Education and Economy in Japan

Overeducation, Anxiety, Unhappiness and Low Productivity

By

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Abstract

The thesis reviews research about economic impact of education and overeducation, and also researches about education, inequality and suicide in Japan. The thesis describes Thurow's job competition model, Spence's job market signaling model and Tsang and Levin's production model. By using descriptive quantitative methods, it shows that Japan has overeducation problem brought by mismatch between education and employment. Extremely difficult university entry exams, sense of competition and class stratification create the mismatch of education is usually created when students chase after higher education regardless of what companies really require, and employers also use an inappropriate single standard to search for new employees. Overeducation and mismatch are mainly due to institutional and cultural reasons and some reforms are discussed as feasible solutions.

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1 Introduction

Overeducation is a sociologic phenomenon closely related to economy and productivity usually with three common possible definitions, as a decline in the economic position of educated groups, unrealized expectations of high-educated group towards work achievements, and the better possession by those of better educational backgrounds than the job itself requires. In Japanese, the similar word *Kogakurekika* is used to describe the atmosphere of pursuing higher education extremely, has become more common among Eastern Asian countries. It got EJU (Japan), CSAT (Korea) and NCEE (China) are believed as the most difficult and competitive university entrance exams in the world with extreme huge number of examinees and lower acceptance rate, while the proportion of master and PHD graduates is also increasing massively in the recent years. Meanwhile, the impact of education might not be that much positive. Though students are willing to spend more money and time in education mainly due to the purpose of finding a better job with higher salary, related research shows that in fact the average salary of high educated groups (above bachelor) doesn't have obvious advantages against low educated groups, together with the similar unemployment rate. It has been complained that many students have wasted too much time in universities while they cannot get enough return from the advantage in education background. Many find that they graduate with master degrees but still can only find jobs as sales and customer services which might not require very much education background. While on the other hand, serious competition in education causes various of social problems, such as increasing suicide rate and mental illness among students together with heavier financial burden to the family.

Thus, due to the phenomenon described above, may we ask the question: **What is the evidence for overeducation and its social consequences in contemporary Japan? Can the existence of overeducation in Japan be explained by economic theories on job competition and job screening?** According to many economists, technology is the main factor of long-term economic growth under the assumption that education is usually positively related to technology progress, and Eastern Asian countries did achieve progress in some technological areas, especially in IT, electronic communication, internet, AI, chip manufacturing, etc., still it doesn't mean that all those new technological areas could absorb all the highly educated labors in the market. Thus, there is an assumption that the supply of highly educated labors might be more than the real demand of the industry. Moreover, there is also no evidence to prove that education is closely related to living standard, by which the living standard of highly educated class are not necessarily better than low-educated class.

Japan could be regarded as a typical example of overeducation. According to the data from Ministry of Health, Labor and Welfare (MHLW), until 2022 among all the school-age youth above 18, 83.5% are succeeded in get involved into high education (above senior high), by which 4.2% enter into junior colleges, while 54.4% enter into universities, and 24% flow into technique colleges. According to the data from OECD and PISA, Japan ranks among top 10 in the world in education level, especially in mathematics and scientific areas. In general,

since 1980, Japanese average education level has kept increasing rapidly with more high-educated population. While on the other hand, the employment status indicates a different conclusion that with too much high-educated labor force with and not enough positions in the market, the unbalance of supply and demand for high-educated labor leads to competition. Along with the competition in education, heavy pressure brings serious problem in mental health. According to the statistics from MHLW, in 2015 the top reason for student death is suicide. In 2012 there are 18.1 cases of suicide in every 100,000 personals in Japan, while in the same time France with 9.3, India 7.6, Canada 12.0, USA 12.8, UK 6.6 and Italy 4.8. Meanwhile, in South Korea the top reason for student death is also suicide, with 18.3 almost the same high level as Japan. And according to MHLW, the top reason for suicide under 19 is pressure from study while for those between 20 and 29, unemployment is among the main reasons for suicide. In South Korea the situation is even worse, with more than 70% of suicide under 19 is related with educational background-oriented society. South Korea is among the bottom of happiness index ranking for teenagers under 18 and in the recent years suicide rates among senior high student in South Korea remains a very high level with more than 100 cases every year. On the other hand, the unemployment of young generations between 15 and 29 in South Korea is 9.8%, almost twice the unemployment rate in Japan (around 5%). Education brings more competition and mental pressure to graduate students, while the achievement could be much less. Compared with those born between 1930s and 1940s, there tend to be less correlation between salary and education for younger generations in the next decades (Furuta b, 2018), which means that the advantage of extra education is decreasing in the future job searching, which seems to make overeducation less worthy.

Thus, whether the overeducation and education-emphasized society is really worthy with the cost of negative impact towards living standards brought by heavy pressure such as mental unhealth and suicide rate? **The aim of this paper is to investigate evidence of overeducation and its consequences in contemporary Japan in the light of economic theories of job competition and job screening.** The paper will discuss the necessity of highly-educational society to see whether the value created by education in Japan is remarkable with the bearable cost. The paper consists of four parts: theories and previous research, Evidence of overeducation in Japan, Discussion and Conclusion. We will use descriptive quantitative methods instead of econometrics and modelling to make the analysis and all the data will be collected from government departments and statistical bureau of Japan. And also, an empirical survey is made with respondents collected from Japan to investigate the hypothesis of overeducation in Japan. The study will mainly focus on Japan because as the first developed country in Eastern Asia, most of his neighbors are simulating the development mode of Japan in politics and economics, thus all of them have similar socio-economic problems to Japan, and Japan got more complete database which could provide as much statistics as possible to support the analysis. The value of the research is trying to find out whether social problems brought by current education in Japan is really necessary for the economy and people's living standard. If not, then we might be able to find out the way to reform the education system and structure in order to create a better and happier environment for young generations with less pressure and more methods for

comprehensive development. Overeducation is becoming more popular in the Eastern Asian society and what people need to think about is how to make our next generation live in a better life.

2 Theories and Previous Research

Before we start to do research about education in Japan to understand its role, we have to read related papers about economic impact of education first. There are certain papers about this topic since it has appeared in western developed countries especially in USA for decades, and related research about macro-economic impacts towards productivity from education will be preferable to our research since we need to determine the model and theory we are using in order to find the appropriate independent variables and factors we are trying to study about. It is important to consider about the role of education in economy and how investments in human capital leads to positive effects. While in the case of Japan, there is debate about whether Japan has too much education since Eastern Asia is among those which suffer the fiercest competition in education, and it is argued that whether a trend of overeducation happening in Japanese society nowadays and should be taken into consideration. After presenting theories on the positive impact of education we will thus review the overeducation theory including several models to discover how too much investment in human capital can have negative effects.

2.1 Human capital theory and the economic impact of education

Usually in classic economics it is believed that education takes positive impact towards economic development since education is closely related to human capital and more education workers receive, more skilled they are and thus higher productive they become. If we say that higher technical and skilled labor and trainee are necessary for the increase of productivity, then the investment in human capital will be proved to be necessary, since more educated labor is required in industrialization and industrial upgrading. Can we find any previous studies about the economic impact towards human capital brought by education? Fortunately, there are many papers we found useful.

Human capital is a definition which mainly refers to intangible economic value such as educational background, working experience, health, skill or even loyalty of workers. Human capital theory states that employers usually have incentive to search for human capital with better production to increase the efficiency of employees. It is believed that employers can increase productivity through more education and skill training. With the decreasing cost of school, impact of education in human capital has attracted more attention from economists. Human capital theory was first mentioned by Becker and Schults and now has become a very important knowledge base to explain the impact of education towards economy.

2.1.1 Becker and Chiswick – Empirical quantitative results

Does education always bring positive impact towards income and economy? In Becker and Chiswick's work in 1966 they set equations trying to analyze how the years of formal schooling affect human capital and measure the contribution of schooling to the distribution of earnings to provide some new ideas (Becker, et al, 1966). By imputing empirical data into the model, they find out that the contribution of education towards earning distribution varies according to different conditions. By comparing data of earnings, they find out that the biggest regional differences domestically is between the traditional southern states and non-southern states. The variance in the log of earnings brought by schooling is some kind of higher in the South where economic development is slower and mainly rely on agriculture. Also, the inequality of earnings is also more obvious in the South. With this discovery, by inputting more data from several other countries such as Mexico, Israel and Canada, etc., the result comes that contribution of education is more obvious in poorer and more inequal countries compared with richer and more equal areas. This is easy to understand since in the less equal districts education will bring more competitiveness to the personal and also larger gap in education will bring more return in earnings if the average educational standard is low in total. Though the paper mentions that due to limitations of data, the scale of empirical data is reduced and might not be accurate enough, still it gives an important idea that contribution of education towards earnings differs geographically and also depends on current equality condition. That might explain why people in poorer and less equal countries are more willing to chase for higher education.

