Remaking Chinese Science:

Institutional Reforms and the Reorganization of Scientific Careers in the 21st Century China

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Extended Abstract

Introduction

Over the past two decades, China has become a scientific powerhouse. Between 2009 and 2021, its scientific publication output increased nearly fivefold, and China overtook both the EU-15 and the United States in citable research papers. Over the same period, China also turned the tide on brain drain, as the proportion of overseas students returning home rose markedly. These shifts were driven in large part by systematic reforms of the academic personnel system from the late 2000s onward, most notably the national talent programs and the tenure-track reform.

My dissertation asks how these institutional reforms mobilized scientific labor by reorganizing scientists' careers. This paper, drawn from one chapter, focuses on two questions: How have academic institutions implemented their personnel reforms? And how have these reforms restructured scientists' career ladders?

I show that this process reproduced the career ladder with two increasingly distinct routes: a newly made "golden rice bowl" for scientists with talent titles, and a broken "iron rice bowl" for most regular faculty. I argue that these reforms worked through an entrenched professional rank system. Academic institutions attached new talent titles and new tenure-track posts to this system, so that new forms of value, such as overseas experience and national honors, had to be converted into rank before they could be recognized both within the scientific field and in the broader society.

Data and Methods

The study draws on in-depth interview, participant observation, and archival methods. First, I conducted 110 in-depth interviews with scientists across three types of institutions: universities, CAS-affiliated institutes, and new-type R&D institutions. Nearly half of the interviewees were faculty members, about 43% were postgraduate students, and around 9% were postdoctoral researchers; roughly 55% were male and 45% female. Second, I conducted fieldwork at a new-type R&D institution in the life sciences in Shenzhen, attending lab seminars, institutional events, and informal activities. Third, I constructed an archival dataset of national policies, including talent programs, together with recruitment announcements and personnel policies from 23 Project 985 universities, supplemented by news reports and discussions on online forums. Interview accounts were triangulated with institutional policy documents wherever possible.

The Pre-Reform Era

After 1949, China's academic system was modelled closely on Soviet. The Chinese Academy of Sciences (CAS) handled primary research, while universities focused on teaching. Under the work-unit system, employment was essentially lifetime and mobility was administratively controlled. After the reform and opening up, very few scientists who went abroad returned, because domestic salaries and facilities could not compete with those in Western countries.

Scientists' careers were organized around a ladder of professional ranks: intermediate (*zhongji*), sub-senior (*fugaoji*), and senior (*zhenggaoji*). Junior scientists typically occupied intermediate-rank positions and worked under senior scientists. For domestic scientists, real independence, such as running their own labs and setting their own research agendas, came relatively late in their careers.

Making the "Golden Rice Bowl"

The first stream of reform was driven by the state's national talent programs. The number of these programs rose sharply after 2008, and the programs expanded to a junior tier open only to applicants under 38 or 40. Originally designed as research funds, an investment in scientists, the programs gradually turned into socially recognized honorary titles. These talent titles and awardees were called "four junior talent" (*si xiao qing*) and "four senior talent" (*si da qing*). The key to this transformation was that academic institutions linked talent titles to professional ranks.

In 2006, new regulations on post setting in public institutions issued by the Ministry of Personnel subdivided the four professional ranks into 13 grades, with the senior rank alone divided into four grades. This regulation laid the institutional foundation for building new upper rungs of the career ladder, which became especially important for recruiting overseas scientists.

Academic institutions linked four junior talent titles to Grade 4 senior rank. Feng Qiming, an overseas-trained geoscientist, once applied for a lecturer position at a 985 university in Guangdong and was turned down. Three years later, after further postdoctoral work abroad, he was approached by the university through the talent recruitment route. His overseas experience had made him eligible for the Young Thousand Talents Plan (*qingqian*). After winning this junior talent title, his appointment was soon upgraded to full professor, with millions of yuan in startup funding and a settling-in allowance of 1.95 million yuan from the state, the province, and the university. The university that had once judged him unready to be a lecturer now placed him at the senior rank at the age of 31.

