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# The determinants of a pornography actress's career life

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## ABSTRACT

Statistics on Japanese adult video (A.V.) indicated that it is an industry that produces over 4500 videos every month and has recently provided 5.27 hundred million U.S. dollars a year. All related stories and sex toys promote the culture and trades of sex goods in Japan at home and abroad. They even affect the mass in sexual life, knowledge, chats as well as values in both good and bad ways. Nonetheless, almost no empirical analysis exists of this industry. This study investigates empirically the influences of debuting age, risky-sex movies and other related factors on the career life of Japanese A.V. actresses. By analysing data concerning the Japanese A.V. actresses whose careers commenced between 2002 and 2014, the authors found that the larger the cup size of an actress, the more likely she also serves as a model entertainer, and the longer she stays. On the contrary, an A.V. actress has to retire earlier or leave the industry because of a later starting age or the numbers of risky-sex movies she has produced.

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survival analysis


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J19; J79; L89

What the erotic mad sees will trigger lust. Because they are very embarrassed, looking at things with that blind eye, everything is awkward. –Japanese director Akira Kurosawa's comment on the opinion of the public on the grading of the film.

## 1. Introduction

The documentary *How Does an Adult Video Actor Manage to Survive* was shown in 2013 and indicated that there were over 4500 adult videos (A.V.s) released every month in Japan, and an annual output value of physical commodities was more than 55 billion yen or around 527 million U.S. dollars. After 2000, with the rise of digital video technology and the popularisation of the Internet, the Japanese A.V. industry extended consumer groups through the Internet as well as domestic and overseas marketing and trade. Not only did the economic activity and output value of the A.V. industry account for a part of Japanese economic output value, but also some A.V. actresses such as Yoshizawa Akiho, Yui Hatano, Akira Elly, Ohashi Miku and

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Rei Mizuna had a large number of fans in mainland China, Taiwan, and Korea. Furthermore, Maki Wakui, Ai Jima, and Sora Aoi even turned to being singers or actresses in the opera. What is more, all scenarios and materials related to A.V. have more influence on the sex and culture and demand and supply of logistics of sex products in many places. They even affect the audience on sexual life, knowledge, and terms of sex as well as attitudes towards sex on no matter whether good or bad aspects, which also forms culture shocks. However, surprisingly, although the A.V. industry has been developed, and has a significant impact on the society of many Asian countries, few studies exist on the productive economic behaviour and the labour market status. The existing references are all field researches on similar jobs in society, journalists' reports and interviews as well as books on the discussion of its historical development. Most people gain knowledge of the A.V. industry from the Internet, news reports and other similar ways, and only know little about the working status, supply and demand of production and marketing, consumer preference, productive activity and the homogeneity and heterogeneity of this particular industry. How do practitioners in the A.V. industry get to know consumer preferences? What is the pay structure of this industry? Does there exist labour migration or a dual labour market, which is similar to the theories explained in general labour economics? People know almost nothing about these. As described by Voss (2012), academic studies did not really focus on the business aspects of pornography and thus proposed associated theoretical frameworks and methodological approaches in order to gather rich empirical material for a wider pornography research field.

As works have emerged in recent years, people have gained a clearer recognition of the development of this industry. For example, Nakamura (2012) described the level of salary, low employment rates, and high workload of A.V. actresses. Ke (2014) summarised the number of A.V. actresses and working conditions in the A.V. industry. Rattan (2014) introduced the history of A.V.s and how the A.V. actresses came into being with the development of the A.V. industry. All these works made people curious about the status of A.V. actresses. Ke (2014) inferred from the number of brokerage agencies in Tokyo that there are now 2000–2200 A.V. actresses who are employed every year on average in Japan. However, about 80% of them whose stage names have not been remembered by consumers would be weeded out and replaced by new ones and lose their markets. In other words, the career life of A.V. actresses is always very short. Why is their career life so short? What influences such a short career life? There is no reference about a survey or empirical analysis on labourers in the A.V. actress market.

From the aspect of labour economics, Mincer (1974) emphasised that the working experience could have a great influence on salaries in the traditional document. Katz and Meyer (1990) pointed out that salary, age and productive ability of labourers play vital roles in career life and unemployment. Are they still the main reasons for the workplace life of a Japanese A.V. actress? A.V. actresses would usually refuse to make public their educational background, birth, age, and other information on mass media, except in adult magazines, websites, and pictorials, which are published for specific consumers, in order to decrease discovery by their relatives. This also means that researchers could integrate characters about the labourers in the A.V. industry

through these relevant websites, magazines, and data. In addition, some profession discussion boards update relevant information about new A.V. actresses, videos, and the retirement of A.V. actresses irregularly and offer research data. Therefore, this study integrates relevant personal characters of A.V. actresses who debuted during the period 2002–2014, and collects data about the output of productive videos during the employment of the single A.V. actresses based on the public information about A.V. actresses on Japanese Google, Baidu search engine, and Wikipedia as well as A.V. information from Digital Media Mart Corporations (D.M.M.), and then will utilise empirical econometrics and the survival regression estimation model (survival analysis), which is widely used in unemployed labourer research in this paper, in order to discuss the influences of A.V. actresses' career life.

From the results of research, the fact she is an A.V. actress and also works as a part-time model entertainer, the number of her videos, the ratios of her videos and the output of risky-sex adult videos, which involve multiple individuals in sexual behaviour, a high possibility of pregnancy, sadomasochism (S.M.) or other types of vigorous sex acted recently influence her career life significantly. The debuting age has a negative effect on an A.V. actress's career life, which means the older she debuts, the less attraction to consumers and market value she has. The influence of output of a single A.V. on A.V. actresses' career life also has similar results; the more output they produce, the higher rewards they earn but the less marginal effect they have. And there is no difference between A.V. actresses born in Tokyo and others born in another area. Next, in this paper, the output of a single A.V. during the career life and the ratio of a single A.V. in the current season are regarded as the strength of productivity of A.V. actresses. Then, the authors analyse the influences of output ratio and indicate that the rise of both output and output ratio of a single A.V. will increase the probability of their retirement. What is more, the variables about the output of risky-sex videos could be explained as the improvement of marketing capability of A.V. actresses by shooting risky-sex videos. However, empirical analysis may indicate that such risky-sex films would also increase the risk of health problems and pregnancy, which will decrease their career life. All in all, an A.V. actress earns money by showing her naked body and her beautiful appearance as well as good preservation, which will attract consumers continuously. The standard of employment of practitioners in the A.V. industry depends on the sales volume of her products, so debuting age, appearance, the output of videos and whether her videos are sex-risky will have influences on her career. If all these factors of an A.V. actress cannot attract consumers, she will probably be retired from the A.V. industry. Otherwise, if A.V. actresses can attract an audience all the time, she could continue her career in the labour market.