2.1.2 Goldin and Katz – Narrative and empirical evidence from the US

United States is believed to be one of the most successful economies worldwide which benefit from mass higher education establishment and slowly the experience is shared by other countries and expand rapidly with economic growth in the western world in 20th century. Goldin and Katz made comparison between European and American higher education in their paper where they point out that compared with European education which is more centralized with lower wealth levels and higher equality, education in USA tend to be more focused on small decision-making units and job-focusing training (Goldin, et al, 2001). Claudia and Lawrence believe that general education especially secondary education played a key role in the early stage of industrialization in US economy from 1910s to 1930s, and high rate of return from education reflects the expansion of large-scale industrialization due to increase of educated skilled labor, while this started to slow down after 1940s. With the higher average education level, the rate of return seems still to be growing but with slower speed due to diminishing marginal benefits. By using standard growth-accounting framework to analyze the empirical data of Iowa which has been one of the main origins of educated-labor force since 1915, they found out that extremely high rate of return by education really existed in the early 20th century, but the education doesn't boom the economic and living standard directly. Instead, it is the technological dynamism

brought by education that improved the industrialization but this is during a long period and might not always effective. In fact, the impact of education towards the economy is not always immutable. In the early stage of development, it might become very positive, but with the decreasing of inequality and increasing of average educational and salary level, it could change. So, if human capital theory could explain the differences of educational level in different regions in America, is it also applicable in other countries nowadays?

2.1.3 Barro and Lee – Stock of Human Capital in the current world

In 2010 a paper was published with comparable data to estimate the current stock of human capital in the world measuring average years of schooling by gender and annual growth rate in years of schooling (Barro, et al, 2010). The result shows that highly developed and industrialized countries mainly in western Europe and Northern America have higher stock of human capital than developing countries with longer average years of education especially in females, while on the other hand growth rates of human capital in developing economies also increase which indicates that human capital convergence seems to be the tendency. It has been proved that education has become the key determinant of economic growth since technologic progress is the core of industrial upgrading. Barro and Lee estimate that increasing average of schooling per year increases GDP per capita for 10.4% while another study shows that the increase of return from growth in years of schooling rise up to 9.8% (Cohen, et al, 2007; Barro, et al, 2010). Now we have clearly seen how important education is in human capital and education has been widely regarded as the key of long-term economic growth in the modern world, but if in a rich and comparatively equal developed economy, such as Japan, will the contribution of education still be significant?

2.2 Economics of Overeducation

For the negative impact of education, there are some related researches about this topic to describe the overflow of education and decreasing effectiveness of education import towards economic and salary, which is defined as overeducation. In 2006 McGuinness represented a review of literature about overeducation in his paper where he compared the economic phenomenon and educational data based on the human capital theory and finally the result concluded that overeducation is likely to bring negative impact to both employers and employees (McGuinness, 2006). Moreover, the data in the paper indicates that the incidence of education has been increased during the last decades in developed countries such as UK and Germany and also for graduated students, those who majored in Arts, Humanities and social sciences are more likely to face with overeducation problems (McGuinness, 2006). The paper provides a long list of literature review about overeducation among which we can find the appropriate theories for our study.

There are several famous models and theories analyzing the negative effects brought by too

much investment in human capital. We will review Spence job-signaling model, Thurow's competition model and Tsang and Levin's value-added production model. They all explain the relationship between education and productivity, reason of overeducation and why workers might be irrational in education. Review on those three theories could provide us a complete logic about the impact of overeducation and help us to find what factors and data we need for analysis.

2.2.1 Thurow's Job Competition Labor Market Model

One of the most important theories of overeducation is job competitive model presented by professor Lester C. Thurow in the book *Generating Inequality* in 1975. In the book he comes up with a theory that inequality in salary and income is the main reason of inequality, and salary is calculated by contribution of work, hiring the best applicant in this position, while the contribution is mostly decided by the characteristic of the job rather than workers' individual ability, and employees will be sent to different positions according to their different background such as techniques and education due to the inequal distribution of work opportunities (Barth, 1977).

In Lester C. Thurow's *Generating Inequality*, he criticizes neoclassical labor market theory that workers will try to get the job by wage competition, and the priority of position is based on the training costs which companies are trying to minimize, and in order to do so with the lowest cost to pick the best candidates, companies will tend to use one or more screens to filter the candidates. And as a result, considering that each employee got different background, the candidates will be ranked according to their own background, which could be understood as higher education requires less training cost, and labor markets for new position are in fact a market for training opportunities (Barth, 1977). Training opportunities only occurs when there is a demand for a specific skill, unless there will be no supply for trained labor if there is no demand for the skill. According to Thurow's theory, there is a position distribution in the labor market which depends on technology, wage standards and makes the shape of labor queue, and the job distribution together with job queue have impact on training slots and opportunities which result in the decision whether companies want to employ this worker. It is believed that Thurow's model explains more realistically than previous neoclassical theories, and provides a reasonable explanation for the differences among workers due to background (Bath, 1977). Employers will try to minimize the cost of training to get new employees into production as soon as possible, while the need of training varies from person to person with different backgrounds, and those who got better educational background are widely believed to be better trained and requires less training costs before start of work. One labor market could have competition in both wage and job positions due to educational gap or relative average wage standards in the industry.

While on the other hand, for labor supply, we should consider about what is the key factor for employers to evaluate candidates. Job competition theory emphasizes that labor productivity is the character of job rather than individual, and salary is depending on job

distribution rather than individual ability. In the job distribution, employees will be distributed into different positions to fulfill the demand of companies and labor queue is decided by training cost, thus those who requires less training will be put in the front position in the queue and with information asymmetry, companies will prefer those who got better educational background rather than those who got better ability and skills because they believe that better educated individuals require less training cost. This well explains the reason why both employers and employees overweight the importance of education in labor market. Among Thurow's points of view, one of the most interesting points is that he believes, investment has positive elasticity, by which it means investing in education might create more amount of decline in training cost from employers. Based on this assumption, workers will be more willing to spend more time, money and energy to achieve education in order to make themselves more competitive in the labor queue. Thurow's job competition model provides an explanation of the reason of pursuing education on workers' side, and then we need to know what is going on by the employers' side in the game.

2.2.2 Spence's Job Market Signaling Model

So, why does company also prefer higher education background even though it might be unnecessary for the position? The reason why the importance of education background is overestimated might be due to the information asymmetry between employees and companies. This phenomenon was pointed out by Spence in his work (1973) where he set a model to introduce job market signaling mechanism and describe the employment as some kind of investment under uncertainty. According to paper, signals are defined as some methods for job applicants to present their value and potential to companies, and education could be regarded as a part of signal cost, as more spend in education leads to better education background, providing better signal to employers, while whether this signal completely match the ability and position is still beyond consideration, and this uncertainty might cause waste of extra education for the position. The reason why educational signaling model is valuable for us is because Spence makes this model avoid all the other observes other than education, so model can directly measure the signaling impact of education without any interference. Before 1970s, neoclassical economists tended to believe in complete competition model based on two assumptions:

1) Complete competition – the decision of individuals in the market won't affect the result of market
2) Complete information – all the participants have complete information related to trade

According to neoclassical theory, in the complete competition market, it is accessible to reach balance and pareto equilibrium at the same time, which could maximize the social effectiveness. But in the reality, when information is asymmetric, things could be different. In 1973 A. Michael Spence established Market Signaling Model which concludes that education got the function of signaling. According to the model, there exists asymmetry in employment market, since workers clearly know their own ability while companies don't. If employers are not be able to distinguish those who can raise the productivity and those who cannot, then everyone will achieve the average wage, thus workers with higher productivity finally receive

lower marginal return while the ones with lower productivity receive higher marginal return. In this game, the ones with higher productivity will try to send signals employers in order to be distinguished from the others in order to make their wages appropriate to their productivity. Education is a very good way as a signal from "sender" to the "receiver". In another words, education itself doesn't have any direct relation with a person's ability, instead it could be regarded merely as a signal to tell the employer that the individual is better than the others, and workers with lower ability tend to be less interested in competition with those with higher ability due to higher marginal cost of education, which indicates that they require more time, money and efforts to achieve the same level of education. Though under the assumption that education has no relation with productivity and ability, still companies are willing to provide more wages in order to attract those who get higher education because this is the signals they can get from limited information which might have higher possibility to indicate that the worker has better productivity.

