
The Ph.D. as a Professional: Current Status and Issues concerning the Early Careers of Doctorate Holders

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This paper revisits and clarifies the issues relating to the early careers of doctorate holders and the reform of graduate education, while at the same time considering the significance of doctorate holders as a particular group of professional. In this paper, initially, we introduce the condition of the labor market for doctorate holders, and perform international comparisons to demonstrate that the state of the post-doctoral market in Japan is not particularly unusual. We also introduce the idea that a new paradigm is emerging among doctorate holders, which differs from the conventional perspectives both of doctorate holders and professionalism. This new paradigm, which expresses itself in the phrase “one profession, multiple careers,” categorizes the doctorate not simply as a part of one’s educational history, but in fact as a whole new area of professional. Estimating the lifelong rate of entry to Ph.D. programs in Japan from this perspective shows that the rate is not in fact falling significantly, and that it is perhaps premature to link the superficial falling rate of progression to doctoral programs to a process of readjustment in supply and demand within the market for doctorate holders.

I. Introduction

Since the beginning of the 2000s, the decline in employment rates of doctoral graduates in Japan has been raised as a policy concern. It has been taken up by the newspapers, and become a common subject of discussion. This paper attempts to explain the problem from an academic perspective. For this reason, in addition to clarifying the situation in regard to the early careers of doctorate holders, we also consider the concept of the “Ph.D.¹ as a professional in itself.”

The title of this paper (“The Ph.D. as a Professional”) compares doctorate holders to traditional professions, and may give rise to some confusion. This concept is not, however, the creation of the author. The 2003 revisions to Japan’s Labor Standards Act made possible the fixed-term employment of “employees with a high level of expert knowledge, skills or experience” for up to five years. The specific range the article should be applied is defined as criteria set by the Minister of Health, Labour and Welfare, based on “the provisions of Article 14, paragraph (1), item (i) of the Labor Standards Act.” It is particularly symbolic that “doctorate holders” are cited at first in said provisions, ahead of certified public accountants, doctors, attorneys and other traditional professions. Holding a doctorate is essen-

¹ Within Japanese educational statistics, students leaving a doctoral program without a degree at the end of the fixed period are counted as having “completed” a doctorate, and are therefore treated the same as doctorate holders. Students leaving without a degree are equivalent to Ph.D. candidates or the so-called “All But Dissertation,” but there is no official Ph.D. candidate system in Japan.

tially an expression of one's educational history; it is not a certification for employment or something that defines one's profession. Legally, it has always been necessary to categorize "doctorate holders" not as researchers or university professors, but as an independent profession, alongside other traditional professions.

Realistically speaking, we are faced with a situation in which it is necessary to consider doctorate holders as a profession in themselves, not simply as one issue within a labor market divided according to academic background. The core of this paper has managed to clarify this issue. Subsequent to the "academic revolution" in the 19th century, when universities engaged internally in research activities in the natural sciences and began to train new academics to succeed existing teaching staff, graduate schools² began to train researchers and university teaching staff, in the same way as medical schools train doctors. At such a time, the topic of doctorates was studied from an educational perspective, while the market for researchers or university professors was studied from a perspective of their labor market. Nowadays, however, it has become difficult to analyze doctoral education and professional employment independently of one another.

Today, doctorate holders are not only researchers and university professors. They are expected to play roles across a wide range of fields within society, and the fact is that those fields are increasingly multi-faceted. Graduate schools, too, are not only educational institutions; they also play a second role as a country's central agencies of scientific and technological enterprises. This attribute was fixed during the history of the development of graduate schools at American universities, and it is now impossible to ignore the fact that doctoral programs play a role as research agencies, and that doctoral candidates, while students, are, at the same time, already functioning as researchers, or at least in the role of research assistants. When considering the market for researchers, it is therefore necessary to include doctoral candidates as part of this market.

In addition to this, Japan currently faces a situation in which the employment rate among doctorate holders is low, and increasing numbers are either becoming post-docs or remaining unemployed.³ When considering employment for doctorate holders, we must

² Japan's current graduate school system has a superficial similarity to U.S. graduate schools in that it offers three types of education: master's programs, Ph.D. programs, and professional school programs. Professional schools in Japan are part of a new system, however, and while they are similar to those in the U.S., they are not the same. Up until around 40 years ago, people completing master's degrees went on to Ph.D. programs, and for this reason many Ph.D. programs are still divided into "the first cycle" and "the second cycle." Because of this history, "the first cycle" of Ph.D. program and master's programs both tend to be conventionally referred to as "master's programs," where many people take master's degree. "The second cycle" of Ph.D. programs are called "doctoral programs." Traditionally, many people taking a master's degree have gone onto a wider range of professional employment, while doctorate holders tended to go on to research and university teaching posts. Given this history, this paper focuses for research purposes on the analysis of both such doctoral programs with two cycles and a few of unified doctoral programs that are not divided into two cycles.

³ In general, post-doctorate (post-doc) refers to a person who has taken a doctorate, and spends some further time training in research before entering stable employment. Such people may also be

consider not only the employment engaged in immediately after the acquisition of the degree, but also any employment reached after further, post-doctoral study, meaning that education and profession cannot be easily separated.

In other words, there are limits to the analysis of doctoral training, the labor market for doctorate holders, the labor market for researchers and university professors, and the labor market for post-docs, if these are separated from one another. The situation is not explained by the frameworks of theories of traditional professionalism and of the labor market for researchers. This paper seeks to apply data, and recent debates, to these areas, and to clarify and bring a contemporary view of the labor market for doctorate holders.

II. Where Are the Problems in the Labor Market for Doctorate Holders?

1. What Is Being Seen in the Market for Doctorate Holders

Firstly, we need to establish the basic state of the labor market for doctorate holders. There is, however, very little to be understood from the data relating to doctorate holders. Compared to that available in Europe and the U.S., there is simply a significant lack of data. The available fragments of data are concerned with the low rate of employment of people attaining doctoral degrees, and the increase in post-docs.