In this study, the second section introduces the development of the A.V. industry, the third part describes the empirical model, the fourth discusses the empirical data and results, while the last section concludes.

## **2. Development of the A.V. industry**

The development of the A.V. industry is related to marketing and sales. Specifically, the Japanese A.V. industry was developed after 1980. With the production and

improvement of television and video equipment, the number of people who went to the cinema to see a movie or opera declined in the 1970s. In order to increase the incomings of the film industry, some Japanese film-makers began to create pornographic films for male audiences, who were the main consumers. This was the predecessor of A.V.s. From the 1980s, it became common that there were televisions and video equipment in most Japanese families, so people did not need to go to the cinema, instead renting a video cassette at a low price and watching pornographic films at home. The former companies which created pornographic films could not meet the demand of the market; video cassettes for video stores and renting to people appeared on the market. In May 1981, the first A.V. *Peep the Secret* was created and sold by a Japanese video company. Then, an increasing number of photography companies, brokerage firms and film companies for A.V. production was built up; and during the period from 1998 to 2002, the mode of A.V. consumption was transferred from watching in the cinema to renting from video stores. After that, videos began to be sold or watched online with payment.

Before 1996, all A.V.s had to be allowed by the Japanese Imaging Ethics Review Association (J.I.E.R.A.) before they went on sale; and these videos were sold and rented in specific video stores. In November 1995, Soft on Demand (S.O.D.), which is the largest film production corporation up to now, was built up. S.O.D. began to create films in the way of making television programmes and quitted J.I.E.R.A. in 1996. From then on they made A.V.s independently, without reviewing by J.I.E.R.A., and authorised supermarkets and stores to sell A.V.s directly. In other words, through the last half of the 1990s S.O.D. started to compete with A.V. practitioners of J.I.E.R.A. in the renting and sales markets. S.O.D. not only changed the transaction behaviour in the A.V. industry but also influenced video content and style. For instance, different A.V.s, including sexual organs without mosaic or with a thin mosaic and film with a television programme style, were designed and published by S.O.D. Such different A.V.s can be watched up to now and have gained a number of consumers. The publishing and promotion of these new types of film aimed at promoting a desire to purchase by consumers and increasing takings. In addition, a number of episodic A.V. heroines appeared, who did not sign with any film-maker corporations and maintained their popularity by video cassette, magazines, and films. During the period of video-renting transactions managed mainly by J.I.E.R.A., practitioners in the A.V. renting industry and A.V.-makers took responsibility for the propaganda and popularity of A.V. actresses. When a large number of A.V. works of the episodic A.V. heroines become popular in the market, the dependence of the episodic A.V. heroines will decline and the profits and the space of labour negotiation of practitioners will shrink. With the improvement of video technology, video cassettes were replaced by video C.D.s (V.C.D.s) and D.V.D.s, and the videos can be downloaded from the Internet due to the development of online consumption after 2000. On 23 August 2007, the Japanese Police of Security Bureau searched J.I.E.R.A. because of their assistance in publishing pornographic images. After four years of litigation, J.I.E.R.A. ended up reviewing A.V.s and formed the current A.V. industrial ecology.

In a few words, the construction of S.O.D. made a great transformation to the A.V. industry, and the quality of A.V.s has changed the working forms of A.V.

actresses completely. For example, A.V.s without mosaic or with a thin mosaic have made consumers prefer to purchase the real performances of A.V. actors and A.V. actresses. In the past, the borrowed shooting avoided real sexual behaviour, and is less nowadays. The profits of producers are partitioned by network download and sharing. Additionally, because of laws and regulations from the Japanese government, the way of debuting A.V. actresses since 2000 is different from that in the 1990s. Overall, whether A.V. actresses can debut is increasingly influenced by their appearances; and the capability of attracting the attention of consumers affects whether they can shoot films and earn money steadily.

The existing references on A.V. actresses mainly concentrate on the reasons for debuting, family background, social perception and other perspectives. Nakamura (2012) and Ke (2014) recorded the interviews of A.V. actresses in writing and discussed the above questions. Basically, the authors supposed that with the development of the A.V. industry the educational level of A.V. actresses in the last half of the 1990s was higher than before. Previously, many A.V. actresses played in A.V.s because of their financial problems and unemployment; however, nowadays most of the players work in part-time jobs in order to subsidise household and family expenditure during the company's off-season, as well as it being a popular start to an entertainment career.

Studies on A.V.s have been mainly concentrated on the controversy about the openness of A.V.s and the security of society. Zillman (1971), Meyer (1972), and Baron and Bell (1977) thought that the openness of pornographic videos would induce violent thoughts and sexual assaults of consumers, resulting in violent crimes. Specifically, Baron and Straus (1984, 1987) pointed out that there was a positive relevance between violent sexual assaults and the circulation of adult magazines in the market. Paul (2006) figured that reading pornographic magazines and watching A.V.s might make the adults addicted and damage their interaction with families and cloud relationships, which emphasised the negative effects of openness of adult products on the whole of society. Nevertheless, Kutchinsky (1991) demonstrated that the openness of A.V.s with the allowance of government decree decreased the occurrence of sexual crimes in Europe. Also, Diamond and Uchiyama (1999) found that the tendency of similar crimes declined in Japan. Next, Wongsurawat (2006) utilised the instrumental variable model to analyse the relevance of crimes, divorce and pornographic video in American families during the period 1990–1992. The empirical analysis in this paper shows that although pornographic video consumption increases the occurrence of rape and the frequency of divorce by traditional regressive analysis, the occurrence of rape has a negative relevance with pornographic videos and has no significant effect on the divorce rate by controlling the instrumental variable about whether family members watch the pornographic videos.

