



# Returns to part-time formal education while on the job are positive and worthwhile, but are lower than full time formal education

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## IMPRESSUM

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# RETURNS TO PART-TIME FORMAL EDUCATION WHILE ON THE JOB ARE POSITIVE AND WORTHWHILE, BUT ARE LOWER THAN FULL TIME FORMAL EDUCATION

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His teaching includes econometrics, economic forecasting, labor economics, and microeconomics.

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*Evidence from the Chinese Household Income Project (1995-2007) with multi-year cross-sectional data shows that in China a significant proportion, around 18.5%-36%, of working individuals received their tertiary degrees while at work, and on-job students increasingly pursued higher education degrees. After controlling for unobserved individual heterogeneity and job heterogeneity, we find a significant difference in the returns to education between regular students and on-job students. In particular, the rate of return for an on-job graduate degree is approximately 29–39 percentage points lower than that for a regular graduate degree. The gap in return increases with the education level, and it is quite sizeable. Additionally, our simple estimates show that the “income savings” due to non-forgone wages while maintaining a job throughout a study program can generally recover the life-time earnings gap caused by the differing returns on the college degree, though this is generally not the case for an on-job graduate degree. No evidence is found that school quality, student quality, or aging are the direct causes for the gap in returns. Our investigation points to two other factors as possible explanations for the estimated earnings gap: career wage path differentials due to cost-sharing for study, and the “signaling effect.”*

## Introduction

### Is it worthwhile engaging in part time education?

Economic globalization and new technologies have greatly raised the demand for human resources (OECD 1992). Therefore, lifelong learning as a key area for human capital investments has been emphasized in the policy pronouncements for many developed and developing countries. Lifelong learning, especially on-job learning, can enhance those interactions and idea creation, thus advancing the technology frontier and enhancing economic growth. On-job schooling provides adult workers with a new sequence of learning, receiving formal education while at work. Employees can keep their working positions and further their studies in school at the same time. It is relevant not only for individuals attempting to enhance their employment chances and promote productivity through continuous learning, and also relevant to the work of national and European educational institutions and policymakers who are developing further education programs and long-run investment strategies.

Most studies find positive returns to adult learning. However, some studies find that the returns to

adult learning are lower than the returns to regular learning at normal schooling age. For Europe's policymaking bodies, it's of significant importance to recognize the potential differences between the effects of learning full-time and learning on-job. The topic has important implications for on-job schooling in particular, and for lifelong learning in general. More specifically, should universities continue to promote programs, for instance, the Internet-based distant learning, for employed individuals? Should the government or employers encourage employees to get a degree while at work via various policy incentives? Is it worthwhile for the individuals to spend time and effort in such job accompanying education programs? In which circumstances can the education program for those with a job be an efficient way to spend social resources and thus be justified as part of a lifelong learning policy?

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## Key Observations

### China's higher education system with employed students

Quantitative and qualitative growth of the tertiary education system brings significant change to on-job learning systems. Colleges and universities are developing various degree programs aimed at working professionals. The recent rapid growth in internet-based education makes it even easier than it was before for workers/professionals to obtain formal higher education while at work.

