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Abstract

With the growing trend of internet penetration, researchers have conducted studies to determine its economic implications. Specifically, many studies have sought to determine what, if any, effect does internet penetration have on market competition. This study seeks to contribute to this body of work by examining the internet and competition in the movie industry. While previous studies have used variables such as product pricing as measures of competition, this study looks at indicators of market structure, such as the distribution of market shares and the Herfindahl Index. Ultimately, the results indicate that internet penetration may increase the market shares of smaller studios while decreasing the market shares of smaller and mid-sized ones. Moreover, the effect may be more pronounced when the internet is first introduced than when it grows thereafter. Finally, the study yields no conclusive results for whether internet penetration affects market concentration when measured by Herfindahl Index.

I. Introduction

The internet is a technological breakthrough, and its use has increased over the past few decades. This is a trend with important implications for the dynamic of firms and consumers optimizing. Consumers, for example, may face lower information costs, and therefore be better equipped to maximize utility by finding a better match to their tastes or a higher quality product. On the other hand, firms may have greater access to information about consumers which, when harnessed properly, enables them to gain an advantage in maximizing profit. Additionally, internet acts as a medium through which products can be advertised, and certain firms may gain an edge by more effectively exploiting it.

As a result, one might reasonably expect the internet to affect the overall structure of markets. Just how it affects markets, however, is unclear, as these aforementioned effects are not necessarily in the same direction. In the former case, with greater consumer access to information, the market in question might look more competitive and less concentrated. Indeed, consumers may discover films from small or independent studios that they may not have otherwise. For the latter cases, the direction of the effect depends on what types of firms gain the advantage: less concentrated if it is the smaller firms, and more concentrated if it is the larger ones. For instance, large firms might be able to easily make the investments necessary to obtain information about consumers—such as browsing history—which would allow them to more effectively market their products. Thus, market shares would become more concentrated among larger firms.

Taking the sum of these conflicting effects, one would obtain the extent of the internet's effect on market concentration—and more importantly, its direction. It is necessary to do

empirical work in order to evaluate the overall effect from the conflicting channels through which internet affects market concentration. Doing so yields knowledge which is important for firms and consumers, whose welfare is at stake in the optimization game. It is also useful for policymakers and competition authorities. The DOJ, for example, often uses studies measuring the concentration of particular industries in evaluating mergers. Specifically, the DOJ may look at market concentration before and after a proposed merger in order to determine whether to allow it. This study aims to obtain somewhat similar information for the movie industry, but instead of evaluating the effects of a merger on concentration, it evaluates the effects of internet penetration. By doing so, the study contributes to a body of work which has been done on the internet's effect on market structure. While previous research has tended to focus on the internet and pricing (Baylis 2002, Brown 2000, Ellison 2009, Orlov 2011, etc.), this study looks at how overall market structure is affected by the internet. Moreover, it analyzes the structure of the movie market in particular, which, to my knowledge, has not been done with respect to the effect of internet penetration.

I examine the internet's impact on the structure of markets and attempt to gain some insight on its magnitude and direction. I focus on a single industry: the movie industry. Doing so runs the risk of yielding results specific only to this industry; however, it also makes it easier to control for other variables and reach a more decisive conclusion. In Section II, I review some of the research which has been done on this topic of internet and market structure. In Section III, I offer a theoretical model which explains some possible channels through which the internet might affect the concentration of movie markets. Using the theoretical model, I will derive an empirical model in Section IV, which may help to estimate the sum of the effects of these channels. With this, I will be able to make an assessment of the overall direction and magnitude

of the internet's effect on the industry as a whole. I will do this by analyzing a data set—which will be described further in Section V—that features information on movie revenues, the studios who earned these revenues, indicators for internet penetration, and other indicators which will be used as control variables.

II. Literature

Research on how the internet affects market competition has reached differing conclusions. Baylis and Perloff (2002), for example, examine the prices of a digital camera and a scanner sold by different online retailers and find wide variation. Moreover, their results point to this price dispersion being the result of attempts to discriminate between informed and uninformed consumers, rather than differences in the quality of service. Put simply, their research suggests that the increased access to information offered by the internet does not necessarily inhibit firms' ability to exercise market power, that even online marketplaces can exhibit non-competitive features such as price discrimination. However, they do not have a clear point of reference; that is, they do not compare the price dispersion in the internet marketplace to that which might exist in the physical marketplace. They make a convincing case against the intuition that the low information costs of the internet lead to something resembling perfect competition; they do not, however, examine whether the internet has had at least some effect in this direction.

Ellison and Ellison (2009) also examine the effect of internet use on consumer search costs, and its corresponding effect on market structure. They choose to examine a market for which pricing competition over the internet is particularly important: computer parts. To do this, they look at the website Pricewatch.com, a price search engine which is frequented by informed consumers of computer parts. Essentially, the purpose of the site is to foster lower information

costs; consumers use the search engine to easily compare and find the lowest prices for similar or homogenous products. The site is at times effective in its purpose, according to the findings of Ellison and Ellison; for example, by examining computer memory modules specifically, they find that firms can face a demand elasticity of -20 or lower for their lowest quality products . Put another way, the greater access to information offered by the internet makes consumers more sensitive to changes in price. One might expect this if they are more easily able to see price differences among firms with similar or homogenous products. In this way, internet penetration pulls the market for computer parts in a more competitive direction and works to make it less concentrated. However, this is not the only direction in which the internet pulls, and the aforementioned case of highly negative elasticity does not always hold. Ellison and Ellison also find that firms make efforts to counter the effects of decreased search costs; that is, they seek to increase them so that they are not forced to compete as rigidly in their pricing. They refer to this practice as "obfuscation," and their findings suggest that it is effective: profits as well as markups increase as a result of it. In sum, the findings of Ellison and Ellison find that the internet decreases search costs for consumers, but also makes it easier for firms to raise search costs in turn. It is unclear which phenomenon is more important, as it appears to differ on a case-by-case basis. As a result, one cannot determine the net effect on the overall structure of the market.

Eugene Orlov (2011) does a similar analysis of the airline industry. He concludes that in regions of the US with greater access to the internet, price dispersion within firms tends to be higher, while dispersion between firms is not affected significantly. These results suggest that the internet makes it easier for firms to discriminate prices among their own customers. However, Orlov also concludes that the average prices in these areas with more internet

penetration tend to be lower. Put simply, though the prices are more discriminated, they are lower overall and therefore might offer consumers a higher surplus. Another study by Brown and Goolsbee (2000) examines prices of life insurance, and offers a similar conclusion. Their results indicate that increases in internet usage among groups of customers decreases prices and leads to higher consumers surpluses, controlling for individual and policy characteristics. In other words, the market is more competitive. However, it is unclear whether discrimination increases among firms' own customers, as Orlov suggested occurs in the airline industry.

From these studies, one might conclude, overall, that the internet can enhance or inhibit competition, perhaps simultaneously. In other words, the intuition offered earlier seems to hold; the internet affects market concentration through various channels which differ in direction. In the next section, I establish a theoretical model which explains these channels in greater detail. They key will then be to determine the sum of the effects of these channels and whether they more or less nullify one another, or whether an effect in one direction overpowers the other.

III. Theoretical Model

These previously cited studies determined internet's effect on competition by looking at price levels and dispersion. For the movie industry, this approach is problematic, as there appears to be little variation in prices. For example, the price of a movie ticket will likely not vary too much, at least not immediately following release. In spite of this apparent price uniformity, it would be difficult to argue that the movie industry resembles anything close to perfect competition, as products are not homogenous and studios of different sizes face different costs. So, another tradeoff variable is needed. In this model, the variable will be quality. In other words, the model will operate under the assumption that it is more important for consumers, in

maximizing utility, to choose a movie with a high quality, rather than a low price. Moreover, it will be assumed that firms, in maximizing profits, will have quality as an important choice variable, as opposed to prices. That is, firms compete by choosing quality. Quality will operate similarly to the way pricing does in traditional profit-maximization models. For example, increasing quality will also increase costs, a result of hiring more and higher quality individuals as components of the cast, crew, and staff. This positive effect on costs is similar to the negative effect on revenues one might obtain by lowering price in a traditional profit model. Moreover, just as lowering price also increases sales, increasing quality does the same.

Now that the purpose behind including this variable has been established, the utility a consumer *i* gains from watching a movie *j* in a market *t*, where a market refers to a country year, is

$$U_{ijt} = \theta_j f_i(Internet) + \theta_j \beta X_{it} + \theta_j \psi_{jt} + \alpha + \theta_j \varepsilon_{ijt} \qquad \textbf{(1)}$$

where θ represents the quality of the movie *j*. The first term interacts quality with a function of internet to capture that the internet affects the way consumers perceive quality. For example, a consumer with access to online user reviews may perceive the quality of a movie differently than someone without access to such information. This is a multiplicative effect; i.e., in the aforementioned case, greater internet penetration magnifies the effect that quality has on the consumer's utility. In this way, internet operates much like it does in Ellison and Ellison's model, in which decreased internet search costs make consumers more sensitive to changes in price (Ellison 2009). *X* represents observable characteristics of the individual *i*, other than perception of quality, which affect his or her utility, such as personal taste. ψ represents other observable characteristics related to the movie *j* and the country year *t*, such as time of release. ε

is the random shock variable. Quality is also multiplied by these three terms because each of them can also be expected to influence a consumer's perception of the quality of a movie, or the weight they give to quality. For example, the importance of quality to consumers may differ depending on if they are young or old. This could be captured in the model through the interaction between θ and age, which could be one of the variables represented by *X*. Finally, the last term in the model α is simply a constant, and works as a shifter on the utility of watching movies.