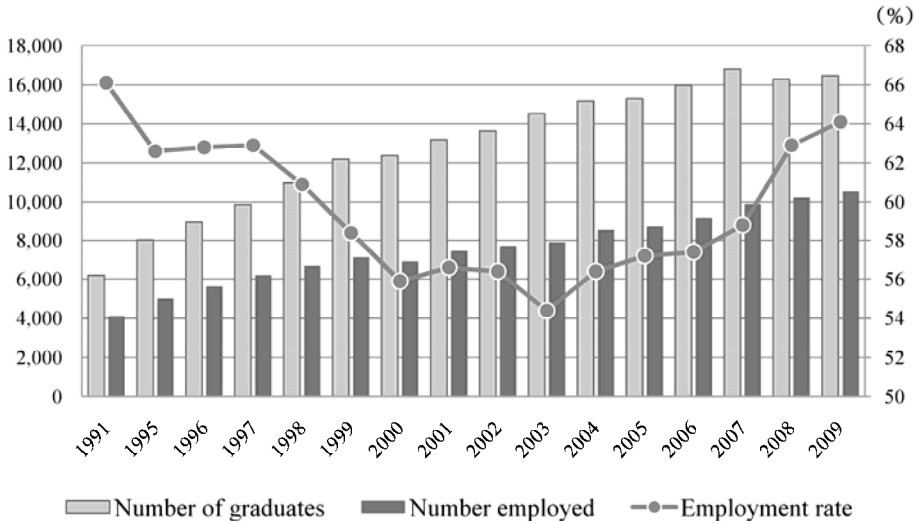
Figure 1 shows the trend in employment of doctorate holders, immediately after they obtain their degrees. The employment rate among students completing doctoral degrees fell in the 1990s, alongside the increase in students taking doctorates, and had dropped to 54% in 2003. This level was lower, not only than that of master's degree holders, but also of students completing undergraduate programs.

In terms of employers of doctorate holders, since there is not sufficient data within the School Basic Survey, a range of further additional surveys have been carried out. Cumulative data on students completing doctoral programs between FY 2002 and FY 2006 has been published (NISTEP 2009), and shows that 11% of doctorate holders were immediately employed as full-time teaching staff in universities, while 1.4% took up research posts outside universities. 14.7% of doctorate holders entered post-doctoral employment.⁴

The situation for post-doctoral fellows has been surveyed since FY 2005 by the Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau, at the Ministry of Education, Culture, Sports, Science and Technology (MEXT), in cooperation with MEXT's National Institute of Science and Technology Policy (NISTEP), allowing cla-

referred to as post-doctoral research fellows. In Japan, recently, the numbers of doctorate holders whose initial careers involve part-time research, and of unemployed doctorate holders, are increasing, and there is a tendency to refer to such people also as post-docs. This paper uses the term "post-doc" to refer to people who have obtained a doctorate, and are engaged in research training prior to entering stable employment, including those in part-time or fixed-term posts.

⁴ The School Basic Survey and other government official statistics do not include statistical surveys of post-docs in their data relating to doctorate holders.

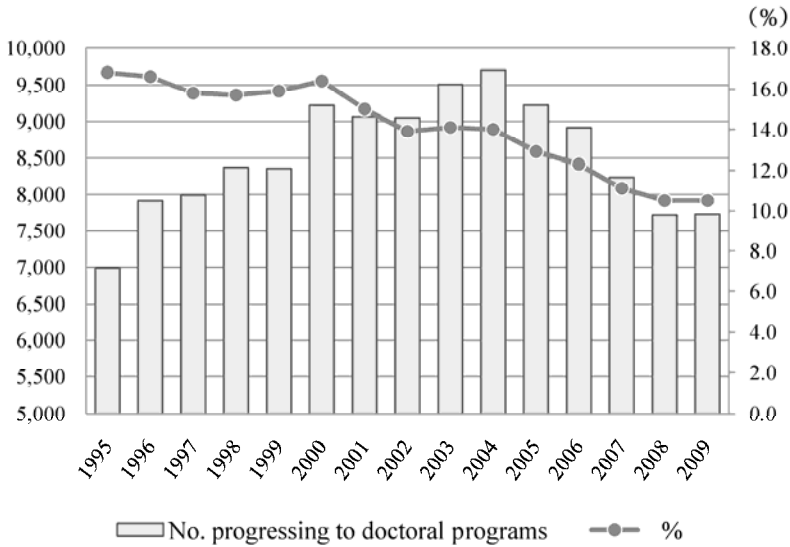


Source: Annual School Basic Survey.

Figure 1. Employment of Doctorate Holders (all subject areas, immediately after completion of degree)

rification of the situation since FY 2004 (NISTEP & Knowledge Infrastructure Policy Division, Science and Technology Policy Bureau, MEXT, 2008). According to this report, the number of post-doctoral fellows in Japan rose from 14,854 to 15,496 and 16,394 respectively between FY 2004 and FY 2006. The number of post-doctoral fellows over the age of 35 is gradually increasing. Divided into areas of research fields, the life sciences represent the largest proportion by far, but the humanities are also significant enough in scale to mean that they cannot be ignored.

Let us take a look at the market for university professors. According to MEXT's survey of teaching staff appointments (part of its School Teachers Survey), among all appointments to university teaching staff (other than transfers between universities) in FY 2006, 14.4% of appointments were of newly graduated staff (including doctorate holders). Newly qualified doctorate holders are clearly a minority within the market for university professor appointments. Past figures, incidentally, show that the proportion was 20.3% in FY 1988, and 17.4% in FY 2000, indicating a falling trend in new doctorate holders being appointed as university teaching staff immediately after graduation. On the other hand, the proportion of appointments to university teaching staff at age 35 or older was 29.3% in FY 1988, 45.2% in FY 2000, and 48.8% in FY 2006, demonstrating that appointees are getting older. In FY 1988, 30.9% of these had prior experience in either the private sector or public service. This figure rose to 33.7% (in FY 2000) but then fell noticeably to 24.1% (in FY 2006).



Source: Annual School Basic Survey.

Figure 2. Progression to Doctoral Programs by Students Completing Master's Programs

This figure could lead to the assumption that increasing numbers of post-docs are being appointed, but there is no data to demonstrate this fact.