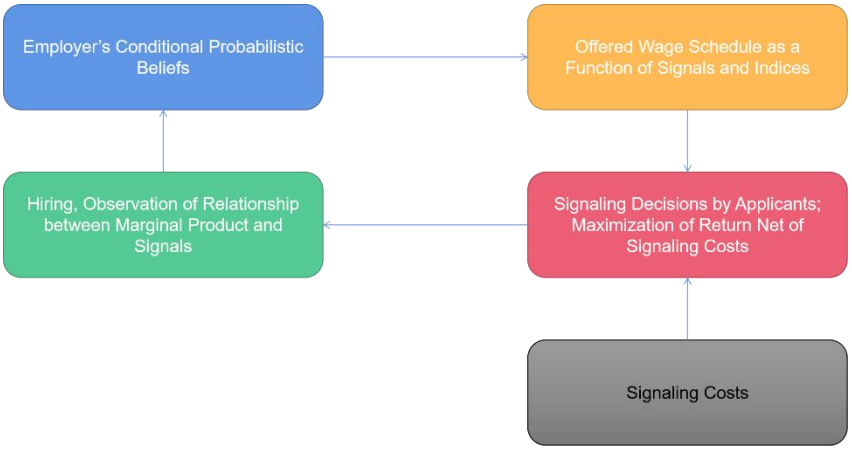

Figure 2.2.2.1 Information Feedback in Job Market
Source: Spence, 1973

Job Market Signaling Model provides us a new vision of employment from the employer's side. Due to the existence of information asymmetry, employers are willing to provide higher wages for those who got better education based on the assumption that the individual got higher productivity. But what we should pay attention here is that this feedback mechanism is based on the very important assumption that education is only a signal from the sender, and education itself is not directly related to productivity and ability itself. As we can see in the reality most university knowledge which you learnt from the class could not be implied in the work directly, even regardless of whether your major is suitable for the position. Besides, some other factors might be more appropriate to become the signal which can prove productivity of worker such as related experience, professional skills or interview performance, etc. **Thus, from both Thurow and Spence's points of view may we conclude that education does not directly represent the productivity or ability of worker, instead it's just a signal which might attract companies to provide more wages or lead to front position in labor queue, so the education could be valued inappropriately, such as overvalued.** This is the conclusion we want to emphasize, that since education can make workers more competitive, many will try to pursue for higher education without considering

about whether the position requires that much education, which might result in waste of education. For instance, master students might compete to get a position of teller in the bank. With job competition model and market signaling model those phenomena could be explained. Now, after we use theories to explain the reason of overeducation, then what will be the macro impact of overeducation towards economics? We should go back to Tsang and Levin to look deeper into the macro-economic problems.

2.2.3 Tsang and Levin's Production Model

There was increase in supply of high-educated labor in the market brought by increase in college-age population and proportion of post-senior education in USA (Freeman, 1976, 1979; Rumberger, 1984), while on the other hand it is also claimed that the economic return of high education is declining due to the gap between career expectations and the positions and salaries market could provide (Yankelovich, 1974; Golladay, 1976). It seems that more workers are owning skills and education more than requirement from their jobs, which makes their extra education unnecessary. Meanwhile, other studies indicate that overeducation could decrease the satisfaction of workers and thus leads to the decrease in productivity, since overeducation could bring poorer health condition and heavier mental pressure (Quinn, et al, 1975). Thus, for individuals they need to consider about how to find the balance between education investment and happiness, while the government should also try to improve the structure and institution to make education more effective in production progress.

Mun C. Tsang and Henry M. Levin published their paper in *Economics of Education Review* which provides a brief account of economic impact of economic overeducation (1985). The paper instructs that according to neoclassical theories of labor market, the economic impact of overeducation could be long-term considered with Spence's job-screening model and Thurow's job-competition model rather than short-run. The paper provides a production-function model which includes the negative impact of overeducation. Tsang and Levin provide us a very good perspective about how to relate overeducation with economics and productivity. We are trying to set a model to explain the economic impact of overeducation, and this paper could bring us some ideas about factors and variables we could take into consideration.

Tsang and Levin made brief research about economic impact of overeducation. According to neoclassical economists, firms create value and make production based on technology progress and prices, and technology process could be provided by more educated and skilled workers, while on the other hand the price of labor might also go down with the raise of labor supply, and firms could easily rebalance their production process with cheaper and more educated labor (Tsang, et al, 1985). Though neoclassical economists believe that the negative impact of overeducation is sourced from mismatch between expectation in career and education investment and since firms can use flexible pricing to adjust the unbalance, this kind of mismatch will usually be short-term, Tsang and Levin questioned in their paper

that this readjustment progress might be far much longer than economists expected. Besides, the paper also mentioned some other factors that would tend to increase the supply of education, such as decrease in cost of education due to subsidies from government, and also high education is usually related with higher salaries and higher social status, and finally, increase in public education is beneficial for social structure stability (Tsang, et al, 1985). All those analyses could explain the motivation of overeducation and indicate that overeducation could have long-term impact rather than short-term just as what neoclassical economists believe. However, the increase in investment into education could not always bring positive results. Some data shows that growth rate of productivity is declining after rapid investment into education (Denison, 1979), though people usually believe that skills and technology can increase the effectiveness of productivity thus education should have positive correlation with growth rate of productivity. While in the same time, workers with high education could have higher dissatisfaction together with mental illness and psychologic problems. Overeducation could bring lower productivity because of lower dissatisfaction due to worse health and mental condition. Moreover, related researches claim that overeducation suffers the most dissatisfaction among them (Berg, 1970; Quinn, et al, 1975). Thus, how to keep the balance between positive and negative economic impacts of overeducation is the things we need to focus on.

To answer this question and also look deeper into economics of overeducation, the paper set a production model for a firm to try to explain how overeducation will affect productivity in macro view, which includes Labor, Labor Characteristics, Capital, Organization Structure, Time/Technology and Other factors. This is a very important base for us to choose factors and variables for our qualitative analysis, thus we will explain more details about the model in the theory and data part. The paper found out that education adds value to production through job structure, labor input and capital, while as the source of labor, workers efficiency is related with needs, skills and education. Overeducation can give negative impact on underutilized skills and unfulfilled expectations which might lead to disappointment and dissatisfaction, health problem and negative work behavior (Tsang, et al, 1985). Paper used various of models to instruct overeducation and emphasized that overeducation increases will be a long-term impact unless some measurements are taken by the government. The role of governments is doubled-they can be either employer of workers who get profits from educated and skilled workers, or investors of labor who put funds into education and look forward to the return. Governments around world has taken various of measurements and policies try to solve the problem and keep the balance between demand and supply of education in order to decrease waste of education resources, but the effectiveness in different countries are still beyond judgement. In conclusion, the paper insists that overeducation could lead to the significant decline in productivity and actions should be taken to improve effectiveness of education in workplaces.

In The Economics of Overeducation Tsang and Levin proposes a production model for a company to explain the factors of productivity and value-added production (1985). The previous neoclassical theories focus on organization issues and Decision-Making (DM) process. In the theories they have several most important assumptions:

1) A firm is a hierarchical organization with different standards of vertical integration.
2) The core of integration is management-labor relationship. There is inevitable conflict between employer and employees, and labors are not merely a capital input into the productivity. Work efficiency could be shrunken, so the utility of labor input is unstable and difficult to predict. Thus, creating a supervision institution to increase the efficiency of labor is a very important topic.
3) Productivity is finally determined by DM process which could be restricted by management, technical condition and other possible factors.

Based on the assumptions, Tsang and Levin created a formula to describe the relationship between production and its independent variables as below:

$$Y = F(L, LC, K, M, JS, OS, T, X)$$

In this equation there are eight factors in total which the authors believe that it will bring impact to productivity of the firm, which includes: 1) Labor: Labor force is the basic elements of the market which create value. And this concept widely includes different positions in various industries, such as management class, administrative class, skill labors, blue collar and technical staff, etc. 2) Labor Characteristics: it indicates the background of labor, such as gender, age, educational level, etc. 3) Capital: Categorial viable, such as equipment and fluent assets 4) Materials: primary production material used to create output. 5) Job structure: usually consists of physical and social characteristics, and organizes the production environment and framework of management-labor relationship. 6) Organizational structure: firm size, institution, legal form, ownership and other things closely related to management. 7) Time/Technology and 8) Other factors: such as macroeconomic environment, strategic goals of the firm, etc. With technology, price of labor, other capital, management-labor relationship remains the same in long-term, we focus on job structure (JS), Labor (L), Labor characteristics (LC) and capital (K). Based on this Tsang and Levin set the value-added production sub-model since they discover that LC and JS could be affected by education as below:

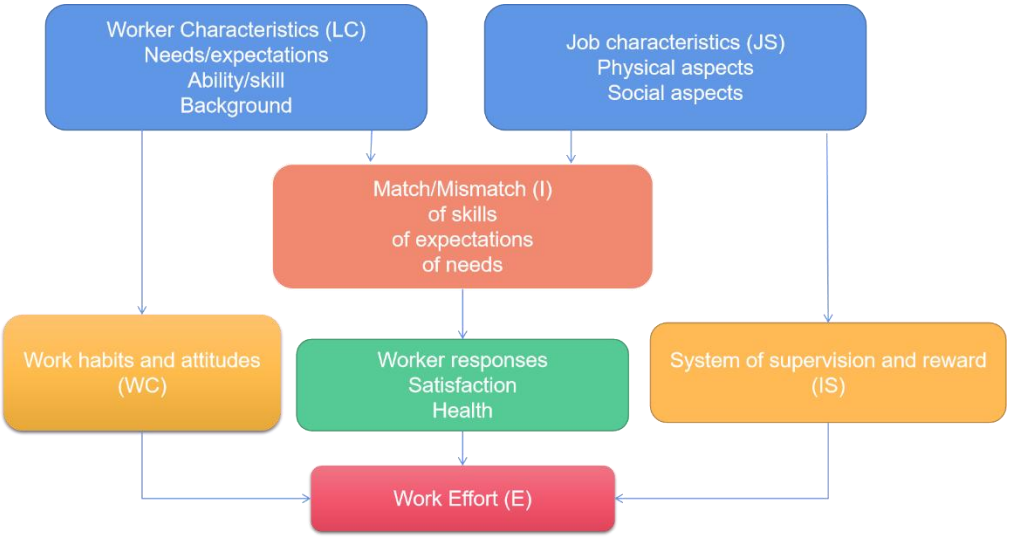

Figure 2.2.3.1 DM of Working Effort
Source: Tsang, et al, 1985

Education brings impact to LC and JS. With higher education, workers tend to have higher JS and LC which might be very difficult to match their expectations of wages in the position provided by employer which might create dissatisfaction or mental problem which result in decrease of working positivity and effort (E_i) closely related with efficiency and productivity. Meanwhile, education and skill background could bring work habits and attitudes in the work (WC) while higher aspects could bring more supervision and less reward which might both leads to lower work effort. In summary, work effect could be affected by three factors: workers' response to match/mismatch to expectations (I_i), institutional factors which related to supervision and reward (IS_i) and work habits and attitudes (WC_i). In conclusion, we can rewrite the whole production model as below:

$$E_i = E_i(LC_i, JS_i) = E_i(WC_i, IS_i, I_i)$$
$$VA = H(L, K, T, E)$$
$$Y = F(VA, M, OS, T, X).$$

