DO AGE AND GENDER AFFECT MANAGERS' CAREER PROGRESSION? EVIDENCE FROM THE CAREERS OF MOVIE DIRECTORS.

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ABSTRACT

This paper considers bias in the market for managerial positions by following the career paths of film directors. Film directors manage multi-million projects and are hired on a project-by-project basis. Unlike other industries, researchers have most of the data available to decision makers.

We gather data on directors' film projects from the time they enter the profession. We also study their background prior to the first movie they direct. As expected, the economic success of previous film projects is the main determinant of hiring for a new film, thus our null hypothesis is that controlling for career paths, age gender and race should not matter in landing a new project.

However, we find that age matters and although directors direct their first project around age 40 on average, there is evidence of age discrimination even for directors under 50. We do not find convincing evidence for gender bias, however, we also document that on average, only 12% of an entering cohort of new directors are women and they follow a different path than men in the entertainment industry.

We conclude that if there is evidence of bias in an industry where career related information is public knowledge, it may be worse in more opaque industries.

I. Introduction

This paper presents a simple data exercise which should allow us to test for discrimination on the basis of gender or age in the market for film directors. To the economist, movie directors should be viewed as project managers. They manage projects that cost tens or even hundreds of millions of dollars and they are responsible for completing projects on time and within budget. Since the break-up of the studio system more than sixty years ago, directors have usually been hired on a project-by-project basis.[1]. This provides advantages to the researcher that are not available in other industries where project data and other quantifiable information relevant to the performance of project managers or corporate officers are not visible to outsiders. In our market the researcher has most of the relevant information which decision makers consider. Our basic research design is straightforward- we establish the criteria used to award projects to directors. Then, we conceptually compare two candidates with identical qualifications vying for their next assignment. If candidates of a particular gender or age are more likely to land a job everything else equal, we interpret this as possible discrimination. In the market for film directors, a previous record is clearly available and quantifiable, and we can make such comparisons.[2]

In spite of a voluminous literature on discrimination, it is not easy to establish whether there are equal opportunities for men and women and people of different ages in managerial positions. For this you need

[1] People who are not familiar with the motion pictures industry may think that producers are in charge of film projects. However, this is generally not the case. The term (or credit in the movie for) producer means many things in the business. The most important credit is that of "Producer" and it is generally accorded to the person(s) who initiates a project, sells it to a studio, and/or develops and shepherds it through the system until it is produced and released. The Executive Producer credit is usually reserved for a variety of people associated at one time or another with a project, in one form or another. For example, in the first set of Adam Sandler movies his then managers Brad Grey and Bernie Brillstein received Executive Producer credit, yet neither had anything to do with the development or production of the project beyond being Sandler's managers. Sometimes writers receive Executive Producer credit in addition to their writing credit because they may have originated the idea and have achieved a certain stature. Line Producers, the individuals who manage the production on a day to day basis, may seek Executive Producer credit as they gain stature, because it is perceived as better than a "Line Producer" credit. In the independent film world Executive Producer is often a credit accorded to individuals who assisted in raising financing for a film, or who are associated with a financial company or fund that finances a picture. See also the Wall Street Journal article entitled " A plague of Executive Producers" (12/2019) https://www.wsj.com/articles/a-plague-of-executive-producers-11577648316?mod=searchresults&page=1&pos=3
In other words, the term "producer" may refer to various roles, but producers generally originate the project or finance it.

[2] This is another instance of using the creative industries as a lab for human capital valuation (see Han and Ravid, 2020).

to follow people's careers and control for various factors that may affect their success[3][4]. Many of these factors may not be publicly observable. However, our study uses a unique data set to follow the career paths of film directors project by project, so that in each point in time we can assess the precise relevant track record of the director in question. Clearly, lab experiments may provide more precise data on bias and discrimination, but they are limited to the participants, and are rarely done in a full real-life context. We believe that real life data, while not as clean, can and should be used to study the important question of bias in the workplace and in particular in the market for managerial positions.

It is widely believed in the industry that the success of previous films determines the hiring of directors for future multi-million dollars projects. In the only study to our knowledge of the career paths of directors (John et al. 2017) the authors show that the average return on previous movies and experience, i.e. the number of films made so far as well as professional reviews (which can all be seen as proxies for quality) determine directors' ability to land their next job. Our paper builds on these insights and asks whether age and gender matter as well as the economic success of the project. We have the benefit of a better data set which provides more information regarding each director and film and we have extensive background information on each director which John et al. (2017) did not have. We also have user reviews which did not exist for the earlier sample. This allows us to investigate in detail any instance of presumed discrimination. [5]. Since the data used by decision makers in the industry is for the most part publicly available, and essentially, the researcher and the people in charge in the industry have the same information, it is difficult to expect that discrimination, should we find it, would be statistical. Decision makers can see if they wish the success metrics of every film by their candidate directors or any other man or woman in the profession. Thus, if we find gender or age bias, it will probably be taste based. Also, since everybody in our sample self-selected into directing, then they are much less likely to self -select not to continue (although we do look into the circumstances of every director who drops out of the sample as discussed later).

We ask two questions. The first question is mainly descriptive. Do women and men follow the same path in the directing profession? The second, and more important question is whether directors, with a statistically identical record but who differ by gender or age, are equally likely to land a directing job. We also try to test whether or not gender and age are factors in determining the budget provided for film

[3] See Bertrand and Schoar (2003) for the first study of the value of CEOs and later work by Bennedsen et al. (2010,2020), Graham et al. (2012) and Fee et al.(2013)

[4] This paper is also related to a huge literature on career paths and promotions, going back to Stiglitz and Weiss (1983) or Waldman (1984) and including such papers as Von Wachter and Bender (2006) and many others.

[5] Industry professionals like to say that "you are as successful as you last film". However, evidence is more consistent with using the entire career path as a measure of success.

projects. In principle, we can run the same experiment with a dummy for race, but in our sample the number of black directors is too small for meaningful statistical analysis (which is a statement in itself). Our main finding is that age matters. Although directors on average direct their first film around age 40, there is evidence of age discrimination even for directors under 50. We further investigate manually to make sure that the directors who dropped out did not retire. We should keep in mind that the usual reasons (or excuses) for not hiring older people, i.e. that it is difficult to train them, old dogs do not learn new tricks and that it makes little sense to train people since they will not be there for a long time do not apply to movie directors. Movie directors are hired on a project-by-project basis. You do not need to train them and the length of their employment regardless of age is the same. There is plenty of anecdotal evidence in Hollywood to support the argument of ageism.

While we do not find convincing evidence for gender discrimination in the market for film directors, we also document that on average, only 12% of an entering cohort of new directors are women and they follow a different path than men in the entertainment industry. This suggests that the main question regarding the dearth of women directors should be why women do not enter the profession in the first place.

We suggest that if discrimination seems to occur in a profession where all relevant information is publicly available, it is likely to be present in hiring and promotions for other professions where much less data is available to outsiders.

I.2 Related Literature

The discrimination literature, going back to Becker (1957) and Arrow (1973), distinguishes between taste- based discrimination, where there is an inherent bias against a specific group, and statistical discrimination, where there is a belief that differences between groups are because of unobserved relevant characteristics. Bohren et al. (2019) argue that inaccurate statistical beliefs can sometimes look like taste-based discrimination. In our experiment, as we will show, we believe we are able to rule out statistical discrimination and probably also inaccurate beliefs-based discrimination, although Bohren et al. (2019) admit themselves that the distinction between taste based discrimination and inaccurate beliefs may be "blurred" (ibid. footnote 1 p.3)

There are numerous studies of possible discrimination in many contexts, many of them focus on race (for a seminal study see Bertrand and Mullainathan, 2004) and gender. Far fewer papers analyze age discrimination.

Quite a few studies in finance focus on women entrepreneurs who are similar to film directors, in the sense that the vast majority of entrepreneurs are men and that entrepreneurs need to attract funding to projects. Ewens and Townsend (2020) use the Angel List platform to show that women are less likely to attract investors, in all forms of interaction allowed by the platform, and are also less likely to be ultimately funded. However, this seems to be because most investors are male. Female investors are more likely to fund female led ventures. Hebert (2020) studies French entrepreneurs and has similar findings. Women are 18-27% less likely to raise capital from VCs on average, but the trend reverses for female dominated sectors where women are 3-5% more likely to raise capital. However, gender incongruent ventures that do get funded tend to outperform, suggesting that there is a discrimination based on stereotypes (See Bordalo et al. 2016) where females are expected to perform well in female dominated industries, and the bar for female entrepreneurs in male industries is set much higher. This is similar to our results regarding gender and similar to findings in Sherman and Tookes (2020) who show that women in the finance profession tend to work with women.

In a "lab in the field" test of lending officers in Turkey (Brock and de Haas, 2020) a similar pattern emerges, where women are required to have a guarantor more often- and this bias seems to be attenuated as officers get to be more experienced. In an interesting new paper Egan et al. (2018) document gender discrimination in the financial services industry.

Gornall and Strebulaev (2019) run one of the few controlled "field experiments" in this area. They sent "pitches" from fictitious entrepreneurs to real venture capitalists and angels. The "pitches" were identical but randomly listed a name of a man or a woman, Asian or White. The (low) response rate to these "cold calls" was somewhat higher for women and for Asian sounding names, although white men are by far the dominant group in venture capital and entrepreneurship.

Far fewer studies address age discrimination- which perhaps in itself is suggestive evidence for ageism. This is indeed the conclusion of an issue of Nature published in 2021 (see De la Fuente-Núñez and Officer, 2021). However, some studies do tackle the issue of age discrimination. In a study similar to Gornall and Strebulaev, 2019, Neumark et al. (2019) sent fictitious resumes for job openings, trying to adjust experience to what is expected at the relevant age. Callbacks declined monotonically by age, in particular for women.

Similarly, Lahey and Oxley (2020) perform lab in the field experiments which show that HR managers spend less time physically reviewing resumes by older workers (except that at some age the relationship flattens out) and seem to have biased opinions of older workers.

Our work differs, in that it follows real careers and managerial level positions, but the results complement and enhance other age and gender studies. Our design has several advantages compared to other studies on age discrimination. Neumark et al. (2019) argue that one of the challenges of age discrimination studies is that it may be hard to separate real discrimination from training costs for older workers, their nearness to retirement, (which makes it less worthwhile to invest in them) or assumptions regarding declining physical capabilities of older individuals that may be true (see Neumark et al., 2019). These concerns are alleviated to a large extent by the project-by-project nature of the film business and the availability of all previously relevant information. Some results in Hebert (2020) are related to our work, showing that older entrepreneurs find it harder to obtain financing, however, our methodology allows for much more precise comparisons. The age angle is less often discussed in finance, but Goergen et al. (2015) show that age differentials between a CEO and chair are beneficial to German firms, which as we explain later on, is consistent with the detrimental effect of age discrimination we find[6]. Perhaps it is best to conclude with a quote from Nature which published in 2021 a whole issue dedicated to ageism following the release of a special report by the WHO "ageism influences social values and shapes the focus of research and policy, including the way problems are conceptualized, the solutions proposed and the way institutions develop and implement rules and procedures. Unless ageism is tackled and these fundamental beliefs and processes are changed, our capacity to seize innovative opportunities to foster a world for all ages will be limited" (De la Fuente-Núñez, Vânia & Alana Officer,2021)

A final set of related studies which is somewhat related to our work, analyzes the influence (generally positive) of women in boards of directors and the different career paths of men and women in various professions[7]. Some interesting studies suggest that women may be less competitive than men. The question of competitiveness is very relevant to some of our findings and will be discussed later. However, other work (Adams and Ragunathan, 2017, Adams et al. 2016) finds that women who enter very competitive professions may be different, in particular, less risk averse, than an "average" woman. Specifically, women in finance are similar to men in their chosen profession and different than the average woman. Similarly, Sila et al. (2016) do not find any effect of board diversity on firm risk however measured. Marx (2021) suggests that in the presence of stricter non-compete policies, women may be less inclined to become entrepreneurs because of higher concerns with a potential risk of lawsuits.