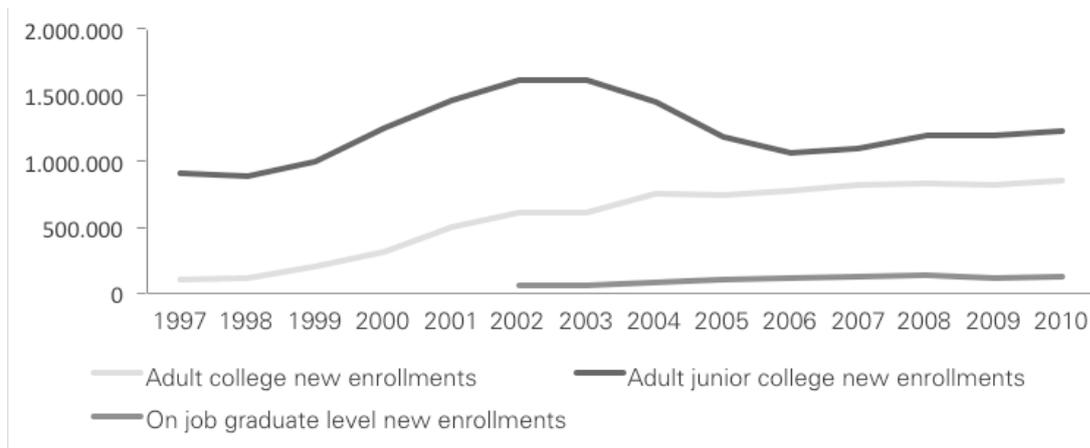
In China, at the beginning of the economic reforms in 1978, there was a severe lack of workers with tertiary education, because a large number of adults had missed the chance of going to college during the Cultural Revolution. The Chinese government created a variety of continuing education programs to make it possible for these people to earn formal degrees. Colleges and universities have made their degree programs available for those who have full-time jobs. As a result, China has a large number of individuals who received their degrees while at work. However, for China, in contrast to the large number of studies on the regular education, there are very few studies available on education for working adults.

There exist various forms of adult learning in Organization for Economic Cooperation and Development (OECD) countries (Belanger and Tuijnman 1997). In China, there are various channels too for individuals to receive formal education while employed. Working adults can get a tertiary degree at a regular institution of higher education or at an institution of higher education for adults. The adult higher education system includes radio and TV colleges, correspondence college, workers' college, college of education, etc. Here we focus on higher education programs for workers that are offered at junior college (three year college), college, and graduate school levels. Working students can take classes in the evenings and/or weekends, or self-study through course materials, or via radio, TV, and Web, or even take classes with regular students in normal class schedule.

Graph 1 shows the new enrollments of on-job students at junior college or above. The number of on-job junior college students is the largest among the three education groups, followed by college students (4-year curriculum), and then by on-job graduate students. In the early period of economic reform, there was a strong demand for workers with higher education, but the labor market for new entrants with a tertiary degree in higher education could not meet the demand. Many on-job individuals chose to enroll in education programs to get degrees (and perhaps their employers had demands for them to obtain a higher degree too). It is generally easiest to get into a junior college degree program, because of the low pre-requisite, i.e., a high school diploma. That probably explains why this group has the largest percentage of on-job students.

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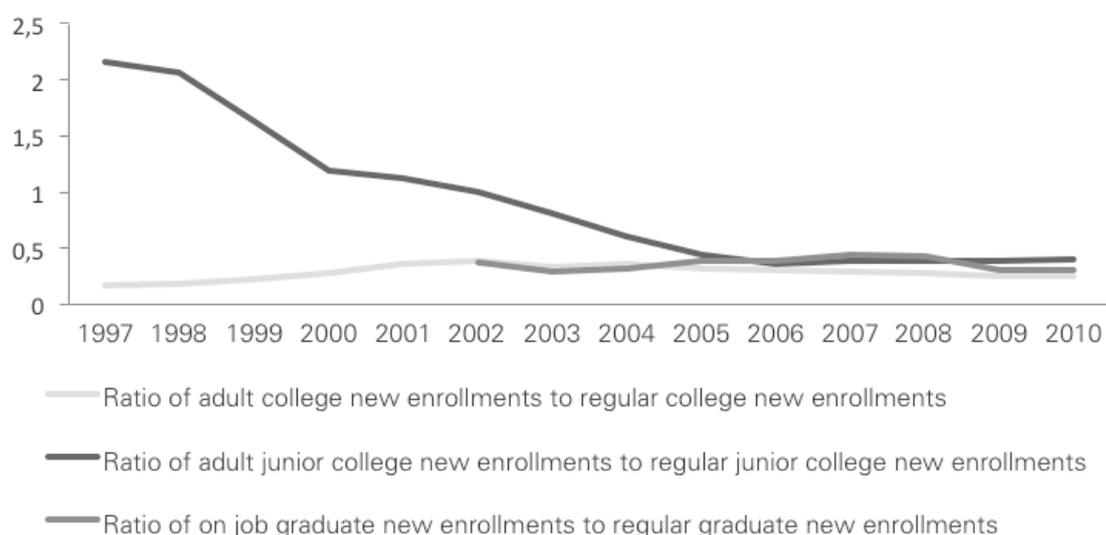
Figure 1 New Enrollment of On-job Students