Some studies on the sex trade industry pointed out that female workers in the pornography industry earn two times more than other female workers (Rao, Gupta, Lokshin, & Jana, 2003; Torre, Havenner, Adams, & Ng, 2010). Other studies indicate the relationship between highly risky sexual services and their prices (Gertler, Shah, & Bertozzi, 2005). For example, Islam and Smyth (2012) found that attractive female workers had better capabilities of negotiation and demanded higher pay for highly

risky sexual services in the Bangladeshi sexual service industry. Chang and Weng (2012) pointed out that sex workers of favourable appearance obtained higher pay than others in the trade of risky sex or that workers of unfavourable appearance were more willing to conduct risky sex. In other studies, Paul (2006) surveyed the supply chain of pornographic websites and found that with the development of video technology the pornographic video had more violent sexual behaviours, and the popularisation of the network also extended the markets. D'Orlando (2011) thought that it was difficult to analyse the demand of consumers who watch pornographic videos through the traditional economic market analysis, thus it should be calculated by hedonic adaptation. According to the existing literature, there are no studies on empirical analysis and discussion about labourers in the A.V. industry. Other studies related to pornographic films mostly focus on the explorations that viewers may have caused sexual risk behaviours (Tadesse & Yakob, 2015) and subsequent sexually transmitted diseases (Mahapatra & Saggurti, 2014). For pornography actress production, there are few studies addressing related issues, such as the effects of pornography consumption on U.S. males in Wright (2013) and on gender equality in Baron (1990), and the damaged goods hypothesis on female performers in Griffith, Mitchell, Hart, Adams, and Gu (2013). In an empirical study of the A.V. industry in Japan, Chou and Wang (2017) investigated empirically the influences of physical appearance and risky sex on the production of A.V. actresses and concluded that significant increases in the number of video shots of actresses are brought about by cup size, working experience, experiences as models or entertainers, and acting in videos of risky sex.

From the perspective of the job of A.V. actresses, their appearances, vital statistics, intellectual beauty or temperament all have influences on their output of videos and the types of video. In the labour economic references, Hamermesh and Biddle (1994) first pointed out that the physically attractive labourers could earn 10–15% more than others based on their advantages on appearance. Then, Biddle and Hamermesh (1998) and Pfann, Biddle, Hamermesh, and Bosman (2000) illustrated that the average salary of physically attractive labourers would be higher, and the promotions would be easier for them than others. The empirical results of Mobius and Rosenblat (2006) showed that physically attractive labourers would be more confident in their career with a higher salary, and employers would mistake their competence. For these two reasons, physically attractive labourers could increase their salaries during negotiations with the capital in the labour market. Some researchers such as Averett and Korenman (1999), Bockerman, Johnsson, Kiiskinen, and Heliövaars (2010) further concluded that the appearance of the body was related to personal labour ability and cognitive ability, and might directly or indirectly affect their productivity in the market, therefore they applied the labourers' body characters such as breast, height, weight, body mass index and others to investigate whether or not the characters of the body would affect the labourers' wage and income level. According to these papers, in order to avoid office romances in the A.V. industry, the privacy of A.V. actresses and information about A.V. actresses' earnings in the different companies is concealed, and even A.V. actresses could not be familiar with other workers. Therefore, the methods of analysis in such literature could not be learned and utilised

to discuss the influence of A.V. actresses' appearance on income. In the empirical analysis, we take the age, cup, appearance and whether they have part-time jobs as models or entertainers as variables.

### 3. Empirical model

This study applies survival analysis to investigate the determinant of a Japanese A.V. actress's career life; survival analysis is used to evaluate and analyse the likely factors of the subject in the empirical period. This model is usually adopted on biomedical statistics, unemployment, and employment of workers. According to the theory of survival analysis, researchers could define survival time, survival function and survival probability only if it is possible to define the subject's starting and ending time. The purpose of the text is to investigate the factors affecting the workplace life of Japanese A.V. actresses – which is suitable for using survival regression estimation.

The definition of survival regression estimation model theory could be explained by Figure 1. The horizontal axis records time and the longitudinal shaft records the subject. Time A and time B are the research period, and the space between them is the period the researcher is going to study. Given that there are four study samples, we are going to find out which of them keep the subject still, kill it, or call it an end. We can see that the sample may exist before time A, that is when we started, but disappeared during the research period (Sample 1). Or we could observe that the sample may appear during the research period but stopped in that period (Sample 2), or keep its situation during the whole period (Sample 4). It can also exist before time A, but be able to keep itself still after the research (Sample 3).

The survival function, conventionally denoted  $S$ , is defined as:

$$S(t) = \Pr(T > t) \tag{1}$$

where  $t$  is some time,  $T$  is a random variable denoting the time of death, and 'Pr' stands for probability. That is, the survival function is the probability that the time of

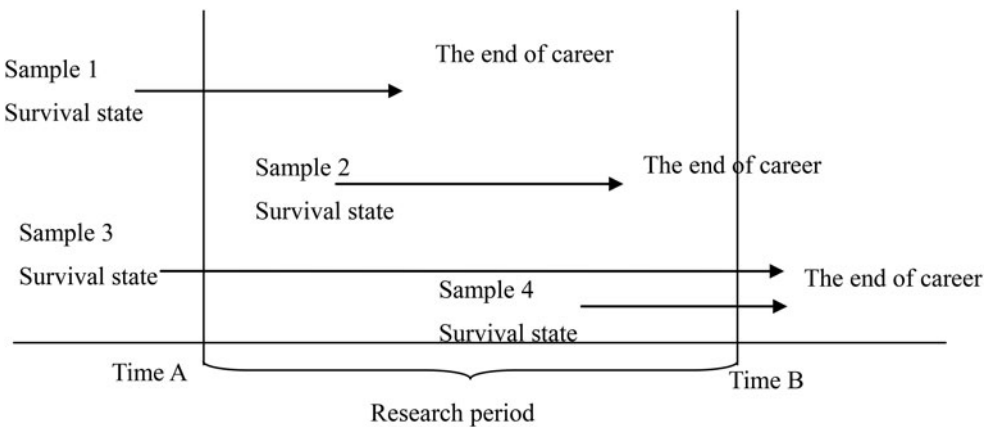


Figure 1. Survival analysis chart. Source: This study.



