Economic Returns to Education in China: An Updated Literature Review

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1 Introduction

Since Mincer (1974) established the pioneering mathematical framework of human capital theory, empirical research has sprung up to estimate the rate of returns to education in various regions and groups worldwide. Psacharopoulos and Patrinos (2018) proposed a 9 percent income return corresponding to an extra year of schooling by detecting data from 139 countries, which is stable over decades. Social returns are noticed higher with added positive externalities based on private returns. In all, investments in education are conducive to future returns for both individuals and society. This rationale has been widely recognized.

As the largest developing country, China serves as a fitted research range for this topic. The focus on Chinese data arose in the 1990s. Several studies have provided evidence for positive economic returns and sketched its changing patterns. Scholars attribute the empirical results to economic transformation and a series of educational system reforms in China after the 1980s. With extensive literatures accumulated, more consensus, dissensions, and directions have emerged in this area.

This essay reviews the updated literatures on economic returns to education in China during the last five years, extracts their main contributions, and adumbrates the latest research trend. To clarify, the term "economic returns" here refers to private returns in particular, which is the wage

premium or increasing earnings brought by an individual's additional education years. Compared to previous studies, most literatures adopt updated and more comprehensive dataset to re-estimate the wage premium and its variation trend through different reform stages. Some estimating results are used to evaluate educational policies, among which the great higher education expansion (HE) in 1999 was the principal social practice in recent decades. Discussion of heterogeneity concentrates on main factors like gender, region, educational levels, with extra attention to family background, subject, work unit, language proficiency, and health. The Mincerian model is revised and extended as the theoretical foundation, allowing for diverse econometric approaches among these studies.

2 Background: A Brief Overview

Before the reform and opening-up, administratively set wages suppressed the true value of returns to education in China (Fleisher & Wang, 2004). The 1980s witnessed China's transformation from a centrally planned economy to a market-oriented economy. Substantial physical capital investment led to greater demand for high-skilled labor (Heckman & Yi, 2012). As a result, the demand expansion expedited educational reforms in response to the market call, as the traditional education system was no longer efficient under this mechanism. Education system reform started in 1985, promoting the decentralization and marketization of Chinese higher education.

In general, Chinese higher education policies from 1978 to 2018 can be divided into three stages, with two significant turning points (Xiong, Yang & Shen, 2022). The first point is the

Urgent Notice on Expanding the Enrollment of Higher Education (HE) issued in 1999. This policy originally aimed to deal with the Asian financial crisis and boost domestic demand, but it also marked a transition of Chinese higher education from elite to mass education (Song, 2021). Universities started to merge independent institutions and provide expansive enrollment places. The admission rate was unprecedentedly higher. The second point is the *Outline of the National Medium and Long-Term Program for Education Reform and Development* in 2010. The promulgation of this document alleviated the large-scale enrollment expansion and laid more emphasis on the improvement of education quality.

Looking at the 40 years of reforms, Xiong, Yang, and Shen (2022) concluded some trends of Chinese education structure into massification, stratification, and decentralization. These features are highly related to the vicissitude of economic returns to education, since education is one of the most crucial determinants of labor market earnings. The massification of Chinese higher education changes the high-return mode in the elite education era and leaves discussions about the magnitude of returns to education after the great expansion. The stratification can be defined by college hierarchy (i.e., first-tier colleges at the top, followed by provincial and local four-year colleges, and finally tertiary vocational colleges), which accounts for a large part of explanations for heterogeneity. The decentralization reallocates educational resources and further impacts the pre-existing regional heterogeneity. In short, the above features can be labeled with uniqueness when considering the Chinese case of returns to education.