Notes: All the data are from the Statistical Yearbooks of Education for 1997–2010, Ministry of Education. For 2003, we cannot separate junior college and college from the original data and thus imputed the data (same for Graph 2).

Graph 2 shows the relative trends of on-job students to regular students based on their new enrollments. Before 2002, the new enrollment of on-job students pursuing a junior college degree was more than that of regular (full-time) students. After that, its proportion declined rapidly to less than one half in 2005 and has been quite stable since then. At the college level, the relative enrollment follows a steady pattern and ranges around 30% of the regular college enrollment. It started to decline slowly after 2004. The relative new enrollment in graduate programs peaked at 43% in 2008, and then also started to decline. Since 2003, the first cohort of the large enrollment expansion graduated and entered the labor markets, the fast increase of new labor market entrants with college education helps explain the relative decline of the ratio of on-job students to regular students.

Figure 2: Ratio of On-job New Enrollments to Regular New Enrollments



Sources: *The China Statistical Yearbooks of Education for 1997–2010*, Ministry of Education.

### Different rates of returns to schooling between part-time learning and regular learning

We find that in the 1995, 2002, 2007 sampling periods,

- A significant proportion of working individuals received their tertiary degrees while at work. However, the overall trend appears to be declining.
- In 1995 and 2002, 36% and 32% of those with junior college education or higher earned their degrees while at work. The ratio fell to 18.5% in 2007.
- On-job students increasingly pursued higher education degrees in China.

Education level	On-job sample mean		
	1995	2002	2007
Graduate degree	4.1%	3.3%	15.0%
4-year college (Daxue)	18.1%	24.4%	40.2%
3-year college (Dazhuan)	77.8%	72.3%	44.8%
No. of observations	900	975	341

After controlling for unobserved individual heterogeneity and job heterogeneity, we find a significant difference in the returns to education between regular students and on-job students, and regression results are quite robust to various specifications:

Year	1995	2002	2007
Variable	ln(Wage)	ln(Wage)	ln(Wage)
Graduate	0.177* (0.0966)	0.429*** (0.0673)	0.431*** (0.0749)
College	0.126*** (0.0231)	0.175*** (0.0250)	0.160*** (0.0282)
Graduate × Onjob	-0.0920 (0.118)	-0.294** (0.101)	-0.210* (0.109)
College × Onjob	-0.0788** (0.0362)	-0.0960** (0.0368)	0.0257 (0.0456)
Junior college × Onjob	-0.00550 (0.0215)	-0.0256 (0.0226)	-0.0127 (0.0437)
Experience	0.0241*** (0.00435)	0.0238*** (0.00467)	0.0232*** (0.00507)
Experience squared	-0.00029** (0.000098)	-0.00033** (0.000109)	- (0.000139)
Constant	0.792*** (0.178)	0.855*** (0.179)	1.775*** (0.130)
Summary Statistics	R2= 0.390 F=37.09 N= 2379	R2= 0.358 F= 32.60 N= 2949	R2= 0.399 F=30.31 N= 1828

Notes: Onjob is a dummy variable which means 1 if the degree was received while employed, 0 otherwise. Occupation, employment type, industry and province are controlled in the regressions above. Grades are controlled in the 2002, 07 results.