So, what can we get from this model? Apparently, education could affect LC and JS closely related with I. The change of work effort will affect value-added production (VH) which will also affect the final output. Overeducation, as a negative phenomenon, will obviously decrease work effort by increase the possibility of mismatch (I_i). Once workers feel that they could not receive enough wages as they expected considering about their education background, they would definitely feel unsatisfied or get too much pressure and become mental unhealthy, together with negative atmosphere in working place, bad habits and more requirement for supervision and rewards. What we need to pay attention is that due to the vertical hierarchy, JS and LC could be changed and improved by the management and better institution. Until now, as far as we know, overeducation could bring negative impact on match of expectation of workers in wages, satisfaction, mental illness which will all lead to less work effort and productivity. Thus, we will use the data to analyze whether this also happen in Japan and are there any new differences between Eastern Asia society and USA. We need to check the relation between wage and promotion and education, dissatisfaction and work efforts, find the reason behind it and try to find what firms and institutions can do to improve this problem.

In conclusion, in the economics of overeducation theory we have reviewed Tsang and Levin's model which mentioned productivity of education and skilled work, dissatisfaction and mental illness which will be regarded as the main structure and base of this paper, together with Spence's model about asymmetric information among workers and companies, and Thurow's theory which mentions inequality and competition. Thus, with the help of those keywords, we will look into Japan and other Eastern Asian countries to see how overeducation theories could be applied in their cases.

3 Evidence of overeducation in Japan

Following the review on economic impact of education and overeducation studies, let's try to review related research in Japan. It is necessary to collect the information about when the establishment of high-educated society started, how the competition in educational system in Japan is now and how the high-educated society affects the economy and productivity. The purpose of this part is to make comparison between case in Japan and USA in order to find whether there are similarity and whether we can apply models and theory from previous studies to Japan. After that we will mention about the negative impacts from overeducation such as mental illness, low satisfaction and low happiness, which will lead to the decrease in production enthusiasm. The impact of education is difficult to quantify thus we have to read more related research in sociology area in order to illustrate the bad consequence of overeducation. Finally, an empirical survey is made through investigation from respondents to see whether the result really supports our assumption of overeducation in Japan.

3.1 Education

To understand the impact of overeducation in Japan, we must look through the educational system and situation of Japan to see the similarity and difference of Japanese overeducation compared with other countries. The trend of high education in Japan first started in 1960s when the massive new born babies after war became adults and get into universities. The Figure below indicates that proportion of university students in whole population increased rapidly from only 8.3% in 1965 to 39% in 2015, and the growth kept in the average of 7% within every 10 years. Considering about the increase of total Japanese population, we can see that the process of higher education keeps going on. But whether the increase of education really leads to the increase of living standards? In Furuta's work he indicates that though there's correlation between education background and income, the gap of income and living standards between students with high and low educational backgrounds are not as huge as before (2018 a). His study discovered that compared with those who graduated in 1960s, the younger generations seem to be more difficult to enter into management class with the same experience and moreover, the proportion of high educated groups work as blue collars are higher than the previous. The problem of stratification seems to be worse and it seems that the motivation of high education for individuals are weakening. Compared with whether employees are with education, companies seem to care more about whether employees are skilled. Thus, in Furuta's work, his main question is whether higher education really make sense since the structure of income and occupation seem to be unchanged with more high education. This conclusion has been instructed and proved again with data in another work in the same year where he questioned whether educational background is still a factor which we should take into consideration in wealth distribution and social economic growth (Furuta, 2018 b).

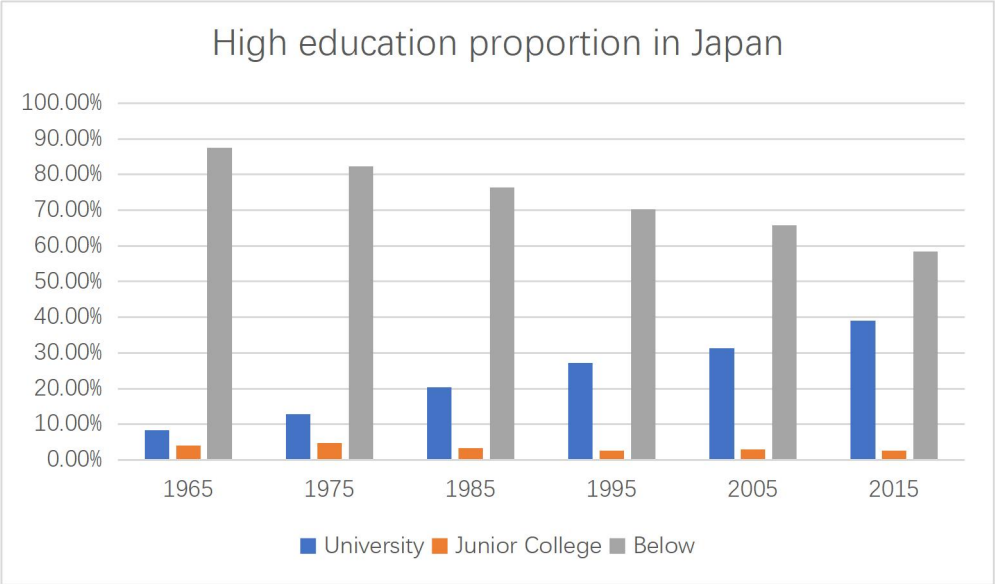

Figure 3.1.1 High education proportion in Japan
Source: Furuta, 2018 a

Another important work by Furuta and others published in 2013 indicates the wealth distribution and social position brought by educational background mainly focused on equality (Furuta, et al, 2013). In this paper, they set a logic that the family background plays the most important role in a person's future development and income, since family background decides how much educational resources one could gain earlier which lead the competition to unfairness at the beginning, and the ability of study determines the final education you could reach together with the financial support from the family, and finally both educational background and social resources provided by family decide the occupation and income you could achieve. In this system, we can see that family background is important in all the three steps and is positively related with them. Students with better family backgrounds will definitely have more advantages in education, thus the education is not making society more equal but rather less equal. In the paper they used Breen and Goldthorpe (1997) to define the disparities and gaps into three categories: gap of studying ability and potentiality, gap of educational resources and gap of risk aversion ability. With the advantages in all the gaps, students with better family backgrounds are considered to be more competitive and keep the advantage of their class against other lower classes. Thus, they believe that the current education in Japan could not increase the ability of study for students to decrease this gap effectively which makes educational system less useful and institutions should make the mechanism more integrated and diversified.

Another paper based on 2015 SSM data also provides the similar analysis, but also discusses about the educational impact for Japanese women which few people mentioned about in the previous study (Toyonaga, 2018). In the paper he indicates that though after 1995 it has been really difficult for males to enter into management level with merely educational background and companies care more about skills and experience, women are exactly the beneficiary of high education. Females with higher education tends to have better

occupation and salary compared with those who hasn't got good education. But according to his study, he claims that the reason why females has achieved more benefits from education since women's affirmative action in 1999 is because females in Japan has suffered from discrimination and inequality in social resource and opportunity distribution for a long time. The education is just helping females return to the position the males already had and might not continue long.

In conclusion, though according to the data from the figure below Japan is among the most educated countries in the world whose successful educational system has been widely learnt by its neighbors, still the previous studies show that there are many social problems that high education seems to be inefficient to deal with. Japanese highly-educated society still suffers from class solidification, inequality and less opportunities which might all lead to low dissatisfaction and work efficiency. Education is not as useful as it looks and might be regarded as too over.

