2009, the Service Annual Survey reports annual sales. From 1972 to 1997, I use the 1997 Economic Census and Census of Services 1972-1992. Before then, I use the US Population Census to estimate aggregate income for photographers. I then interpolate to fill in the missing years and benchmark my estimates to the 2007 Economic Census.

II. Prices and Real Production

In this section, I measure the real cost of art production without adjusting for artistic merit. The consumers experience has not, of course, remained fixed over time. For example, DVDs and plasma TV's offer a much better viewing experience than movie theaters and 1950's television sets. However, 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 my price indexes for theatrical movies, music, books, long-lived television and miscellaneous artwork from 1929 to 2009. Figure 3 uses those price indexes and the nominal production data from Figure 1 to calculate real production from 1929 to 2009. I will describe each price index briefly.

Theatrical Movies: The two main inputs for movies are photographic equipment and labor services. BEA has already calculated a price index for photographic equipment. That price index is published in Table 2.4.4U, line 45 (photographic equipment).¹⁷ Before 1959, I use the price index of audio-video, photographic and information processing equipment as a proxy for photo equipment prices. That price index is published in Table 2.4.4, line 14. BEA does not track prices for labor services in the movie industry, so I use BEA's general price index for services. That price index is published in Table 1.1.4, line 6. I then average the two price indexes to get a price index for theatrical movies.

$$\text{Movie Prices in Year X} = (\text{Service Sector Prices}_X)^{0.75} * (\text{Photo Equipment Prices}_X)^{0.25}$$

In other words, services account for about 75% of movie costs and photographic equipment accounts for about 25% of movie costs. Therefore, movie prices are a weighted average of the two price indexes.

The paper 'Theatrical Movies as a Capital Asset' (Soloveichik 2010d) uses IMDB data to measure real movie inputs and calculate a price index for the movie industry. I found that the IMDB price index matches closely with the input-based price index developed earlier. However, IMDB price index is extremely labor intensive to calculate.

¹⁷ This price index is taken from the PCE series, so it only goes back to 1959. Before then, I use the broader price index for video, audio, photographic and information processing equipment as a proxy.

Furthermore, it can be very volatile. Therefore, the input-based price index is better for the national accounts.

Music: The main input for music production is time and energy from the musician. Therefore, I will use service sector prices as a proxy for music production costs.¹⁸

In ‘Music as a Capital Asset’, I also calculated music prices with a consumer-based index. The consumer-based price index starts out by estimating prices for four separate music categories: a)CD’s and other purchased music; b)Royalties from radio and television broadcast; c)Live concert tickets and d)Printed sheet music. I then combined the four price indexes to get an overall music price index.¹⁹ I found that the consumer-based price index tracks service sector prices reasonably closely, but it is more volatile and harder to calculate. Therefore, BEA will use the service sector price index.

Books: My main price index is taken from the BLS’s producer price index (PPI) for book publishers. This price index runs from 1985 to 2009. From 1980 to 1984, I use the BLS’s PPI for magazine publishers as a proxy for book prices. From 1929 to 1979, BEA has a pre-existing price index for recreational books and a pre-existing price index for educational books. These price indexes are given in Table 2.4.4, lines 17 and 22. I create a composite price index:

$$\text{Book Price}_x = (\text{Recreational Book Price}_x)^{0.5} * (\text{Educational Book Price}_x)^{0.5}$$

¹⁸ In theory, I could adjust for audio equipment prices. However, audio equipment is a relatively small share of music production. Therefore, the weight for audio equipment would be very small.

¹⁹ The weights for each index are based on nominal sales for that year. Over the past decade, CD prices have become less important and live concert prices have become more important.

Long-Lived Television Programs: Like movies, the two main inputs for television programs are photographic equipment and labor services. However, the weight for each input is a little different. I assume that fiction television programs like sitcoms, dramas and television movies use the same input mix as theatrical movies (75% labor services and 25% photographic equipment). However, non-fiction television programs like documentaries or cooking shows spend less on labor services and more on photographic equipment. For example, many reality shows have no script or (paid) actors and very limited sets. Instead, they follow subjects in their daily life and then splice scenes together to get a coherent plot. I use the Nielsen data described earlier to estimate the market share for non-fiction television over time. I then calculate:

$$\text{Photo Equipment Weight in Year X} = 0.25 * (\text{Fiction Share}_X) + 0.5 * (\text{Non-fiction Share}_X)$$

$$\text{Television Price}_X = (\text{Service Sector Price}_X)^{1 - \text{Photo Weight}} * (\text{Photo Equip Price}_X)^{\text{Photo Weight}}$$

Miscellaneous Artwork: I calculate separate price indexes for each category.