death is later than some specified time  $t$ . Next, we can define the lifetime distribution function  $F(t)$ :

$$F(t) = \Pr(T \leq t) = 1 - S(t) \quad (2)$$

If  $F$  is differentiable, then the derivative, which is the density function of the lifetime distribution, is conventionally denoted  $f$ ,

$$f(t) = F'(t) = \frac{d}{dt}F(t) \quad (3)$$

The function  $f$  is the event density and the rate of death or failure events per unit time. The survival function can be expressed as:

$$S(t) = \Pr(T > t) = \int_t^{\infty} f(u)du = \Pr(T \geq t) = 1 - F(t) \quad (4)$$

In Equation (4),  $T$  is greater than zero. Studying the survival time and the factors affecting an A.V. actress's career life (survival) are the aims of this study. Thus, we are going to analyse what affects an A.V. actress's career life, and what variables affect the survival period in survival analysis.

The hazard function is defined as the event rate at time  $t$  conditional on survival until time  $t$  or later. Suppose that an item has survived for a time  $t$  and we desire the probability that it would not survive for an additional time  $dt$ :

$$h(t) = \lim_{dt \rightarrow 0} \frac{\Pr(t \leq T < t + dx)}{dt S(t)} = \frac{f(t)}{S(t)} = -\frac{d}{dt} \ln[S(t)] \quad (5)$$

Equation (5) shows the rate of a sudden failure (the working-state changed to quitting) the next time after at least a  $t$ -year-survival (employment) of subject  $X$  (A.V. actress). Model Equation (5) is a function of baseline and explanatory variables at time  $t$ :

$$\ln h(t) = \ln h_0(t) + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k \quad (6)$$

## 4. Empirical data and results

### 4.1. Empirical data

What distinguishes today's Japanese A.V. actresses? Nakamura (2012) compared video interviews by actresses from the 1990s to 2000s and concluded that the majority of actresses in the 1990s were ignored and destitute people with a heavy social burden, many of them suffering the pain of mental disease. But the counterpart of the 2000s is highly educated workers, university alumni, employees and married ladies. The debut accessed can be divided in two ways: an intermediary introduced actresses in the 1990s, but part-time actresses in the 2000s hunted the job on their own.

Today's A.V. actresses are not like those of the 1990s. They are employed by Showing Model brokerage firms all over the Japan. In the past, actresses were hired by pornographic proprietors, which varies between now and then. In brief, Japanese Showing Model brokerage firms have the right to choose potential actresses and send their information to pornography proprietors or other companies. Pornography proprietors or other companies hunt ideal actress, which means signing a contract and preparing for shooting. This information can also be released to other companies by Showing Model brokerage firms. Actresses may have three missions: shooting pornography, modelling activity or poster shoots, even a role in a Japanese television serial. Today's Japanese society is more comprehensive than the 1990s for A.V. actresses to step on to the stage or superstars' pornography shoots because of the prevalence of Showing Model brokerage firms. Furthermore, job hunters may feel more comfortable in the pornography industry with the public recruiting of Showing Model brokerage firms.

A.V. actresses can be divided into three main categories in this industry: individuals, planning individuals and planning actresses. For individuals, they sign a contract with a specific pornography company; during the contract period they work as the only heroine in A.V. shooting. Once the actress debuts as an individual, the Showing Model Company will broadcast her bikini style portraits on mass media or commercial activities. Many A.V. actresses are gradually turned into movie actresses or music stars: Akiho Yoshizawa, Sora Aoi, and Asami Yui are just a few examples. By the way, individuals is the catchiest category in the labour market, but the proportion is low.

Planning individuals means no contract-signing actresses but whose popularity can prop them up to shoot one female pornography role as individuals. This kind of actress compared with individuals shows advantages as she can cooperate with many pornography shooting companies at any one time; some of the planning individuals outrun the individuals in popularity, but they have their shortcomings as well. No welfare, no broadcasting from pornography shooting companies. Osawa Yuka can be an illustration. After the end of the contract individual actresses have to transit their career as planning individuals, participate in many pornography shoots, and shoot or direct A.V.s or non-A.V.s.

Planning actresses are the majority in the market but are estimated as the less famous, who cannot achieve greater customer base by raising their charms. They cannot work as the above two, only shoot an episodic drama or be a walker-on. Most of them are students, housewives and female workers. There are fewer celebrities, their stage names seldom appear on the cover of A.V. movies, and it is hard to research their retiring information, which has proclaimed that 80% of A.V. actresses are filtered by and introduced into the pornography shooting industry and many of them are planning to be actresses (Ke, 2014), for their existing period is too hard to be prove, so we do not take the newcomer A.V. actresses as research objects. Provided that no matter that they are individuals or planning individuals or planning actresses and no matter continue or leave their work, all of them are individuals on their debut shows (signing a contract with A.V. proprietors). By the way, after 2002 most of the newcomer individuals would shoot retiring works in the last year of their shooting career. Therefore, we can establish their career timetable successfully.

**Table 1.** Definition of variables.

Variable	Definition
Career life	The number of months in which the actress worked in the A.V. industry during the study period January 2002 and June 2014 (unit: month)
Debuting age	The actress's age in the A.V. industry when she first acted in A.V.s
Single A.V. actress movies	The total number of single films of the actress in her A.V. career
Cup	The definition of A = 1, B cup = 2 cup ... in order to M cup = 13 on
Tokyo	Dummy variable, 1 = the actress was born in Tokyo, 0 = not born in Tokyo
Model	Dummy variable, 1 = the actress also serves as a model entertainer, 0 = other
Risky-sex movies	The actress in the occupation in the past eight seasons, such as male superior, actress sex performance accounted for more than one person, or shooting S.M., abuse, high risk of pregnancy caused by the total number of categories or other violent sexual activities of the movie to a healthy body
The ratio of single A.V. actress movies	The actress in a single piece of A.V. industry occupation published all her works for all proportions
The ratio of single A.V. actress movies in current season	The actress in a single piece last season when a quarter of all works published accounts for the proportion

Data source: Digital Media Mart website.