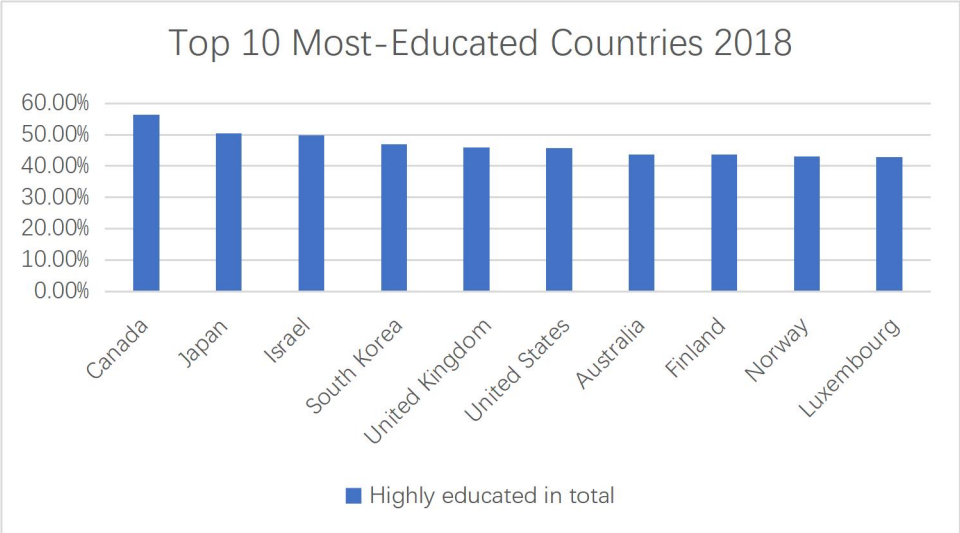

Figure 3.1.2 Top 10 countries with the highest proportion of high-educated population
Source: OECD, 2018

3.2 Inequality

Someone believe that high requirement of educational background brings competition, which might create gap and increase inequality since educational resources are usually not equally distributed among different classes in society. Inequality can bring heavy mental pressure, anxiety and dissatisfaction which could bring low efficiency of employees. In 2009, Professor Arita from Tokyo University published a study about social inequality and salary gap brought by social structure and jobs through comparative analysis to make deeper research about the reasons of inequality in Japanese society (Arita, 2009). The motivation for him to do this study is that he found the huge gap of salary and social position might be determined by the social class, and this difference makes people try their best in the competition to be the better one. The paper uses the examples from Chinese Taiwan and

South Korea because their societies are experiencing the similar problems that huge gaps between social classes are separating and dividing the whole society. He divides the examples into several groups such as employees in big companies and small companies, formal employees and informal employees, new employees and old employees, then uses regression analysis and multiple regression model to see the salience of each factor. The results show that in Eastern Asian society people prefer working in big companies to small companies, working as formal employees to informal employees, and sometimes this kind of preference is not only due to salary gap, but also because of traditional opinions. Moreover, the result indicates that salary varies for different types of work, and those who require higher education got huge advantage in salary and social position. Arita believes that strong sense of class belonging and collectivism which exist commonly in Eastern Asian societies make social hierarchy even more strict. The huge gap between upper class and lower class might be an important reason for severe competition for work, and everyone tries their best to get better education thus they have the opportunity to choose the better types of work and get higher salary.

Similar research was made by Professor Taki from Doshisha University about the role of education plays in inequality (Taki, 2020). The motivation of Taki's study is that he is wondering compared with western world, how close is the relationship between future successful career and education and family background, and whether better family background leads to better education with more opportunities? According to the previous research, education is usually divided into four different categories dur to the ability of students, socioeconomic position of family and local education system (Dupriez, 2008), and based on this method, paper develops five different models of education and uses 22 countries which could be categorized into these five models. By using multiple linear regression analysis, the paper finds out that compared with other models, Japan and Korea who followed competitive system got huge gap both among schools and within schools. Since entrance exams were set before entering into higher education, the class differentiation in Eastern Asian societies is more obvious than other countries. Compared with family background who also plays an important role in future success, the unique examination system in Eastern Asia might be the key point why Japanese society suffers more competition than western countries. Thus, it is really important that how the background of a family could turn into academic ability, which is the main reason of the inequality in Japanese education. Up till now, the over competition in career and education is still a serious social problem in Japanese society, which could also be a direct factor of high rate of suicide and mental illness.

3.3 Suicide

It is important for us to take rate of suicide and mental illness into consideration when we are studying about satisfaction of society closely related to working efficiency, because these two indices could usually reflect whether people are happy. Japan is famous for its high suicide rate, and a rise of rate of suicide usually reflects low happiness and satisfaction of society. In

1989 Professor Ohara from Hamamatsu Medical School made a study about suicide in Japan since Japan was famous for being among the top suicide countries in the world (Ohara, 1989). The data he collected shows that compared with 1950s when World War Two just ended, the major group of suicides has moved from teenagers to middle aged groups. Loneliness happens when working time expands with the development of economy and employees have less time at home with family. After World War Two many teenagers and young adults committed suicide due to the loss of war, while in 1980s middle aged groups committed suicide because of the similar reason-loss of purpose in life. Japanese culture and education expect the youth to become an outstanding person, and when the economic crisis arrives, with disappointment and loss of hope there comes dissatisfaction. Moreover, compared with suicides in other countries, Japanese suicide got a strong tend of scarification, such as die for parents, die for children, die for family, die for company and die for country, named as honorable suicide. This kind of culture and atmosphere might raise the rate of suicide especially in difficult times such as bankrupts brought by economic depression. Paper uses data to show that due to more time at work and less time at home, loneliness becomes the main reason of suicide and mental illness is getting more attention by more financial expenditure on psychotherapy. This might explain the reason why Japanese society is unhappy.

While on the other hand, in 2010 three professors from Tokyo University in Japan and Kyung Hee University in Korea published their joint research about the relationship between recession, unemployment and suicide (Zawata, et al, 2010). According to their research, from 1997 to 1998 the suicide rate in Japan boosted and in the next decade, the annual number of suicides remains above 30,000, which means that everyday around 90 persons commit suicide. A study in 2008 claimed that the main reason for suicide is mental illness, but this paper uses more detailed statistics from interview to indicate that it is in fact 25% of suicide individuals are related to socio-economic problems such as conflicts in family, debts, low living standard, working environment and unemployment. The data used by paper shows that from 1997 to 1998 the number of suicides increased from 24,391 to 32,863, which was about 35%, while 1997 is exactly the year when economic bubble in real estate collapsed. In age, about 25% of the suicide is above 45 years old, which means that middle aged and old generation got higher rate of suicide. Unemployed individuals consist for 15.07% while employed individuals take only 9.28% followed by 5.44% of self-employed cases. Moreover, after comparative analysis with other developed countries with data from WHO, they find some interesting features unique to Japan. For example, suicide in Japan is more related to economic situation than other developed countries, where in other western countries top motivations are divorce, inequality of female and alcoholism rate, in Japan it appears to be economic depression, high unemployment rate, inequality in income, etc. And also, compared with females, males in Japan are easier to get affected by economic reasons, and since banks are more willing to provide loans to big companies than medium and small companies, those who work in the latter one appears to have high suicide rate. High suicide also results in social problems such as increase of one-parent family along with increase of psychological problems among teenagers. With the study of relationship between economic factors and suicide rate, it is better to set a model covering suicide rate and mental illness,

since they also reflect unhappiness, dissatisfaction and lower work efforts.

3.4 Empirical Survey – Samples, Interview and Results

Before data analysis with official macroeconomic data, it is interesting to do an empirical survey among graduate students first since as the theories we explained above, we can see that psychologic factors such as happiness, dissatisfaction, anxiety will give impact to motivation and positivity of employees towards work which might lead to lower productivity. Since it is quite difficult to quantify those factors precisely, we can think about collecting some results directly from random respondents to make the analysis look more figuratively. Social survey is a very common way in quantitative analysis and can also be effective if the respondents and questions are correctly set. In this paper we set a simple social survey trying to find the impact of overeducation towards psychology among young graduated students in Japan. There are totally 7 questions in the survey including the educational background, length of working since graduation, major, does your major match your current work, do you feel your educational graduation really give you competitiveness in the career, do you feel anxiety and are you satisfied with the current salary. Objects of investigation is set as new employees who has graduated from good universities for at least 3 years. Universities including Top 9 National University (Tokyo, Kyoto, Tohoku, Nagoya, Kyushu, Hokkaido and Osaka) and Top 4 Private Universities (Keio, Waseda, Doshisha and Ritsumeikan) with both bachelor and master degrees. Majors are divided into two categories: one is the STEM which is supposed to be more relevant with job while another one is liberal arts such as literature, politics, history and philosophy supposed to be less relevant with current position. The survey is sent to random students which we don't have any conditions on genders and birth place. All the questions were set based on the model instructed as Figure 3.3.1 as we want to use a small example to test whether Tsang and Levin production model is really persuasive in our case. All the surveys were written in Japanese and with English translation.

We sent 112 surveys by email and finally got 61 replies with 36 males and 25 females. Among them 23 are liberal arts students (37.7%) and the rest 38 are STEM students (62.3%). For degree level, 42 got bachelor degree (68.9%) and 19 got master degree (31.1%). For major-job match, 29 students (47.5%) are currently working in the area which has nothing to do with what they major in the university. Meanwhile, if we take a look at liberal students, there are 18 students (78.3%) whose jobs don't match their major while for the STEM students 11 (28.9%) don't match their major. Also, among them 32 (52.5%) feel that their education doesn't help very much in their career, and if we only consider liberal arts student, the number will increase to 15 (65.2%) compared with 17 (44.7%). 53 respondents (86.9%) feel anxiety and if we consider about gender, 18 females (72%) are anxiety while 35 males feel anxiety (97.2%). For the salary, 47 respondents (77%) believe that they deserve better salary and we find that among those 53 who are anxiety, 42 (79.2%) feel unsatisfied about their salary. We get the basic results until now and put the figures below to make some of the results clearer.