Viewed from the supply side, only slightly more than 10% of doctorate holders progress directly to being university teaching staff. This equates to no more than some 10% of appointments. It could be said that post-doctoral work serves as a diversion, but since only 14% of doctoral graduates proceed to post-doctoral studies, even taking into account this “diversion,” it is difficult to see a strong connection between doctoral degree’s program and the market for university teaching staff. In other words, whilst the labor market for doctorate holders and the university professorship market are related, they definitely cannot be seen as the same.

This data not only indicates that even those achieving a doctorate find it difficult to become university professors, but that the overall rate of employment for such people is low, and it is not easy for them to find employment in other industries or professions. This is a serious problem for students thinking about whether to proceed to doctoral programs, and is likely to cause a reduction in the number of students applying for doctorates, since it makes the qualification less attractive. Figure 2 shows the trend in students proceeding from master’s to doctoral programs. The proportion of students entering doctoral programs peaked in 2000, while the number of students peaked in 2004, and both have been in decline ever since.

Multiple theories emerging from this situation. These theories include the ideas that

the scale of doctoral programs has always been too large, or that an expansion in scale of doctoral programs has led to a drop in quality in the students participating in them. Furthermore, in contrast to the labor market for doctorate holders in other countries, it is often said that Japanese companies do not traditionally appreciate the value of a doctorate. On the other hand, we hear from private sector companies that Japanese doctoral programs are strongly biased towards the training of university teaching staff, and that doctorate holders are not suited to careers in the private sector. The need for post-doctoral researchers in the research workforce is also emphasized from the perspective of research enterprises. From the perspective of the individual's career, post-doctoral research can be seen as a process of achieving independence, but on the other hand, it can also be seen as merely playing a role in supply/demand adjustments within the labor market. How should we understand the situation surrounding the labor market for doctorate holders, and the labor market for university professors?

2. The Reality of Doctorate Holders throughout the World

Within Japan, it is a common perception that graduate schools in Europe and the U.S.—particularly in the U.S.—are more successful than those in Japan, and that doctorate holders are playing active roles in a range of fields throughout society. It tends to be assumed that the problems discussed above are unique to Japan. This, however, is not necessarily the case. Unemployed doctorate holders and post-docs working under poor employment conditions are sometimes derogatively referred to as “highly educated *freeters*” (*freeter* is a recently-coined Japanese word meaning a young, low-skilled and non-regular worker). In Europe, people in similar situations are referred to sometimes as the “academic proletariat” (EURAB 2002).

The difficulties within the labor market for doctorate holders are similar around the world. Nature Magazine ran a special feature on the problem of doctorate holders around the world in Spring 2011. Taylor (2011) points out that “Most doctoral-education programmes conform to a model defined in European universities during the Middle Ages,” and calls for change or closure (“Reform the Ph.D. system or close it down”). Cyranoski et al. (2011) described the situation surrounding doctoral education in Japan, the U.S., Germany, China and other countries. It is clear that doctoral programs in Japan are in a serious position, and that the outlook within the Japanese doctoral labor market is pessimistic, but this article explains that such problems exist in doctoral programs in many other countries, to a greater or lesser degree. Nature Magazine publishes cutting-edge research, so the inclusion of these articles indicates the extent to which traditional doctoral programs are facing difficulties worldwide, and how unrealistic it is for all doctorate holders to become researchers.

Since 2005, the OECD has been engaged, in cooperation with EUROSTAT and UNESCO, in the Careers for Doctorate Holders (CDH) Project, which aims to collate data on the careers of doctorate holders in formats that allow international comparisons to be

made. There is much of interest in the project's first set of results (data from 2001-2003),⁵ published in late 2007 (Auriol 2007).

CDH shows the unemployment rate and inactivity rate (the inactive proportion of the whole population) among doctorate holders. The inactivity rate and unemployment rate among doctorate holders is lower than the average across all educational backgrounds, but not necessarily lower than among graduates of bachelor's degree programs. In fact, the inactivity rate is higher among doctorate holders than among university graduates in Australia, Canada, Germany, and Switzerland. In the U.S., the rate of unemployment among doctorate holders (2.9%) is almost the same as that among bachelor's degree holders (3.0%), while in all of these other countries, the unemployment rate among Ph.Ds is lower than the average for all educational backgrounds, and lower than that among the university graduates.

Doctorate holders work in a broad range of fields. In the U.S., 29.7% of doctorate holders are university teaching staff. In Canada, this figure is even higher, at 37.1%, but these two countries have a high proportion of doctorate holders in university teaching posts, with other countries recording lower figures. In Germany, for example, the same as in Japan, doctorate holders include medical doctors, and therefore the proportion of doctorate holders working in medicine is high, while the percentage in university faculty members is only 6.6% (lower than in Japan). These figures merely reflect differences in the graduate school system, however; there is no particular significance in the scale of the figures. What is important is the fact that there is diversity within the employment of doctorate holders in all countries.

In addition to this, the average age at which doctoral degrees are attained in the U.S. is 36.8 for men and 38.1 for women, which is higher than in Germany (33.2 for men, 32.3 for women). This differs, of course, according to subject, so that in the U.S., for example, the average age at which men become medical doctors is 40.2, while in the social sciences it is 40.1. Students in the U.S. also take the longest to achieve their degrees. The average for men in Canada is 69.0 months, whereas in the U.S. it is 101.1 months (for women, these figures are 72.0 and 103.5 months, respectively).

In the U.S., therefore, not only does it take a long time to achieve a degree, the average age of people taking these degrees is high. This issue is frequently the topic of debate within the U.S. According to long-term data relating to American doctorate holders (Thurgood, Golladay, and Hill 2006), the increase in age of people attaining degrees took place since the 1980s, and has been particularly noticeable in the humanities. Furthermore, the time between graduating with a bachelor's degree and attaining a doctorate averaged 10.6 years, for degrees taken in the late 1990s (9.0 years in engineering, 11.0 years in social sciences, 20.0 years in education, etc.), which is longer than it used to be.