Theatrical Play Scripts: My main price index is based on BEA's pre-existing index for live theater. That price index is published in Table 2.4.4U, line 211. I then adjust the price index to exclude live music concerts, which are tracked in the music industry.

Greeting Card Designs: The BLS PPI for greeting card publishers provides the main price index. This price index goes back to 1986. Before then, I use a variety of alternative datasets to estimate prices back to 1929.

Greeting Card Designs: My price index is taken from BEA's pre-existing index for photo studio services. That price index is published in Table 2.4.4U, line 217. Before

1959, I use the price index of audio-video, photographic and information processing equipment. That price index is published in Table 2.4.4, line 14.

III. Depreciation Schedules and Capital Stocks

I cannot observe repeated sales 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 in Year 0, \$Y in Year 1 and \$Z in Year 2. Given a discount rate, ρ , the value of a song for each year is:

$$\text{Net Present Value at Release} = X + Y/(1 + \rho) + Z/(1 + \rho)^2$$

$$\text{Net Present Value at Year 1} = Y + Z/(1 + \rho)$$

$$\text{Net Present Value at Year 2} = Z$$

In this paper, I use a discount rate of $\rho = 10\%$ real per year. I chose a high discount rate because the artistic industry is very risky.²¹

In this section, I use a similar technique to estimate depreciation schedule for each artistic category. I start out with industry data that gives sales by individual product and date. For example, the website The-numbers.com reports weekly box office revenue for every major movie since 2006. I use that industry data to estimate revenue by quarter, starting with the first release of the artistic asset and continuing until the revenues are negligible. I also estimate the sales costs for each quarter and calculate quarterly profits from first release onwards. Finally, I calculate net present value of the asset using the

²¹For 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.

formula described above for each quarter from first release until the asset is fully depreciated.

Figure 4 shows my estimates of the depreciation schedule for theatrical movies, books, music, television programs and miscellaneous artwork. I find that theatrical movies and television programs²³ have a relatively long lifespan. In contrast, books and music earn most of their money in the first five year. The main reason for the different lifespans is consumer storage. Theatrical movies and television shows get most of their money from television licensing. Television broadcasts are not durable for consumers.²⁴ Accordingly, the studios get paid each time a classic movie or television episode is replayed. In contrast, books and music get most of their money from selling a durable product. Once they've bought a book, consumers can re-read it without paying more money to the publisher. In this paper, BEA only measures the capital stock of original artwork. Therefore, we count the reprint rights owned by publishing houses – but not the physical books owned by libraries and consumers.

The depreciation schedules in Figure 4 are based on revenue **net** of sales costs. Studios, musicians and authors typically spend a great deal of money advertising their new releases. BEA's general practice is to treat advertising as a current expense. Because advertising is a current expense, I deduct all advertising costs from revenue for that particular year. As a result, first year profits are much lower than first year revenue. In fact, theatrical movies actually have negative profits in the first quarter and therefore gain value early in their lifespan. Another researcher might consider advertising a long-

²³ That depreciation rate is still preliminary and may change significantly in the final version.

²⁴ Consumers can tape a movie or television program when it is first aired and then watch it whenever they chose. In practice, very few people use their DVR for long-term storage. Instead, they watch whatever is on.

lived investment in brand awareness. That researcher would find higher depreciation rates in the first year after release.²⁵

Figure 5 show my estimates of aggregate capital stocks from 1929 to 2009. The data in Figure 5 are based on the real production estimates given in Figure 3 with the depreciation schedules given in Figure 4. On average, long-lived artwork is worth 2% of GDP. However, the GDP share for capital is not constant over time. At first glance, this seems contrary to the fixed GDP share for artistic production seen in Figure 2. However, the differences can be explained by changing art categories. Television programs and movies have a much longer lifespan than books or music. Therefore, the capital value of pre-existing artwork is larger when television programs and artwork are more important and smaller when books or music is more important.

Conclusion

Classifying artistic production as capital investment would change our measures of GDP and capital stock. I find that artistic production was \$49.7 billion in 2007, 0.35% of GDP. Figure 6 shows artistic production as a share of GDP from 1929 to 2009. Between 1980 to 2009, artistic production grew from 0.23% of nominal GDP to 0.34% of nominal GDP. Accordingly, GDP growth for that period increases slightly when artistic production is treated as a capital investment. Before 1960, artistic production has

²⁵ However, the capital value of artwork + capitalized advertising would be identical to my capital values for artwork alone.

hovered around 0.25% of GDP. Therefore, GDP growth from 1929 to 1960 does not change significantly when artistic production is treated as an investment.