3 Literature Review

3.1 Wage Premium and Its Changing Patterns

Even though the quantitative estimation values of returns exhibit a variation, all literatures reach a consensus that education has a significantly positive impact on individual earnings in China. For example, Dai, Cai, and Zhu (2022) presented an 8% return for OLS and a 24% return for IV using data from 2005 and 2010. Asadullah and Xiao (2019) obtained a similar result of 7.8% for OLS and 20.9% for IV using data from the Chinese General Social Survey 2010, and they renewed their results to 6.7-7.5% for 2010 and 6.2-6.9% for 2015 (2020). Guo and Wang (2020) presented an 8-8.4% return for students attending vocational education. These outcomes further consolidate the robust evidence for positive returns to education in China, which is consistent with the same observations in other countries. The cross-sectional variation mainly comes from different data source selections, estimation methods, and sample periods (Churchill & Mishra, 2018).

Broader research interests lie in the dynamic changing patterns of such a wage premium. There are two perspectives for analysis: the individual and social level.

From an individual perspective, we trace an individual's life cycle and investigate the wage change. Returns to education may vary among different life periods. Jia and Li (2021) studied the discontinuity around elite-tier cutoff scores in Gaokao and found an exceptionally high return for the first-job wage if scoring above the cutoff. Démurger, Hanushek, and Zhang (2019) found a substantial premium for graduating from an elite university at the job entry but it declines quickly

in the early career before starting to recover subsequently.

Both the excellent performance in Gaokao and graduation from an elite university bring higher returns at the beginning of a young person's career, but the advantage appears to be transient. One possible reason is that before the job entry, education is almost the only signaling information that employers can receive, which reinforces its decisive power for the first-job wage. But throughout the whole career, education is the anterior investment while individual skills are constantly accumulative and will be highly rewarded as a demonstration of personal capabilities. Thus, more experienced and skilled workers are preferred in the subsequent career phases. The effects of experience and measured skills partly crowd out that of education; hence the latter generates less wage premium.

Even so, education still lays the foundation of a person's starting wage and plays a fundamental role. Démurger (2019) suggests that educational returns increase again at the mid-career, indicating asymmetric learning. It could also be because educational level reflects (or determines) individuals' learning ability to some extent.

From a social perspective, we treat employees as a whole and follow their holistic wage change in different historical periods. The dynamic pattern of returns is essentially formulated by the periodical equilibrium of labor supply and demand, which are driven by institutional changes and other external factors.

A stylized fact is that returns to education in the 1980s and early 1990s in China were extremely low, compared to other Asian countries and low-and-middle income countries (Psacharopoulos,

1994), which evinces the adaption and gradualism in the initial stage of reform. But this situation changed in the mid-1990s with increased returns, as well as improvements in wages and workers' contractual rights (Chan & Nadvi, 2014). The higher return to education was a landmark of Chinese pre-expansion elite education. However, the explosion of returns culminated in 1999 and then came to a halt.

Scholars examined the post-expansion market outcome and offered relevant policy evaluation. Ample evidence suggests that the HE expansion in 1999 increased schooling years but did not change, or even reduced, economic returns to higher education, illustrating diminishing marginal returns to human capital (Asadullah & Xiao, 2020; Kang, Peng & Zhu, 2021; Song, 2021; Dai, Cai & Zhu, 2022). Although the government had realized the expansion was overhasty around 2010 and started dwindling the large-scale enrollment, the declining tendency of returns has lasted to today.

One compelling explanation is that the slowdown of productivity growth and the paucity of effective demand failed to meet the oversupply of higher education students, which restricts graduates' employment and salary negotiation ability (Yuan & Xie, 2012). Furthermore, the expansion policy dramatically increased the universal possibility of college admission. Due to the flooding of diplomas with detracted value, the signal effect from degrees was largely attenuated, bringing less premium for graduates. Conversely, experience manifested an upsurging trend as a more useful filter in job hunting, which is the opposite of the pre-reform era (Asadullah & Xiao, 2019; Song, 2021). In this sense, the HE expansion did not bring actual earning benefits

for educated people, which partially explains the ascending difficulty for graduates to find a job since the 20th century. This unemployment plight motivated the Chinese government to tilt its educational strategy from quantity-valued toward quality-valued.

However, in a global context, the actual payoff is still relatively higher in China if compared with other developed countries. The excessive returns to education result from low enrollment rate for universities, since Chinese universities tend to pay more attention to entry selection instead of exit quality control (Fan et al., 2018; Jia & Li, 2021).