In regard to the relationship between doctorates and the market for university profes-

⁵ CDH implemented further surveys in 2010, and it is anticipated that more detailed survey results will be published in the future.

sors, Nerad and Cerny (1999) have continued with surveys tracing careers of doctorate holders. Within this, the study compiled data on the time taken between attaining a doctorate and receiving tenure, among those of the cohort taking doctorates between July 1982 and June 1985 who became university professors. According to Nerad and Cerny (1999), the age at which students entered graduate school for molecular biology was 22.8, while it was 23.7 for English, and the time required to achieve the degree was 5.9 years in molecular biology but 8.9 years in English. The period of time between receiving the degree and achieving employment on a tenure track was 4.1 years in molecular biology and 1.1 years in English, and the age at which academics achieved tenure track employment was 32.8 in molecular biology, and 33.7 in English. The time taken subsequently to achieve tenure was 6.1 years in molecular biology and 5.9 years in English, and therefore the age at which tenure was achieved was 38.9 in molecular biology and 39.6 in English. In other words, compared to molecular biology, where post-doctoral work subsequent to the completion of a doctorate appears to be becoming the norm, in English, students appear to take longer to attain their degrees, and then enter employment directly after that, rather than engaging in post-doctoral research. For this reason, the age at which academics are hired to a tenure track, and the age at which they actually achieve tenure is roughly the same in both fields.

This data is based on average values, and there is a need for caution, since there can be disparity. While the data shows that some people become university teaching staff immediately after completing a degree, it also suggests that many people are not in this situation. Furthermore, only 18% of doctorate holders in molecular biology and 57% of doctorate holders in English had achieved tenure within 10 years after their degree, while the data shows that a further 16% in molecular biology and 6% in English were still employed on a tenure track. Not everyone who receives a doctorate is able to work in a university in the U.S., and even 10 years later, it is not unusual to find people who are in uncertain employment situations.

What this data shows is not simply that a doctorate is the terminal in the direct linear educational path that runs primary education – secondary education – undergraduate degree – master’s degree – doctorate. It is not, however, necessarily the case that people graduate with a bachelor’s degree or a master’s degree and go straight into a doctorate. In many cases, people walk a somewhat winding road before entering a doctoral program,⁶ taking a degree requires time, and there are many diverse potential employers subsequent to the attaining of a doctorate. It is certainly not the case that a doctorate is a “passport to the university professorship market.” Even for those entering the profession, it can take time to actually become a university professor.

In other words, when considering the labor market for doctorate holders, or for uni-

⁶ In the U.S., in addition to people who progress to graduate school after taking an undergraduate degree and then working for a period of time, there are also significant numbers of people who enter Ph.D. programs after completing master’s degrees that are not necessarily designed to lead to doctorates, or graduating from professional schools (Thurgood, Golladay, and Hill 2006).

versity professors, we must not consider only the data relating to what happens immediately after the acquisition of a degree. In Japan, since the School Basic Survey only collects data immediately after the completion of a degree, our understanding has been passed on this information. If we assume, however, that it takes time for the career of a doctorate holder to stabilize, the data from the School Basic Survey may be seen as under-estimating the careers of doctorate holders. This is also the case with small figures in the survey of teaching staff appointments, in which the definition of “new graduates,” makes it seem as though a Ph.D. does not lead to employment as teaching staff. In fact, however, the age of those being hired is increasing, which may suggest that an increasing number of doctorate holders are hired after a lengthy career detour following the completion of a doctoral program.

In order to hold a debate as extensive as that in the U.S. and Europe, we need to collect and analyze data not only from students who have just completed degrees, but also throughout the lifetime of a doctorate holder’s career. At this point, we do not have access to sufficient data of this sort. The aforementioned NISTEP report (2009) offers a small amount of data, however. For example, a large proportion of all students completing doctorates between FY 2002 and FY 2006 were aged 27 or 28, but after that numbers reduce gradually, giving a so-called “long-tailed” distribution, and indicating that there is no defined scope within which the age of doctorate holders is concentrated. The median is 31 years, which is young in comparison with the aforementioned OECD survey. Of those who entered post-doctoral posts on completion of a doctorate, 7% were working full-time as university teaching staff within one year, and 24% within five years. In the meantime, of those who took up non-regular work upon completing a doctorate, 18% were working full-time within one year, and 36% within five years. From this data, we can speculate that initial employment entered by doctorate holders in Japan is often transitional, but that with the passage of time, this employment stabilizes, and a significant number of such people move from post-doctoral training to employment in university teaching.

After all, available data, focusing merely on what happens to Japanese doctorate holders immediately after their graduation, may excessively emphasize the negative aspects, i.e., they have difficulties not only in becoming a university professor but also in finding employment in other industries or professions under circumstances where overall employment rates are low. However, such data is extremely specific and the structure of the labor market for doctorate holders in Japan is, in fact, the same in many ways to that in Europe and that in the U.S.

III. Reviewing the Labor Market for Doctorate Holders

1. The Issue of Post-Docs, and the Diversification of Career Paths for Doctorate Holders

Even so, there are many problems with the labor market for doctorate holders. In particular, such problems tend to be concentrated, and distorted, within the post-doctoral sector.

There are some differences with post-doc problems, such as the scale, and the period at which they become obvious, but these issues are becoming more important topics of debate in Europe and the U.S., too.

Historically, the U.S. has had a high proportion of post-docs, but the debate occurred first in the UK and Europe. In the UK, policy discussions related to the problem of post-docs first arose in the early 1990s, and as a result a significant amount of experience has been accumulated in this area. The Human Frontier Science Program (HFSP) and the European Science Foundation (ESF) held a conference in November 2001, which identified the fact that in many countries, post-docs were not infrequently treated as long-term temporary workers or “permanent post-docs” with poor remuneration, security and benefits, and called for improvements to this career structure (HFSP 2002). At the same time, the study found that regardless of the relevance or otherwise of their career to research activities, people who had been educated in science and technology were to be found in a broad range of fields, including industry, schools, government, media, business, etc.