[6] There is a long literature which relates age and tenure to corporate decisions, starting with Gibbons and Murphy (1992)- for example, Serfling, 2014.

[7] See also Bertand et al. 2019, Barber and Odean, 2001, Bayard et al. 2003, Bertrand and Hallock (2001), Bugeja et al. 2012, Sorenson and Dahl, 2016, Chen et al. 2016, Flabbi et al. 2014, Adams and Kirchmaiyer 2016, Tonoyan et al. 2017, Schwartz-Ziv, 2017, Shoham et al. ,2020, Lerchenmuller and Sorenson, 2018. Kynazeva et al. 2019, survey this literature.

Other work focuses on wages of male and female CEOs, as well as on wages and productivity of lower ranked employees. Findings generally point to a wage gap between male and female CEOs.

II. Institutional Background, Surveys, and Hypotheses

There are frequent complaints in Hollywood about discrimination against and mistreatment of women as well as on ageism.

The women and Hollywood Initiative which "educates, advocates, and agitates for gender diversity and inclusion in Hollywood and the global film industry" laments the fact that of the top 100 films of 2019 only 12% were directed by women (in our data, this is interestingly identical to the percentage of women entering the profession).[8] However, Danielle Lessovitz , a director whose first feature film was nominated for awards at the prestigious 2019 Cannes film festival said that after the me-too movement "It seems like there's greater openness for female perspectives and more acknowledgement of the default gender bias and the subsequent power imbalance"[9]. In a significant development, for the first time in history two women are nominated for the 2021 academy award in directing and one of them, Chloe Zhao, won.

There are also complaints about ageism in the movie industry. The famous actor and activist Jane Fonda said that ageism in Hollywood "is alive and well" following her experience in the recent film the "Book Club". In spite of a brilliant history of high quality acting screenwriting and directing of all participants in

[8] several surveys point to a male-female pay gap among the most highly visible and highly paid individuals in the media and entertainment industries. For example, Forbes' list of 15 highest paid actors in 2017 includes 14 men. Only the 15th listed actor was a woman (Emma Stone). Ms. Stone earned less than Ryan Gosling, her co-star in the very successful musical comedy La La Land, although she won an Oscar for her performance and he did not. (https://www.cbsnews.com/news/forbes-highest-paid-actors-2017-mark-wahlberg-emma-stone/).

An analysis of the pay of top stars at the BBC revealed that only 1/3 of the top 96 earners and none of the top 7 were women (https://www.theguardian.com/media/2017/jul/19/evans-lineker-bbc-top-earners-only-two-women-among-best-paid-stars).

[9] https://womenandhollywood.com/cannes-2019-women-directors-meet-danielle-lessovitz-port-authority/

the project, " the film's creators resorted to making it independently after they said executives told them they would only produce the movie if the characters were younger" .

Lloyd Robinson, a well-known talent agent argues that "ageism isn't something restricted to screenwriters in the entertainment industry. It applies to directors and actors too". He attributes this to "younger buyers" who prefer to do business with people their own age[10].

Smith et al. (2017) report that Only 148 (11.8%) of the 1,256 speaking characters in 25 Best Picture-nominated movies were 60 years of age or older. This is 6.7% below the percentage of seniors in the U.S. population, according to the U.S. Census.

In a private conversation, a 65 years old successful indie director told us that he had been told "not to bother" with an agent in LA since nobody would hire a person his age to direct a major movie[11].

There are numerous other claims of ageism and other forms of discrimination in the industry, including racism which we cannot address in our study due to data limitations. [12]

The first part of the paper is descriptive, and it shows the different paths women and men take into the profession. We also describe directors' age profiles. In the second part, we investigate the following simple hypothesis:

Our null hypothesis - Since we control for the previous career path of each director, from their first film and we also adjust for other qualifications, then if there is no discrimination, non-career related variables and in particular age and gender, should not affect the selection of a director for a movie.

This can be specialized a bit along the lines in Hebert (2020) or Bohren et al. (2019). Statistical discrimination is practically ruled out by our design since information about qualifications and previous career of each director is publicly available. If we find evidence that gender age or race affect the career paths of film directors, it will support taste-based discrimination.

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[10] https://www.telegraph.co.uk/news/2018/05/16/ageism-hollywood-alive-jane-fonda-reveals-bosses-wanted-younger/

https://creativescreenwriting.com/heres-what-we-found-out-about-ageism-in-hollywood/.

[11] In Israel, much of the funding for movies comes from non-profits which follow various criteria and support the local film industry. The largest of these organizations set up a special track to help older directors, with 35 years of experience, so as to prevent possible issues with age biases (a private conversation with the former director of the fund, Katriel Sckhori, 2021).

[12] In this study we cannot address pay issues since directors' salaries are not publicly disclosed. We should note, however, that directors' salaries are most often not a significant item on the expense list (see a later discussion of available salary data), so that it is difficult to believe that someone will not be hired because of their wages.

III. Data

We construct a comprehensive dataset of all US directors who started their careers between 1995 and 2015, documenting all the films they made through 2018, henceforth the 95-15 sample. We gather as much information as possible about the directors and their films. For each director in the dataset, we collect their demographic information: date of birth and gender (unlike large scale studies, we are able to find photos of the vast majority of directors in our sample, thus making it easier to identify gender), as well as information about the movies they made. We also collect information about the directors' careers before, during and if relevant after their directing career. For this we use mostly the web site IMDB (Internet movie data base) but we supplement that information with data from Linkedin Wikipedia and other sources.

For each movie we use, we collect the following information: date of release, domestic gross, genre and distributor, as well as the quality of these films, as measured by expert reviews and user reviews where available on IMDB[13]. While expert reviews are reasonably straightforward, aggregating user reviews is not as easy. IMDB exercises some (not very transparent) quality control and publishes a weighted average of user reviews. Therefore, we include these ratings in our main tables. Also, since IMDB is where people find most of the relevant information about movies and directors, it makes sense to expect that decision makers should look there for reviews as well. Nevertheless, we also collect user and professional review information from Rotten Tomatoes, a competing website, which had the slight advantage of covering about 3% more movies in our sample. In robustness checks we show that the results are similar when we use the RT reviews. For about half the sample, incorporating directors who entered the profession between 1998 and 2005, in addition to the data above, we also purchase much more detailed financial information about every film in this sample, including budgets and world-wide grosses from all sources. This data is obtained from Gracenote[14], a data vendor specializing in movies and entertainment industry. Data from Gracenote is only available for movies released on or before year of 2017. This smaller sample covers directors debuting between 1998 and 2005 and we follow their movie career until 2017. However, a director who made another film in 2018 or 2019 is not classified as having left the profession of course.

[13] See literature on the value of user vs. professional reviews starting with Holbrook (1990) Basuroy et al. (2003) and more recently, explicitly discussing internet reviews, Basuroy et al. (2020).
[14] Gracenote was later acquired by Nielson.

The detailed financial information allows us to assess properly the metrics that industry insiders, who hire directors and finance films, use for evaluation[15].

IV. Sample Construction and Methodology

We start with the IMDB (text based) website which lists over 400,000 directors. We consider all feature length films (as opposed to shorts or TV films)[16] released in the US each year which made at least $10,000 in the box office (this sum is somewhat arbitrary, but it is approximately the take for one screen in a small theater for one week- one week is also the cutoff for academy award consideration). This methodology biases the sample somewhat against really awful films (high budget, but total failures) so that we include only bad films that at least had some audience. There are typically 300-400 such movies released every year. We then search IMDB to identify the directors of each film, and then search again to identify first time directors (directors who had not directed any previous film). This allows us to construct the basic list of first-time directors. Once we identify a first-time director, we follow him/her on IMDB and identify all feature films s/he directed either until the end of the sample, or until they drop out and do not make another film[17].

For each director, we go back to his/her IMDB page and find out his/her gender and age when they make their first movie. This also enables us also to document the age when they make each subsequent film which is useful for identifying possible age bias. Many directors do list ages, but others do not. For those, we go back to Wikipedia as well as to other sources, for example, college graduation announcements and population records (only publicly available information was used). We lose some directors for whom we could not find any listing for age. For each director we also go back and look at everything they had done prior to making their first movie. We document the first year they were listed on IMDB in any capacity (typically making a major motion picture is not a first step in the entertainment industry). We list the

[15] We started with 1118 directors directing their first film between 1995 and 2015. 417 directors started their career between 1998 and 2005. After eliminating directors whose age is not available, we end up with 348 directors and after eliminating directors for whom we don't have movie financial data, we ended up with 309 directors.

[16] Theatrical films are distinct from other forms of filmed entertainment and directing theatrical films are most coveted directing positions. Theatrical films involve much larger budgets, higher quality production and post-production, and are generally the most visible projects, also the only ones with widely available professional and user reviews and much greater visibility, culminating with the Oscars. The pandemic seemed to have changed some of this, but as theaters are opening up, it seems theatrical films are back as the dominant form. Nevertheless, any study going beyond 2020 will have to take the changes in the industry into account.

[17] Very few directors may take long breaks (because they could not find a job in the field or for other reasons). However, in practice, in that case they will need to start almost from scratch. The only ones we lose that way are people who say, made a film in 2014 and will make the next one in 2024, and we try to correct this bias below.

number of credits before, during and (if applicable) after a directing career (the latter is only for people who drop out of the directing sample). We classify the roles in a director's non-directing career into a "major" role, a "minor" role, and other credits. The major role is the role with the highest number of credits on IMDB, if they exceed 2. The minor role is for the next in line that is at least 20 percent of the number of major-role credits and which exceed 2. For example, if the future director had 10 writing credits and 4 acting credits, prior to directing his first film, then his major role is writing, and his minor role is acting[18]. Most directors had been actors or writers, with a distribution around other roles such as DP (Director of Photography) or Producer. Thus, in much of the analysis we use the categories writers, actors, other professions, or none, the latter category reserved for people who had had no prior experience we could identify and started in the business as directors. This happens for example, if you direct a film out of film school (or even before that- Steven Spielberg directed his first feature at age 17) or you had a very different profession and made a career change. We do not think this way of classifying experience introduces a significant bias. If say, a finance professor changes profession and directs films, then they can be considered to be with no relevant experience when they shoot their first movie.

We compare the careers of male and female directors and we also analyze the age of directors as movies are made. This analysis provides us with a set of descriptive statistics about the careers of male and female directors who started making movies during the 20-year period from 1995-2015 (Tables 1&2&3). The empirical analysis is based on Logit regressions where the probability of making another film is regressed on career variables which have been shown to determine re-hiring and on variables which should be irrelevant, and indicate discrimination, namely gender and age.

A main variable which determines hiring is the average return on previous movies. Average return has the advantage of being non- age related, in other words, the assumption seems to be that a director would continue to produce at an average level of returns going forward. However, since all proxies for quality of a director are not perfect, we also include experience, i.e. the number of movies directed prior to the current one. One could argue that one "expects" more movies from older directors (see Neumark et al. 2019) and to allay these concerns we also run productivity in our robustness tests, with similar results. We also use average user and professional reviews to provide another quality proxy.