- The gap in return increases with the education level, and it is quite sizeable.
- The rate of return for an on-job graduate degree is approximately 29–39 percentage points lower than that for a regular graduate degree.

- For a four-year college degree, the return to on-job learning is 9–11 percentage points lower than that for regular learning.
- There is no significant gap between returns to on-job and full-time schooling junior college degrees.

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Does the gap in return make the on-job schooling a less efficient investment in education?

We find that there is a trade-off for an individual to choose on-job tertiary education.

- On the one hand, a higher degree obtained while at work raises the earnings, and thus, the earlier a higher educational degree is obtained on-job, the higher life-time income would be.
- On the other hand, the on-job degree has a lower return relative to a regular degree.

Our simple estimates show that

- The “income savings” due to non-forgone wages while maintaining a job throughout a study program can generally recover the life-time earnings gap caused by the differing returns on the college degree, though this is generally not the case for an on-job graduate degree.

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What are the causes for different returns?

The findings on significant differences in return between regular schooling and on-job schooling at college and graduate levels raised an interesting question: Why is the return on a degree earned while having a job lower than that earned as a regular student?

A. School/ program quality

- Are institutions which offer on-job education programs relatively less prestigious or low quality?

**Summary statistics:**

We listed the school ranking among different types of students.



Overall there is no evidence that on-job students are more likely to attend lower ranking schools:

Variable	Low school ranking	
	On-job edu	Regular edu
Sample mean	0.183	0.197
Graduate	0.103	0.061
College	0.116	0.134
Junior college	0.232	0.263
No. of observations	611	1333

Notes: CHIP 2002 contains information on the national rankings of the schools where the individuals graduated. Low school ranking: 1 if the latest school he/she graduated from is ranked below average, 0 otherwise

### Empirical results:

When we run the model by replacing on-job education with school ranking, the result shows that the school ranking actually has no significant impact on the rate of return.

Therefore, the gap of returns to on-job degrees cannot be explained by the quality of the school/program.

- Are those individuals took on-job schooling because they were not able to get admitted as a regular student?

### Summary statistics:

We used grade ranking in high school to proxy student quality for 2002.

- Overall, on-job students are slightly more likely to have had lower high school grades, but the difference is small, and it occurs only at junior college and college levels.
- At the graduate level, however, the proportion of on-job students with lower high school grades is actually much lower.
  - Those who performed well according to their high school grades generally have good studying skills and thus it is easier for them to gain admittance

## B. Student quality/skills

and to complete an education program while maintaining a job;

- They have a greater appetite to study further and are thus more likely to join an education program with a job.

We use an individual's grade at the last school they graduated from to proxy the student quality in CHIP07.

- We can see a slightly better academic performance overall in the on-job group, because of a smaller proportion of students with lower grades, but this only happens at the college and junior college levels.
- Those with an on-job graduate degree did relatively better than their regular counterparts at high school studies but slightly worse in graduate studies.

Year	2002	
Variable	Lower high school grade	
	On-job edu	Regular edu
Sample mean	0.258	0.217
Graduate	0.063	0.152
College	0.153	0.122
Junior college	0.302	0.264
No. of observations	966	2034

Notes: Lower high school grade: 1 if the high school grade is ranked at middle 20%, lower 20% or lowest 20% of the class in CHIP 02, 0 otherwise.

Year	2007	
Variable	Lower GPA	
	On-job edu	Regular edu
Sample mean	0.177	0.199
Graduate	0.059	0.047
College	0.109	0.126
Junior college	0.276	0.277
No. of observations	345	1519

Note: Lower GPA: 1 if the grade at the latest school graduated is at average, below average, or is weak in CHIP 07, 0 otherwise.

### **Empirical results:**

We find that at junior college and college levels, those with lower grades have a significantly lower return.