Based on the results of this conference, the European Union Research Advisory Board (EURAB) compiled a report on the subject of human resources within science and technology in November 2002 (EURAB 2002). The report warned that graduate students needed to find a bridge to careers other than in research, and stated that in order to do this, students needed systematic training, in subjects including intellectual property, ethics, communication skills, etc. Furthermore, as the number of post-docs increase, the report indicates that not only are poor employment conditions becoming the norm, but also that the number of such posts is increasing, leading to a need for reformation of this system.

In Japan, too, the Committee on Human Resources of MEXT’s Council for Science and Technology referred to the HFSP conference report mentioned above in its second proposal, dated 2003 and entitled “Fostering and Securing Research Personnel to Improve International Competitiveness.” The proposal noted, “There is the need to establish diverse career paths in which doctorate holders are treated appropriately.”

There is little expectation that university teaching posts will significantly increase in any country in the future, and as such there is a tendency to debate the fact that there is an “excess supply” of doctoral students and post-docs. On the other hand, however, post-docs are a vital, central force within research activities, and many people would dispute the idea that there are too many such qualified people, based on an awareness that doctorate holders and post-docs are at the cutting edge of transferring knowledge from the academic research to the industry. Within these opposing debates, the discussion has become one of how to diversify the career paths of doctorate holders, rather than the issue of their employment.

2. From a “Pipeline Model” to a “Tree Model”

In the background of this debate regarding the change from employment issues to the issue of diversifying career paths lie changes in the way the labor market for both doctorate holders and university professors is viewed. The underlying theme of the discussions at the

HFSP conference was the change from a “pipeline model to a tree model,” which backs up these theories.

The pipeline model emerged in the 1980s in the U.S., during policy debate and research relating to securing human resources in science and technology for the future. The selection of professions by university and graduate school students, and the selection of fields of study by university students, are key in ensuring both quality and quantity within such human resources in science and technology. The debate began to embrace the idea, however, that an interest in science and technology must be strengthened among children further “upstream,” in elementary and junior high schools. The “pipeline” analogy was used to express this awareness. If the country is to retain scientists and engineers, it is no use to merely widen the pipe at the end, or loosen the valve. Rather, the flow must be increased from upstream. The supply of human resources can be adjusted through opening and closing the valve, but in principle, it is a one-way, cascading flow.

At the HFSP conference, participants expressed objections to this model of training. The pipeline model has as its final objective a small number of academic leaders, and those who leave the field to pursue other areas part way along are considered “failures.” Industry researchers appear to be “imitations” of university professors, and post-docs can appear to be penalized as second-rate human resources. The employment of graduate school students or post-docs seems to come down to how hard each individual works at these issues, and if such a person cannot find employment, it is seen as a sign that they are not capable, or not working hard enough.

In fact, however, it is necessary to understand that the career options for science and technology graduates are more diverse and multi-faceted, and realize that a one-way style of training model is not sufficient, if we are to broaden the range of training given to people in scientific and engineering fields, and respond to the diversification of need within the knowledge-based society, as well as develop careers for young researchers. This is where the metaphor of the “tree” emerges. A tree has roots and branches, as well as a trunk to connect the two, and expresses the fact that people who are educated and trained in different ways may end up in a range of professions (the “leaves”). Those careers may be outside the academic world, and will extend into the non-academic world, in areas such as industry. They may be strongly connected to the worlds of science and technology, or perhaps not so strongly. The “tree” model sees a career path not as a single line or a hierarchy (although there may often be a spiral arrow pointing to the top of the tree), but rather allows for coming and going between a range of professions, and allows a career to be seen as diverse and fluid. This debate has changed the definition of the doctorate holder/post-doc issue from one of training academic researchers, into one of training human resources in a diverse range of fields.

3. One Profession, Multiple Careers: Changes in the Career Perspectives of Doctorate Holders

Changes to the view of diversifying career paths for doctorate holders and post-docs, as expressed by the tree model, inevitably require changes in how we view the relevant professions. Typically, this requires a change in the image of university professorships and the research professions. In other words, if we assume a tree model, professorships and research professionals will no longer appear “unique,” but rather become simply one of the potential professions a doctorate holder or post-doc can aspire to, and the scope of range of such professions will expand significantly.

The European Commission Report “Researchers in the European Research Area: One profession, multiple careers” (European Commission 2003) provides a symbolic glimpse of a harmonious blend of diverse knowledge professionals, including doctorate holders, post-docs, university professors and researchers. The report’s subtitle (“One profession, multiple careers”) skillfully expresses the ideal of professional employment for doctorate holders, as symbolized by the tree model.

This sort of awareness of problems is increasing in other arenas. Conventionally, “doctorate holders” have been referred to just as that—an expression of their educational history—but there are now many examples of professions being referred to using names that express “one profession, multiple careers.” The CDH project describes it in this way: “Doctorate holders, being the highest educated group, are considered most likely to contribute to the advancement and diffusion of knowledge and technologies. As such, they often are seen as one of the key actors behind the creation of innovation and knowledge-based economic growth.” The entire picture must be considered—not only those working within the labor markets for doctorate holders or university professors, but also the process of training doctorate holders, and those holders who are active in diverse careers.

The Carnegie Foundation in the U.S. implemented the Carnegie Initiative on the Doctorate, a piece of research into the training offered by graduate schools, which arose from a similar awareness of issues. The resulting publication is entitled “The Formation of Scholars” (Walker et al. 2008). The words “formation” and “scholar” are symbolic here. “Scholar” conventionally means someone with academic knowledge. In this book, however, graduate school education and degrees such as a Ph.D. are considered as waypoints on a journey into a wide range of destinations. Each of these “destinations,” representing a variety of professions, is referred to as becoming a “scholar.” In other words, the professional as a whole is referred to as being a “scholar,” in as much as it represents “one profession, multiple careers.” This is certainly not the traditional meaning of “scholar,” but in fact provides a whole new definition of the term.