We should note that directors become "attached" to projects in different ways. Often a studio will simply hire a director for a project the studio wants to shoot. Sometimes an agency will put together a package of talent, including directors actors and a given script. Sometimes it is a director-writer who shops the

[18] As it turns out, empirically minor roles are not that important in the analysis so further classifications and refinements do not seem very useful.

project around. However, in all cases, the financiers have to practically hire the director, and in all cases, the entire industry can be considered as a potential talent pool. In other words, everybody is looking at the same data that we are looking at in making the hiring decision.

V. Descriptive Statistics

In the first part of this section we review the data base which includes all directors who started their career in 1995-2005. In itself this can already provide insights into the role of age and gender in the career of film directors.

Table 1 and 2 describe the larger sample. Table 1 is very simple, but it documents a very important and startling fact- very few women enter the directing profession. On average the cohort of first-time directors is 12% female, but unlike other professions, there are no trends, i.e. the number of new women directors is not increasing over time[19]. For example, while 2014 was one of the best years for women who constitute 17% of the entering class of directors, in 2015 only 7% of first-time directors were women. This percentage is also strikingly similar to the percentage of women in the C-suite or women in the academic finance profession (See Knyazeva et al. 2019 and Sherman and Tookes, 2020). It is a bit lower than the percentage of female entrepreneurs (See Hebert, 2020). Expectations of leadership and commitment for film directors are much more similar to those for CEOs than to expectations from board members, where there has been an increase in female representation in recent years as awareness and laws designed to secure diversity in the boardroom have come into effect (See Knyazeva et al. 2019, Gertsberg et al. 2021 and others).

Table 1 suggests that one of the main reasons for the dearth of women directors is that very few women enter the profession in the first place. For example, the fact that only 12% of new directors on average are women, may be part of the reason why only 12% of the directors of top 100 movies in 2019 are women (Women and Hollywood Initiative- discussed earlier) and may indicate than once a woman enters the profession, there is less clear evidence of discrimination. We will look at this idea later in our tests. The small number of first-time women directors also ties to interesting new research by Buser and Yuan (2019) which suggests that women may be less competitive and are likely to be deterred by initial failures, following earlier work by Niederle and Vesterlund (2007). There are also other studies suggesting that women are significantly less likely to enter competitive environments despite having the appropriate skills (Gneezy et al 2003). Goldin in her Feldstein lecture (2020) suggests that part of the difference in wages between men and women is accounted for by the premium paid for jobs that require

[19] For example, Sherman and Tookes (2020) find that women comprise about 15% of the faculty in the top 100 business schools, but this percentage is edging up a bit towards the end of their sample, in 2017.

essentially total commitment with less control. During principal photography, when every day can cost a million dollars, directors are expected to cope with all contingencies no matter when and how they happen so as to make sure that everything is run on schedule and on budget (see Chhaochharia et al. 2021).

Table 1B characterizes the career path of the directors in our sample. Sixty eight percent of men and more than 75% of women make only one film. This number is a bit biased because people at the end of the period may still make another movie. However, since we have a forward look until 2018 and the average director makes a film every 2-4 years, the bias is not as severe. A full 90% of the women and 83% of the men make no more than two films. Only less than 4% of men and 1.5% of women make 6 or more films.

This is a brutal career and failures are not tolerated lightly. However, it seems that women drop out at a higher rate. This empirical fact can be related to the effects discussed in Buser and Yuan (2019) or Niederle and Vesterlund (2007) and Gneezy et al (2003).

Table 2 shows summary statistics for the sample for which we have detailed financial information.

Panel A compares films made by women and men. Men make films with larger budgets and have a higher return. User reviews are similar, but women have somewhat higher ratings by professional reviewers (see Basuroy et al. 2003, 2020, for the importance of professional reviewers). There is no statistical difference (t-test) however, between films made by men or women directors[20].

Table 2 panel B describes the career paths people follow prior to becoming directors. More than 40% of the male directors had been actors or writers, whereas for women this percentage is less than 30%. It can be that the pathway from writing and acting to directing, which is the most common for men, is not as open for women. The second part of the panel shows the secondary roles prior to our sample participants' directing careers. Most people did not have a significant secondary role (defined as at least 2 credits and $\geq$ 20% of the number of credits for the main role). We will test to see whether the different initial paths are important to the future careers of the directors.

Table 2 panel C is striking, as it characterizes the men and women entering the profession and may account for the different rates of participation. Prior to directing, men had more diverse careers (1.32 vs. 1.06 different skills), and consistent with that, they have a higher number of other credits while directing.

[20] A striking fact is that films that are co-directed by women and men have a higher return and higher ratings by both professionals and users. Since the number of such films is small, we should be cautious in interpreting this finding, but this is consistent with work such as Schwartz Ziv (2017) which suggests that a collaboration between men and women can lead to better outcomes.

Men become directors 18 years after their first credit appears in IMDB but women enter the profession only 10 years after their first credit. This seems to suggest that less experienced women get more of an opportunity to direct, or perhaps, that the small subset of women who become directors are more daring and talented than the men. This suggestion is consistent with work such as Adams and Ragunathan, (2017) and Adams et l. (2016) or Hebert (2020). Nevertheless, women on average start their directing career at a later age[21]. This different path is also consistent with work by Kim and Moser (2020) which shows that women in science, and in particular mothers, follow a different productivity trajectory than men. The relatively late age of first-time directors is consistent with work by Azoulay et al. (2020) which shows that entrepreneurs generally start in their 40s and peak even later (contrary to popular belief..) . Film directors also need to be entrepreneurial and similarly need the experience that leads them to succeed.

Table 2 panel D shows the number of films made by directors in the 1998-2005 sample. As we can see, directors in this sub-sample are somewhat "better" than the sample in table 1- only 49% of the men and 52% of the women made one movie and 71% of the men and 77% of the women made either one or two movies. The reason is that there is no data on some of the least successful films. However, the patterns are similar- most directors made only 1 or 2 films, and women drop out faster than men.

Panel E describes the percentage of women and men in our sub-sample. The number of new female directors is on average 10%, similar to the larger sample.

This very simple descriptive analysis already shows that industry studies that try to draw conclusions from the number of women directing films, may be misleading, ignoring the very different paths that men and women take in becoming directors, as well as the small number of women entering the profession in the first place. In a way, this is similar to the "life cycle" of women employment described in Goldin and Mitchell (2017). The other conclusion is that women may find it difficult or may be unwilling to enter this demanding managerial career and this fact deserves more attention and policy remedies rather than addressing what happens once a director starts directing. This pattern is very similar to the findings regarding women in academic finance (Sherman and Tookes, 2020) which picks up professors at the point when they are hired for their first job (and they are on average 15% of the cohort), except that we have data on careers prior to directing films which may help us understand the dearth of first-time women directors. This data, as discussed, enables us to see that the professional profile of first-time women directors is different than that of male directors, and this difference in backgrounds may contribute to the small numbers of women entering the profession. However, as in other studies such as Sherman and

Tookes (2020) or Hebert (2020) it is difficult to provide a precise empirical assessment of why fewer women become directors.

As we will see however, in the empirical analysis, there is less evidence to support bias for the women who do enter the profession.

Table 2 Panel F shows the distribution of return by age of directors. It seems if anything that return increases by age and so do reviews (this is consistent with Azoulay et al. (2020)). We will revisit this later.

Table 3 panel A shows the summary statistics of our regression variables – on average sample films' budget is about 40 million (constant 1998 dollars). Ten percent of our directors are women and on average they had made about 2 films before the current film. Obviously, these averages are skewed because most people drop out after the first film or two. Panel B is the correlation matrix- there are relatively high correlations between the various types of reviews and between reviews and returns (See Basuroy et al. 2003 and Basuroy et al. 2020) All variable definitions are in appendix A.

VI. Empirical Analysis

Table 4 contains our base model and it shows the determinants of making another film. The dependent variable in all models is a dummy that takes the value of 1 if the director makes his/her next film and zero if they drop out of the sample. This is a logit regression with standard errors clustered by director.

Prior performance is measured in our regressions by the average return on the director's prior movies as well as by another proxy, the number of movies made so far (tenure). The latter is also a measure of success- since staying in the business is a function of prior achievements[22]. Finally, the probability of hiring depends the "quality" of a director's previous work, as reflected in the average reviews of the director's various films. All these variables are significant and positive in regression (1) which essentially corroborates John et al. (2017) and shows that hiring is based mainly on prior success[23].

[22] There is a legitimate question as to whether older directors may be expected to have directed more films. We address this mostly by including other proxies, average return and average reviews, and by running productivity analysis in our robustness checks. In unreported analysis we show that the number of films over a career classifies directors into quality bins.

[23] John et al. (2017) use a differently constructed sample, with different definitions of a "film" and of a "first time director". They also have less information on directors and films. Remarkably, even though the two samples include non-intersecting sets of directors, the findings regarding the importance of previous returns and

Model (2) adds several pre-career variables- we split the directors by their previous careers into writers, actors, other entertainment related positions (such as editor, director of photography and others). The fourth category is for those who had had no previous observable experience. The table shows that having been a writer is the only prior experience that contributes to future hiring as a director. This may be consistent with the view of a director as the manager of the project who controls the vision of the film. Writer-directors who are more common in smaller productions[24].

We also find a negative sign on the average non-directorial activity during the career. This essentially reflects the opportunity cost of the director, and a higher number suggests a higher opportunity cost and a lower "commitment" to the profession.

In regression (3) We include control variables common in this literature (see Ravid, 1999). We also add a Herfindahl index which measures the versatility of the director which in this set of regression is mostly insignificant.

We now add variables for age and gender for the first time. We expect that variables that do not proxy for the quality and financial success of prior work should not matter, but they do.

We see that the female dummy is insignificant, but age is negative and significant in these runs and in every regression in the table except (6) where we added a square term. This latter regression means that the negative sign probably reflects a non-linear function (see figure 4) but still age is a deterrent to landing a job, everything else equal.

Regressions (4) (5) (7) and (8) explore different interaction terms. Regression (4) is the only one where gender is significant.[25] it seems that women need a higher user rating to be hired, that is, critical reviews seem to be discounted more in a decision to hire a woman director. Age interacted with performance variables is negative as well (regressions 5 and 7), suggesting that older directors need to show better average performance in order to succeed. However, as discussed, the relationship seems to be non-linear as in model 6 which implies that for a small age range being older may help, but overall age is detrimental to a director's career. We explore this graphically below. Regression (8) shows that the relationship between age and versatility is complex.

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experience are similar. This gives us confidence that hiring in the film industry is indeed based on prior performance. John et al. (2017) do not consider the same set of questions we consider here.

[24] We include both "main" and "secondary" career so a future director may start as both a writer and a director, or a writer and a producer before becoming a director.

[25] We tried interacting the female dummy with other performance metrics, but the results were not significant and thus left unreported.

In table 5 we run the same regressions for the probability of making a second film. An initial successful film is the most difficult hurdle in a director's career and crossing this hurdle is critical in order to continue.

The sample here is obviously smaller and the significance levels are lower, but the overall picture is decidedly similar. Performance, as much as can be gleaned from a first effort, matters- return is mostly significant as well as reviews. Age is negative, but insignificant (but then most of the people in this sub-sample are relatively younger people at the very beginning of their career). However, age interacted with average return still matters. We believe this supports our view- on average, since first time directors are the youngest in the sample, age is still not a factor, but if you start at an older age, then you are expected to do better (keep in mind that the people in question may be older and more experienced in other fields, but are still novice directors). Overall, females do not seem to be treated differently.

The main runs are when we cut off films made after 2015. In other words, we do not count someone who made his last film in or after 2015 but did not direct any feature later as a "failure". We ran robustness checks with films made after 2012, 2013 and 2014 and the results are similar.