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 5% of intangible capital.

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Figure 1: Nominal Production by Art Category

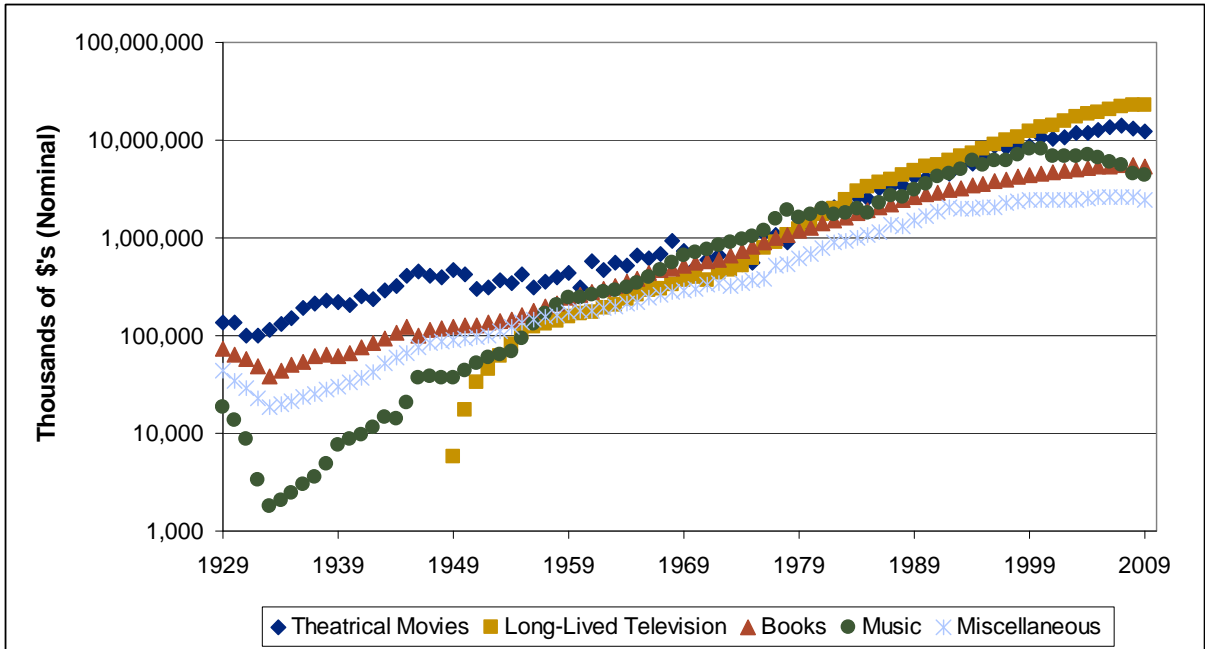