One can take this utility function (1) and divide it by quality θ_j to obtain a more workable linear equation, where $\tilde{U} = \frac{U}{\theta_j}$:

$$\tilde{U}_{ijt} = f(Internet) + \beta X_{it} + \psi_{jt} + \frac{\alpha}{\theta_j} + \varepsilon_{ijt} \qquad \textbf{(2)}$$

We normalize the utility of an outside option, defined as watching a movie from a small studio (market share < 0.01), as

$$\tilde{U}_{i0t} = \varepsilon_{i0t}$$

The consumer chooses among available movies, choosing to watch a movie from a large or a small studio. The consumer chooses a movie *j* if the utility he or she stands to gain is greater than the maximum utility which could be gained from the other choices *k*. That is,

$$\tilde{U}_{ijt} > \max_{k \in \Omega} \tilde{U}_{ikt} \qquad \textbf{(3)}$$

Where Ω refers to the set of movies available to consumer *i*. Thus, the probability that a consumer chooses movie *j* is the probability that this condition (3) holds. If it is assumed that the error term ε follows an extreme value type 1 distribution, this probability is equal to:

$$P(\widetilde{U}_{ijt} > \max_{k\in\Omega} \widetilde{U}_{ikt}) = \frac{\exp(f(Internet) + \beta X_{it} + \psi_{jt} + \frac{\alpha}{\theta_j})}{1 + \sum_k \exp(f(Internet) + \beta X_{it} + \psi_{jt} + \frac{\alpha}{\theta_j})} \quad \textbf{(4)}$$

We assume that $X_{it} = X_t$. The market share *s* of movie *j* in period *t*, then, is the size of the market *M* for all movies in country year *t* times this probability (4):

$$s_{jt} = M_t * \frac{\exp(f(Internet) + \beta X_t + \psi_{jt} + \frac{\alpha}{\theta_j})}{1 + \sum_k \exp(f(Internet) + \beta X_t + \psi_{jt} + \frac{\alpha}{\theta_j})} \quad \textbf{(5)}$$

One can convert this (5) to the market share of a studio *f* by summing this value for all *N* movies produced by that studio:

$$s_{ft} = \sum_{j\in\Omega_t^f} M_t * \frac{\exp(f(Internet) + \beta X_{it} + \psi_{jt} + \frac{\alpha}{\theta_j})}{1 + \sum_k \exp(f(Internet) + \beta X_{it} + \psi_{jt} + \frac{\alpha}{\theta_j})} \quad \textbf{(6)}$$

Where Ω_t^f is the set of movies produced by firm f. So, the ratio between the market share of studio f (6) and the share of consumers that watch a movie from a smaller studio $s_0 = M_t * \frac{1}{1+\sum_k \exp(U_{ikt})}$ is

$$\frac{s_{ft}}{s_{0t}} = M_t * \exp(f(Internet) + \beta X_t) \sum_{j\in\Omega_t^f} \exp(\psi_{jt} + \frac{\alpha}{\theta_j})$$

So, if $\psi_{jt} = \psi_t$ and $X_i = X_t$, then

$$\frac{s_{ft}}{s_{0t}} = M_t * \exp(f(Internet) + \beta X_t + \psi_t + \tilde{\theta}_{ft})$$

with $\tilde{\theta}_{ft} = log \sum_{j \in \Omega t} \exp(\frac{\alpha}{\theta_j})$. One can then take logs to find that:

$$\log s_{ft} - \log s_{0t} = f(Internet) + \beta X_t + \tilde{\theta}_{ft} + \tilde{\psi}_t \text{ where } \tilde{\psi}_t = \psi_t + log M_t$$

On the firm side of the model, each firm *f* maximizes profits from all movies *j* produced in country year *t* by, in part, choosing quality θ. That is,

$$\max_{\theta} Profit_f = \sum_{j \in \Omega_t^f} P * M_t * S_j(\theta_j, Internet, X_t, \psi_{jt}) - Costs(\theta_j, Internet, z_{jt})$$

The profit function follows the traditional form of revenue minus costs. Revenue for a movie *j* is equal to price *P* times quantity. Quantity is equal to the size of the market *M* times the market share of the movie S_j, which in the consumer side of the model, is established to be a function of quality, internet, and other observable variables related to the individual and the movie. Subtracted from revenues are the costs, which are a function of quality, internet, and other variables z_{jt} which determine costs, such as wages. Quality, as discussed earlier, is the primary choice variable for firms in the model. The intuition behind internet's inclusion here has also been discussed. For example, the internet may reduce the costs of obtaining information about consumers and therefore make it easier to discriminate prices. Put simply, the internet may make it less costly for firms to market their products.[1]

IV. Empirical Model

[1] There is a potential endogeneity problem with quality, in that it is likely correlated with the error term. Since quality is not observed (see section V), addressing this problem with instrumental variables, for example, is out of the scope of this study. If future studies are conducted, they should work toward solving this problem.

The above theoretical model established possible channels through which internet might affect market concentration. First, the internet affects consumer choice which then affects the profits of firms and, in turn, the concentration of the market. Second, the internet affects costs, which then also affect profits and therefore market concentration. As discussed before, with just the theoretical model, it is impossible to tell the direction of the effect internet ultimately has on market concentration. As a result, it is necessary to conduct empirical analysis.

First, and most simply, my analysis consists of a descriptive approach; that is, looking at both variables and how they have changed over different country years. First, I look at the distribution of market shares of all studios in different markets with different levels of internet penetration, compare them, and draw rough conclusions accordingly. I then do the same for the Herfindahl Index. The Herfindahl Index, abbreviated HHI, is often used by entities such as the DOJ and the FTC as a measure of market concentration. With it, they might, for example, evaluate proposed mergers. HHI is calculated by summing the squares of the market shares of all firms and multiplying by 10,000. A higher (lower) HHI indicates a more (less) concentrated market.

This approach is simple, but preliminary and with an obvious weakness: one is unable to control for other variables. As a result, I attempt to draw from the theoretical model and obtain a linear equation which can easily be estimated through regression.

Recall that in the theoretical model,

$$\log s_{ft} - \log s_{0t} = f(Internet) + \beta X_t + \tilde{\theta}_{ft} + \tilde{\psi}_t$$

Using available data, an estimable equation based on this model might resemble this:

$$\log s_{fmt} - \log s_{0mt} = \delta_{1t} Internet_{mt} + \delta_{2t} Internet_{mt}^2 + \delta_{3f} X_{fmt} + \tilde{\theta}_{ft} + \tilde{\psi}_t + \varepsilon_{fmt}$$

Where f denotes the firm, m the country and t the year. The term ε_{fmt} captures some potential measurement errors and X_{fmt} are firm-country specific controls that can vary over time. The dependent variable here is the log of the market share of a firm *f*. *Internet* represents a measure of internet penetration, and the parameter δ_1 internet penetration's estimated linear effect on the market share. The model also includes a squared variable for internet penetration. This is to account for the possibility that internet penetration has a non-linear effect on market shares. Together, these two variables, *Internet* and *Internet^2* will comprise the main independent variables of interest.

To see how the effect of internet penetration on market share might differ depending on the initial size of the firm, quantile regressions are also run. Essentially, this will produce separate coefficients for the effect of *Internet* and *Internet^2* at different quantiles of market share. In this model, the regression is done at every tenth quantile; that is, a separate regression is produced for market shares at the 10th, 20th, 30th,etc. percentile. By observing how the coefficients change as market share increases, one might determine if internet penetration affects large and small firms differently.

A similar approach can be taken with the Herfindahl index:

$$HHI_{mt} = \delta_1 Internet_{mt} + \delta_2 Internet_{mt}^2 + \delta_3 NumberMovies_{mt} + \delta_4 X_{mt} + \alpha_m + \gamma_t + \varepsilon_{mt}$$

Internet, Internet^2, and *X* serve the same purpose as in the previous model. However, there are other control variables which will be uniquely necessary for this model. One of these is

NumberMovies or the number of movies produced in the market, the effect of which is represented by δ_3.

The effect of internet penetration on the number of firms in a market will also be evaluated. The model for this dependent variable is essentially identical to that of HHI shown above, except *NumberMovies* is not used:

$$NumberStudios_{mt} = \delta_1 Internet_{mt} + \delta_2 Internet_{mt}^2 + \delta_3 X_{mt} + \alpha_m + \gamma_t + \varepsilon_{mt}$$

Here, it should be noted that there are potential problems with the Internet variables being endogenous. That is, it is likely that internet penetration is correlated with the error terms in the models. This is addressed using an instrumental variable approach.

Using the data set described in the next section, I run regressions based on these equations and evaluate the results to determine the effect internet penetration might have on the market structure.

V. Data

In order to take the empirical approach described, I will use a data set which includes information on movies released from 1999-2012 in several different countries, collected from the websites IMDB and boxofficemojo. Variables include studio, revenue, budget, and distributor. Further, for each entry, there are two variables for internet penetration, which are entered by country and by year: internet users per 100 people, and broadband subscribers per 100 people. These data are collected from World Bank indicators. Additional indicators include GDP growth and unemployment rate, were added for each country year when available. This was done so that that they can be used as control variables which help to explain market concentration.

Additionally, data on wages for US workers in arts, design, entertainment, sports, and media occupations were collected from the Bureau of Labor Statistics and were merged with the dataset.

After merging this information, variables were generated. Generated first were the main dependent variables of interest. First, the market shares of each studio in a given country-year were calculated. Next, a variable was generated which normalizes a market share for an outside option for each country-year. The outside option is defined as watching a movie produced by a small studio, as opposed to watching movie from a large studio. Logs were then taken for both of these variables and then subtracted from one another to get the first dependent variable: log of the ratio of market shares ($\log s_{fmt} - \log s_{0mt}$). The next dependent variable, Herfindahl Index, was calculated twice for each country year. The reason for this is that the dataset contains a lot of missing information for the studio which produced each movie. So, an upper and lower bound HHI were both calculated, with the upper bound assuming each missing studio is the same firm, and the lower bound assuming that each missing studio is a different firm. The true market HHI could be said to lie somewhere in between. Finally, a variable was generated counting the number of Studios in a given country year.

In addition to the dependent variables, several independent variables were generated. As in the empirical model, the indicators for internet penetration were not the sole variables used in regression. Indeed, it was also necessary to create the squared variables (for both Internet Users and Broadband Access per 100 people). Moreover, a variable counting the number of movies in each market (country-year) was created for use in the HHI regressions, in the same way as the variable counting the number of studios.

VI. Descriptive Analysis

The first two figures (Figures 1 and 2) in the Appendix show the trends of the two main indicators of Internet penetration that are used in the analysis, across all years for which data are available (1999-2012). Four separate lines are used to indicate the trend for different countries: one resembles all countries, one resembles the United States, and the other two resemble countries with above or below median levels of internet penetration. The countries represented by these last two lines were categorized as follows: the mean level of internet penetration was taken for each country across all years, and then grouped depending if this mean was above or below the median (when each value is grouped in ascending order across all country-years). This was done so that the countries represented by each line remain consistent across all of the years.