Figures 1-4 explore the interactions graphically, keeping all other variables at their means, and they lead to some interesting conclusions. Figure 1 shows that whereas for male directors as user ratings go up, the probability of hiring goes up as well (keeping all the other variables at their means), for women better reviews do not do much – the slope is even slightly (insignificantly) negative. This explains the negative interaction term in the table.

The next three figures depict the age bias we seem to find in the data. Figure 2 shows that at younger ages, as the record (average return) improves, the probability of being hired increases, all but at a decreasing rate, but for older directors, success is essentially discounted and the curve of the probability of being hired vs. previous success is flat. Figure 3 plots re-hiring vs. the number of films made, revealing a similar picture. Figure 4 is perhaps most interesting. It plots hiring vs. age-keeping everything else at its mean. Hiring peaks at around age 35-40 which is the average age of making a first film. If you are younger, this is not good, but as soon as you get older, your age is a hindrance. The probability of hiring drops by about a half, everything else equal, as a director ages from 40 to 55.

One possibility to interpret our findings is that people simply decide to retire at some point. We should keep in mind that directors are not movie stars. First time directors receive five or six figure-pay per film. and they direct on average once every two or three years. In other words, they do not do much better and

possibly worse on average than finance or economics professors[26]. Nevertheless, we went manually through the data looking up every director who dropped out of the directing sample to see if they retired (stopped working) or not. The vast majority of the people who stopped directing went back to related professions, but some completely changed fields, from teaching Buddhist meditation to financial planning. However, in the entire sample only 8 directors disappeared from our view (which means they either died with no retrievable record or indeed retired). Finally, Table 2 panel F shows that older directors seem to perform better than younger directors, so that at least on the face of it, there is no statistical reason for discrimination (of course, there are selection issues in that table, so the evidence is just suggestive). We should keep in mind that all first-time directors in the sample self-selected to be directors.

Notable examples of directors working well into their late seventies or eighties such as Clint Eastwood, Woody Allen Martin Scorcese and earlier Alfred Hitchcock suggest that retiring at age 55 is not what a director who starts at age 39 would like to do. Our work provides evidence for age bias for a majority of the other, lesser-known directors. We should keep in mind that film directors manage large projects, for which they need to find financing, and the finding that as they get older financiers are less willing to provide them with projects to run, regardless of their proven success, should be generalizable to other professions. While it is difficult to provide a counter-factual (i.e. what would happen should the industry give a fair chance to older directors) we see that older directors who do work do better than younger directors suggesting that at the margin, providing financing to additional older directors can be helpful to profitability (see Table 2 panel F). In a fascination study, D'acontu et al. (2021) show that individuals are willing to give up return rather than lend to borrowers from a group they dislike. Similarly, Hollywood may be giving up some profitability by shunning older directors.

VII. Additional Tests

Table 6 shows the budget of the next film as a function of the career path. The age coefficient is still negative and significant. A gender bias seems to show as well- in other words, a woman needs to be more

[26] From https://work.chron.com/much-money-film-director-make-7811.html: "Film directors working in professional productions under the Directors Guild of America guidelines earn salaries based on the type of production and the number of weeks on the job. Films, classified as low or high budget, shorts or documentaries, earn different pay. High-budget films have budgets more than $11 million. Directors working a week on a high-budget film earned a minimum of $19,143 in 2018, while a week on a short or documentary paid $13,672. When the film takes more than the week, directors on high-budget productions earned $4,786 daily pay. Short and documentary film directors took home $3,418 for a day of work in 2018. The Bureau of Labor Statistics (BLS) reported in May 2016 that directors working in the motion picture and video industries earned an annual mean wage of $111,320". Naturally, well known directors can make millions + percentages of the gross of films. Also, similar to actors, pay will go up and down depending on the success of previous projects.

successful in order to land a higher budget. As we saw in the descriptive statistics, women direct films with significantly lower budgets on average and the industry indeed laments this[27] . Perhaps these are the instances where the bias against women exists, or again, it may be the result of the very different career path women take. The latter interpretation is less likely since we do control for the previous career path.

In table 7 we address endogeneity concerns- it may be that the average return is a function of other unobserved variables. Thus, we run a first stage regression on years in the entertainment business prior to directing a first theatrical movie as an instrument. The instrument is very significant, and the second stage shows results that are very similar to the results in previous tables.

So far, we have not found much evidence for gender bias, but it seems that age bias matters a great deal more in the industry. In order to test this notion further, in table 8 we re-run our main specifications for directors under the age of 50- in other words, we exclude films made by directors over age 50. The coefficient on age is still negative. It is very difficult to argue that people who start their career on average at age 39 retire for exogenous reasons at age 49. Similarly, it is hard to argue that there are other, unobserved reasons (such as cultural connection to the current generation) that separate someone who is 40 from someone who is 49, although this type of argument in itself can be masking discrimination. We perform several additional tests. One may be concerned that what matters is productivity rather than the number of films (tenure)- similar to arguments in Neumark et al. (2019) who suggest that older workers are expected to have done more. We test this idea in unreported results by running a "productivity" variable (films per year) with or without the tenure variables. This variable is significant, but when run with tenure, tenure remains significant. Age is still negative and significant in all runs, and the sample is smaller, since obviously we had to run these regressions on films beyond the directorial debut. Running interactions, we see that productivity helps directors of all ages to get hired, but it is somewhat more helpful for older directors.

To further address gender and age issues along the career path, in table 9 we consider very experienced directors, people who have made at least 3 or at least 4 movies.

[27] Telefilm Canada (an agency that is financing of film and TV in Canada) was working towards gender parity in the industry by 2020 by funding films with women in key roles (director, producer, writer). In 2018/2019 close to 60% of Telefilm funding went to films with women in key roles and parity has already been achieved in the producer role. However, in private conversations we found out that most of the progress has been in low budget films rather than in major studio productions and indeed the agency is calling for partnerships to ameliorate this situation https://telefilm.ca/en/news-releases/telefilm-canada-releases-update-on-gender-parity-initiatives.
In order to test the notion that perhaps women are better at lower budget films we ran profitability regressions. This seems not to be the case, so lower budgets may indicate a gender bias.

The findings are interesting- whereas we still seem to show an age bias, the female dummy becomes positive and significant. It seems that once the women directors make it through the early difficult stages of the profession, first entering the field and then crossing the first film barrier, they are treated as well or possibly better than their male counterparts.

Finally, since the proxies for the quality of the director are imprecise, we re-run the entire analysis using reviews from Rotten Tomatoes instead of IMDB professional and user reviews. As discussed, we believe that IMDB reviews are somewhat better as quality proxies, but on the other hand, RT allows us to add some observations for which there were no IMDB reviews. Table 10 is similar to Table 4 and we see that the results are nearly identical- if anything the age variable is even more (negative and) significant. In unreported results we replicated most other tables with qualitatively similar outcomes.

VIII. Conclusions

In this simple exercise we provide an analysis of film directors' careers, which economists should view as project managers in charge of very large projects. The main determinants of hiring in the movie industry, as economists would expect, are previous financial success and to some extent previous critical acclaim.

We find evidence for age bias which seems to be taste or stereotype based rather than statistical, and more complex evidence regarding gender. It seems that very few women enter the directing profession, following a career path in the entertainment industry that differs from that of men. Once they enter, there are subtle barriers, but experienced female directors seem to be as successful as men. It would be interesting to find out why women do not enter the profession. We offer a few suggestions; however, the strength and weakness of our sample is that a director is included once they make their first film so we do not know how many people wanted to enter and could not. In that sense this study is similar to many other studies who address possible discrimination, such as a study of women in finance (Sherman and Tookes, 2021) which considers women who are hired in top 100 schools, not those who may want to enter the profession. We do discuss, however, the pre-directing career, and we are able, to follow an entire career based on a project by project hiring which better addresses biases throughout someone's career.

We present a strong case showing that age discrimination starts almost immediately as a director enters the profession, and that people do not just retire but seem to be unable to find another directing job.

We believe that this analysis can provide insights also into women's career paths towards managing large projects and enterprises in fields where data such as we have does not exist. Also, our findings about age

discrimination are suggestive because even though movie directors start this career path at a relatively late age, they seem to be almost immediately subject to an age bias.

One may wonder how an industry that is focused on profits exercises discrimination which obviously is not profit maximizing. However, this is a question for any instance of discrimination, in any industry. In the film industry, as in other creative industries, it is sometimes possible to disguise discrimination as artistic differences. Producers and directors have told us that some other producers and directors feel "more comfortable" with people their own age which in our view, is a way of sugar-coating bias. In a way this mechanism is the same that produces lower value in corporations (See Goergen et al. 2015). Goergen et al. (2015) show that age dissimilarity between a CEO and chairman of the board leads to higher firm value, arguing that age dissimilarity leads to cognitive independence and more scrutiny and better decisions. There however, the structure of German corporations allows for separation- it is implied that if they could, the CEO and chair were likely to be closer in age. In our setting they can, which as we see leads to discrimination against qualified job applicants. Finally, as discussed, D'acontu et al. (2021) show that individuals are willing to give up return rather than lend to borrowers from a group they dislike. It may be that older directors are simply not considered for some film projects.

Perhaps the most worrisome conclusion from our analysis is that if discrimination is allowed to occur for a profession which is in the limelight and where all relevant career information is publicly available, it is very likely to be present in other professions which are more opaque, where much less data is available to outsiders.

References:

Adams, R. and T. Kirchmaier, 2016, "Women on boards in Finance and STEM industries" *American Economic Review,* 106(5): 277–281

Adams R and V. Ragunathan, 2017, "Lehman Sisters", Working paper,

Arrow, Kenneth. 1973, "The theory of discrimination." *Discrimination in Labor Markets*, 3(10): 3{33.

Azoulay, Pierre, Benjamin Jones, Daniel Kim and Javier Miranda (2020) "Age and High-Growth Entrepreneurship" American Economic Review: Insights 2(1): 65–82.

Basuroy, S., S. Chatterjee and S.A. Ravid, 2003, "How Critical are Critical Reviews", *Journal of Marketing,* October, Vol. 67 Issue 4, pp. 103-117.

Basuroy, S., S.A. Ravid, R. Gretz and B. J. Allen, 2020, "Is everybody an expert? An investigation into the impact of professional versus user reviews on movie revenues", *Journal of Cultural Economics* volume 44, pages 57–96.

Becker, Gary S. 1957, "The economics of discrimination." University of Chicago.

Bennedsen M. F. Perez Gonzalez and D. Wolfenzon , 2010, "Do CEOs matter? " Working paper, Columbia University.

Bennedsen M. F. Perez Gonzalez and D. Wolfenzon , 2020, "Estimating the Value of the Boss: Evidence from CEO Hospitalization Events" *Journal of Finance,* August, 75(4) 1877-1912.

Bertrand, Marianne. and Anoinette. Schoar, 2003, "Managing with Style: The Effect of Managers on Firm Policies" *Quarterly Journal of Economics*, 118(4), pp. 1169-208.

Bertrand, M. and Mullainathan, S., 2004, "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination". *American Economic Review*, 94(4):991_1013.

Bertrand, Marianne, Sandra E Black, Sissel Jensen, Adriana Lleras-Muney,2019, "Breaking the Glass Ceiling? The Effect of Board Quotas on Female Labor Market Outcomes in Norway" *The Review of Economic Studies*, 86, Issue 1, January, 191–239,

Bohren, J Aislinn, Kareem Haggag, Alex Imas, and Devin G Pope, 2020, "Inaccurate statistical Discrimination"." Working Paper.

Bordalo, Pedro, Katherine Co_man, Nicola Gennaioli, and Andrei Shleifer, 2016, "Stereotypes." *Quarterly Journal of Economics*, 131(4): 1753-1794.