3.2 Discussion of Heterogeneity

When estimating economic returns to education, heterogeneity analysis is an indispensable issue. Scholars kept modifying the econometric models to reduce heterogeneity and make comparisons. In terms of China, copious literatures corroborate the existence of heterogeneous returns among different demographic groups, with the wage gap enlarging or shrinking in different heterogeneous dimensions. Most heterogeneous returns exhibit a downward trend after 2010, reflecting the improvement of social equity. The three most common dimensions are gender, region, and educational level.

3.2.1 Gender

Studies across nations have verified that schooling impact is more prominent for females than males, despite the fact that males usually earn more after controlling other variables. This statement is also applicable in China with abundant observations of higher female returns even in different regions and educational levels, although the female advantage in returns over males

gradually narrowed after the 2010s (Churchill & Mishra, 2018; Asadullah & Xiao, 2019; 2020).

Education promotes skills and productivity for both gender, but also eliminates intrinsic occupational discriminations, reshapes preferences, and optimizes circumstances for females (Dougherty, 2005). The double effects of education on females seem to be a plausible explanation for higher female premiums in China. But from another point of view, the wage gap between highly-educated and less-skilled women is enormous.

Within each gender group, the wage premium differs when mingled with other heterogeneous impacts. For example, men born in major cities or eastern areas tend to have a higher premium, while for females the regional effect is insignificant (Kang, Peng & Zhu, 2021).

From a sociological perspective, the heterogeneous return based on gender in China is rooted in the collision of traditional ideology and modern production. Its diminution reflects the spread of females' higher education and the progression of gender equality.

3.2.2 Region

Regional inequality has been an inherent structural problem of Chinese education system for a long time (Xiong, Yang & Shen, 2022). Analysis of regional heterogeneity can be classified into education places and job locations. Particularly for education places, there are two primary criteria, respectively based on local economic development and educational resources (Song, 2021). As for specific classifications, there can be various methods according to different region types (i.e., urban, rural) and orientations (i.e., coastal, inland). Nevertheless, some literatures make no efforts to separate the education and job region due to data limits, convenience for study,

equivalence of between, ignorance of immigration, or different research priorities, which makes the cross-literature comparison harder. Considering the two aspects are accordant and unified in a region most of the time, unnecessity of distinction can be acceptable by default. The following discussion attempts to soft-pedal the meticulous classifications and integrate the main findings of various literatures.

Typically, coastal (eastern) and urban (big-city) residents show a higher return than inland (western) and rural (ordinary-city and within-county) residents (Asadullah, & Xiao, 2019; 2020; Wang et al., 2020; Song, 2021; Huang et al., 2022). More developed regions with richer educational resources, where education quality is guaranteed and the signal effect is enhanced, emerge a higher return to education. Featured with industrial agglomeration, private-sector concentration, and more employment opportunities, these areas possess superior utilization efficiency of capital and labor allocation, revitalizing the productivity of human capital (Wang et al., 2020).

In an eastern-western context, Song (2021) illuminated in his study that less developed western provinces with fewer educational resources gained an upward trend for returns and benefited most during the HE expansion. The returns slightly decreased after 2008 due to poorer educational quality. Returns in the eastern area remained high but expansion effects are subtle because of the saturated admission rate and living cost premium. Returns in the middle area fluctuated the most. In this sense, the HE expansion can be regarded as an effort to overcome institutional barriers and adjust the unbalanced distribution of educational resources, eroding regional heterogeneity and promoting social equity, despite the shortage of inadequate emphasis on education quality.

However, in an urban-rural context, the HE expansion exacerbated the pre-existing tremendous urban-rural gap in returns under the Chinese hukou system. This result may be more complicated when family background and parental education are also taken into consideration. Disadvantaged residents tend to benefit more in urban and less in rural, narrowing the urban within-group inequality but widening that for rural (Huang et al., 2022). Even though studies affirm a decline in urban wage returns from 2010 to 2015 (Asadullah, & Xiao, 2020), the rising cost of education still discourages rural access and undermines social equity.