For the reason that A.V.s are about body bareness and sex shooting that may be seen by relations and friends of actors and actresses, to prevent this actors and actresses are apt only to share their works in unique customers' usage and reading on pornography, for the sake of privacy. Meanwhile, before 2000 A.V.'s spreading accesses were mainly sale and rent. After 2000 V.C.D.s and D.V.D.s have been sold on the market. We have proved that the data were not integrated before 2002, so we have proved the data since 2002. With the statistics from the D.M.M. website,<sup>1</sup> we have collected the career life (work seasons) of 605 newcomer A.V. actresses in 50 seasons from January 2002 to June 2014 as the dependent variable and tried to analyse what kind of elements affect them continuously. In addition, independent variables include movie statistics from January 2002 to June 2014, debuting date, cup size, from Tokyo or not, serves as a model entertainer or not, amount of risky-sex A.V. movies, the proportion of single A.V. movies. Table 1 lists the definition of related variables.

Ke (2014) proclaimed that A.V. actresses should depend not only on their lovely charming face and figure but also on actual strength (sexual skill) to maintain popularity. So, if they want to get fans' favour, they have to perform more professionally and undertake self-promotion.

In the pornography industry the crucial element is the appearance of an actress but the popularity of which is still the actual strength of them, and the pornography shooting companies only focus on the value of sales. So, this study considered their debuting age, cup size, model or not to reflect their appearance and analysis, which affect their career longevity. Furthermore, because of the lack of sales statistics, we regard the number and ratio of single A.V. actress movies as a sales strength. The latter shows the exposure of an A.V. actress; for the newcomer, if she can shoot a single A.V.

**Table 2.** Descriptive statistics.

Variable	Observations	Average	Variance	Least value	Crest value
Career life	605	38.754	28.844	2	162
Debuting age	605	22.511	4.289	18	56
Single A.V. actress movies	605	36.226	45.952	0	405
Cup	605	4.808	1.949	1	13
Tokyo	605	0.398	0.490	0	1
Model	605	0.367	0.482	0	1
Risky-sex movies	605	6.441	8.709	0	93
The ratio of single A.V. actress movies	605	0.407	0.261	0	1
The ratio of single A.V. actress movies in current season	605	0.339	0.338	0	1

Data source: same as Table 1.

means she was given talents such as a nice appearance or intellectual beauty, which can be regarded as customer-catching potential by pornography shooting companies.

With the raising of her popularity, the A.V. movies she shot before would be republished as a second edition or a collection with other works, and more new A.V. movies would be shot, but with the rising number of republished works, the ratio of single A.V. actress movies will decrease. In other words, the ratio of single A.V. actress movies on the debuting period is proportional to her existing time on the market, but under the condition of a long shooting time, this ratio is positively correlated to her actual sales strength. When her actual strength is high, she is hard to retire or to filter. We also considered the risky-sex A.V. movies; like the coin has two sides, shooting risky-sex A.V. movies also harms her body. An A.V. actress may shoot risky-sex movies to increase market sales and her pornography career, but this kind of film will do harm to an A.V. actress's health or has a high pregnancy potential risk. Nakamura (2012) mentioned that A.V. actresses will shoot risky-sex A.V. movies after a decrease in her normal A.V. movies. Accordingly, we considered the influence of risky-sex A.V. movies.

Table 2 lists the descriptive statistics, which show that the average pornography career is 38 months, the shortest is two months, and the longest is 162 months (13.5 years). Then, the debuting age of actresses is between 18 and 56 years old (22 years old an average) and the average cup size is E. There are two major perspectives to the cup sizes of A.V. actresses. Paul's (2006) research on American pornography showed us that the most acceptable is the movie with busty female actress, so many proprietors like to sell this kind of movie to cater to the market. On the contrary, Ke (2014) holds the view that many actresses are misled by the theory that busty female star and baby face actresses will increase sales, but they cannot in some actual sales status.

In Table 2 we also find that: the average number of single A.V. movies is 36; nearly 40% of actresses were born in Tokyo; 36.7% of them are models and entertainers simultaneously; average number of risky-sex A.V. movies is 6.4; the single movie is in 40.7% proportion to the whole; and some single movies take one-third of the movies in the current season.

Table 3 lists the proportion of age distribution, from born in Tokyo or not, from work as showing model simultaneously or not and the numbers of risky-sex movies shot in nearly eight quarters. First, from the age distribution: 95% of actresses

**Table 3.** Statistics of different age groups.

Age cohort	Sample ratio	Tokyo	Model	Risky-sex movies
18–20	28.93%	44.00%	38.86%	85.71%
21–25	59.83%	38.40%	37.85%	83.70%
26–30	7.11%	39.53%	25.58%	76.74%
31–35	1.82%	27.27%	27.27%	81.82%
36–40	1.01%	50.00%	16.67%	83.33%
41–45	0.49%	33.33%	33.33%	66.67%
Above 45	0.83%	20.00%	20.00%	80.00%

Data source: same as Table 1.

debuted before 30 years old, more than 50% of them 21–25 years old, shows high school graduates, college students, newcomer employees as majority.

In the statistics of the variable model and risky-sex A.V. movies, the former except from 36 to 40 years old, more than 20% of them had part-time jobs as models and the latter, except from 41 to 45 years old part, more than 76% actresses have shot risky-sex A.V. movies, most of them are from 18 to 20 years old or from 21 to 25 years old. This phenomenon may be caused by market competition and the statistics show that 18–25-year-old actresses are the majority labourers and, under the pressure of sales, they have to shoot drastic A.V. movies to increase their work and exposure rate.

Table 4 lists the descriptive statistics of cup sizes of A.V. actresses. First, actresses with C, D or E cup take 60%, and more than 30% of A–J cup actresses are from Tokyo. All the samples show that more than 30% of actresses are models simultaneously, except A cup actresses.<sup>2</sup> At length, the ratios of risky-sex A.V. movie shooting show us that the majority of A.V. actresses have shot them.