Brock, M and F. de Haas, 2020, "Discriminatory Lending- Evidence from Bankers in the Lab" Working paper.

Buser, T and H Yuan , 2019, "Do Women give up competing more easily? Evidence from the lab and the Dutch Math Olympiad" *American Economic Journal- Applied Economics,* 11(3) 225-252

Dahl, Michael and olav Sorenson, 2016, "Geography, Joint Choices, and the Reproduction of Gender Inequality" *American Sociological Review,* 81 issue: 5, 900-920.

Chhaochharia, Vidhi, Suman Ghosh, Alexandra Niessen-Ruenzi, and Christoph Schneider, "The Effect of Child Care Provision on the Effectiveness of Gender Quotas in Corporate Board" Working Paper, October 2021

Francesco D'Acunto Rajiv Jain Pulak Ghosh "How Costly Are Cultural Biases? Evidence From FinTech", Working paper, October 2021.

Alberto G. Rossi{ De la Fuente-Núñez, Vânia & Alana Officer "Demographic Change and Healthy Ageing Unit. The Global Campaign to Combat Ageism calls on us to act together". *Nature Aging* **1,** 146 (2021). https://doi.org/10.1038/s43587-021-

Elberse, Anita, 2007, "The Power of Stars: Do Star Actors Drive the Success of Movies?" *Marketing Science* October, 71 (4), pp. 1547-7185.

Elberse, Anita and Jehoshua Eliashberg, 2003, "Demand and Supply Dynamics for Sequentially Released Products in International Markets: The Case of Motion Pictures," *Marketing Science*, 22, 3, 329-354.

Egan, Nark L. Gregor Matvos, Amit Seru , 2018, "When Harry fired Sally: The double standard in Punishing Misconduct" Harvard Business School Working Paper. No. 19-047, October.

Ewens, M., Townsend, R., 2020. Are early stage investors biased against women? *Journal of Financial Economics*, March, 135(3) 653-677.

Fee, Edward C. Charles J. Hadlock, Joshua R. Pierce, 2013, "Managers with and without Style: Evidence Using Exogenous Variation" *The Review of Financial Studies*, Volume 26, 3, March, 567–601

Gertsberg Marina, Johanna Mollerstrom and Michaela Page "Gender Quotas and Support for Women in Board Elections" Working Paper, October 2021.

Gibbons, Robert and Kevin J. Murphy, 1992, Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence, Journal of Political Economy, volume 100, 3, June,

Goergen Marc, PeterLimbach and Meikc Scholz, 2015 "Mind the gap: The age dissimilarity between the chair and the CEO" *Journal of Corporate Finance* Volume 35, 2015, Pages 136-158

Gneezy, Uri , Muriel Niederle, Aldo Rustichini, 2003, "Performance in Competitive Environments: Gender Differences" *The Quarterly Journal of Economics*, 118, Issue 3, August, 1049–1074,

Goldin, Claudia, 2020, Martin Feldstein Lecture, NBER 2020.

Goldin, Claudia and Joshua Mitchell, 2017, The New Life Cycle of Women's Employment: Disappearing Humps, Sagging Middles, Expanding Tops *Journal of Economic Perspectives,* 31, 1—Winter, 161–182.

Gornall Will and Ilya A. Strebulaev, 2019, "Gender, Race, and Entrepreneurship: A Randomized Field Experiment on Venture Capitalists and Angels" Working paper, Stanford University.

Graham, J. S. Li and J. Qiu, 2012, "Managerial Attributes and Executive Compensation" *Review of Financial Studies, 25 (1), pp. 144-186.*

Graser, M. , 2007, "Helmers Go on a First Date" *Weekly Variety*, October 1-7 p. 9.

Han, S. and S. Abraham Ravid "Star Turnover and the Value of Human Capital- Evidence from Broadway Shows" ,2020, *Management Science*, 66, #2, February, 958-978.

Hebert, Camille, 2020, “Gender Stereotypes and Entrepreneur Financing” Working paper.

Holbrook, Morris B. 1999, “Popular Appeal versus Expert Judgments of Motion Pictures,” *Journal of Consumer Research*, Vol. 26 (September), 144-155.

John, K. S. A. Ravid and J. Sunder, 2016, “Managerial Ability and Success- Evidence from the Career Paths of Film Directors” forthcoming: *Journal of Corporate Finance.*

Kim, Scott and Petra Moser: (2020) “Women in Science: Lessons from the Baby Boom” – Working Paper, NYU

Knyazeva,A. D Knyazeva, and L. Naveen “, 2019, Diversity in Corporate Teams” Working Paper.

Lahey, J. N and D.R. Oxley,2020, “Age Discrimination, HR Managers, and Eye-tracking: Evidence from a Lab-in-the-Field experiment” (working paper, presented at ASSA 2021)

Lerchenmueller, Marc J. and Olav Sorenson, 2018, “The gender gap in early career transitions in the life sciences” *Research Policy* 47, Issue 6, July, 1007-1017.

Marx, M. (2021) “Employee Non-compete Agreements, Gender, and Entrepreneurship” (Working paper Cornell University).

Neumark, D. I Burn and P. Button, 2019, “Is It Harder for Older Workers to Find Jobs? New and Improved Evidence from a Field Experiment” *Journal of Political Economy* Volume: 127 Issue 2.

Palia, D. S. A. Ravid and Natalia Reisel, 2008, : “Choosing to Co-Finance: Analysis of Project-Specific Alliances in the Movie Industry” *Review of Financial Studies*, April, pp. 483-511

Niederle, M and L Vesterlund, 2007, “Do women shy away from competition? Do Men compete too much?” *Quarterly Journal of Economics*, 122(3) 1067-1101

Ravid, S.A., 1999, "Information, Blockbusters, and Stars: A Study of the Film Industry", *Journal of Business*, Vol. 72, No. 4, 463-492.

Ravid, S.A. and S. Basuroy, 2004, “Executive Objective function, the R-rating puzzle and the Production of Violent Movies” *Journal of Business*, April

Schwartz Ziv Miriam, 2017, “Gender and Board Activeness: The Role of a Critical Mass” *Journal of Financial and Quantitative Analysis*, April, Vol 52, # 2 751-780.

Serfling, Matthew, 2014, CEO age and the riskiness of corporate policies, *Journal of Corporate Finance*

Volume 25, April, 251-273

Shail, R, 2007, British Film Directors, a Critical Guide, Edinburgh University Press, UK.

Sherman Getmansky M. and H. Tookes, ,2020, “Female Representation in the Academic Finance Profession” working paper, Yale University.

Sila Vathunyoo, Angelica Gonzalez and Jens Hagendorff, 2016, Women on board: Does boardroom gender diversity affect firm risk?, *Journal of Corporate Finance* Volume 36, 26-53

Smith, S. M. Choueiti, and K. Pieper, 2017, “Over Sixty, Under-estimated: A Look at Aging on the “Silver” Screen in Best Picture Nominated Films” USC Annenberg Report.

Shoham, Amir, Sang MookLee ZaheerKhan Shlomo Y.Tarba and Mohammad FaisalAhammad, 2020, The effect of board gender diversity on cross-listing, *Journal of Corporate Finance***,** Volume 65, December,

Stiglitz, J. and A. Weiss, 1983, "Incentive Effects of Terminations: Applications to the Credit and Labor Markets", *American Economic Review*, Vol. 83, No.5 December, pp. 912-927.

Stout, H., 2001, "Crunch Time", *Wall Street Journal* January 2, 2002, P. A7.

Von Wachter, T., and S. Bender, 2006, "In the Right Place at the Wrong Time - The Role of Firms and Luck in Young Workers' Careers", *American Economic Review*, vol. 96, #5, December, pp. 1679-1705.

Waldman, M., 1984, "Job Assignment, Signaling and Efficiency", *Rand Journal of Economics*, Vol. 15, pp. 255-267.

Table 1 Panel A- The number of female and male first-time directors by year of first movie, 1995-2015 Sample.

This table shows the number of male and female directors based on the year they made their first film (debut year). The last column shows the percentage of female directors each year. We consider all feature length films (as opposed to shorts or TV films) released in the US each year.

Debut year	N. of Male	N. of Female	Grand Total	% Female of the Grand Total
1995	38	2	40	5%
1996	45	7	52	13%
1997	49	3	52	6%
1998	50	14	64	22%
1999	60	6	66	9%
2000	58	10	68	15%
2001	52	4	56	7%
2002	58	7	65	11%
2003	43	6	49	12%
2004	54	1	55	2%
2005	53	6	59	10%
2006	52	11	63	17%
2007	60	12	72	17%
2008	61	9	70	13%
2009	51	8	59	14%
2010	35	2	37	5%
2011	26	5	31	16%
2012	43	2	45	4%
2013	33	5	38	13%
2014	40	8	48	17%
2015	27	2	29	7%
Total	988	130	1118	12%

Table 1 Panel B - Directors by the number of movies made during their entire career (1995-2015 cohort)

Column 1 shows the total number of films a director has made from 1995 to 2018. These directors started between 1995 and 2015. Column 2 shows the number of male directors who have made this number of movies until 2018. Column 3 shows among all male directors, the percentage of male directors who have made this number of films. Columns 4 and 5 provide similar statistics for female directors.

Total Number of Movies made btw 1995-2018	N. of Male Directors Making this number of films	Percentage of Male Directors Making this # of Films Among all Male Directors	N. of Female Directors Making this number of films	Percentage of Female Directors Making this # of Films Among All Female Directors
1	674	68.2%	98	75.4%
2	157	15.9%	19	14.6%
3	56	5.7%	7	5.4%
4	37	3.7%	3	2.3%
5	28	2.8%	1	0.8%
6	17	1.7%	2	1.5%
7	8	0.8%		
8	4	0.4%		
9	3	0.3%		
10	2	0.2%		
11	1	0.1%		
15	1	0.1%		
Grand Total	988	1	130	1

Table 2 panel A - Summary statistics by gender for the 1998-2005 sample. All variables are defined in appendix A.

This table shows the summary statistics of movies in the smaller sample (1998-2005, where we obtained more data from Gracenote) by gender.

	Return	Meta score	User ratings	Domestic Gross (millions)	Budget (millions)	Max screen count
male	3.12	50.99	6.30	36.28	44.70	1798.49
female	2.61	52.46	6.28	25.09	28.03	1339.43
Female male coop(joint)	6.02	62.40	6.71	139.03	97.82	3131.50

Table 2 Panel B- Number of directors by pre-directing roles and gender.

This panel is also based on the 1998-2005 sample. It describes the career paths people follow prior to becoming directors. We collected credits they had received before becoming directors. We categorize roles into four groups: actor, writer, anything but actor or writer (such as editor, producer, TV/commercial director, etc), and nothing (no IMDB credits).

Number of directors by pre-directing major role and gender.

Major role is defined as the role with the highest number of credits in IMDB, if greater than 2. Others are all roles but actor or writer.

	Male		Female		
	N.	%	N	%	N
Actor	59	21%	5	16%	64
Writer	48	17%	3	10%	51
Others	86	31%	11	35%	97
None	85	31%	12	39%	97
Total	278		31		309

Number of directors by pre-directing secondary role and gender. Secondary role is a role with the second highest number of credits in IMDB, if they are at least 20% of the number of credits for the major role.

	Male		Female		
	N.	%	N	%	N
Actor	13	5%	0	0%	64
Write	18	6%	1	3%	51
Others	42	15%	5	16%	97
None	205	74%	25	81%	97
Total	278		31		309

Table 2 Panel C- Characteristics of first-time directors by gender.