Such conversions were routinized. Zhejiang University's policy on professional ranks reserved Grade 1 for academicians, and linked its special posts, Qiushi Chair Professor and Qiushi Distinguished Scholar, to Grades 2 and 3; these posts were largely reserved for holders of senior national talent titles. East China Normal University stated even more explicitly that holders of junior talent titles would be appointed directly to the full senior rank. As institutions competed to recruit title holders with generous packages, talent titles became the "golden rice bowl" for scientists in China.

Breaking the "Iron Rice Bowl"

The second stream of reform aimed to break the "iron rice bowl", the lifetime job security that scientists had long enjoyed, by transplanting the American tenure-track model. Pilot reforms began around 2006. In 2014, Peking and Tsinghua Universities extended the model to all schools and departments, and other top universities followed, but in a distorted way.

As understood by reformer scientists, the tenure-track model rested on two principles: independence and mobility. First, it is an independent PI system in which assistant professors run their own labs with startup packages of funding, space, and graduate students, free from the constraints of senior scientists. Second, it involves an "up-or-out" review after around six years. Yet only a few institutions applied both principles. Most maximized the up-or-out logic while granting independence selectively.

Sun Zhiwei, an associate professor at K University, received only 200,000 yuan in startup funding, while junior talent recruits could receive up to 3 million yuan from the university, plus another 1 to 3 million yuan from the talent program. With little funding, she had to join a group led by a senior scientist to access research resources. She passed her review within three years, but many others faced harsher conditions. Yin Luxi, at S University, had to produce eight papers and two NSFC grants within six years, and even then her promotion depended on the number of established slots (*bianzhi*) available and on competition within her cohort. As she put it, if three candidates meet the criteria but only one slot exists, "the other two have no option." Combined with quantified metrics and fixed quotas, the up-or-out principle became a rank-and-yank management strategy applied mainly to non-independent, lower-rank faculty.

Continuity: The Commensuration through Rank

Why did institutions deny independence to assistant professors, while appointing talent-title holders directly to full professorships and even higher grades? I argue that the answer lies in the commensuration of scientists' value and social status through the professional rank system, the most stable and entrenched institution throughout the reforms. Each reform attached new posts and titles to this system so that scientists' value could be measured on a single scale.

The clearest example is that independence remained the prerogative of the senior rank. Throughout the 2000s and 2010s, being an independent PI effectively required senior rank, either in practice or in name. The qualification of doctoral supervisor, which gave access to doctoral students as the lab workforce, was largely reserved for full professors, as were most large research grants. Institutions seeking to recruit overseas scientists as independent PIs therefore had to offer full professorships. Where administrative quotas prevented this, institutions created titles such as "specially appointed investigator" to match the senior rank in name. In short, because independence was symbolically tied to rank, new forms of value had to be converted into rank before they could be recognized in the scientific field.

Rank also served as a common currency beyond academia, as professional ranks are commensurable with bureaucratic ranks. Some academicians have been appointed deputy provincial governors, and one associate professor I interviewed became a local civil servant at the deputy division level. Even for the majority who remain in academia, rank functions as a general marker of social status. As the mathematician Shing-Tung Yau observed, a title in China "dictates how one is treated by others." The reforms leveraged this entrenched norm to design new posts, to restructure the tenure track locally, and to mobilize scientific labor.

Conclusion

Academic institutions implemented the personnel reforms by attaching new talent titles and tenure-track posts to the old professional rank system. While the ladder itself remained largely intact, the reforms increasingly sorted scientists into two very different routes up it. On the first route, the "golden rice bowl", talent-title holders were lifted directly to the senior rank, where independence and resources were concentrated. On the second route, the broken "iron rice bowl", most regular faculty entered at the bottom without independence and competed for limited slots through up-or-out reviews. The middle path of being independent without talent titles has been narrowing.

Making the "golden rice bowl" and breaking the "iron rice bowl" were held together by commensuration: because rank remained the common measure of scientists' value and social status, every reform had to be converted into it. This finding shows how transplanted

organizational models are reshaped by entrenched status orders, and how reforms aimed at mobility and meritocracy can reproduce and even sharpen existing hierarchies.