The debate within the Carnegie Initiative on the Doctorate reaches as far as the actual attributes of the profession. Doctoral education, which is required to train “scholars,” involves the communication of knowledge that could almost be called “secret arts” and an understanding of moral obligations as well as intellectual obligations. This is represented by

the expression “formation.” “Formation” means not only acquiring specialist knowledge, but also developing the personality of a scholar, and training habits of heart and mind, as well as playing a role in academe and society. In other words, it means acquiring both knowledge and the scholar’s professional identity. This is secondary to the theory of the traditional professions, but a scholar is equivalent to the traditional professions such as a cleric, legal specialist or doctor. They will not have been trained in a professional school, but rather in a graduate school where they were able to acquire a Ph.D.

These discussions all converge in the area of linking educational attainment (in the form of a Ph.D.) to diverse professions, without being restricted to university teaching or research. The concept on which they are based is that of treating a whole range of professional labor markets as a single entity. This is the embodiment of the concept of “one profession, multiple careers,” and provides an alternative image of “professionals” to the traditional view. Through this, we are convinced that the “doctorate holder,” which has conventionally been nothing more than an expression of educational history, is in fact a “professional with a high level of expertise,” equivalent to the traditional professions.

IV. Reviewing the Japanese Doctorate

1. The Labor Market for Doctorate Holders in Japan

Even in Japan, the subsequent careers of doctorate holders and post-docs appear to equate to “one profession, multiple careers.” As we have already seen, and similarly in Japan to the situation in Europe and the U.S., there is a significant range of ages at which candidates complete a doctorate, and post-docs are on the increase. The age at which people become university teaching staff is increasing, and rather than becoming a faculty member on completing a doctorate, many people engage in other professions first, only entering teaching at a later stage. Perhaps we should be looking at a person’s professional experience, and their experience during a doctoral program, as joint parts of the composite network that goes to make up the career of a doctorate holder. Figure 3 shows a type of doctorate holder in this style. It assumes that the labor market for doctorate holders, as well as those for researchers and university professors and other labor markets all form the labor market for “one profession, multiple careers.” In Japan, there is an extremely high employment rate for students completing master’s degrees (including those who are employed after completing only the first cycle of a doctoral program), which indicates success within the educational program. As a result, the “recurrent” flow of working adults with a master’s qualification back into education in the form of entry to a doctoral program must be considered. Furthermore, if consideration of the role of students on doctoral programs as researchers is also included, in the wider definition, it is perhaps appropriate to analyze the labor market for doctorate holders as including holders of master’s degrees who may in the future proceed to doctoral programs as part of that overall labor market.

In order to analyze this labor market for doctorate holders, it will be necessary to

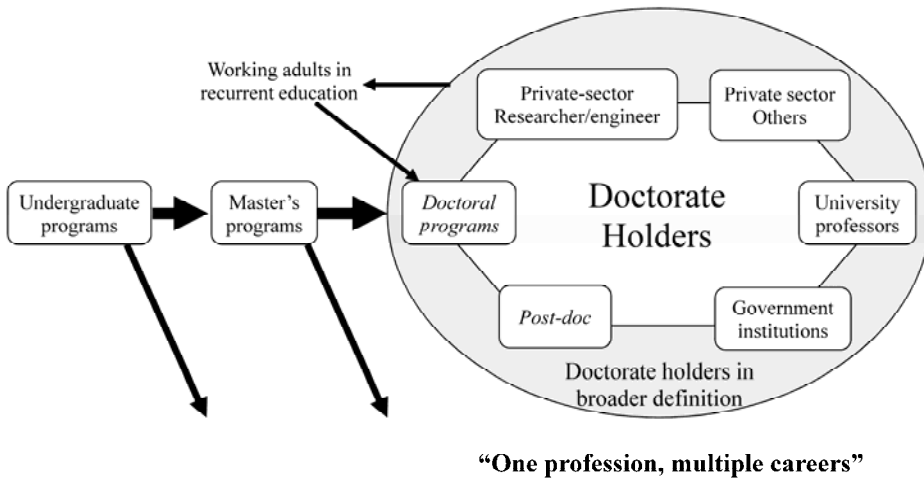


Figure 3. An Alternative Image of Doctorate Holders

collect and analyze data on the entire scope of the careers of doctorate holders in Japan, too. If this can be achieved, we will be able to ascertain the rate of employment of doctorate holders “X” years after completion of their degrees. Unfortunately, no such all-embracing survey has been implemented in Japan, and although fragmentary data is available.

As we have already discussed, the range of ages at which Japanese doctorates are completed shows an extremely broad distribution. Clearly, it can be assumed that part of this is explained by “recurrent” education—people who have entered employment, but then returned to education within a doctorate program. Furthermore, according to the School Basic Survey, 21.7% of students on doctoral programs in 2003 were people who had already had careers—and this had risen to 34.1% in 2008. Analyzed by field of study, a particularly high proportion of working adults had returned to education in the field of healthcare, but there were also high rates of recurrent education within engineering and agriculture. The School Basic Survey only began to release details of how many working adults had returned to education in 2003, but in fact MEXT has been collecting this data since the end of the 1980s, and according to these figures, the proportion of working people in graduate education has been rising since the mid-1990s. By the year 2000, it was already around 15%.

This fact is less due to the concept that a doctorate is the connecting pipe between a master’s degree and a profession, and more an indication that a doctoral program is part of the recurrent educational process that is forming the same human resources pool as pursuing a profession. If this is the case, then it is inappropriate to estimate the proportion of people entering a doctoral program by looking at the rate of direct progression from a master’s course.

2. Has the Rate of Progression to Doctoral Courses Fallen?

Fortunately, the School Basic Survey has published the age distribution of people entering doctoral programs since 2003. These figures show a broad distribution in the age ranges of such students. During the five years between FY 2003 and FY 2008, these figures show a distinct rise in age. In other words, rather than entering doctoral programs immediately after completing master's degrees (or undergraduate degrees, in the case of medical or veterinary sciences), it is natural to assume that an increasing number of people are entering doctoral programs at some point during their careers.