This table describes the characteristics of directors when they made the first movie. Pre-debut scope is the number of areas they have at least 2 credits in before becoming directors. The areas include TV/commercial director, writer, editor, special effect, miscellaneous crew, soundtrack and animator. Years before debut is the number of years between their first credit on IMDB and the year they made the first movie. Other engagements are the total number of credits the directors receive from the non-directing areas during their tenure as directors.

	Average pre-debut Scope	Average years before debut	Average of Other Engagements	Age when directing first movie
Male	1.32	18.33	1.49	38.32
Female	1.06	10.61	1.60	40.33
Total	1.30	17.56	1.50	38.53

Table 2 panel D Number of films by director 1998-2005 sample

This table describes the number of directors by the number of movies they made until 2018. It also shows the percentage of male/female directors making different number of movies.

Number of movies made	Male		Female	
	N	%	N	%
1	137	0.49	16	0.52
2	62	0.22	8	0.26
3	28	0.10	3	0.10
4	22	0.08	2	0.06
5	14	0.05	2	0.06
6	9	0.03		0
7	2	0.01		0
8	2	0.01		0
9	1	0.00		0
11	1	0.00		0
Total	278	1	31	1

Table 2 E- The number of female and male first-time directors by year of first movie (1998-2005 sample)

This panel shows the number of male and female directors based on the year they made their first film (debut year) for the 1998-2005 sample. The last column shows the percentage of female directors each year. We consider all feature length films (as opposed to shorts or TV films).

Debut year	Male	Female	% of female	Total
1998	28	5	0.15	33
1999	43	5	0.10	48
2000	44	8	0.15	52
2001	41	3	0.07	44
2002	40	4	0.09	44
2003	24	2	0.08	26
2004	25	1	0.04	26
2005	33	3	0.08	36
Total	278	31	0.10	309

Table 2 Panel F – Film performance by the age of the director. Variables are defined in Appendix A.

This table compare the performance of the film (return, meta score, user rating) based on different age groups of directors. Metascore is the professional reviews score on IMDB. User reviews are by users.

	1st quartile	2nd quartile	3rd quartile	4th quartile	P value -ANOVA test to compare means
	<37	37-41	41-47	>47	

Return	2.76	3.38	3.35	3.42	0.07
Meta score	51.63	53.05	49.86	54.70	0.12
User ratings	6.36	6.42	6.25	6.43	0.93

Table 3 Panel A-Summary statistics for regression variables. Variables are defined in Appendix A.

	N.	Mean	Std. Dev.	Min	Max
Next	645	0.62	0.49	0.00	1.00
Female	645	0.1	0.29	0.00	1.00
Tenure	645	2.23	1.58	1.00	11.00
Average return	645	3.25	3.16	0.00	25.64
Average budget	645	42.11	40.56	0.12	214.29
Average user rating	645	6.41	0.84	3.30	8.40
Average meta score	645	52.28	15.17	5.00	90.33
Age	645	41.72	7.63	22.00	70.00
Scope of pre-debut career	645	1.31	1.25	0.00	6.00
Years before debut	645	10.48	8.26	0	41
Other engagements	645	1.50	1.47	0.00	13.00
Coop	645	0.09	0.28	0.00	1.00

Table 3 Panel B- Correlation matrix. Variables are defined in Appendix A.

		1	2	3	4	5	6	7	8	9	10
Next	1	1									
Female	2	-0.041	1								
Tenure	3	0.256***	-0.076+	1							
Average return	4	0.281***	-0.021	0.132**	1						
Average user rating	5	0.322***	0.006	0.099*	0.393***	1					
Average meta score	6	0.310***	0.070+	0.106**	0.419***	0.762***	1				
Age	7	-0.058	0.083*	0.356***	0.059	0.024	0.074+	1			
Scope of pre-debut career	8	0.010	-0.062	-0.038	0.004	0.010	0.068+	0.300***	1		
Years before debut	9	0.015	-0.023	0.006	0.005	-0.021	0.034	0.030	-0.051	1	
Other engagements	10	-0.124**	-0.052	-0.053	-0.049	-0.061	0.012	-0.013	0.297***	-0.072+	1
Coop	11	-0.090	0.079*	-0.152***	0.026	0.087*	0.037	-0.133**	0.008	-0.022	0.109**

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Table 4 - The determinants of the probability of making another movie. The dependent variable is a dummy taking the value of 1 if the director makes another movie and zero if they drop out of the sample. All variables are defined in Appendix A.

Dependent Variables	Probability of making another movie							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female		-0.108	-0.107	4.094*	-0.031	-0.048	0.008	-0.051
		(0.350)	(0.340)	(1.976)	(0.353)	(0.365)	(0.347)	(0.342)
Tenure	0.367***	0.493***	0.383***	0.375***	0.390***	0.370***	2.380***	0.389***
	(0.074)	(0.085)	(0.098)	(0.098)	(0.092)	(0.101)	(0.540)	(0.099)
Average return	0.160*	0.143*	0.157*	0.157*	0.805*	0.156*	0.151*	0.150*
	(0.067)	(0.063)	(0.075)	(0.075)	(0.330)	(0.066)	(0.075)	(0.074)
Average user rating	0.463**	0.379*	0.397*	0.469*	0.381*	0.442*	0.450*	0.405*
	(0.174)	(0.184)	(0.192)	(0.198)	(0.193)	(0.197)	(0.195)	(0.192)
Average meta score	0.016+	0.022*	0.027**	0.026**	0.028**	0.027**	0.026**	0.026**
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
age		-0.079***	-0.081***	-0.080***	-0.045*	0.437***	-0.009	-0.191**
		(0.016)	(0.018)	(0.018)	(0.021)	(0.117)	(0.027)	(0.060)
Other engagements		-0.173*	-0.157*	-0.162*	-0.134+	-0.174*	-0.158*	-0.164*
		(0.075)	(0.078)	(0.079)	(0.073)	(0.076)	(0.077)	(0.079)
Actor		0.239	0.042	0.034	0.024	0.158	0.089	0.083
		(0.344)	(0.345)	(0.348)	(0.330)	(0.358)	(0.345)	(0.350)
Writer		0.685**	0.579*	0.562*	0.619*	0.675*	0.690**	0.644*
		(0.260)	(0.251)	(0.253)	(0.246)	(0.276)	(0.261)	(0.260)
Others		0.469	0.519+	0.534+	0.557*	0.689*	0.575+	0.592*
		(0.301)	(0.292)	(0.294)	(0.282)	(0.311)	(0.298)	(0.299)
None		0.182	0.198	0.168	0.259	0.346	0.244	0.262
		(0.391)	(0.396)	(0.396)	(0.398)	(0.402)	(0.397)	(0.399)
R_percent			0.747	0.774+	0.725	0.726	0.654	0.702
			(0.473)	(0.467)	(0.491)	(0.487)	(0.479)	(0.478)
G_percent			-0.128	-0.094	-0.284	-0.240	-0.196	-0.153
			(0.559)	(0.558)	(0.582)	(0.559)	(0.563)	(0.559)
PG13_percent			1.036*	1.004*	1.055*	1.077*	0.980+	1.006*
			(0.507)	(0.498)	(0.527)	(0.523)	(0.511)	(0.512)

Rating Herfindahl			-0.786	-0.834	-0.671	-0.827	-0.611	-6.276*
			(0.512)	(0.517)	(0.515)	(0.553)	(0.542)	(3.000)
Female*Average user rating				-0.655*				
				(0.313)				
Age*Average return					-0.014*			
					(0.006)			
Age*Age						-0.006***		
						(0.001)		
Age* Tenure							-0.043***	
							(0.011)	
Age* Rating Herfindahl								0.124+
								(0.065)
Observations	676	645	645	645	645	645	645	645
log likelihood	-381.8	-344.8	-337	-335.6	-332.5	-326.9	-330.7	-335.2

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Table 5: Probability of making the 2nd movie with age and gender. The dependent variable is a dummy taking the value of 1 if the director makes another movie and zero if they drop out of the sample. All variables are defined in Appendix A.

Dependent Variables	Probabilities of making the 2nd movie					
	(1)	(2)	(3)	(4)	(5)	(6)
Female		-0.089	0.004	5.172*	0.031	-0.046
		(0.454)	(0.470)	(2.582)	(0.489)	(0.484)
Average return	0.226+	0.173+	0.191	0.189	0.810*	0.195*
	(0.118)	(0.100)	(0.120)	(0.119)	(0.370)	(0.097)
Average user rating	0.212	0.038	0.049	0.146	0.015	0.063
	(0.187)	(0.217)	(0.220)	(0.226)	(0.222)	(0.227)
Average meta score	0.022*	0.033**	0.037**	0.037**	0.039**	0.037**
	(0.010)	(0.012)	(0.012)	(0.013)	(0.013)	(0.012)
age		-0.033	-0.034	-0.034	-0.007	0.397*
		(0.021)	(0.022)	(0.023)	(0.023)	(0.196)
Other engagements		-0.338**	-0.325**	-0.327**	-0.289**	-0.332**
		(0.115)	(0.119)	(0.120)	(0.107)	(0.116)
Actor		0.029	-0.076	-0.086	-0.122	-0.021
		(0.531)	(0.530)	(0.535)	(0.510)	(0.544)
Writer		1.170**	1.152**	1.161**	1.180**	1.054**
		(0.399)	(0.384)	(0.390)	(0.378)	(0.392)
Others		0.471	0.545	0.568	0.541	0.549
		(0.488)	(0.484)	(0.487)	(0.473)	(0.496)
None		0.364	0.407	0.434	0.433	0.452
		(0.587)	(0.588)	(0.590)	(0.594)	(0.596)
R_percent			0.565	0.626	0.529	0.602
			(0.501)	(0.496)	(0.516)	(0.509)
G_percent			-0.337	-0.262	-0.575	-0.390
			(0.655)	(0.657)	(0.651)	(0.634)
PG13_percent			0.721	0.751	0.730	0.780
			(0.545)	(0.539)	(0.567)	(0.563)
Rating Herfindahl				-0.808*		
				(0.402)		
Female*Average user rating					-0.014*	
					(0.007)	
Age*Average return						-0.005*
						(0.003)
Observations	315	288	288	288	288	288
log likelihood	-190.2	-160.5	-157.3	-155.9	-154	-154.2

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue

(adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Figure 1: Plotting the interaction between gender and average user review (Table 5 Model 4)

The X axis depicts the average user rating of movies. Y is the predictive probability of making another movie keeping all the other values at their means.