#### 4.2. Empirical results

In Table 5, the first empirical results of ordinary least square indicate the variables cup and model have a significant positive effect on  $\ln(\text{Career life})$ , which means the appearance of the actress does have an impact on her career life. Will the size of the actress's breasts have a visual effect on the consumer and attract consumers to pay attention to their performance? If there is such an effect, is there a tendency to marginal effects diminishing? In OLS2 we further consider the impact of cup square, region and the numbers of risky-sex movies, and the results show that there is a significant positive effect except for the variable 'Debuting age'. The coefficients of variables 'Cup' and 'Cup square' are 0.130 and  $-0.010$  significantly, which indicates that the size of an actress's chest is also affected by the size and there is a marginal diminishing effect.

A.V. actresses' job is not like common jobs of peasants, workers, and waiters; for A.V. actresses, their work date is flexible. So, when we did the salary analysis like Mincer equation, traditional labor economic studies may define labors' working years by their work experience. But this cannot be the standard of actresses, such as individuals; although they sign contracts their working time is not fixed, cannot be measured by years or months. Ke (2014) concluded his A.V. shooting experience in his books: one A.V. movie shooting costs just one day, and all the scenes will be shot in nine hours; actresses are over-burdened, shooting several sexual scenes in hours, and

**Table 4.** Statistics of the proportion of different cups of female stars.

Cup size	Sample ratio	Tokyo	Model	Risky-sex movies
A	1.16%	42.86%	14.29%	71.43%
B	6.45%	33.33%	30.77%	76.92%
C	20.83%	41.27%	30.95%	84.13%
D	20.50%	42.74%	41.13%	79.84%
E	19.83%	37.50%	37.50%	83.33%
F	12.73%	35.06%	35.06%	90.91%
G	9.59%	36.21%	34.48%	86.21%
H	4.63%	42.86%	42.86%	85.71%
I	2.15%	69.23%	61.54%	84.62%
J	0.99%	66.67%	50.00%	83.33%
K	0.66%	25.00%	50.00%	100.00%
L	0.33%	0.00%	50.00%	50.00%
M	0.17%	100.00%	100.00%	100.00%

Data source: same as Table 1.

**Table 5.** Regression results.

The explanatory variable: ln(Career life)	OLS1	OLS2	OLS3	OLS4	OLS5
Debuting age	-0.006 (0.008)	-0.005 (0.007)	-0.005 (0.006)	-0.002 (0.005)	0.0004 (0.006)
Cup	0.030* (0.017)	0.130** (0.064)	0.094* (0.054)	0.110** (0.047)	0.103* (0.053)
Cup square		-0.010* (0.006)	-0.008* (0.005)	-0.010** (0.004)	-0.009** (0.005)
Single A.V. actress movies			0.022*** (0.001)	0.017*** (0.001)	0.020*** (0.001)
The square of single A.V. actress movies			-4.88e-05*** (4.90e-06)	-3.85e-05*** (4.26e-06)	-4.34e-05*** (4.83e-06)
Model	0.629*** (0.067)	0.552*** (0.067)	0.199*** (0.061)	0.257*** (0.053)	0.232*** (0.060)
Tokyo		0.143** (0.065)	0.062 (0.055)	0.045 (0.047)	0.068 (0.053)
Risky-sex movies		0.020*** (0.004)	-0.014*** (0.004)	-0.014*** (0.003)	-0.014*** (0.004)
The ratio of single A.V. actress movies				-1.350*** (0.092)	
The ratio of single A.V. actress movies in current season					-0.499*** (0.080)
Constant	3.118*** (0.194)	2.720*** (0.247)	2.612*** (0.209)	3.196*** (0.185)	2.688*** (0.204)
Observations	605	605	605	605	605
R-square	0.140	0.188	0.421	0.574	0.579

Note: standard error values are in parentheses; \*, \*\*, \*\*\* mean 10%, 5%, 1% statistically significant levels. Data source: same as Table 1.

each scene lasts above one hour. A.V. actresses need a period of non-working time to relax and adjust their bodies, which lasts several days.

We regard the amount of single A.V. actress movies as the working experience; with experience of their age, their work will increase in number. The coefficient of this variable is significant and estimated to be 0.022 in OLS3, which means the accumulation of working experience will benefit her pornography shooting career. Previous literature such as Mincer (1974) has mentioned that the experience of employees should benefit their salary, but the increasing tendency will gradually slow down. From the analogy concept, we can see the square of single A.V. actress movies is estimated as  $-4.88E-5$ ; the increasing number of movies shows an increase of A.V.

actress's sexual experience and may prolong her career, but the increasing tendency will gradually slow down, as mentioned above.

Comparing OLS2 and OLS3, we find the coefficients of the variable 'Risk-sex movies' is reversed. In the result for OLS2, the estimated coefficient of variable risky-sex movies may also include the positive impact of the number of films taken on the A.V. actresses and the negative influence of the film on their body. To clarify further the effect, we include the variable 'Single A.V. actress movies' and its square. When we controlled the number of movies, we found that the *R*-square increased from 0.188 in OLS2 to 0.421 in OLS3 and the effect of this variable on the dependent variable was negative. The coefficient of risky-sex A.V. movie is measured as  $-0.020$  significantly, which may increase body bankruptcy and pregnancy potential, which will decrease their career period.

For OLS4 we further include the variable 'The ratio of single A.V. actress movies'; the estimated results are similar to OLS3, and the ratio of single A.V. actress movies can be an important index of sales and popularity of actresses, estimated as  $-1.350$  significantly. As mentioned above, famous A.V. actresses shoot more singles, their past A.V.s will be republished, and the proportion of their single A.V. actress movies reduced in the total number of films. Finally, we replace the variable 'The ratio of single A.V. actress movies' with the variable 'The ratio of single A.V. actress movies in current season' in OLS4, and we find the outcome is similar to OLS3. All results indicate that the higher ratio of single A.V. actress movies in her whole or current films, the less existing time there is for actresses. That means that when an actress earns high popularity, past works will be republished. If the number of republished works is a small proportion of all works, it shows this A.V. actress is famous, the existing period is longer. In other words, with the number of single A.V. fixed, if the proportion of single A.V. actress is increasing, her visual attraction and popularity, so it is maybe bad for her career.