Figure 2: Price Indexes by Art Category

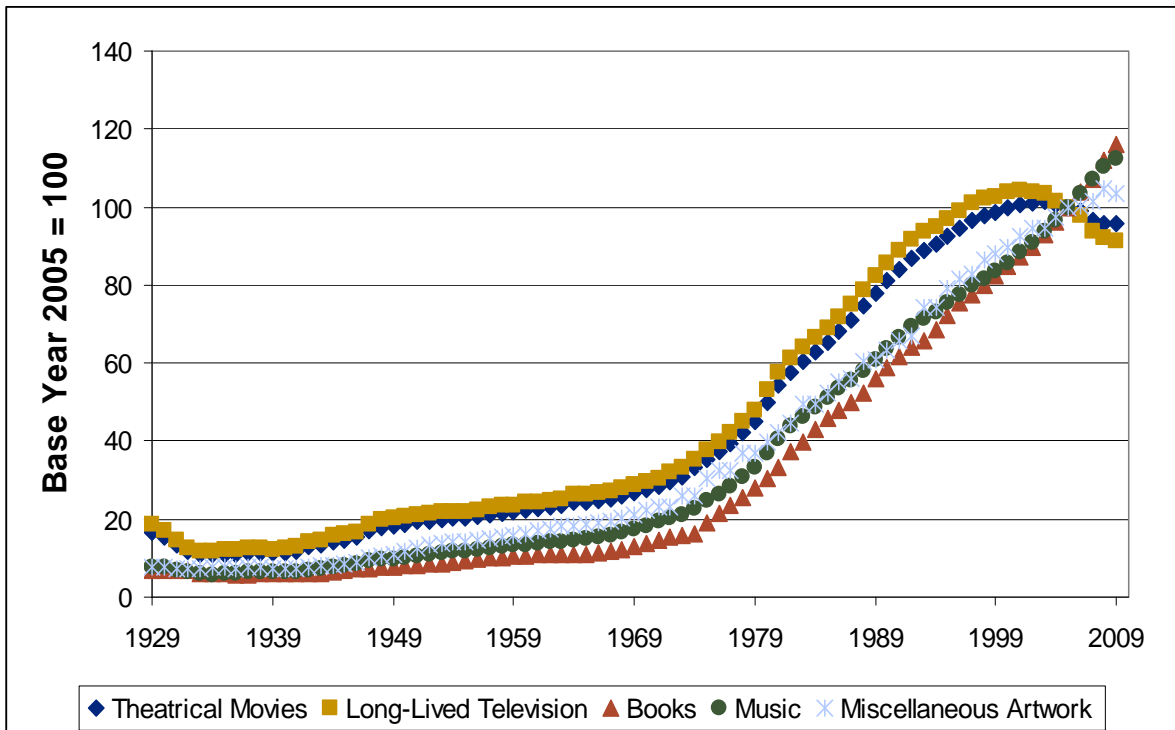


Figure 3: Real Production by Art Category

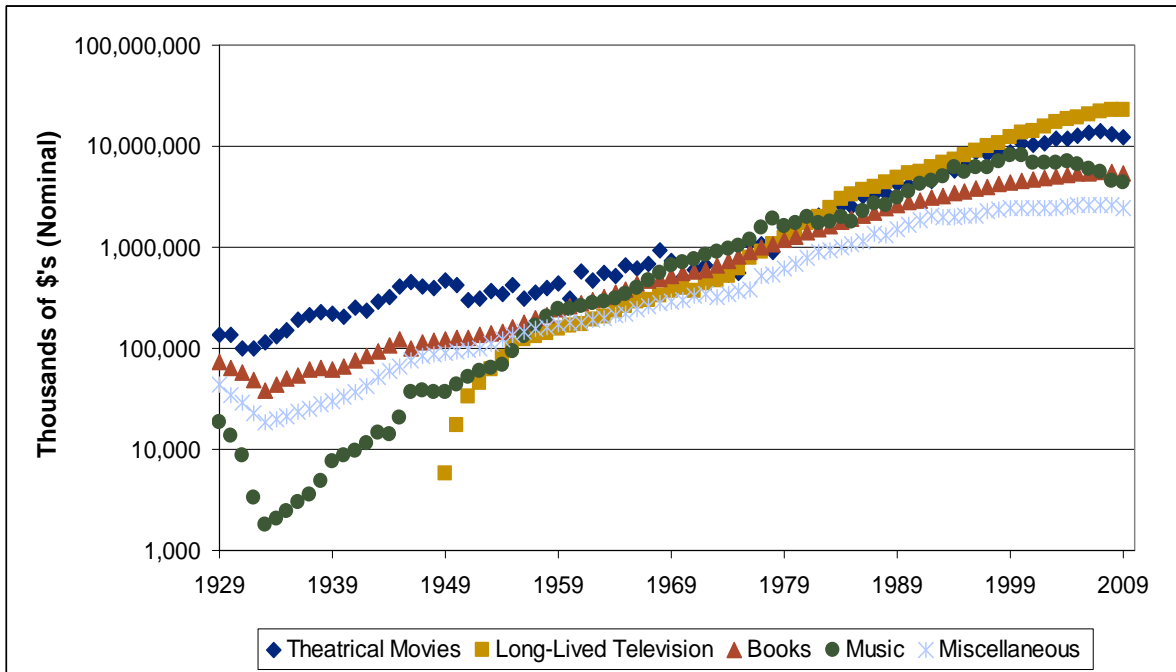