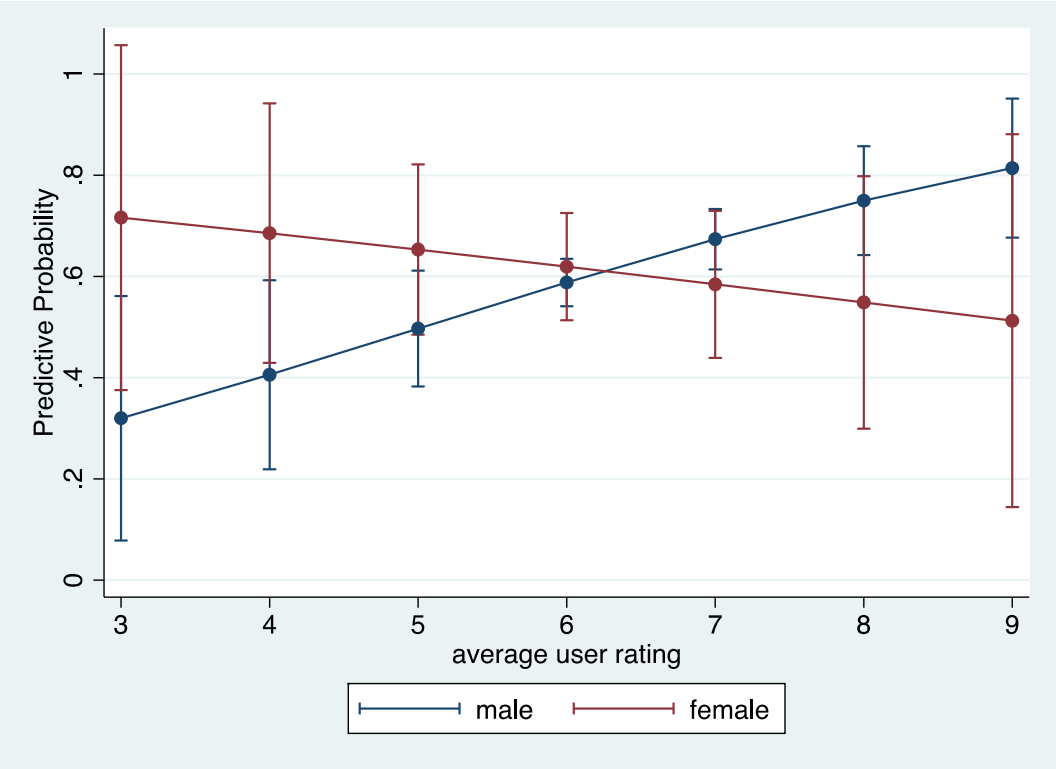


Figure 2: Plotting the interaction between age and average return (age is at the mean, 2 SDs above the mean and 2 SDs below mean) (Table 5 Model 5)

The X axis depicts the average return of movies the director has done so far. The three lines depict age at the mean, 2 SDs above the mean and 2 SDs below the mean. Y is the predictive probability of making another movie keeping all the other values at their means.

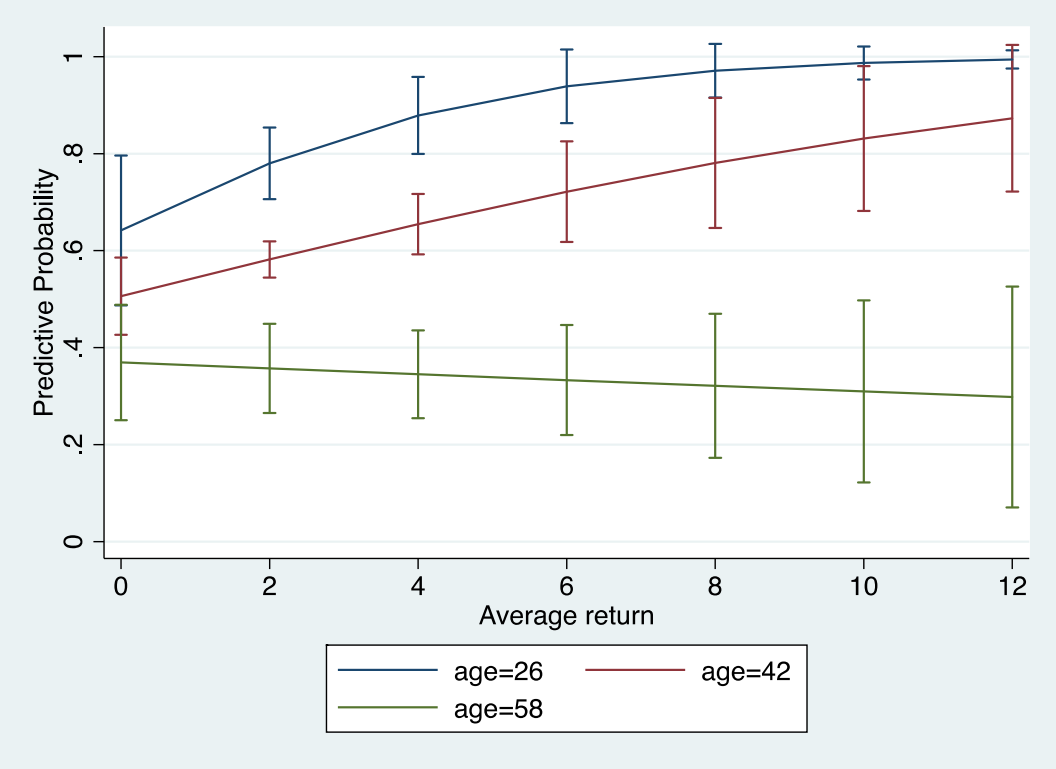


Figure 3: Plotting the curvilinear effect of age (Table 5 Model 6)

The X axis depicts age of the director. Y axis is the predicted probability of making another movie keeping all the other values at their means.

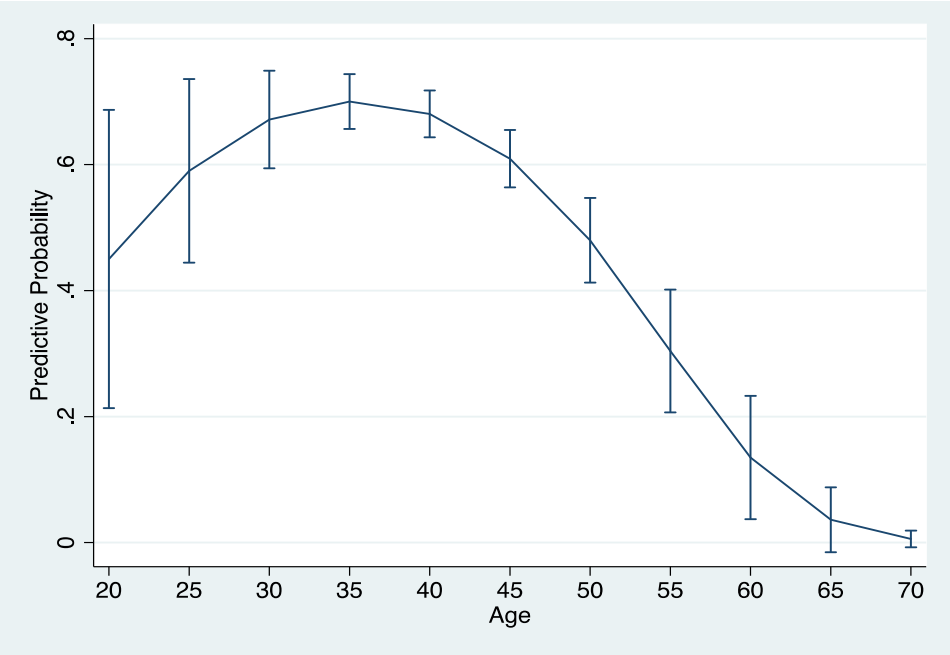


Figure 4- The probability of being hired as a function of tenure for different ages (Model 7)

The X axis depicts the tenure of the director (number of movies made so far). The three lines show age at the mean, 2 SDs above the mean and 2 SDs below mean. Y is the predicted probability of making another film, keeping all the other values at their means.

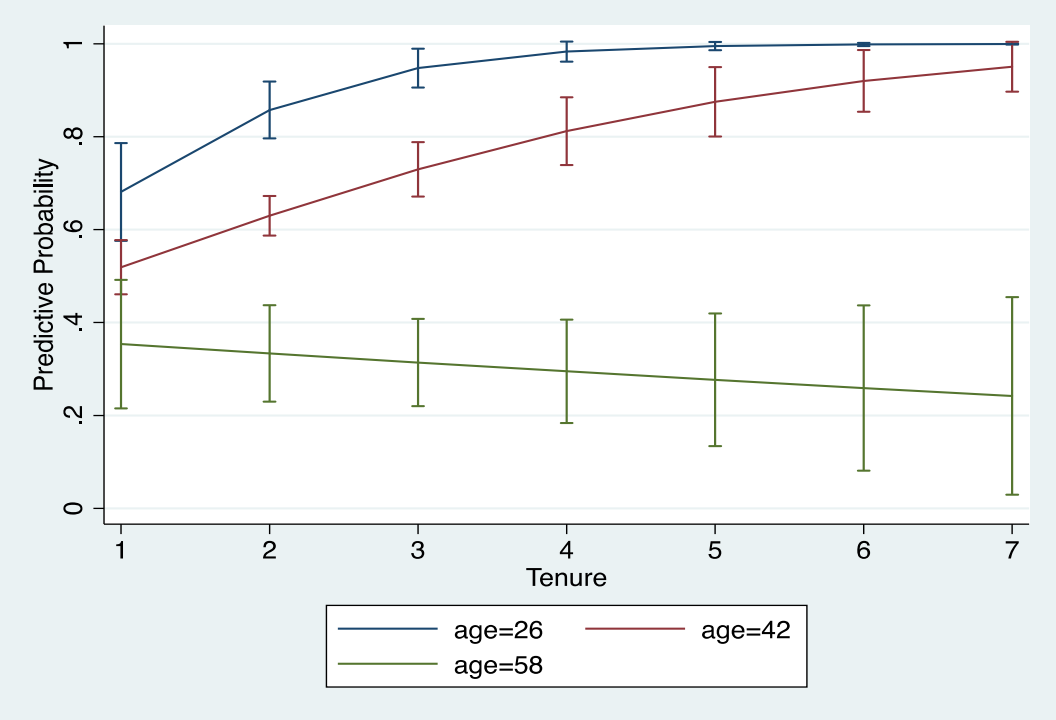
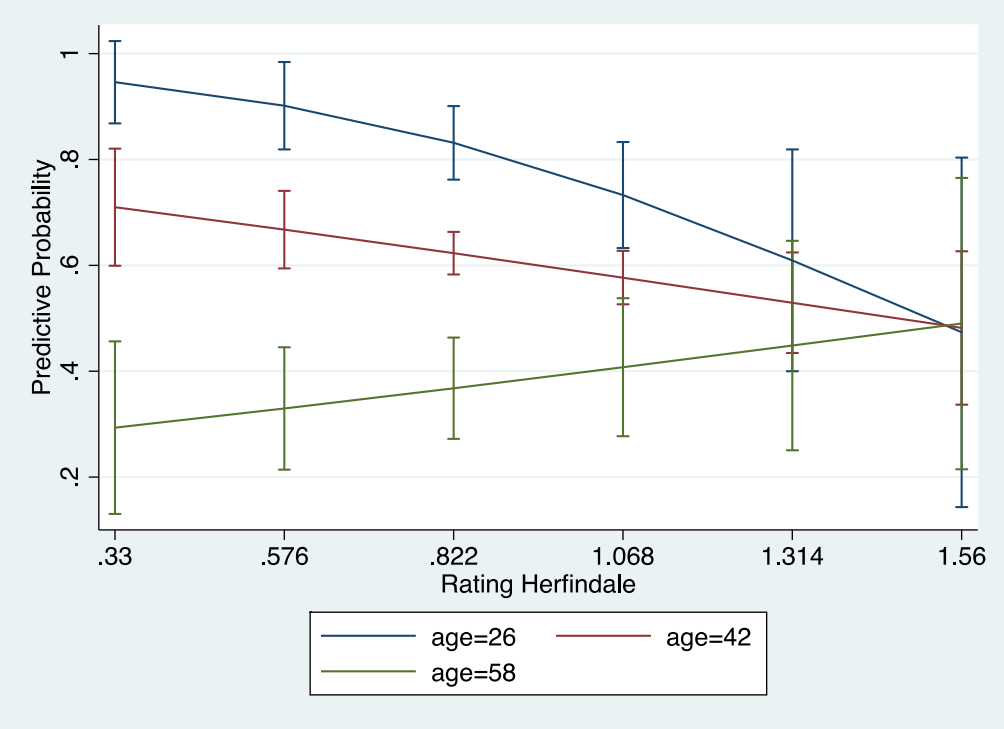


Figure 5- The probability of being hired as a function of rating Herfindahl for different ages (Model 8)

The X axis depicts the Herfindahl index of the rating of movies the director has done so far. The three lines depict age at the mean, 2 SDs above the mean and 2 SDs below mean. Y is the predicted probability of making another movie keeping all the other values at their means.