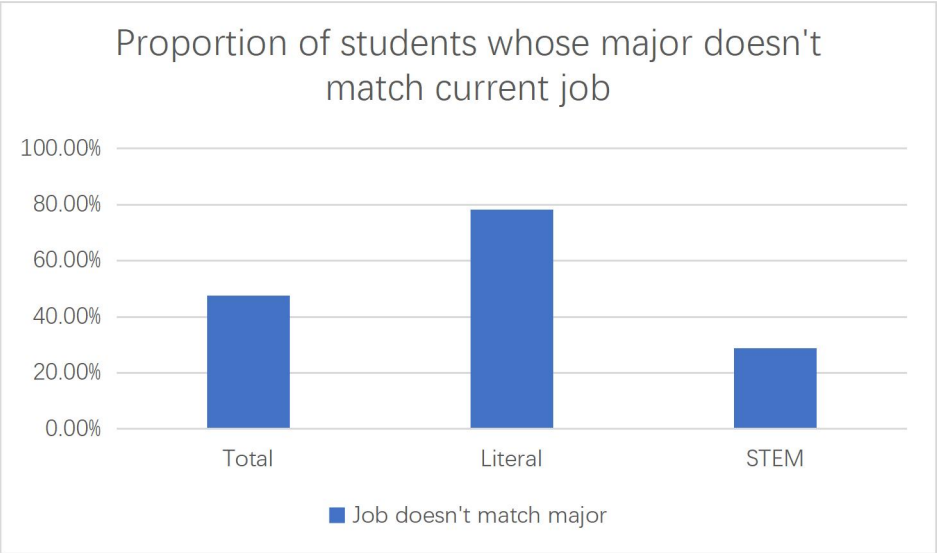

Figure 3.4.1 Proportion of students whose major doesn't match current job

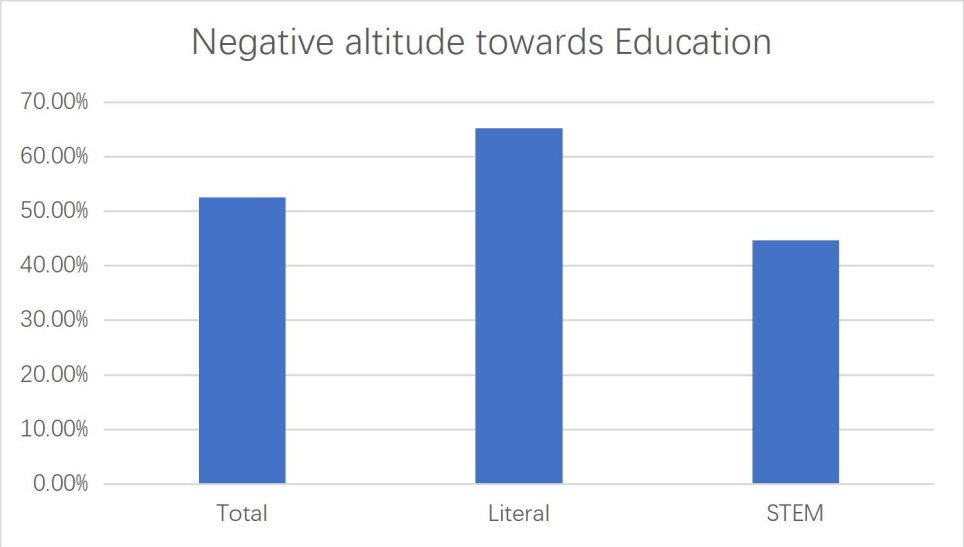

Figure 3.4.2 Negative of positive attitude towards education

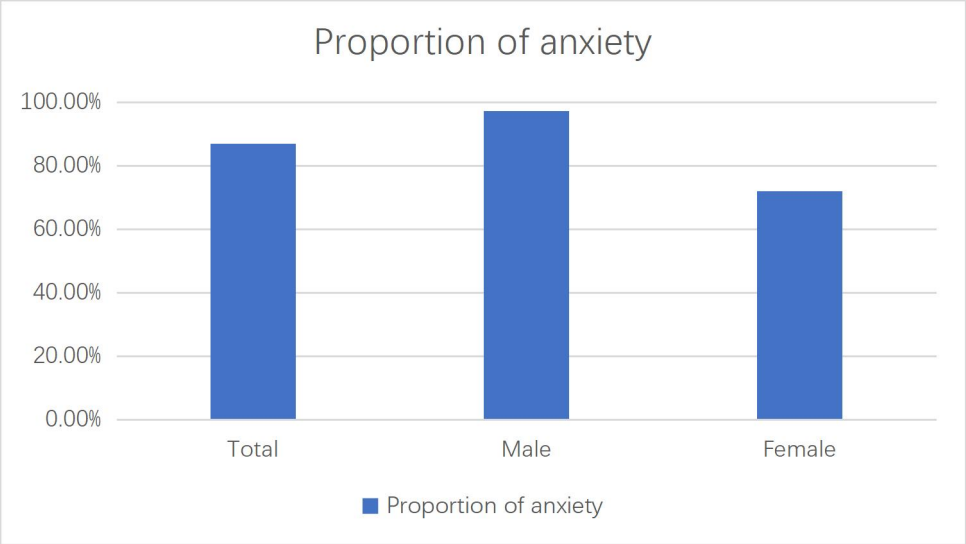

Figure 3.4.3 Proportion of anxiety according to gender

Figure 3.4.4 Satisfaction towards salary among anxiety group

From the results above we can observe and get some simple conclusions. First, from Figure 2.3.1 we can see that about half of the respondents are not working in the area which they majored in their university, and liberal art students seem to have this problem worse than STEM students. This is not difficult to understand because STEM subjects are highly targeted to several areas and more practical with higher barriers to entry which means that students studying other subjects are very difficult to enter into those areas and compete with STEM students, which makes STEM subjects look more worthy to study, while liberal arts subjects are more similar to general education with less professional positions. There is some debate that whether liberal arts education is really necessary since society and labor market cannot absorb too many graduate students in liberal arts areas and thus liberal art subject tend to become more unnecessary in the future (Tran, 2018). Second, from Figure 2.3.2 we can see that there are totally around half of the students who feel that the education is unnecessary or irrelated to their work. Overeducation might be taken into consideration when someone feel that education background is unrelated with the future career while taking much energy and time to achieve the degree. Figure 2.3.3 indicates that observations suffer from high

level of dissatisfaction and anxiety which might lead to mental illness, and males seem to have more anxiety than females. Though there is still doubt that whether in Japan males are working longer or under worse working conditions such as heavy labor work, there are some previous studies insist that in traditional Japanese patriarchal society males are suffering more social pressure from concepts such as males should take responsibility of the family or husbands should be better than their wives to make themselves look more reliable (Taga, 2005). Finally, Figure 4.4 indicates an interesting phenomenon that most respondents dissatisfied about current work is also unhappy about their current salary. Though there is still doubt whether salary is exactly the biggest reason of anxiety, still we can see that among the high-educated examples, many cases are not happy with their current salary, or we can say that high education they received don't provide them the return they are expecting.

The results we get from 61 observations we chose randomly from high-educated group is not a precise model for explaining everything, but the results we get from the social survey that there is a trend that the future career graduated students can get could not perfectly reach what they were expecting and though there are many factors related, still the anxiety and dissatisfaction increase and high-education they received don't get enough positive feedback from the observations. From a micro perspective we can find a logic of dissatisfaction towards overeducation on individual level, and Tsang and Levin's production model seems to be applicable in the Japanese case we did in the social survey. So how does this overeducation affect the productivity and economy in macro way? In the next part we will use macroeconomic data to measure the impact of overeducation towards economy.

4 Analysis and Discussion

Until now we have reviewed the theory of human capital and overeducation in relation to empirical evidence from Japanese society. According to the overeducation theories and overeducation models, too much investment in human capital might cause negative impact due to inappropriate of educational requirement towards workers, and from the previous study in Japan and an own empirical survey we could see that there is a trend that graduated students and young employees find their education background and what they have learnt from the university is not that much important when competing in the career. Thus, can we make the conclusion that there exists some kind of mismatch between requirement from employers and educated labor supply? Based on competition model and market signaling model we could see this hypothesis as reasonable since there might exist insufficient information asymmetry and unnecessary competition. In fact, mismatch of job and education has been studied recently with the comparative cases between Japan and several western countries. We will use mismatch studies to analysis and test whether the case of Japan is explainable under Tsang and Levin production model, and one of the reasons behind this mismatch could be the cultural and institutional factors which might have been ignored by others.

4.1 Education and Job Mismatch

According to Tsang and Levin's production model, the source of overeducation dissatisfaction towards work is the mismatch of education and job. If employees expect a higher return of income and salary with their current educational background while the job they could find is exactly far much lower than what they expected, it will create a huge dissatisfaction of disappointment and might lead to lower productivity. Job mismatch has been studied for some time in the academia and has proved to be a very good way to explain the reason of negative impact of overeducation.