Data were only available for the United States for years 1999 through 2003. Other countries only appear in 2003 and each year thereafter. From here, each group of countries follows the same general increasing trend. For Internet Users (Figure 1), the United States deviates from the increasing trend and decreases instead from around 2007 until 2011. This is perhaps related to the economic crisis of this period, though it is unclear why this did not also occur in other countries. Aside from this, the increasing trend in Figure 1 follows a relatively constant slope; in other words, the trend is fairly linear. In contrast, the trend for broadband subscribers (Figure 2) increases at an increasing rate until an inflection point at around 2006, and then increases at a decreasing rate. One might say that this indicates that the broadband first caught on earlier in the decade and thus grew rapidly as people wanted the new technology available to them in their home. Then, growth slowed after the newness faded.

Despite the subtleties of the trends, one can easily conclude from these first two figures that internet penetration has increased since the early 2000s, and has done so in all types of countries in the dataset. The trend is not so clear, however, for the Herfindahl index. Figures 3 and 4 indicate the trends for the upper and lower bound Herdindahl indexes respectively, for different countries grouped the same way as in the previous two figures. Here, one can see that the upper and lower bound Herfindahl indexes follow much different trends. The upper bound graph (Figure 3) shows that market concentration increased, reached a peak, and then began to decrease. The lower bound graph (Figure 4), on the other hand, tends to decrease, reach a minimum, and then increase. The lower bound trend seems not to be as steady as that of the upper bound, but the trends are nonetheless essentially the opposite. With this, one cannot say for certain what the exact trend of market concentration in the movie industry was over the 2000s decade. One can say that it lies somewhere between the upper and lower bound, but the trends differ so wildly that it is difficult to assess where in between the true trend lies. However, one might use the trend of market concentration in the United States to make a guess. The United States is the only country for which studio data are complete; that is, there are no missing values for the studio variable, and thus, the upper and lower bound Herfindahl Indexes for the United States are the same (hence why its trends in Figures 3 and 4 are the same). It is perhaps fitting, then, that the United States trend lies close to the middle of the two aforementioned trends; market concentration fluctuates up and down, but does not really increase or decrease overall. It might be reasonable to assume that market concentration for all countries followed such a trend: neither decreasing nor increasing in a clear pattern, remaining relatively unchanged overall.

Overall, then, internet penetration has increased while market concentration has not unambiguously increased or decreased. Figures 5, 6, and 7 illustrate the trend of the other main

dependent variable of interest: studio market shares (or the log of the ratio of market shares, specifically). Countries are grouped as before in these density graphs. First, Figure 5 shows how the distribution of market shares changed over ten years, from 2002 to 2012. In both years, there seems to be a group of both mid-sized and large-sized studios, hence the two "bumps" in the density curve. It is plain to see that the density for the mid-sized group increased from 2002 to 2012, as this bump increases in height. At the same time, the large group makes up a smaller share of the density curve in 2012 versus 2002. Thus, one can conclude that in the United States, the distribution of market shares changed so that there were more smaller and mid-sized firms and less large ones.

One can find a somewhat similar trend in Figure 6, which shows the distribution of market shares for firms with above median internet in the same two years. In 2002, the market shares are distributed such that the larger firms dominate, hence the high peak on the right and short tails. In 2012, however, the left tail of the function becomes much wider and the peak at the high end goes down considerably. Essentially, this means that the distribution of market shares for countries with above median internet shifted toward smaller and mid-sized firms making up a larger part of the market from 2002 to 2012. This is the same trend that was found in Figure 5. Figure 7, which does the same for countries with below median internet, also shows a similar trend, though it is not as pronounced. In 2002, there is a peak on the right side, and in 2012, the peak lowers and the left tail becomes larger. Though it does not do so as much as countries with above median internet, the distribution of market shares for firms with below median internet also shifts toward smaller and mid-sized firms from 2002 to 2012.

Finally, Figure 8 shows the trend for the number of studios in a country year, with the countries grouped in the same way as in Figures 3 and 4. In each group of countries besides that

which only includes the US, the number of studios in the market seems to have either decreased or stayed more or less the same. In the US, however, the number of studios seems to have increased substantially since 1999, with a somewhat large dip understandably occurring in recession year 2009. Aside from this year, the number of studios seems to increase at a decreasing rate.

In sum, internet penetration has generally increased since 1999, while the distribution of market shares has shifted toward small and mid-sized firms in favor of large ones. Meanwhile, market concentration has not changed conclusively in one direction or another, and it is likely that it has hovered around the same level. Moreover, the number of studios has increased substantially in the United States, but not in other countries. This preliminary analysis indicates that an increase in internet penetration correlates with smaller firms gaining a larger share of the market, and thus, that internet promotes competition. Moreover, internet appears to correlate with an increase in the number of studios, at least in the US. However, these results are just preliminary, and it is unclear whether there is a causal effect, and whether these trends were determined by other variables. As a result, regression analysis is necessary, and will be discussed in the following sections.

VII. Baseline Model

Tables 1 and 2 show the results of the baseline regressions, which follow the empirical model established previously. In Table 1, the dependent variable is the Log of the Ratio of Market Shares. The main independent variables of interest are Internet and Internet^2. The regression in run twice, first with Internet Users Per 100 People used as the measure for internet penetration, then again with Broadband Subscribers Per 100 People used as the measure.

Control variables include GDP Growth (from World Bank Indicators), Median Yearly Salary of Directors (from BLS), and fixed effects for Year and Studio. Fixed effects for Studio are not shown because there are too many studios to include each effect. They are still accounted for, but not presented in the tables. This is true for all regressions which include the ratio of market shares as the dependent variable.

The Median Yearly Salary for Directors is one highly significant variable (significant at the 1% level), and its coefficient is negative. In other words, as the wages for directors increases, the market shares of the larger studios tends to decrease relative to smaller studios. This follows intuition, to some extent; wage increases signal increasing costs, which thus mean less profits and lower market shares. Additionally, Internet and Internet^2 are also significant at the 1% level (holding true for both internet users and broadband subscribers). The coefficient of the first is positive, while the coefficient of the second is negative. This indicates that the relationship is U-shaped; as internet penetration increases, the ratio of market shares falls sharply at low levels of internet penetration, but the magnitude of this effect decreases and at one point may actually increase once internet penetration increases to a certain point. So, one could interpret this to mean that if there is low internet penetration in a market, an increase in internet users of 100 will lead to a sharp decrease in market shares, thus making the market less concentrated. However, if the level of internet penetration is already high, an increase of internet users by 100 will not change market shares very much, or may in fact increase market shares and make the market more concentrated.

Table 2 shows the results of the regressions on Herfindahl Index. The first two columns feature regressions on the upper bound, while the second two feature regressions on the lower bound. Like before, Internet and Internet^2 are the main independent variables of interest, and

the regression is repeated for both measures of internet penetration available in the dataset. Additional control variables include GDP Growth, Number of Movies in the market (country-year), and fixed effects for year and country. Country fixed effects are hidden in the same way studio fixed effects were hidden in Table 2.

Internet and Internet^2 are insignificant for both regressions on the upper bound Herfindahl Index. With this, one might say that internet penetration does not conclusively affect market concentration positively or negatively. However, Internet^2 is significant and negative when regressed on the lower bound Herfindahl Index, and when Internet Users is used as the measure of internet penetration. Moreover, Internet and Internet^2 are both significant when regressed on lower bound HHI and when Broadband Subscribers is used as the measure of internet penetration. The coefficients are positive and negative, respectively, as is the case in Table 1. These results more or less confirm what was found in Table 1, that an increase in internet penetration will have a different effect on market concentration depending on its initial level. If penetration is initially low, concentration will decrease; if it is initially high, concentration will not change as much and will perhaps increase. However, regressions were done on the upper and lower bound HHI because of missing values, and so that the true effect could be approximated as somewhere in between. Because these results do not show up in both regressions, one should exercise caution in drawing any conclusions. Indeed, there is no reason to believe that the effect of internet penetration on market concentration resembles that found in the lower bound regressions, because there are no significant results from the upper bound regressions that can be compared.

Overall, then, these baseline models provide modest evidence that the internet can both positively and negatively affect the market share of firms, depending on the initial level of

penetration. However, these results should be taken mostly with a grain of salt, because they are not necessarily consistent. Moreover, these regressions fail to address the potential endogeneity problem, of internet penetration being correlated with the error term. This problem is addressed in the next section.

VIII. Instrumental Variable Model

Tables 3 and 4 feature the results of instrumental variable regressions. An instrumental variable approach is necessary because of potential endogeneity problems with the Internet variables; they may be correlated with the error term. Table 3 displays the results of the market share ratio regressions, as they were done before, but with the Foreign Direct Investment and Investment in Telecommunications (World Bank Indicators) used as instruments for the Internet and Internet Squared variables. Fixed effects for year are once again included, but with fewer years. This is because data for Investment in Telecommunications is not available for every year in the dataset. This also has the effect of there being fewer observations included in the regression. Thus, in some ways, this instrumental variable regression is a tradeoff with the previous regression, in that there are fewer controls and observations. Nonetheless, it is worth considering the results since this approach addressees the endogeneity problem.

The results for the Market Share instrumental variable regressions differ from those in Table 1. First, the median wage of directors is no longer significant. Additionally, the effects of Internet and Internet2 have changed signs, with Internet being positive and Internet2 being negative, but these variables are only significant when Internet Users Per 100 people is the measure of internet penetration. Broadband Subscribers Per 100 People, when used, is no longer significant. This change in signs points to a U-shaped relationship like before, but with opposite

implications: if internet penetration is initially low (high), the market shares of firms will increase (decrease/not change).

Table 4 shows the results of instrumental variable regressions for the Herfindahl Index. Different instruments are used for these regressions than previously, however. Since Investment in Telecommunications data are not available for every year, only Foreign Direct Investment was used, in addition to Foreign Direct Investment^2 (so that the number of instruments was equal to the number of instrumented variables). Including Investment in Telecommunications unfortunately reduces the number of observations too dramatically, from 209 to 41. Moreover, the results with this approach are the same as with Investment in Telecommunications as an instrument: all variables are insignificant. In other words, when instruments are used for internet penetration, it does not affect the concentration of movie markets at a statistically significant level. This holds whether Internet Users or Broadband Subscribers is used to measure internet penetration, and also whether the dependent variable is the upper or lower bound Herfindahl Index.