Figure 4: Depreciation Schedules by Art Category

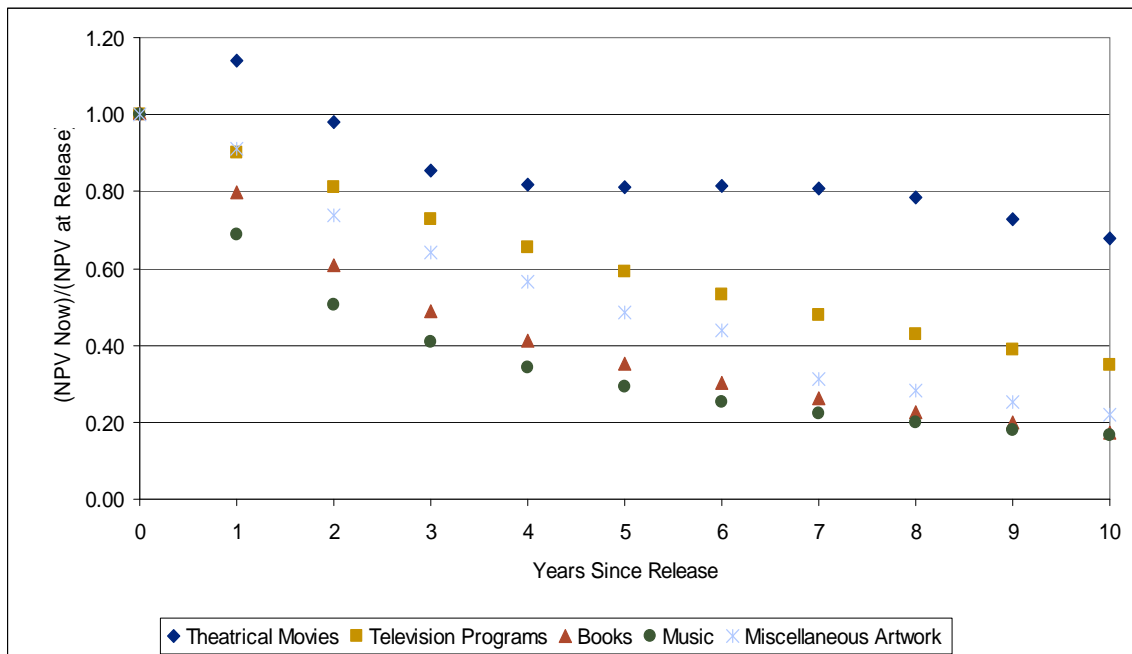


Figure 5: Capital Stocks by Art Category

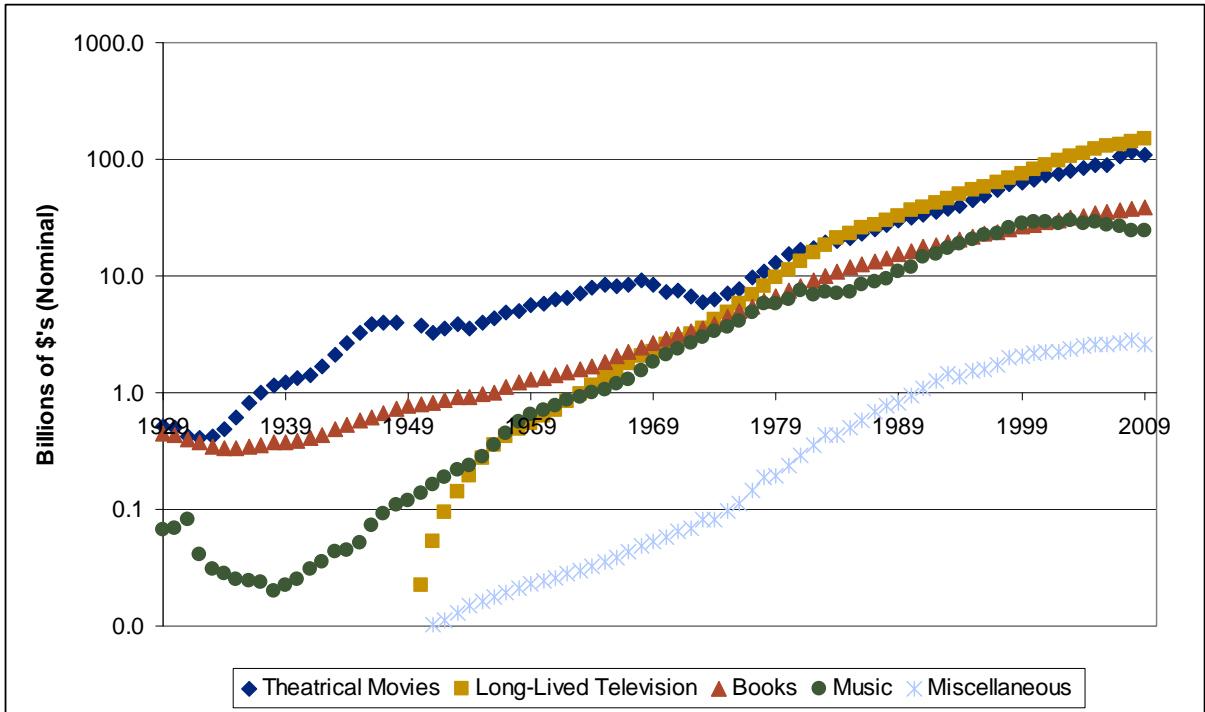


Figure 6: Artwork Relative to GDP