According to an interview made by International Social Survey Programme (ISSP), Japan ranked one of the most dissatisfied countries towards jobs. Among all the 32 countries, Japan ranked 28 with 73% satisfaction while in 2015 this figure dropped to below 60%. It was once believed that easier jobs usually create better satisfaction, the data shows that not everyone is happy with the easier work, since easier jobs usually also provide less salary. The reason of dissatisfaction is various. For instance, most employees who got interviews mentioned about overtime work and management class's careless about employees. Also, the atmosphere of levels in Japanese companies has also been blamed a lot. But one of the most important reasons is the lack of future career development possibility. Many employees don't feel that their career is going upward in the company and feel that their abilities and educational background deserve more. The dissatisfaction of mismatch between ability and return is one of the main reasons that creating unhappiness in Japanese society. Another report made by Research Institute of Economy, Trade and Industry (RIETI) also mentioned that in their research towards foreign employees in Japan indicates that the impact of education towards satisfaction is bigger for Japanese employees than foreign employees. Japanese employees care more about education match and they will feel happier than foreign employees if they feel their education match the current job while on the contrary if they feel the education and job don't match, they will also feel more disappointed than foreign employees. And compared with Japanese working abroad, Japanese working domestically care more about education. Also, many Japanese who feel their education doesn't match the job may choose to go abroad for more chances.

In a paper about education mismatch in labor market they used data from OECD Program of International Assessment of Adult Competences (PIAAC) and by analyzing the distribution of data with logistic model as below they found out that Japan has more education overmatch than undermatch (Cervantes, et al, 2022). Unlike Italy which has a low college education rate and German who possesses a good educational system which ensures that the amount of skilled labor could match the number of positions, in Japan the average high-educated level is really high and people are trying to get educated and trained no matter what the jobs are asking for. Compared with high-educated groups, lower-educated labors suffer less from education mismatch because due to the office culture, in Japanese companies it is unusual to fire an employee if he doesn't make mistakes. Usually, the time period of staying in the first company in Japan is far much longer than other countries. Most Japanese employees

seldom change their companies and jobs and the salary and position go upwards slowly as longer as they stay. All these make low-educated workers care less than education.

$$P_r(e_i = 1|a_i) = \frac{exp^{a_0+a_1a_i}}{1 + exp^{a_0+a_1a_i}}$$

	Ed-Job (General)	Ed-Job (Undermatch)	Ed-Job (Overmatch)
Germany	0.330	0.386	0.179
Italy	0.420	0.460	0.394
Japan	0.256	0.330	0.346
United States	0.311	0.412	0.197
Pooled	0.339	0.339	0.345

Significance level: 1%

Table 4.1.1 Correlations between education and job mismatch

Source: Cervantes, et al, 2022

Why is there overmatch between education and job in Japan? One possible reason is the overheat of education, which means that people are chasing higher education not because the jobs and society needs intelligence in this area, but because usually this kind of jobs provides higher salary so students rush to this area to get as high education as possible, while in the industry there are limited positions, so a large part of intelligence and education in this area is useless and wasted. Since 1965, with the industrial centralization of Japanese economy, high-educated people got more advantages in getting higher-salary jobs which require more professional skills and will get more opportunity of promotion to get into management, and also high-educated groups also earn a better start point compared with low educated groups, and the gap between high-educated and lower-educated groups remains until now (Furuta, 2018b). While on the other hand, as part of technology capital, overeducation also suffers decreasing marginal productivity. Unemployment of high-educated groups becomes a common problem among Asian countries mainly due to the slow economic development speed, since it is far much easier to produce doubled university graduate students than increase of jobs and positions brought by rapid growth of economy, and when the economy cannot provide enough high-skilled and professional positions or satisfying salary, high-educated groups will tend to become unemployed or accept lower salary, and moreover, the number of students graduated every year tends to be stable while economy got periodicity, thus during economic depression there will be far much more supply of high-educated than demand (Muta, 1987). Meanwhile, the value of high-educated groups is also decreasing due to the decreasing marginal utility, and most high-educated students have upper-middle class family background, which means that they are more affordable to unemployment and lower salary. Figure 4.1.1 shows that according to data from Japan Statistics Burea, among graduate students, high-educated students with degree above bachelor achieve the lowest employment which means that many of them couldn't get a job even with the advantage in education compare with low-educated students below senior high. Also, the advantage of good private universities is not as obvious as before in certain industries such as finance, and employment of graduate

students tend to concentrate in certain industries, which makes competition more serious. Extra education doesn't bring enough return, instead it overmatches the income and salary status of graduate students. The great unbalance and missing expectation are the source of disappointment and unsatisfaction of high-educated employees.

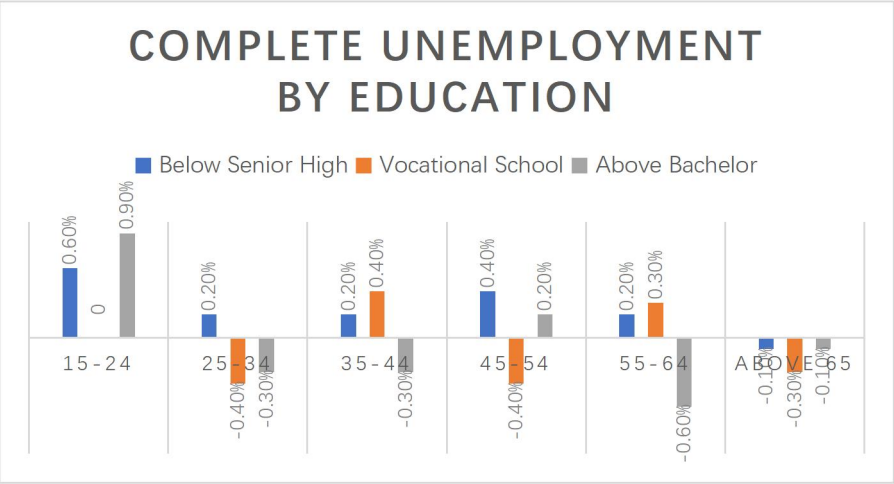

Figure 4.1.1: Total unemployment by age group and level of education 2019
Source: Japan Statistics Bureau

When temporary overestimation and over expectation towards education, the satisfaction of workers will fall with the impact of education fall back to what it belongs to. As Figure 4.1.2 shows below, if the red curve refers to expectation of education and blue curve refers to the real demand of education from companies, and in t_2 the gap between expectation and real demand reaches to the top, which indicates that the overmatch of education reaches maximum, while on the contrary, in t_3 the undermatch reaches to the maximum. With the employment of graduate students, the education expectation curve will return to the real demand, and the regression of curve creates workers' negative impact towards happiness and satisfaction. Moreover, additional supervision is required from employers which might lead to lower productivity. Also, worse habits and altitudes of workers result in lower working efforts. Mismatch of education should always be avoided since no matter whether education is overmatched or undermatched, process of correction will create fluctuation and uncertainty.

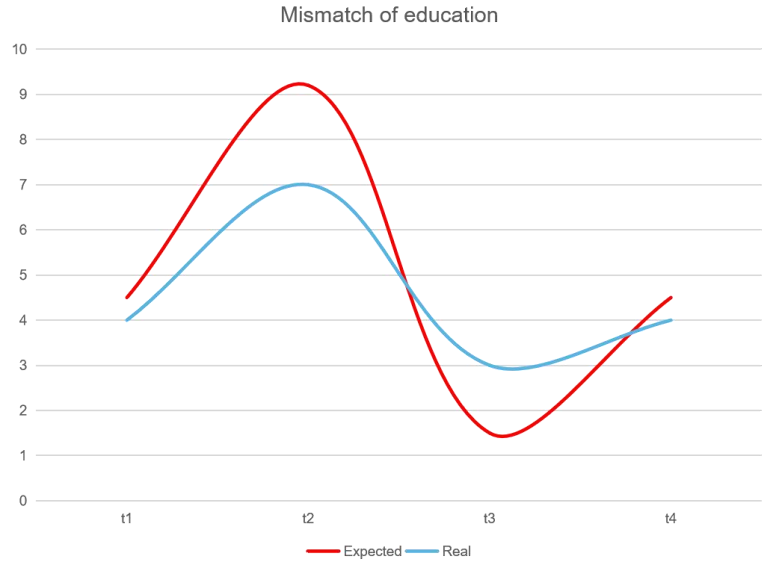

Figure 4.1.2 Mismatch of education-Overmatch and Undermatch

If two curves cross, then it means the expectation of education and real achievement are equal. If not, then there is a mismatch.

So now there is the question. If overmatch of education exists in Japan and many graduate students don't know that they won't get what they are expecting with their education, and being a labor worker in a comparative equal developed economy is also acceptable, then why students are still going for higher education through fierce competition? What makes them over expect the impact of education in employment?