Overall, the instrumental variable models provide some evidence that internet penetration has a U-shaped relationship with market shares, but in the opposite direction of that which was found in the baseline model. However, these results should perhaps not be emphasized because of a lack of valid instruments. Indeed, the correlation coefficients between the instrumented and instrumental variables located on the left give some indication of the validity of the instruments. Investment in telecommunications seems strongly correlated with internet penetration, which means the results of the first model (regression on market shares) should probably be trusted more. Foreign direct investment, however, is not strongly correlated with internet penetration, so it is questionable whether this variable or its squared version are valid instruments. For this

reason, one might trust the results of the first model more than the second, because the second does not feature investment in telecommunications as an instrumental variable. Overall, however, the results of these models should perhaps not be emphasized.

IX. Quantile Regression

The quantile regression model tests for the possibility that internet affects large and small firms differently. The same regression that was run for the baseline model is conducted again here as a quantile regression, and the results can be seen in Table 5. The quantiles are by tens; that is, the regression is run for market share at the tenth percentile, the twentieth, thirtieth, etc. until the ninetieth. Different coefficients are yielded for each level of market share, and with this, we can determine whether the effect of internet penetration differs for large versus small firms. For the lower quantiles (10, 20, 30, 40, 50, and 60), the relationship is with internet penetration is negative; for smaller and mid-sized firms, internet penetration tends to coincide with a decrease in market share. The internet variables are then insignificant until the highest quantile (90), at which point the sign changes. This indicates that an increase in internet users would also increase the market share of large firms.

In sum, the quantile regressions suggest that for small firms, market share decreases as internet penetration increases. Meanwhile, for large firms, market share increases.

X. Regressions on Number of Studios

Finally, in Tables 6 and 7, regressions were run which include the same independent, control, and instrumental variables as in the HHI models; however, the number of studios in a market was used as the dependent variable instead. This is done to test for the possibility that internet penetration affects market structure by inciting an influx of small/independent studios

into the market. This would inevitably decrease the market concentration, but overall, the concentration may stay the same or even increase if the top studios gain disproportionately from internet. However, the regressions yield no results; internet penetration is statistically insignificant in explaining the number of studios in a given market, whether it is instrumented or not.

XI. Conclusion

Overall, it is clear the internet penetration has some effect on the structure of markets in the movie industry. The results of the quantile regressions should be emphasized; one can see fairly strong evidence that internet penetration can be associated with a positive increase in the market shares of the largest studios, which would indicate that internet penetration makes the movie market less competitive. Additionally, the baseline models suggest that the market shares of smaller studios are likely to decrease with greater internet penetration, further suggesting greater concentration and less competition. However, the regressions on Herfindahl Index indicate that internet penetration also seems to have no significant effect on the concentration of movie markets.

These results are seemingly contradictory, but there is a possible explanation. It may be the case that the internet is a resource that is effectively exploited by the largest studios, who can use its information to more effectively market their movies, and thus, gain a larger market share. But simultaneously, the internet allows smaller, independent film studios to promote their films more effectively than was possible previously. This results in a large influx of small/independent film studios into the market. The sum of the two effects, looking at the concentration of the market, is that they more or less cancel each other out. That is, the top firms gain a larger market share,

increasing the concentration of the market, but many small firms with a tiny market share decrease market concentration. This is consistent with the theory offered in the introduction of the paper, that internet penetration could affect the structure of the market in various directions, and could give an advantage to large and small firms alike. However, the regressions on the number of studios in the market yield no significant results. Further, it seems that for most countries in the dataset, the number of studios has either decreased or remained constant. But, the number of studios in the US has increased considerably, and since it also has high internet penetration, there still may be something to this theory. It is also possible, however, that the data are simply not complete enough to draw any meaningful conclusions on the internet's effect on market concentration.

In sum, this study finds that large firms tend to benefit from increases in internet penetration, in that their market shares increase, while small firms find their market shares decrease. However, the difference between the effects fizzles out as internet penetration becomes greater. At the same time, it yields no conclusive results suggesting that internet penetration has any effect on the concentration of the market. It is possible that this due to an increase in the number of firms in the market, but this is also unclear.

Future studies could perhaps run similar regressions with more accurate calculations of Herfindahl Index. Additionally, future studies might look to alternative industries where measures of market concentration are more accurate and readily available. Moreover, they might want to look more into the internet's effect on the number of firms in a market. Finally, future studies could seek to find the magnitude of both effects by performing some sort of structural analysis, be it in the movie industry or another.

If the results of this study are to be trusted, and large firms tend to benefit from internet penetration (especially in places where internet penetration is initially low), competition authorities may find it useful to exercise caution when the internet is introduced. Indeed, it may be necessary to create policy which maintains a competitive marketplace, especially in cases where the internet is first beginning to grow.

Citations

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Brown, Jeffrey R., and Austan Goolsbee. "Does The Internet Make Markets More Competitive? Evidence From The Life Insurance Industry." *NBER Working Paper Series* (2000): n. pag. *NBER*. Web.

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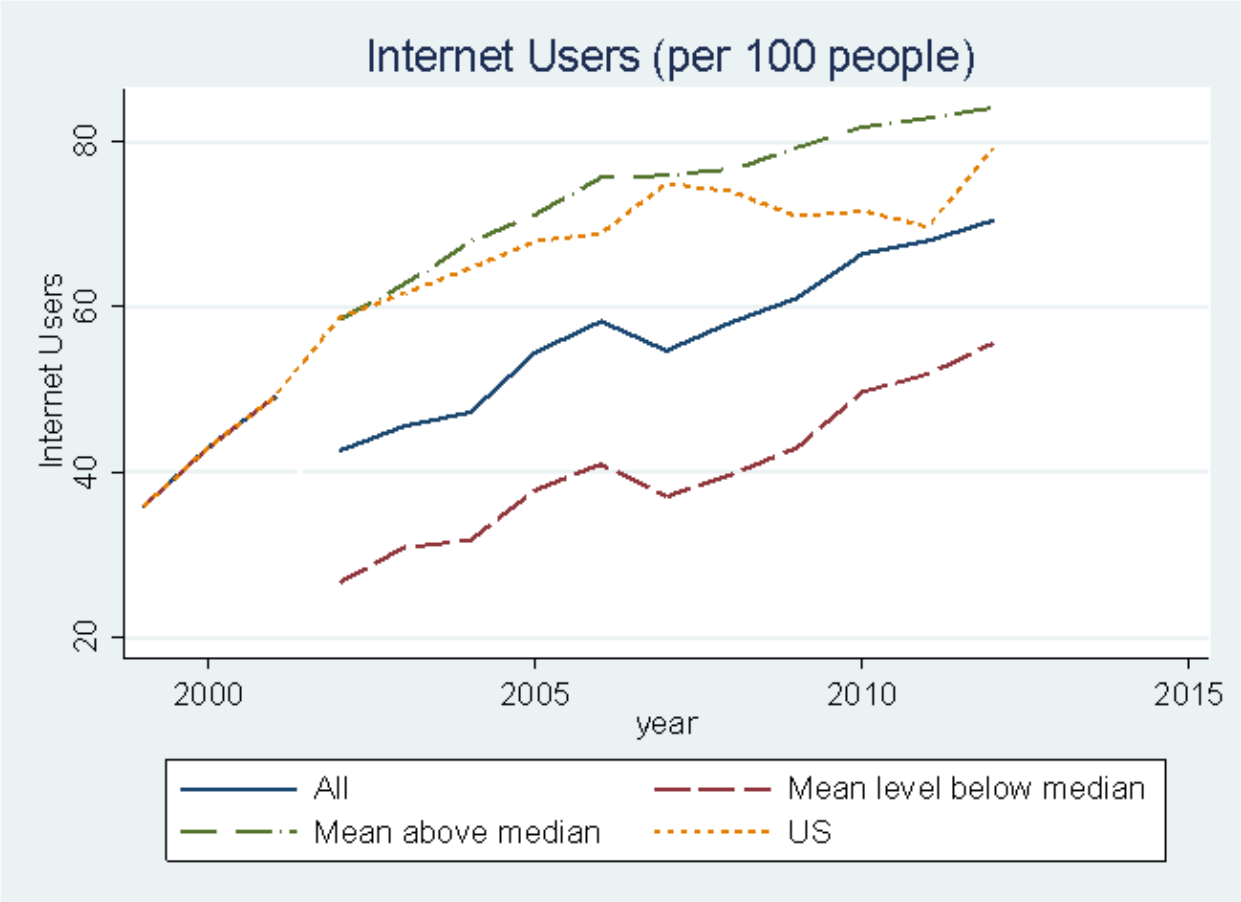
Orlov, Eugene. "How Does The Internet Influence Price Dispersion? Evidence From The Airline Industry." The Journal of Industrial Economics 59.1 (2011): 21-37. Web.