3.2.3 Educational level

Different educational levels will cause selective bias when estimating returns to education. In China, educational levels are underpinned by prestige tiers, which can be simplified into elite or key universities, ordinary universities, technical and vocational education (TVE), and lower.

Elite university eligibility is associated with higher returns than other levels of education (Churchill & Mishra, 2018; Asadullah & Xiao, 2019; Kang, Peng & Zhu, 2021). According to Jia and Li (2018), three mechanisms contribute to this wage premium: human capital, social networks, and signaling. Though elite universities indeed provide better education quality and nurture human capital, the peer effect from university-related networks and the signal effect jointly work as dominant explanatory powers.

Although students from vocational colleges are often expected to be academically low-performing students and identified as a vulnerable group, there is still an 8-9% earnings premium for TVE linked with a matched occupation, compared to general academic high school

(Guo & Wang, 2020). Given both private and social benefits, the Chinese government has implemented many supportive policies since 2007 to strongly foster TVE, upgrade human capital, and lessen the wage gap.

3.2.4 Other heterogeneity

Trivial evidence also enunciated that people working in enterprises, choosing LEM or STEM subjects, in better health conditions, and with more proficient English language skills tend to receive higher returns (Asadullah & Xiao, 2019; 2020; Song, 2021; Huang et al., 2022). These factors were often tested in combination with the three main factors, forming interaction terms like gender and language proficiency, or prestige tiers and subjects.

3.3 Methodology

Mincer equation is the most commonly used tool for econometric methodology:

$$\log(y_i) = \alpha + \beta_1 \mathrm{Edu}_i + \beta_2 \mathrm{Exp}_i + \beta_3 \mathrm{Exp}_i^2 + X_i\lambda + \epsilon_i$$

where y_i denotes the individual income, Edu_i denotes the year of schooling or other dummies for educational level, Exp_i denotes the experience, and X_i denotes the vector of all other variables, which is a generalization term of all specific extended model in the literatures.

Ordinary least squares estimation (OLS), instrument variables (IV), regression discontinuity design (RDD), and propensity score matching are some most common approaches. In particular, IV approaches are often used to correct bias from unobservable endogeneity like family background. From a meta-analysis view, the studies using “year of education” or adopting IV approaches tend to report a higher estimation value, while pooled OLS and the random effect (RE) model

tend to underestimate the returns (Kang, Peng & Zhu, 2021). Except estimation methods, the estimated effect size is also affected by publication outlets and dataset type (Churchill & Mishra, 2018). These variations help explain the discrepancy of estimated values in different literatures.

4 Conclusions and Suggestions

Literatures about China within five years center on the estimation of returns to education and interpretation of heterogeneity. After economic transformation in the 1980s, Chinese educational reforms, especially the HE expansion in 1999, have profoundly impacted private returns in the labor market. The quantitative expansion ameliorated regional inequity to some degree, but the cost of quality and growing intense competition under the faded market demand incredibly restrained the overall growth of returns to education. Urban-rural disparities also deteriorated severely. Therefore, quality-assured educational policies and more systematic reforms are effective prescriptions to deracinate structural problems, stimulate human capital growth, and achieve sustainable education development simultaneously in different regions, levels, and types.

For future studies, more econometric models, heterogeneous dimensions, and educational policies are yet to be explored to enrich this study field. Moreover, two promising directions are lacking in existing Chinese literatures, which can be delved into later. The first one is revising the measurement of education variables. Most studies adopt years of schooling, which may not necessarily reflect real knowledge capital accumulation. School quality (DeCicca & Krashinsky, 2020), participation rate (Ukaj, Hoti & Topxhiu, 2022), devotion time (Hanushek & Woessmann, 2020), or other dummies for educational levels (Rizk, 2019) might be better substitutes. The

second is comparative studies on returns of traditional face-to-face and distance education. In the pre-pandemic era, empirical evidence already suggests returns to distance education are positive but lower than traditional (Li, 2018). However, the result is not known for the post-pandemic era after 2020 when distance education experienced wide popularization and normalization, making the new issue more interesting and significant under the epidemic context.

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