4.2 Culture and Institution: Sense of Competition, Ranking and Collectivism

In 1997 Professor Sano from Kyoto University Education Faculty published a paper sharing his point of view towards the over competition in education, where he mentioned that Japanese companies choose their employees based on the education rather than required skills even for blue collar workers due to the fact that companies usually only use single standard to recruit those whom they want to work with (Sano, 1997). The reason for this is because Japanese companies use a very detailed and complex management system by which every employee will be put on the position where they just need to focus on very detailed works without knowing much about the whole progress, thus for new employees they will learn their skills after short period of training before starting new work, and there is few requirements for special techniques and skills from graduate students. In a typical Japanese company, most of the positions are located in the middle of the level, which means that they are just responsible for their own part of work in the whole progress which doesn't require much special techniques and skills. Then, the only standard employers judge candidates is their academic achievement from universities. In fact, in many Japanese companies the only standard for recruitment of new employees is the education which doesn't related very much with the real work, and that is the main reason why overmatch of

education is common in Japan. Just as what job market signaling model mentions, education might cannot provide the exact appropriate skills new employees need for the new jobs, but at least those with better academic achievements are believed to be smarter than the others and are supposed to learn faster than others in the new employees' skill training, and thus it could also be regarded as a very important measurement for employers to find the appropriate candidates for the position especially for graduate students. Though average high-educated rate is very high in Japan, enrollment rates of famous universities such as old imperial universities and famous private universities are extremely lower than normal universities, thus companies are far much more willing to enroll students from famous universities than normal universities regardless of the fact that majors of candidates from famous universities might have totally no relation with the position they are applying for.

Another reason for over competition and overmatch of education might be the common belief of competition and ranking in Japanese society, which refers to the phenomenon that Japanese culture emphasize that a person should try to become better than others and get higher rank in a group no matter whether it is necessary. Recently there are increasing researches and studies about comparison between European and Japanese education, pointed out that sense of competition and ranking in Japanese society could in fact enlarge the desertification, feeling of unsafe and self-denial among students (Fujihara, et al, 2012). Collectivism could exacerbate the competition since everyone is trying to get enrolled by the better universities and those bad students also have to follow with the others around them no matter whether university education is really necessary for them. Basically, Japanese universities could be divided into various of levels as Figure 6.1 below and each level has huge gap between each other. There is currently no official ranking of universities in Japan, but in society it is common to have rankings for educational background and this ranking doesn't only affect the employment, but also have impact on normal life. For instance, students from upper universities are often considered to be smarter than lower university students, thus they have their own socialize circles which they don't want others to enter. Old employees in the company are more willing to enroll those students who graduated from the same universities as them. Moreover, upper university students are less likely to get married with graduate students from lower universities since they are confident that they could get into better universities because they are smarter and they will have better life in the future than others. On the contrary, students from lower universities suffer from lack of confidence, desertification and self-denial, and with collectivism this negative feeling might be exacerbated because students will just limit their life under this kind of logic no matter whether it is reasonable, since all the others believe so. Modern Japanese society is divided into classes and those classes are usually based upon various of standards, determinations, social consciousness and other factors, and the barriers between classes are difficult to break through (Hashimoto, 1986).

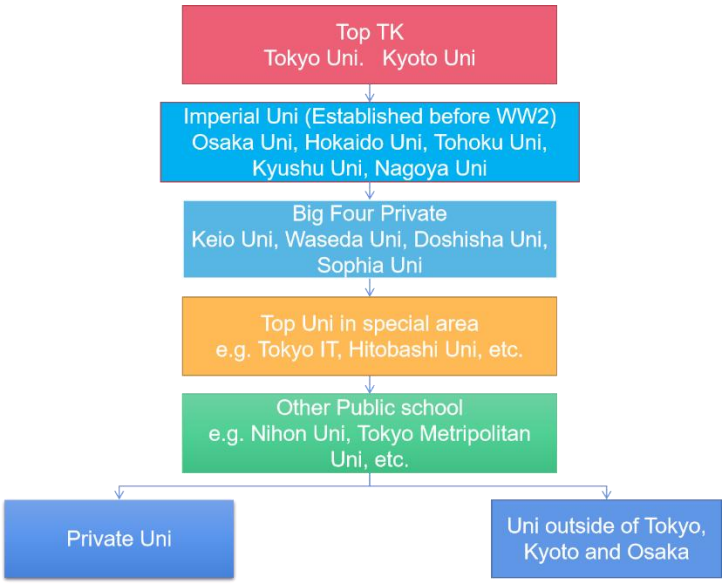

Figure 4.2.1 Levels of Japanese Universities

Instruction: There is currently no official ranking for universities in Japan, but in society there are numerous of rankings for reference. This ranking is just a popular example widely believed in Tokyo

Moreover, the negative impact of competition could be exacerbated by the strict institution of university entrance examination system. Japanese university entry examination system creates a very high barrier for students to increase the cost for education. Japan got a very huge and complex examination system for students to enter into universities which increase the difficulty of high education. There is a study about comparison of university entry examination system between Japan and western country, which claims that compared with western university entry exam which focuses mainly on comprehensive ability with integrated standards, entry university exams in Japan is more likely to be single standard and inequality, which might worsen the inequality and expand the gap and hierarchy among students (Sato, 2017). If students want to enter into good universities, especially public or national universities, they must take National Center Test for University Admissions. This exam is usually called common first-stage exam, since students need to reach different score line in order to get the qualification to attend second-stage exam which is hold by the university itself you are applying for. Student is only allowed to apply for one public or national university in the same time, so basically if he fails to pass the second stage, then his first-stage result will also be voided and student can only wait for the next year to try again. He will be enrolled only when he could pass both exams and for good universities, score requirement for first-stage exam is higher and second-stage exam is more difficult, which makes the rate of enrollment extremely low. For student, he has to consider how much possibility and uncertainty is when he applies for his dream school. For private universities, there are fewer limits. Students can apply for as many as they want, but the requirements are various. Some want just first-stage exam scores, while the others might require second-stage exam too and the rest even could ask for TOEFL, TOEIC or IELTS scores. Preparing exams for a university requires huge amount of energy, time and education resources, and one more application of chance always means less time for previous applications. Usually, a senior high student in Japan only has one or two options every year

and in order to enter into good universities, it is common for students to study and keep taking exams for 2 to 3 years or even more. Every time when students fail and wait for one more year, they will suffer heavier pressure and anxiety, and that is the reason why those who entered into good universities have so much over expectation about their education. Once the education is proved to be overmatched in job searching and employment, the dissatisfaction and unhappiness will be enlarged which refers to negative impact towards productivity.

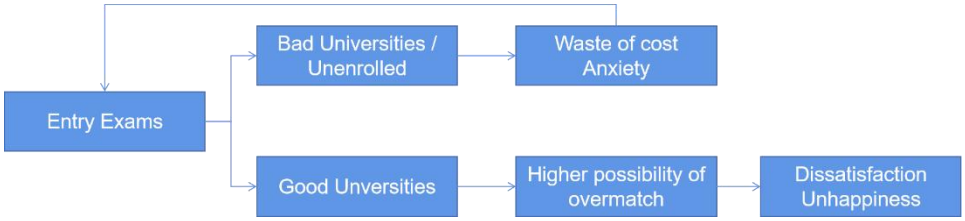

Figure 4.2.2 Japanese university entry exam system and Overeducation

Instruction: No matter whether they finally enter into good or bad universities, it seems that for students, unhappiness and anxiety seem to be inevitable

5 Conclusion

Overeducation is what Japan is suffering. After review of human capital theory, we conclude that education plays an important role in economic growth, but overeducation could be negative for both companies and employees. Through Job Market-Signaling Model and Job-Competition Labor Market Model we understand that employers have a high possibility of enrolling employees with inappropriate education requirement due to information asymmetry while Production Model explains how unhappiness and anxiety brought by overeducation lead to the decrease of production. Empirical evidence shows that mismatch of education become more common in developed countries including Japan, and too much expectation towards education leads to overmatch between educational background and employment which creates dissatisfaction and unhappiness which give negative impact towards productivity. Overmatch and over expectation of education are sourced from sense of competition, high barrier brought by university entry exam systems and culture of class stratification. Job-screening mechanism from companies and competition among employees are the source of increasing unhappiness and anxiety in Japan, and high rate of suicide and mental illness not only decrease the standard of living standard, but also decrease the production of companies, which might slow down the long-term economic growth. Thus, what we consider about is whether overeducation could be solved from the root? Are there any possible solutions?

One of the ways to solve over education is to provide enough highly paid positions for high-educated people. It will be rather difficult for a country to start a new rapid increase in economy since in the long-term, technology is the only factor of growth and it usually

means that an economy needs to do industrial upgrade to high technique areas such as IT, AI, precision industry, etc. It requires huge primary investment which could be far beyond normal countries can afford. Another way is increasing the number of government employees in order to absorb extra high-educated labor (Nitungkorn, 1985), but expansion of employment in government will also cause the increase of financial expenditure. Another way is to do something on the supply side. Authorities could try to increase the threshold of education to make it harder for people to gather into universities by raise the tuition fee and the requirements of transcript. This is opened to question because Eastern Asian has already become one of the regions which got the most difficult university entrance examinations (Nanbu, 2011). Authorities could also try to set more vocational and professional colleges to teach skills such as accounting, car repair, machine operation, etc., to produce skilled workers and put them into those positions lack of labor instead of gathering everyone in high-educated industries such as IT and finance, just like what other western countries like Germany do. The biggest barrier is the culture and stereotype, since in Eastern Asian countries like Japan, South Korea, China and Vietnam, families and society have the tradition of respecting intellectuals, and in this atmosphere, people are willing to receive higher education anyway even with the cost of lower salary because higher education will give them better social position (Date, 2013). Finally, sub-replacement fertility might also be a predictable tendency which might be able to mitigate the problem. With decreasing fertility rate and less population in Japan in the next decades, we can see that there will be fewer students taking part into competition every year, which might also relieve the pressure on both demand and supply side.

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