Appendix

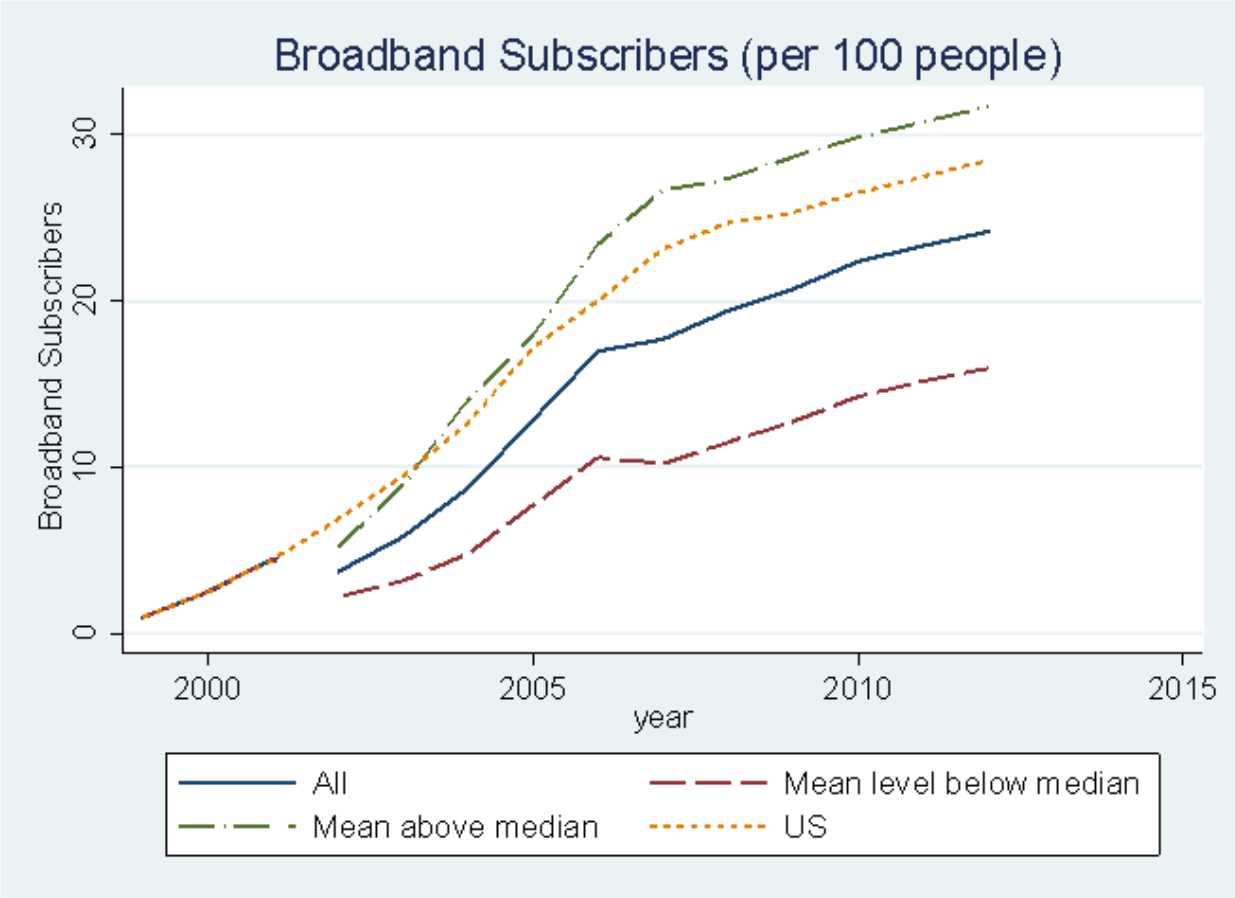
Figure 1



Notes

This graph displays the trend of Internet Users per 100 People, as indicated by the World Bank, over the years 1999-2012. The four different lines indicate different groups of countries: all, countries with above median internet penetration, countries with below median internet penetration, and the United States only. See Section VI (Descriptive Analysis) for more information on how the countries were grouped and for a discussion of the trend.

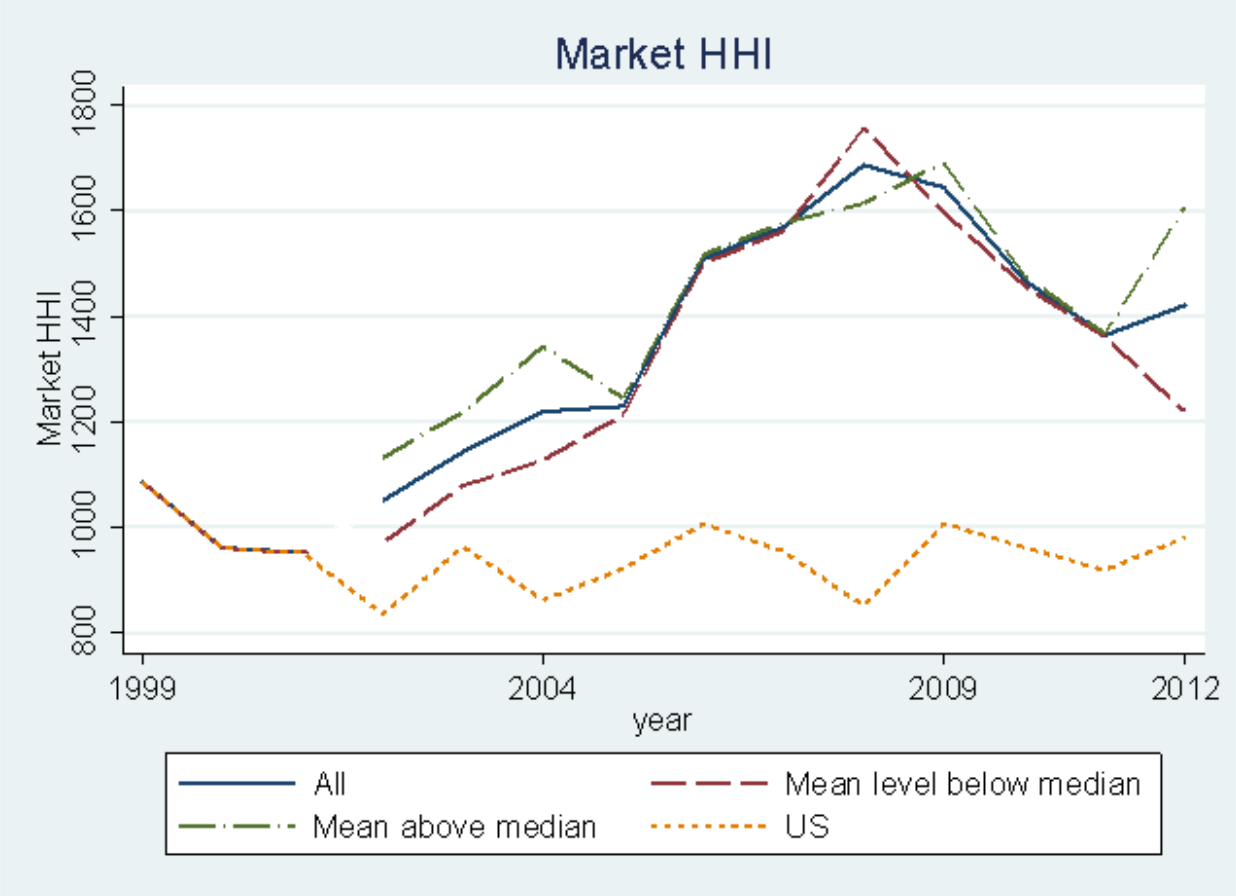
Figure 2



Notes

This graph displays the trend of Broadband Subscribers per 100 People, as indicated by the World Bank, over the years 1999-2012. The four different lines indicate different groups of countries: all, countries with above median internet penetration, countries with below median internet penetration, and the United States only. See Section VI (Descriptive Analysis) for more information on how the countries were grouped and for a discussion of the trend.

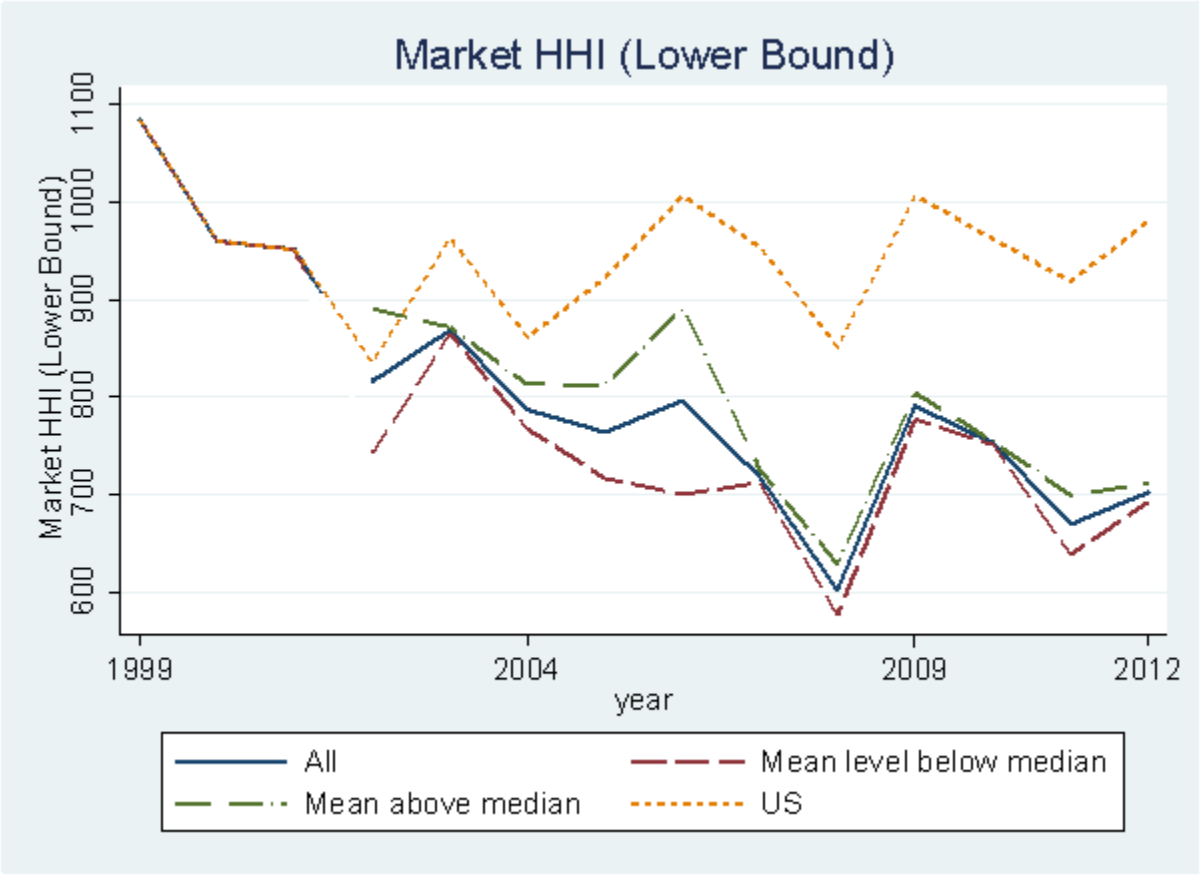
Figure 3



Notes

This graph displays the trend of Herfindahl Index (HHI) in the movie industry over the years 1999-2012. It is the upper bound calculation; that is, HHI is calculated assuming that all missing studios are the same studio. The four different lines indicate different groups of countries: all, countries with above median internet penetration, countries with below median internet penetration, and the United States only. See Section VI (Descriptive Analysis) for more information on how the countries were grouped and for a discussion of the trend.