Table 6 performs the multicollinearity test and the White test for heteroscedasticity checks on the estimation results of Table 5. According to Nerlove (1963), if the variance inflation factor (VIF) is greater than 10, the influence of the estimated variable collinearity is higher. The results show that the VIF values of the other variables are less than 10, except for the variable 'Cup, Cup square'. However, comparing OLS1

**Table 6.** Robust check, multicollinearity check for variance inflation factor, heteroscedasticity check for White test.

The explanatory variable: ln(Career life)	VIF in OLS1	VIF in OLS2	VIF in OLS3	VIF in OLS4	VIF in OLS5
Debuting age	1.008	1.013	1.014	1.014	1.030
Cup	1.009	15.896	15.979	15.987	15.991
Cup square		15.913	15.976	15.996	15.995
Single A.V. actress movies			6.564	6.945	6.932
The square of single A.V. actress movies			4.860	4.994	5.021
Model	1.017	1.062	0.810	1.242	1.244
Tokyo		1.016	0.975	1.026	1.025
Risky-sex movies		1.043	1.607	1.608	1.608
The ratio of single A.V. actress movies				1.114	
The ratio of single A.V. actress movies in current season					1.113
Mean VIF	1.011	5.991	6.030	5.547	5.551
<i>p</i> -Value for White's test ( $H_0$ : homoscedasticity)	0.122	0.000	0.000	0.035	0.000

Data source: same as Table 5.

with OLS2–5, it could be found that collinearity does not affect the significance of the variable. Next, except for OLS1, all results reject the null hypothesis which assumes the model with homoscedasticity.

The existence of heteroscedasticity may weaken our OLS outcomes, and to reduce the possible effect of heteroscedasticity, Table 7 applies the weighted least square (WLS) to estimate the influence of each variable. It could be found that most of the estimated coefficients, significance and *R*-square estimates in Table 7 are lower than those in Table 5, but the main results in these two tables are consistent. In addition, variable ‘Debuting age’ has a significantly negative impact on dependent variables in WLS3–WLS5 when we apply WLS, which means the younger the actress when she enters the A.V. industry, the longer she lives in the workplace.

Table 8 applies survival analysis, the estimated coefficient here called hazard ratio. The estimated values of the coefficients in Table 8 are all positive. Estimated value greater than 1 indicates that the variable will increase the possibility of the A.V. actress exiting the market; estimated value less than 1 means that the variable will reduce the probability of the actress exiting the market. For example, the estimated value of the variable ‘Cup’ in Result1 is 0.918, and the result is that when the A.V. actress’s cup is the larger size, her probability of leaving the labour market will be reduced by 8.2% (1–0.918).

We add cup sizes square, single A.V. actress movies and the square of single A.V. actress movies in Result3, Result4 and Result5. Take Result5 as an example, cup and its square are estimated to be 0.761 and 1.024, which shows the larger the cup size the longer stay, but it has a marginal effect diminishing tendency. Undoubtedly, the customer base is focused on different cup size, and the actress had breast implants to

**Table 7.** Robust check, weighted regression results.

The explanatory variable: ln(Career life)	WLS1	WLS2	WLS3	WLS4	WLS5
Debuting age	–0.003 (0.004)	–0.0004 (0.004)	–0.005* (0.003)	–0.010*** (0.002)	–0.013*** (0.003)
Cup	0.034* (0.017)	0.099 (0.064)	0.038 (0.053)	0.095** (0.045)	0.071* (0.041)
Cup square		–0.007 (0.006)	–0.004* (0.005)	–0.009** (0.004)	–0.007* (0.004)
Single A.V. actress movies			0.023*** (0.002)	0.017*** (0.001)	0.020*** (0.002)
The square of single A.V. actress movies			–5.50e–05*** (5.50e–06)	–4.15e–05*** (4.86e–06)	–4.71e–05*** (5.46e–06)
Model	0.553*** (0.070)	0.467*** (0.069)	0.161*** (0.061)	0.325*** (0.053)	0.220*** (0.059)
Tokyo		0.117* (0.067)	0.14 (0.057)	0.069 (0.049)	0.031 (0.055)
Risky-sex movies		0.024*** (0.004)	–0.012*** (0.004)	–0.011*** (0.004)	–0.013*** (0.004)
The ratio of single A.V. actress movies				–1.339*** (0.088)	
The ratio of single A.V. actress movies in current season					–0.568*** (0.082)
Constant	3.039*** (0.143)	2.685*** (0.208)	2.520*** (0.173)	2.886*** (0.147)	2.505*** (0.165)
Observations	605	605	605	605	605
<i>R</i> -square	0.108	0.164	0.411	0.574	0.455

Note: standard error values are in parentheses; \*, \*\*, \*\*\* mean 10%, 5%, 1% statistically significant levels. Data source: same as Table 1.



**Table 8.** Survival analysis results.

The explanatory variable	Result1	Result2	Result3	Result4	Result5
Career life	Hazard ratio	Hazard ratio	Hazard ratio	Hazard ratio	Hazard ratio
Debuting age	0.992 (0.014)	0.993 (0.013)	0.996 (0.012)	0.993 (0.011)	0.992 (0.012)
Cup	0.918*** (0.025)	0.735*** (0.063)	0.771*** (0.075)	0.740*** (0.064)	0.761*** (0.067)
Cup square		1.022*** (0.007)	1.023*** (0.009)	1.028*** (0.007)	1.024*** (0.007)
Single A.V. actress movies			0.958*** (0.004)	0.956*** (0.004)	0.960*** (0.004)
The square of single A.V. actress movies			1.000*** (1.46e-05)	1.000*** (1.09e-05)	1.000*** (1.08e-05)
Model	0.381*** (0.040)	0.423*** (0.047)	0.829*** (0.100)	0.682*** (0.083)	0.792** (0.094)
Tokyo		0.823* (0.086)	0.863 (0.089)	0.888 (0.099)	0.868 (0.101)
Risky-sex movies		0.960*** (0.009)	1.027*** (0.009)	1.033*** (0.008)	1.028*** (0.007)
The ratio of single A.V. actress movies				11.507*** (2.531)	
The ratio of single A.V. actress movies in current season					1.527** (0.263)
Observations	605	605	605	605	605
Log likelihood	-2281.327	-2262.373	-2164.046	-2103.931	-2159.711

Note: robust standard error values are in parentheses; \*, \*\*, \*\*\* mean 10%, 5%, 1% statistically significant levels. Data source: same as Table 1.

seize the market. Single A.V. actress movies and its square statistics (0.960 and 1.000) show a similar trend to debuting ages.