Additional tests:

Table 6: The determinants of film budgets. The dependent variable is the budget for the film directed in constant 1998 dollars. All variables are defined in Appendix A.

Dependent variables	Budget	
	(1)	(2)
Female	-4.262	10.742
	(11.252)	(13.782)
Tenure	7.278**	7.288**
	(2.205)	(2.192)
Average return	0.899	1.154
	(1.203)	(1.295)
Average user rating	-0.240	-0.270
	(0.383)	(0.384)
Average meta score	19.515*	20.168*
	(7.761)	(7.845)
Age	-1.222*	-1.150*
	(0.552)	(0.562)
Actor	19.388	19.152
	(13.055)	(12.969)
Writer	11.496	10.591
	(9.508)	(9.492)
Other	22.519*	22.764*
	(10.305)	(10.241)
None	13.872	12.927
	(14.327)	(14.316)
R rating	28.362**	28.894**
	(9.374)	(9.629)
G rating	80.432***	81.723***
	(11.526)	(11.747)
PG13 rating	63.282***	64.165***
	(10.853)	(11.118)
Female x Average return		-4.187*
		(1.901)
Observations	336	336
R-squared	0.282	0.286

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of

critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Table 7- A Robustness check: the instrument is the number of years a director had spent in the entertainment industry before directing her/his first movie. In the second stage, the dependent variable is a dummy taking the value of 1 if the director makes another movie and zero if they drop out of the sample. All variables are defined in Appendix A

Dependent Variables	Probability of making another movie	
	(1)	(2)
	2nd stage	1st stage
Average return	0.253**	
	(0.095)	
Gender	0.030	-0.393
	(0.180)	(0.430)
Tenure	0.194*	0.282*
	(0.089)	(0.130)
Age	-0.042***	0.004
	(0.011)	(0.023)
Other engagement	-0.119*	-0.003
	(0.053)	(0.099)
R percent	0.125	1.118*
	(0.207)	(0.520)
G percent	-0.390	2.381***
	(0.278)	(0.616)
PG13 percent	0.092	1.012*
	(0.201)	(0.497)
Rating_Herfindahl	-0.410	0.466
	(0.295)	(0.688)
Actor	0.319	-1.425**
	(0.238)	(0.514)
Writer	0.413**	-0.491
	(0.140)	(0.400)
None	0.191	-0.847
	(0.216)	(0.618)
Others	0.264	0.222
	(0.184)	(0.357)
Years before debut		0.001**
		(0.000)
Observations	687	687
log likelihood	-2098	-2098

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made

prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Table 8 : The determinants of directing another film for directors under the age of 50. The dependent variable is a dummy taking the value of 1 if the director makes another movie and zero if they drop out of the sample. All variables are defined in Appendix A

Dependent variables	Probability of making another Movie
Female	-0.294
	(0.433)
Tenure	0.494***
	(0.098)
Average return	0.199*
	(0.081)
Average user rating	0.460*
	(0.206)
Average meta score	0.018+
	(0.010)
Age	-0.048*
	(0.023)
Scope of pre-debut career	0.222*
	(0.092)
Years before debut	0.000
	(0.000)
Other engagements	-0.212**
	(0.079)
Coop	-0.523
	(0.340)
N	546
Log likelihood	-283.7

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Table 9 – Success for experienced directors. The dependent variable is a dummy taking the value of 1 if the director makes another movie and zero if they drop out of the sample. All variables are defined in Appendix A

	Probabilities of making the 4th movie and beyond	Probability of making the 5th movie and beyond
Female	1.347+	3.516*
	(0.792)	(1.401)
Tenure	0.415*	0.753**
	(0.172)	(0.270)
Average return	0.037	-0.201
	(0.149)	(0.222)
Average user rating	1.902**	1.803+
	(0.734)	(0.960)
Average meta score	-0.026	0.023
	(0.028)	(0.064)
age	-0.214***	-0.273***
	(0.048)	(0.071)
Other engagements	0.355+	0.441+
	(0.194)	(0.245)
Actor	0.092	1.659
	(0.691)	(1.181)
Writer	0.624	2.439**
	(0.614)	(0.941)
Others	0.793	1.553+
	(0.618)	(0.848)
None	0.742	3.085**
	(0.848)	(1.143)
R_percent	-0.594	-1.829
	(1.921)	(5.377)
G_percent	-1.205	-0.019
	(2.137)	(4.640)
PG13_percent	-0.693	-1.670
	(1.741)	(4.743)
Rating Herfindahl	-1.114	1.709
	(1.126)	(2.814)
Observations	201	115
log likelihood	-75.17	-35.37

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten

Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Table 10 _ Robustness checks with Rotten Tomatoes- the dependent variable is a dummy taking the value of 1 if the director makes another movie and zero if they drop out of the sample. All variables are defined in Appendix A

Dependent Variable	Probability of making another movie							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female		-0.243	-0.254	4.318+	-0.207	-0.181	-0.159	-0.205
		(0.328)	(0.317)	(2.246)	(0.325)	(0.337)	(0.325)	(0.319)
Tenure	0.392***	0.510***	0.412***	0.406***	0.415***	0.404***	2.285***	0.420***
	(0.073)	(0.083)	(0.096)	(0.096)	(0.092)	(0.098)	(0.545)	(0.098)
Average return	0.151*	0.136*	0.149*	0.148*	0.651*	0.154**	0.144*	0.142*
	(0.062)	(0.057)	(0.067)	(0.067)	(0.298)	(0.059)	(0.068)	(0.066)
Critics average	0.318***	0.395***	0.463***	0.473***	0.475***	0.448***	0.453***	0.450***
	(0.093)	(0.105)	(0.112)	(0.113)	(0.113)	(0.111)	(0.109)	(0.110)
Audience average	0.761**	0.571*	0.506+	0.647*	0.457	0.622*	0.627*	0.560+
	(0.254)	(0.291)	(0.297)	(0.297)	(0.299)	(0.306)	(0.299)	(0.298)
age		-0.078***	-0.080***	-0.077***	-0.052**	0.350**	-0.014	-0.183**
		(0.015)	(0.016)	(0.016)	(0.020)	(0.108)	(0.026)	(0.059)
Other engagements		-0.193*	-0.182*	-0.185*	-0.165*	-0.199**	-0.183*	-0.186*
		(0.076)	(0.080)	(0.079)	(0.076)	(0.077)	(0.078)	(0.080)
Actor		0.097	-0.088	-0.127	-0.093	0.036	-0.049	-0.063
		(0.347)	(0.348)	(0.353)	(0.342)	(0.356)	(0.344)	(0.349)
Writer		0.594*	0.506*	0.488+	0.523*	0.635*	0.612*	0.565*
		(0.259)	(0.249)	(0.254)	(0.244)	(0.271)	(0.259)	(0.257)
Others		0.325	0.372	0.370	0.415	0.551+	0.417	0.425
		(0.308)	(0.297)	(0.299)	(0.292)	(0.311)	(0.299)	(0.299)
None		0.120	0.102	0.050	0.155	0.280	0.143	0.150
		(0.386)	(0.388)	(0.390)	(0.388)	(0.392)	(0.387)	(0.389)
R_percent			0.570	0.611	0.530	0.543	0.494	0.548
			(0.446)	(0.445)	(0.456)	(0.457)	(0.449)	(0.449)
G_percent			-0.250	-0.216	-0.383	-0.367	-0.300	-0.252
			(0.526)	(0.529)	(0.544)	(0.526)	(0.527)	(0.525)
PG13_percent			0.692	0.683	0.692	0.685	0.626	0.670
			(0.479)	(0.473)	(0.489)	(0.493)	(0.482)	(0.484)
Rating Herfindahl			-0.722	-0.751	-0.636	-0.760	-0.560	-5.811+
			(0.518)	(0.523)	(0.520)	(0.551)	(0.546)	(2.967)
Female*Audience average				-1.290*				
				(0.650)				
Age*Average return					-0.011+			
					(0.006)			
Age*Age						-0.005***		
						(0.001)		
Age*Tenure							-0.040***	
							(0.011)	
Age* Rating Herfindahl								0.115+

								(0.064)
Observations	705	662	662	662	662	662	662	662
log likelihood	-399.6	-353.9	-348.3	-346.8	-345.4	-339.7	-342.6	-346.7

Age is the age of the director when making the current movie. ***Female*** **i**s a dummy variable that takes the value of 1 if the director is female. ***Coop*** is a dummy variable for films co-directed by a man and a woman. ***Revenue*** is the film Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars***) Domestic Gross*** are the North American revenues ***Budget*** is production Cost +print and ad (adjusted for inflation – 1998 dollars). **Return** is *Revenue/Budget* ***Tenure*** is Number of movies made prior to the current movie. ***Max Screen Count*** is the largest number of screens during the run of the movie. ***Dummy R***= '1' if film has an MPAA rating 'R', '0' otherwise. Similarly for G and PG-13. ***R G or PG percent*** are the percentage of such movies among the director's previous films. ***Average Meta-score*** is the Metacritic score from IMDB User Rating is the user reviews score from IMDB ***Critics Average*** is the average critics' score from Rotten Tomatoes. ***Audience Average*** is the average user reviews score from Rotten Tomatoes. ***Average Return*** is the average return of all prior films by the director excluding the current film. ***Average Critic Rating*** is the average of critical reviews for all prior films by the director excluding the current film ***Average User Rating*** is the average user ratings for all previous films by the director. ***Years Before Debut*** is the number of years from the first listing on IMDB and until the director directs her/his first movie. ***Major Role***-The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2. ***Minor Role***- the minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2. ***Scope of pre-Debut*** the number of pre-debut skills. ***Other Engagements*** is the average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.

Appendix A Table A1- Variable Definitions

Age	The age of the director when making the current movie.
Female	A dummy variable that takes the value of 1 if the director is female.
Coop	A dummy variable for films co-directed by a man and a woman.
Revenue	Domestic gross revenue + International box office + TV revenues+ home entertainment gross revenue (adjusted for inflation – 1998 dollars)
Domestic Gross	North American Revenues
Budget	Production Cost +print and ad (adjusted for inflation – 1998 dollars)
Return	Revenue/Budget
Tenure	Number of movies made prior to the current movie
Max Screen Count	The largest number of screens during the run of the movie.
Dummy R	= '1' if film has an MPAA rating 'R', '0' otherwise.
Average Meta-score	Metacritic score from IMDB
User Rating	User reviews score from IMDB
Critics Average	Average critics' score from Rotten Tomatoes.
Audience Average	Average user reviews score from Rotten Tomatoes.
Avg Return	Average return of all prior films by the director excluding the current film.
Average Critic Rating	Average of critical reviews for all prior films by the director excluding the current film
Average User Ratings	Average user ratings for all previous films by the director.
Years Before Debut	The number of years from the first listing on IMDB and until the director directs her/his first movie.
Major Role	The major role is the role the director is credited with prior to their directing career with the highest number of credits on IMDB, if they exceed 2.
Minor Role	The minor role is for the next role that is at least 20 percent of the number of major-role credits, if they exceed 2.
Scope of pre-Debut	Number of pre-debut skills
Other Engagements	The average number of other credits on IMDB per year (besides directing a feature film) for a director while pursuing a directing career.