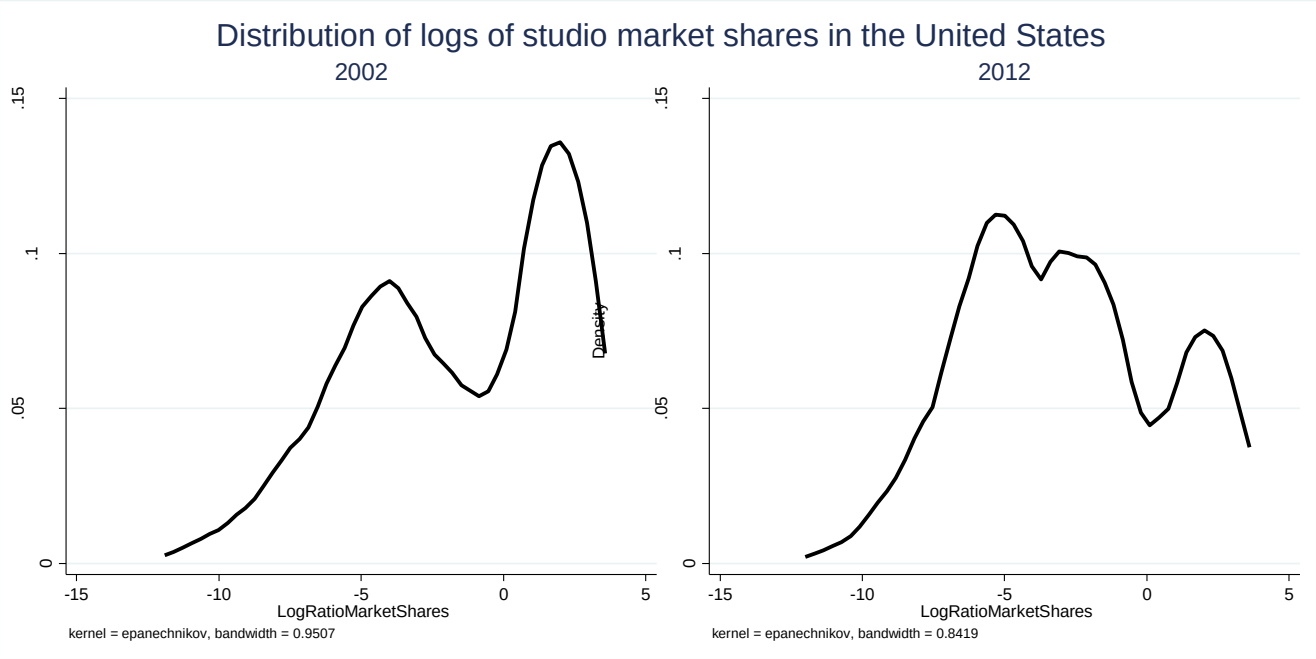
Figure 4



Notes

This graph displays the trend of Herfindahl Index (HHI), over the years 1999-2012. It is a lower bound estimation; that is, HHI is calculated assuming all missing studios are a different studio. The four different lines indicate different groups of countries: all, countries with above median internet penetration, countries with below median internet penetration, and the United States only. See Section VI (Descriptive Analysis) for more information on how the countries were grouped and for a discussion of the trend.

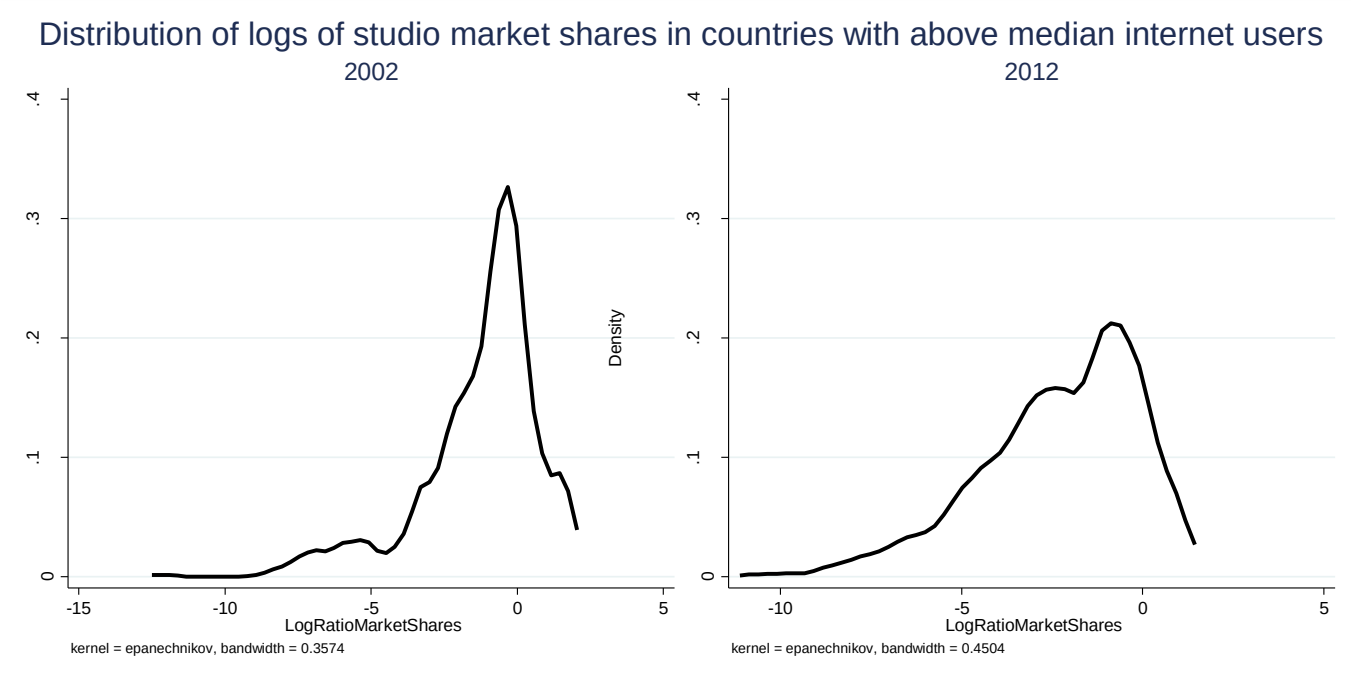
Figure 5



Notes

This graph displays the distribution of the logs of market shares in the movie industry. The two distributions represent two different years: 2002 and 2012. These distributions correspond only to the market in the United States. See section VI (Descriptive Analysis) for discussion.

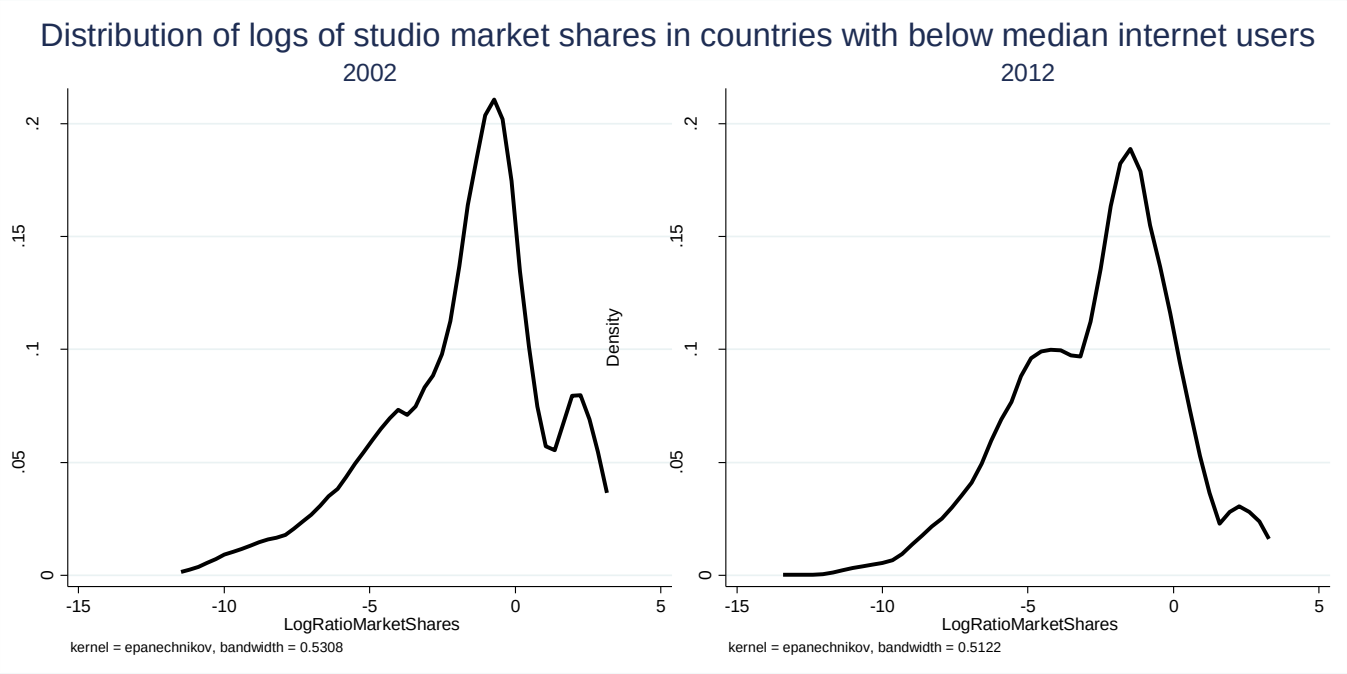
Figure 6



Notes

This graph displays the distribution of the logs of market shares in the movie industry. The two distributions represent two different years: 2002 and 2012. These distributions correspond only to the markets in countries with above median internet users, grouped the same way as in Figures 1-4. See Section VI (Descriptive Analysis) for discussion and further explanation for how countries are grouped.