In order to consider the rate of entry (progression) to university programs as a part of life-long education, we need to look not at the progression of people from master's program directly into doctoral programs, but rather the entry into further education programs by cohort. Since an accurate, lifelong cohort-based rate of entry is not saturated until relatively high age levels, realistically we will need to estimate the expectation of lifelong rate of entry by calculating the sum of rates of entry according to age at a particular point. In other words:

Suppose that the number of people entering education is x_i out of a population of p_i at age i in year t ,

$$\text{the expectation of lifelong entry rate (in year } t) = \sum x_i/p_i.$$

That is, the lifelong entry rate in year t is expected by the sum of x_i/p_i for all i . Table 1 shows a collation of the major data estimates.⁷

According to the estimation, there is a high possibility that the rate of progress from master's to doctoral degrees has been underestimated. The percentage of students progressing directly fell 3.6 points in five years—from 14.1% to 10.5%—but the expected lifelong rate of entry to programs fell from 76.8 to 71.5 people per 10,000, which represents a smaller range. Since the units of measurement for direct progression and lifetime entry are not the same, it is difficult to make a direct comparison. For this reason, if we convert both to a rate of change in order to compare them, we see that the direct rate of progression has changed by -0.26, while the expected lifelong rate of entry has changed by -0.07, indicating that the direct progression rate has fallen by a larger amount.

Furthermore, the sudden recent drop in the direct progression rate is thought to have been caused by the future increase in entry by working people, and it is estimated that this phenomenon (the reduction in direct progression) will result in a temporary lowering of the expected lifelong entry rate, until such time as the future increase is reflected in the data. Given this, there is a high possibility that the most recent expected lifelong rate of entry may have been underestimated compared with the lifelong rate of entry by cohort.

⁷ Data collated by age in the School Basic Survey is new and not cumulative. Sufficient scrutiny of estimation methods, therefore, is not possible. At present, these indicators are therefore provisional.

Table 1. Changes in the Major Data Relating to Entry to Doctoral Programs

	2003	2008	FY 2008/ FY 2003	Rate of change between 2003 and 2008*
Number of people entering doctoral programs	18,232	16,271	0.89	-0.11
Number of people entering doctoral programs directly from master's programs	9,507	7,722	0.81	-0.19
Percentage of working adults entering doctoral programs among all entrants	21.7	34.1	1.57	0.57
Percentage of people entering doctoral programs over the age of 30 among all entrants	33.0	40.3	1.22	0.22
Rate of people entering doctoral programs directly from master's programs	14.1	10.5	0.74	-0.26
Expected lifelong entry rate to doctoral programs (per 10,000 people)	76.8	71.5	0.93	-0.07

Sources: Estimated from annual School Basic Survey, and the population estimated by the Statistics Bureau, the Ministry of Internal Affairs and Communications.

Note: *Rate of change = (values for FY 2008 – values for FY 2003) / values for FY 2003

Using the rate of change allows analysis of the factors involved in the change. If the rate of lifelong entry $=\alpha$, and the rate of direct progression from master's courses $=\beta$, then the proportion of direct progression $\rho=\beta/\alpha$. Here, we can calculate that $\beta=\alpha\cdot\rho$, in other words, $\Delta\beta/\beta=\Delta\alpha/\alpha+\Delta\rho/\rho$.

α and β cannot be estimated using the same dimensions, but the rate of change estimated as shown above allows us to show that:

$$\Delta\beta/\beta (-0.26) = \Delta\alpha/\alpha (-0.07) + \Delta\rho/\rho (-0.19)$$

This gives an estimated change of direct progression rate ($\Delta\rho/\rho$) of -0.19. The "change in rate of direct progression" could also be considered to be the "effect of delaying entry to doctoral programs" (by changing the plus and minus sign). As a result, it can be estimated that 73% of the drop in students moving directly from master's to doctoral programs between 2003 and 2008 is explained by the effect of delaying entry to doctoral programs.

This suggests that the view that "the reduced appeal of doctorates is leading to reduced entry to doctoral programs" is not necessarily correct. In the short term, we may be

seeing a certain amount of adjustment in supply and demand in the market for doctorate holders (increase in doctorate holders → difficulty in doctorates finding employment → reduction in people progressing to doctoral programs), but it is not the case that the rate of progression to doctorates has dropped significantly in the true sense. Rather, we must understand that the market for doctorate holders in Japan has been gradually merging into one that equates to “one profession, multiple careers.”

V. Doctorate Holders: Professionals in What?

1. Doctorate Holders and Traditional Professionals

If it is the case that a view of doctorate holders as a new breed of professionals is emerging, then our next problem is to identify the profession attributes that define doctorate holders, and understand what sort of training they should be given. Firstly, let us start by comparing doctorate holders with the traditional professions. The CID report “The Formation of Scholars” states that a “scholar” has the ethos of traditional professions, and sees their training as similar to that within traditional ones. In general, the training of a professional emphasizes the establishment of their identity, and their assimilation to the professional community. In order to be a professional, an intellectual level must be maintained, and behavior in line with the responsibilities of the professional is required. These efforts allow the autonomy of the community, which are acknowledged by society at large. This image of the traditional professional can be applied equally to a scholar.

Aspects that clearly differ from traditional professions include, firstly, qualifications. A doctorate (Ph.D.) is effectively no more than a signpost indicating the holder’s educational history, and is not a professional qualification. It may allow the monopolization of a title, but it does not indicate monopolization of a particular job, and given the range of jobs done by doctorate holders, nor does it define the scope of work that should be monopolized.

Secondly, there is the level of doctorate holders’ sense of belonging. Medical doctors, attorneys and other traditional professionals have a strong sense of affiliation to a particular professional community, which, it is often pointed out, can on occasion surpass their sense of affiliation to the organization for which they work. Doctorate holders, on the other hand, are different to this. Even university professors, who are the traditional doctorate-holding profession, do not tend to have a sense of belonging to their own professional community (academic society) that is greater than their sense of affiliation to a university. University faculty, particularly those who are engaged in research, are traditionally unique in that they have a dual affiliation—to their professional community (academic society) and to the organization for which they work. In other words, before science was included in university curriculums as a result of the academic revolution, scientists were all amateur scientists, and their scientific enterprises had no bearing on their organizational affiliation. As scientists began to choose to work as university professors, however, as part of the academic revolution, they effectively chose to belong both to an academic society and to a university. Uni-

versity professors are “marginal people,” who must, through their activities, hold in balance their affiliations to both academic societies and organizations. This is one of the attributes that differentiate doctorate holders from traditional professionals. Traditional professionals either operate without affiliation to a designated organization, or are affiliated, but even then are able to act relatively independently. Doctorate holders, however, are almost always employed by a designated organization, while also at the same time affiliated to a professional organization (academic society).