Tokyo-born actresses showed no statistical difference to actresses from other places in Result5. But the variable 'Model' has more distinguishable advantages (0.792), which told us that appearance and beauty affect their existing period a lot. As for risky-sex movies in the recent eight quarters, it is estimated obviously to be 1.028, which indicates these kinds of shoots may harm their career. According to Nakamura (2012), A.V. actresses will shoot risky-sex movies to resuscitate sales, but we know that shortcomings such as pregnancy potential or disease surely surpassed its advantages. Finally, the ratio of single A.V. actress movies in the current season estimated outcomes are similar to outcomes in OLS5, which estimated 1.527. When sales are not so good, A.V. proprietors will not call A.V. actresses to continue shooting or republish their former work. The proportion of single A.V. actress movies will increase, and also increase the potential of leaving. Finally, Table 9 lists survival analysis with other distributions. We apply the Weibull regression and the exponential regression with Result3–Result5; comparing Tables 8 and 9, we find that except for the statistical significance of the variables and the difference in the magnitude of the coefficients, the direction of influence of each independent variable on the dependent variable is consistent.

## 5. Conclusion

This study took the 2002–2014 newly debuting A.V. actresses as research samples to analyse what kind of elements affect their existing period from January 2002 to June 2014. The empirical results indicate that models or not, single A.V. actress movies, single A.V. proportion and risky-sex movie amount will all affect their career

**Table 9.** Robust check, survival analysis results with other distributions.

The explanatory variable: Career life	Weibull regression			Exponential regression		
	Result3 Hazard ratio	Result4 Hazard ratio	Result5 Hazard ratio	Result3 Hazard ratio	Result4 Hazard ratio	Result5 Hazard ratio
Debuting age	0.993 (0.012)	0.991 (0.011)	0.990 (0.012)	0.993 (0.012)	0.992 (0.011)	0.990 (0.012)
Cup	0.759*** (0.074)	0.724*** (0.072)	0.747*** (0.073)	0.830* (0.081)	0.828* (0.082)	0.825** (0.081)
Cup square	1.025*** (0.009)	1.030*** (0.009)	1.026*** (0.009)	1.016* (0.009)	1.016* (0.009)	1.016* (0.009)
Single A.V. actress movies	0.958*** (0.004)	0.956*** (0.004)	0.959*** (0.004)	0.970*** (0.004)	0.973*** (0.004)	0.971*** (0.004)
The square of single A.V. actress movies	1.000*** (1.44e-05)	1.000*** (1.37e-05)	1.000*** (1.49e-05)	1.000*** (1.59e-05)	1.000*** (1.58e-05)	1.000*** (1.63e-05)
Model	0.823* (0.099)	0.674*** (0.082)	0.784** (0.095)	0.830* (0.099)	0.763** (0.092)	0.805* (0.097)
Tokyo	0.845 (0.087)	0.874 (0.089)	0.857 (0.088)	0.947 (0.096)	0.975 (0.099)	0.949 (0.097)
Risky-sex movies	1.027*** (0.009)	1.033*** (0.009)	1.028*** (0.009)	1.013* (0.009)	1.013* (0.009)	1.014** (0.009)
The ratio of single A.V. actress movies		12.393*** (2.625)			3.503*** (0.666)	
The ratio of single A.V. actress movies in current season			1.566*** (0.220)			1.366*** (0.195)
Observations	605	605	605	605	605	605
Log likelihood	-562.037	-497.958	-557.121	-638.683	-618.491	-636.371

Note: robust standard error values are in parentheses; \*, \*\*, \*\*\* mean 10%, 5%, 1% statistically significant levels. Data source: same as Table 1.

longevity. The number of single A.V.s does benefit the existing period, but the decrease will slow down marginally. Influence of cup size is akin to single A.V.s, which benefit the existing period but will slow down. Furthermore, the proportion of single A.V.s can indirectly reflect the actress's popularity; when her popularity declines, A.V. shooting companies will increase or decrease her work or republish work, and A.V. proprietors will urge actresses to shoot drastic movies under the pressure of low sales. But this kind of movie will harm their bodies or bring them high pregnancy potential. We have proved that although the drastic movies are not so obvious, they really shorten actresses' existing period.

To sum up, A.V. customers' attention is a crucial element for the existing period of an A.V. actress. But the quality of A.V. actress is the only element that will attract a customer base. If her works and news meet customers' attention, she can be a long-standing actress. This phenomenon may explain why so many A.V. actresses who have fans are meeting in Hong Kong, mainland China, and Taiwan, or register microblogs and on Facebook to communicate with fans. Other A.V. actresses will shoot a different kind of A.V. or interact with fans between shoots. When time has passed by, their age increased and their work cannot attract customers, they have to retire.

Although we have investigated which factors affect a pornography actress's career life, there are still some limitations. For example, planning actresses are less famous and it is hard to prove their retiring information. So those A.V. actresses we found in the market were usually individuals and planning individuals. It is hard to extend our research topic to planning actresses, and this problem may generate sample selection bias; later we may apply Heckman's two-stage approach to discuss those related

topics. The next aspect we should pay attention to is how long the period of attraction will last. From the perspective of A.V. proprietors, A.V. actresses with higher popularity could push the A.V. movies' sales. How to retain the popularity? In the future we may apply related theory or empirical methodology in the media economics field to analyse the popular phenomenon in the pornography shooting industry.

## Notes

1. The website link: <http://www.dmm.co.jp/digital/>
2. For the statistical difference descriptions of the variables in Tables 3 and 4, we have performed a pairwise comparison test of the parameters, and the statistical results reject the null hypothesis which assumes variables are equal.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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