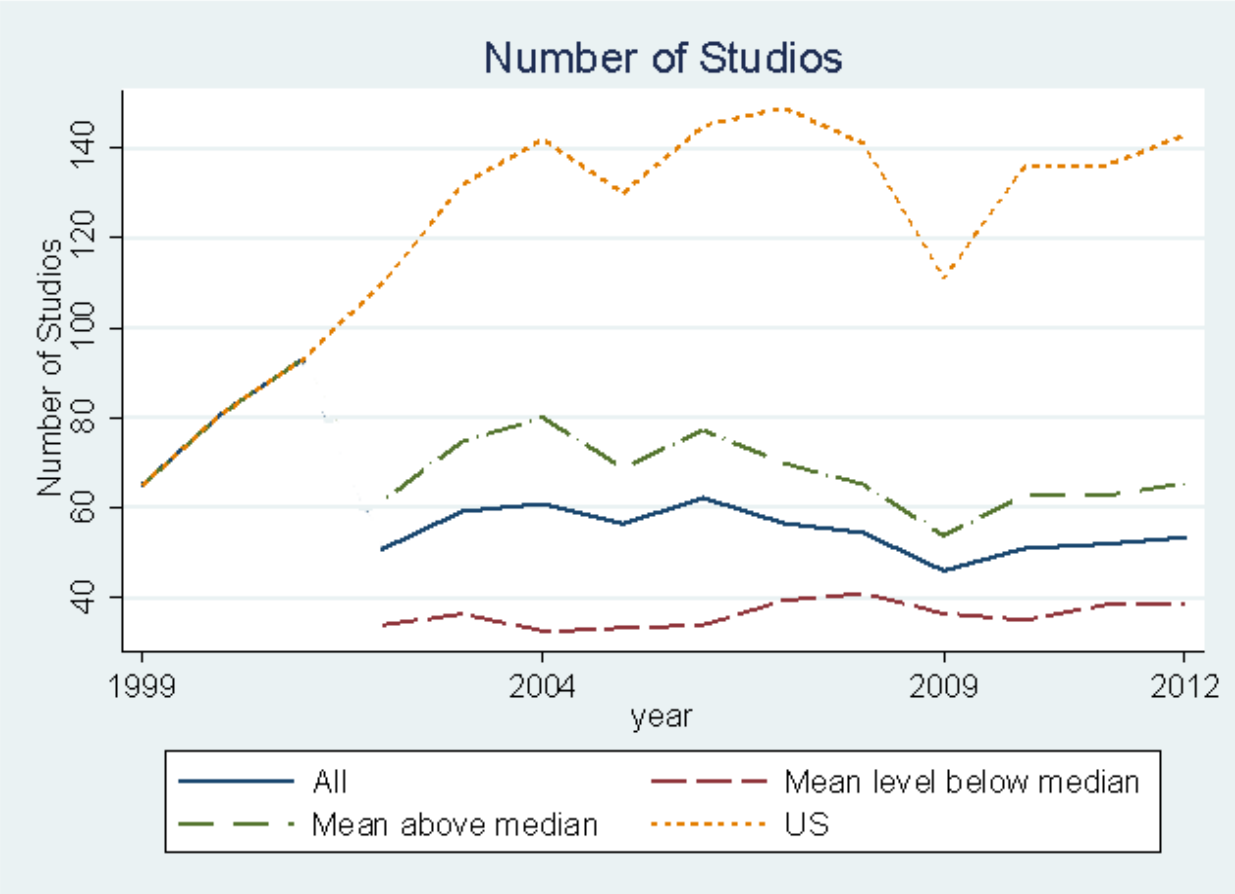
Figure 7



Notes

This graph displays the distribution of the logs of market shares in the movie industry. The two distributions represent two different years: 2002 and 2012. These distributions correspond only to the markets in countries with below median internet users, grouped the same way as in Figures 1-4. See Section VI (Descriptive Analysis) for discussion and further explanation for how countries are grouped.

Figure 8



Notes

This graph displays the trend of the number of studios in the movie market over the years 1999-2012. The four different lines indicate different groups of countries: all, countries with above median internet penetration, countries with below median internet penetration, and the United States only. See Section VI (Descriptive Analysis) for more information on how the countries were grouped and for a discussion of the trend.

Table 1

Log of Ratio of Market Shares		
InternetUsers	0.068	
	(14.21)**	
InternetUsers^2	-0.001	
	(13.57)**	
BroadbandAccess		0.16
		(17.78)**
BroadbandAccess^2		-0.004
		(20.03)**
GDP Growth	-0.004	0.007
	(0.48)	(0.72)
Median salary directors	-0.00008	-0.0001
	(9.94)**	(12.33)**
2000	0.427	0.444
	(1.34)	(1.41)
2001	0.004	-0.043
	(0.01)	(0.15)
2002	-0.98	-1.219
	(4.50)**	(5.67)**
2003	-1.117	-1.491
	(5.57)**	(7.51)**
2004	-0.741	-1.264
	(4.34)**	(7.43)**
2005	-0.636	-1.248
	(3.91)**	(7.60)**
2006	-0.722	-1.345
	(4.89)**	(8.92)**
2007	-1.024	-1.48
	(8.94)**	(12.71)**
2008	-0.935	-1.278
	(9.47)**	(12.99)**
2009	-0.435	-0.639
	(4.28)**	(6.39)**
2010	-0.128	-0.283
	(1.36)	(3.01)**
2011	0.097	0.044
	(1.1)	(0.5)
Constant	-0.315	1.924
	(0.54)	(3.42)**
R2	0.65	0.66
N	8198	8198
	*p<0.05	**p<0.01

Notes

This table displays the results of the first baseline regression described in Section VII (Baseline Model) where the ratio of market shares is the dependent variable. The independent variables are Internet Users per 100 people as indicated by the World Bank, and Internet Users per 100 people squared in the left column. On the right, Broadband Subscribers per 100 people and Broadband Subscribers squared, also indicated by the World Bank, are used instead. Control variables include GDP Growth, indicated by the World Bank; the median yearly salary earned by movie directors as indicated by the Bureau of Labor Statistics; year fixed effects (2000, etc); and Studio fixed effects, which are not shown for the sake of space.

Table 2

Herfindahl Index	Upper Bound		Lower Bound	
InternetUsers	0.599		4.566	
	-0.08		-1.87	
InternetUsers^2	0.104		-0.046	
	-1.59		(2.18)*	
BroadbandAccess		-38.995		15.578
		(1.85)		(2.32)*
BroadbandAccess^2		0.588		-0.268
		(1.62)		(2.31)*
Number of movies	-0.413	-0.321	-0.123	-0.165
	(0.73)	(0.55)	(0.67)	(0.89)
GDP Growth	-1.105	-5.791	2.109	4.099
	(0.10)	(0.51)	(0.58)	(1.13)
2000	-194.093	-76.901	-131.789	-146.14
	(0.43)	(1.00)	(0.90)	(1.00)
2001	-274.538	-40.323	-137.615	-171.559
	(0.60)	(0.09)	(0.93)	(1.16)
2002	-555.379	-250.499	-46.971	-101.042
	(1.51)	(0.68)	(0.40)	(0.86)
2003	-492.201	-54.143	-1.516	-88.891
	(1.32)	(0.14)	(0.01)	(0.73)
2004	-513.045	93.117	-72.074	-202.701
	(1.36)	(0.23)	(0.59)	(1.59)
2005	-539.288	183.222	-99.539	-255.484
	(1.39)	(0.43)	(0.80)	(1.90)
2006	-289.451	555.408	-73.783	-259.217
	(0.73)	(1.23)	(0.58)	(1.81)
2007	-399.428	532.279	-137.659	-340.148
	(0.97)	(1.13)	(1.04)	(2.26)*
2008	-263.120	713.070	-266.281	-471.94
	(0.62)	(1.47)	(1.95)	(3.05)**
2009	-358.069	655.060	-72.095	-277.716
	(0.82)	(1.33)	(0.52)	(1.77)
2010	-517.711	585.224	-117.859	-342.04
	(1.19)	(1.19)	(0.84)	(2.18)*
2011	-636.650	487.416	-195.983	-420.153
	(1.44)	(2.65)**	(1.38)	(2.65)**
2012	-617.160	543.446	-158.234	-384.849
	(1.37)	(1.08)	(1.09)	(2.41)*
Constant	1,544.253	1,517.005	809.730	927.634
	(4.12)**	(4.41)**	(6.71)**	(8.45)**
R2	0.84	0.83	0.80	0.80
N	209	209	209	209

* p<0.05 ** p<0.01

Notes

This table displays the results of the second baseline regression described in Section VII (Baseline Model) where Herfindahl Index, both upper and lower bound, is the dependent variable. The independent variables are Internet Users per 100 people as indicated by the World Bank, and Internet Users per 100 people squared in the far left column and the third from the left. In the columns second from the left and to the far right, Broadband Subscribers per 100 people and Broadband Subscribers squared, also indicated by the World Bank, are used instead. Control variables include the number of movies produced in a market; GDP Growth, indicated by the World Bank; year fixed effects ; and Country fixed effects, which are not shown for the sake of space.

Table 3

Correlation		
	Telecomm.	FDI
Internet Users	0.3804	-0.2218
Internet Users^2	0.342	-0.2355
Broadband Access	0.4796	-0.2206
Broadband Access^2	0.4778	-0.2263

Log of Ratio of Market Shares		
InternetUsers	-0.99	
	(2.07)*	
InternetUsers^2	0.019	
	(2.09)*	
BroadbandAccess		-9.69
		(1.15)
BroadbandAccess^2		0.797
		(1.15)
GDP Growth	-0.131	-0.034
	(1.83)	(0.42)
Median salary directors	-0.002	-0.004
	(1.7)	(1.05)
2002	-57.316	-115.156
	(1.67)	(1.05)
2003	-50.377	-104.108
	(1.64)	(1.04)
2004	-38.924	-81.113
	(1.62)	(1.04)
2005	-35.626	-71.464
	(1.61)	(1.03)
2006	-29.606	-55.733
	(1.61)	(1.03)
2007	-19.91	-34.812
	(1.64)	(1.03)
2008	-13.091	-19.6
	(1.67)	(1.02)
2009	-7.782	-10.472
	(1.59)	(0.96)
2010	-2.876	-5.799
	(1.21)	(0.9)
Constant	171.051	308.369
	(1.68)	(1.04)
R2	.	.
N	1309	1309
	* p<0.05	** p<0.01

Notes

This table displays the results of the first instrumental variable regression described in Section VIII (Instrumetnal Variable Model) where dependent, independent, and control variables are exactly the same as in Table 1 (see notes). Here, however, Internet Users, Internet Users^2, Broadband Access, and Broadband Access^2 are instrumented. The instruments are Investment in Telecommunications, as indicated by the World Bank, and Foreign Direct Investment, also indicated by the World Bank. To the left are the correlation coefficients for the instrumented and instrumental variables.