2. Boundary Organizations and Communities of Practice

This sort of dual affiliation is not necessarily a difficult situation. Guston (2000), has proposed a theory of boundary organizations, which focuses on boundary organizations and boundary work within knowledge production.

Organizational theory frequently refers to the concept of “boundary spanning” (e.g. Daft 2007). This refers to the concept of a person bridging two groups, and people who work in this way are known as “boundary spanners.” This theory, however, looks only at the act of linking two organizations. Boundary organizations and boundary work are more proactive than this. Boundary organizations, and boundary people, who implement boundary work, exist as agents of two principal organizations at the same time. This is the point of interest. Only in cases where this agent operates not in one but both directions will the boundary person exist in a stable state. Put another way, these organizations and this type of boundary work have been developed through history, and have survived selection.

Within the boundaries of science and policy, this debate has been drawn out of analysis of particular organizations that are responsible not only for ensuring scientific correctness, but also appropriate policy (decision making). The basic principles at work, however, apply to the whole arena of intellectual activity. University professors implement teaching and research in universities, but academic societies provide decision-making criteria that allow consideration of whether the contents of that teaching and research are correct and meaningful. In other words, a university professor is required to behave in a way that is considered “correct” by the academic society, as an agent of that society within the university. At the same time, he or she is also required by the university to be an agent of the desired educational and research activities. If university professors are focused only on their academic society activities, they may destroy their principal-agency relationship with the university to which they belong, while at the same time, professors who are not involved at all with the activities of an academic society may invite the same result.

And how about those not employed as professors in universities? Some researchers in public research institutes or private sector companies are active in academic societies, and therefore exist in a similar principal-agency relationship to that of university professors. Other knowledge workers may not be members of academic societies, but we can assume that they have a vague sense of themselves as belonging to the intellectual community. The CID emphasized the cultivation of identity as a professional, including achieving a role

within the community engaging in the scholar's "discipline," in the formation of scholars. These "professional communities" are not necessarily academic societies. We can understand the phrase as encompassing the whole intellectual community in a particular field. This is the same as the way in which university professors may consider themselves as acting within a somewhat vague "academic world," rather than a specific academic society. The intellectual community does not need to have a clear structure, in the way that traditional professional communities do.

The theory of "communities of practice" (Wenger 1998) gives hints in regard to this point. The formation of a community of practice happens through mutual engagement, communal activities, and a scope of knowledge and skills requiring sharing (a specialist field). A community of practice does not necessarily require a name or a clear membership structure. It does, however, provide guidance as to what makes good practice within a particular field of knowledge. It is an extension of the definition of an academic society or professional community.

An example of a community of practice is the sort of "community" that develops via an information network. Communities span companies and departments, and become arenas for the exchange of the knowledge required for work, and regardless of the fact that the work belongs to the company, it is in fact progressed through mutual engagement with the community. Individuals may, in some cases, leave their work in progress so as to supply information to help another person to do his/her job. From the perspective of the organization, the community is a source of knowledge, and is not necessarily something to be eliminated. Individuals, however, must maintain a balance between their work in progress and their engagement with the community.

Intellectual work has many shared attributes and its prototype may be found within the work of a university professor. Doctorate holders differ from traditional professions, and also from workers within traditional organizations. They are a new type of professional.

VI. Conclusion

This paper has introduced the state of the labor market for doctorate holders, who have tended to be considered in excessive supply, and through international comparisons, has shown that the Japanese market for doctorate holders is not particularly unusual. Furthermore, it has introduced the idea that a new view of doctorate holders is emerging, which differs both from the traditional view of doctorate holders and the traditional view of professionals. This new perspective—expressed as "one profession, multiple careers," sees the doctorate not merely as an indication of educational history, but also as significant in identifying a new profession. If we revise our view of the situation in Japan in the light of this, we see that doctorate holders in Japan are also shifting in a similar direction. In conclusion, we offer two points relating to the implications for policy.

The first point relates to the theory of excessive supply of doctorate holders. In addi-

tion to the fact that employment opportunities for doctorate holders are not good, the rate of progression to doctoral programs is falling, with some departments being under-subscribed. For this reason, some people are calling for numbers of places on doctoral programs to be reduced, and the supply of doctorate holders to be more controlled. As discussed in this paper, however, the present statistics may not in fact be appropriate in order to understand the state of employment and professions engaged in by doctorate holders, and as such it is dangerous to judge the situation in the same manner as undergraduate departments. Furthermore, Japan's situation is not particularly bad. Additionally, restricting the number of places on doctoral programs as an over-reaction to the recent falling rate of progression may threaten opportunities for working people to return to recurrent education in the future, and so any response must be considered carefully.

Secondly, there is a theory of separation between the training of academic professionals and researchers and other occupations in the private sector. This debate becomes more confused due to the fact that graduate school systems differ in various countries. In comparison with the U.S., where professional schools train professionals, Japan has only just begun to introduce a professional school system, and it is often said that private-sector researchers and engineers should be trained by professional schools, or that university graduate schools should split off their programs to train academic professionals, and provide separate specialist training programs. Realistically, however, it is not anticipated that the future market for university professors will be particularly large, and since the market for university professors is not closed within academe, and a large number of professors come to universities from other professions, it is thought likely to be difficult to split off the training of academic professionals. More fundamentally, the issue for today is how, instead of professional schools, university graduate schools, which have traditionally existed to train academic professionals, can progress into training doctorate holders to play roles throughout a broad section of society, and not only within universities. Doctorate holders are already evolving into this new type of professional.

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