Table 4

Correlation		
	FDI	FDI^2
Internet Users	0.0488	0.0826
Internet Users^2	0.0469	0.0733
Broadband Access	0.1073	0.1477
Broadband Access^2	0.1063	0.1425

Herfindahl Index	Upper Bound		Lower Bound	
Internet Users	348.107		-89.181	
	(0.40)		(0.49)	
Internet Users^2	-3.983		0.930	
	(0.48)		(0.54)	
Broadband Access		-78,060.878		17,238.504
		(0.01)		(0.01)
Broadband Access^2		1,955.865		-432.186
		(0.01)		(0.01)
Number of movies	-4.060	303.653	0.661	-67.303
	(0.46)	(0.01)	(0.36)	(0.01)
GDP Growth	-125.475	-22,165.323	21.202	4,896.636
	(0.45)	(0.01)	(0.37)	(0.01)
2000	-497.640	94,766.733	10.121	-21,080.531
	(0.12)	(0.01)	(0.01)	(0.01)
2001	-855.820	157,993.287	100.522	-35,048.470
	(0.20)	(0.01)	(0.11)	(0.01)
2002	211.997	121,632.073	-354.466	-27,162.649
	(0.07)	(0.01)	(0.59)	(0.01)
2003	620.910	269,484.845	-334.828	-59,734.874
	(0.22)	(0.01)	(0.58)	(0.01)
2004	1,131.799	415,431.314	-496.670	-92,019.373
	(0.38)	(0.01)	(0.81)	(0.01)
2005	1,266.473	508,800.567	-497.279	-112,630.173
	(0.41)	(0.01)	(0.77)	(0.01)
2006	2,186.526	567,007.269	-574.051	-125,349.313
	(0.63)	(0.01)	(0.79)	(0.01)
2007	2,786.302	514,242.839	-788.066	-113,738.894
	(0.72)	(0.01)	(0.98)	(0.01)
2008	2,827.977	461,096.694	-879.677	-102,068.206
	(0.74)	(0.01)	(1.10)	(0.01)
2009	2,311.069	378,681.204	-600.258	-83,675.820
	(0.64)	(0.01)	(0.80)	(0.01)
2010	3,250.543	508,740.975	-809.121	-112,468.762
	(0.75)	(0.01)	(0.90)	(0.01)
2011	3,167.739	459,238.551	-892.578	-101,625.834
	(0.73)	(0.01)	(0.99)	(0.01)
2012	3,424.494	415,126.912	-898.491	-91,826.737
	(0.76)	(0.01)	(0.96)	(0.01)
Constant	-4,116.150	65,102.708	2,731.769	-12,965.668
	(0.23)	(0.01)	(0.72)	(0.01)
R2	.	.	.	.
N	209	209	209	209

* p<0.05 ** p<0.01

Notes

This table displays the results of the second instrumental variable regression described in Section VIII (Instrumetnal Variable Model) where dependent, independent, and control variables are exactly the same as in Table 2 (see notes). Here, however, Internet Users, Internet Users^2, Broadband Access, and Broadband Access^2 are instrumented. The instruments are Foreign Direct Investment, as indicated by the World Bank, and Foreign Direct Investment squared (using Investment in Telecommunications as in Table 3 would yield too few observations). To the left are the correlation coefficients for the instrumented and instrumental variables.

Table 5

Quantile Regressions	10	20	30	40	50	60	70	80	90
Internet Users	-0.019	-0.013	-0.010	-0.007	-0.007	-0.007	-0.004	0.000	0.005
	(6.24)**	(5.34)**	(4.24)**	(3.17)**	(3.03)**	(2.90)**	(1.61)	(0.20)	(2.27)*
Median salary directors	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(3.26)**	(2.72)**	(1.45)	(0.66)	(0.38)	(0.86)	(1.97)*	(3.07)**	(6.21)**
GDP Growth	-0.015	0.008	0.023	0.035	0.036	0.039	0.008	0.014	0.017
	(0.58)	(0.37)	(1.15)	(1.84)	(2.01)*	(2.01)*	(0.45)	(0.73)	(1.01)
2000	1.890	2.078	1.171	0.294	-0.093	-0.792	-0.518	-0.163	0.283
	(2.30)*	(3.04)**	(1.78)	(0.47)	(0.16)	(1.26)	(0.85)	(0.25)	(0.50)
2001	0.959	0.818	0.138	-0.242	-0.540	-0.994	-1.331	-1.552	-0.135
	(1.29)	(1.32)	(0.23)	(0.43)	(1.01)	(1.74)	(2.42)*	(2.65)**	(0.26)
2002	1.125	0.968	0.589	0.460	0.637	0.395	0.022	-0.350	-1.361
	(2.03)*	(2.10)*	(1.32)	(1.10)	(1.59)	(0.93)	(0.05)	(0.80)	(3.58)**
2003	0.735	0.455	0.523	0.351	0.206	0.048	-0.065	-0.437	-1.413
	(1.44)	(1.07)	(1.28)	(0.92)	(0.56)	(0.12)	(0.17)	(1.09)	(4.05)**
2004	1.196	0.895	0.556	0.194	0.118	0.126	-0.008	-0.449	-1.213
	(2.78)**	(2.50)*	(1.61)	(0.60)	(0.38)	(0.38)	(0.03)	(1.32)	(4.11)**
2005	1.304	0.985	0.703	0.379	0.462	0.233	0.020	-0.343	-1.092
	(3.15)**	(2.86)**	(2.11)*	(1.22)	(1.55)	(0.73)	(0.06)	(1.05)	(3.85)**
2006	0.971	0.995	0.631	0.249	0.087	0.005	-0.241	-0.632	-1.020
	(2.58)**	(3.18)**	(2.09)*	(0.88)	(0.32)	(0.02)	(0.87)	(2.13)*	(3.95)**
2007	-0.374	-0.256	-0.273	-0.566	-0.670	-0.826	-0.865	-0.838	-1.221
	(1.29)	(1.06)	(1.17)	(2.58)**	(3.20)**	(3.70)**	(4.03)**	(3.66)**	(6.13)**
2008	-0.285	-0.355	-0.428	-0.664	-0.529	-0.445	-0.472	-0.656	-0.964
	(1.13)	(1.69)	(2.11)*	(3.49)**	(2.90)**	(2.29)*	(2.53)*	(3.30)**	(5.57)**
2009	0.112	0.301	0.187	0.260	0.228	0.102	-0.112	-0.297	-0.409
	(0.41)	(1.34)	(0.86)	(1.28)	(1.17)	(0.49)	(0.56)	(1.40)	(2.21)*
2010	0.061	-0.078	-0.025	-0.193	-0.090	-0.001	0.293	0.107	-0.081
	(0.25)	(0.37)	(0.12)	(1.03)	(0.50)	(0.01)	(1.59)	(0.54)	(0.48)
2011	-0.101	-0.052	0.182	0.039	0.261	0.224	0.239	0.134	0.048
	(0.42)	(0.26)	(0.93)	(0.21)	(1.49)	(1.20)	(1.33)	(0.70)	(0.29)
Constant	-11.241	-9.071	-6.824	-5.140	-3.465	-2.138	-0.342	1.671	5.063
	(7.99)**	(7.75)**	(6.04)**	(4.85)**	(3.42)**	(1.98)*	(0.33)	(1.51)	(5.25)**
N	8,198	8,198	8,198	8,198	8,198	8,198	8,198	8,198	8,198
	* p<0.05	** p<0.01							

Notes

This table displays the results of the quantile regressions described in Section IX (Quantile Regression) where dependent, independent, and control variables are exactly the same as in Table 1 (see notes), except Internet Users^2 is not included. The regression is repeated and gives a separate coefficient for nine different quantiles of the dependent variable (market shares). The quantiles are multiples of ten.

Table 6

Number of Studios		
Internet Users	0.130	
	(1.26)	
Internet Users^2	-0.001	
	(1.52)	
Broadband Access		0.113
		(0.4)
Broadband Access^2		-0.007
		(1.4)
GDP Growth	-0.021	0.002
	(0.14)	(0.01)
2000	15.822	15.866
	(2.55)*	(2.59)*
2001	27.729	27.740
	(4.41)**	(4.47)**
2002	61.365	60.951
	(12.51)**	(12.55)**
2003	65.279	64.857
	(13.20)**	(12.99)**
2004	66.026	65.692
	(13.08)**	(12.40)**
2005	66.590	66.479
	(12.88)**	(11.90)**
2006	68.883	69.110
	(13.04)**	(11.63)**
2007	75.495	76.121
	(14.07)**	(12.38)**
2008	75.797	76.661
	(13.79)**	(12.23)**
2009	70.617	71.748
	(12.36)**	(11.18)**
2010	69.635	70.780
	(12.08)**	(10.95)**
2011	72.073	73.417
	(12.33)**	(11.26)**
2012	72.888	74.354
	(12.18)**	(11.31)**
Constant	-31.660	-29.261
	(6.19)**	(6.35)**
R2	0.97	0.97
N	209	209
	* p<0.05	** p<0.01

Notes

This table displays the results of the baseline regression results described in Section X (Regressions on Number of Studios) where independent and control variables are exactly the same as in Table 2 (see notes), except Number of movies is not included. Here, however, the dependent variable is the Number of Studios in a market.

Table 7

Correlation		
	FDI	FDI^2
Internet Users	0.0488	0.0826
Internet Users^2	0.0469	0.0733
Broadband Access	0.1073	0.1477
Broadband Access^2	0.1063	0.1425

Number of Studios		
Internet Users	2.832	
	(0.46)	
Internet Users^2	-0.033	
	(0.56)	
Broadband Access		25.814
		(0.29)
Broadband Access^2		-0.676
		(0.3)
GDP Growth	-2.270	5.851
	(0.69)	(0.22)
2000	12.909	-15.255
	(0.29)	(0.11)
2001	19.236	-26.561
	(0.42)	(0.14)
2002	-27.005	-60.099
	(0.72)	(0.56)
2003	-19.270	-103.101
	(0.54)	(0.39)
2004	-13.665	-146.297
	(0.36)	(0.35)
2005	-11.929	-174.050
	(0.31)	(0.33)
2006	-4.052	-188.141
	(0.09)	(0.32)
2007	1.867	-169.175
	(0.04)	(0.31)
2008	-2.591	-155.567
	(0.06)	(0.33)
2009	-15.317	-134.471
	(0.35)	(0.37)
2010	2.185	-165.511
	(0.04)	(0.32)
2011	2.862	-148.564
	(0.05)	(0.32)
2012	4.087	-133.316
	(0.08)	(0.33)
Constant	17.055	12.375
	(0.11)	(0.06)
R2	.	.
N	209	209
	* p<0.05	** p<0.01

Notes

This table displays the results of the instrumental variable regression described in Section X (Regressions on Number of Studios) where independent, control, and instrumental variables are exactly the same as in Table 4 (see notes), except Number of movies is not included. Here, however, the dependent variable is the Number of Studios in a market. To the left are the correlation coefficients of the instrumented and instrumental variables.