- Compared with the results based on high school grades, it appears that lower grades at college reduce the return to schooling even more. Consistent with our argument that college grades can represent both student quality levels and skills learned then.
- Lower grades at junior college reduce the return significantly. It is likely that the knowledge learned at the junior college level is more closely related to job requirements, and thus better grades also speak for improved job performance.

Differing from the high school grades, lower grades at graduate school seem to have insignificant effect on the returns, although the sign is negative.

- Grades obtained in graduate school, where there is a different focus, may not be emphasized as strongly as grades obtained in high school, and graduate school grades may not represent a student's quality as well as high school grades do, and/or that the graduate curriculum does not directly strengthen the individual's job performance.
- It may also indicate that graduate education, or its curriculum, may have low quality in China, and thus, the academic performance does not make a difference in the labor market outcome.

Year	2002	2007
Variable	ln(Wage)	ln(Wage)
Graduate	0.273*** (0.0596)	0.344*** (0.0633)
College	0.168*** (0.0223)	0.168*** (0.0285)
Graduate × Lower grade	0.204** (0.0893)	-0.181 (0.165)
College × Lower grade	-0.0905* (0.0495)	-0.0977* (0.0536)
Junior college × Lower grade	-0.00328 (0.0248)	-0.0864** (0.0365)
Experience	0.0218*** (0.00461)	0.0223*** (0.00505)
Experience squared	-0.000306** (0.000108)	-0.000498*** (0.000138)
Constant	0.861*** (0.182)	2.089*** (0.133)
Summary Statistics	R2= 0.356 F= 33.52 N= 2949	R2= 0.397 F= 30.99 N= 1828

- Because the on-job students are generally older than regular students, is it possible that aging lead to lower returns?

### Summary Statistics

The majority of regular students begin their higher education at ages below 20 years, where most of the on-job students started after the age of 22 years. Older students dominated in the on-job student group.

Year	2007			
Variable	Starting age			
	Junior college		College	
Age	On-job edu	Regular edu	On-job edu	Regular edu
Under 20	0.197	0.823	0.205	0.825
20-24	0.352	0.158	0.538	0.158
25-29	0.169	0.012	0.180	0.015
30 up	0.282	0.007	0.077	0.002
22 up	0.634	0.052	0.564	0.044
No. of observations	71	716	39	659

## C. Learning capacity as aging

### Empirical Results

- For on-job and regular degree, there exists no significant effect of age on the returns to junior college degree or college degree
- Difference between on-job and regular students for the same age group at 22+
- Around 4–5% of regular students began junior college or college at age 22 or above, and they may be individuals who were employed and then quit their jobs to enroll in a regular education program.
- No different returns to their degree for those with working experience, whether earned via full-time study or via part-time study

	On-job sample	Regular sample	Total sample age 22 or above
Variable	ln(Wage)	ln(Wage)	ln(Wage)
College	0.134 (0.172)	0.188*** (0.0339)	0.282* (0.166)
College × Onjob			-0.0571 (0.170)
Junior college × Onjob			0.00798 (0.139)
College × Age 22 up	0.0504 (0.196)	0.0794 (0.124)	
Junior college × Age 22 up	-0.0500 (0.143)	-0.00541 (0.109)	
Experience	0.00404 (0.0248)	0.0427*** (0.00640)	-0.00447 (0.0230)
Experience squared	0.000002 (0.00053)	-0.0012*** (0.00022)	0.000107 (0.000487)
Constant	2.687*** (0.569)	2.025*** (0.0668)	2.567*** (0.369)
Summary Statistics	R2= 0.265 F= 3.67 N=109	R2= 0.180 F= 25.48 N= 1360	R2=0.300 F=6.07 N=131

## D. Earnings paths and the signalling effect

- Are lower returns caused by career path differentials due to cost-sharing for study or signaling effect?

The cost-sharing outcome between the employer and employee can be viewed as a market mechanism that contributes to optimal resource allocation.

However, the signaling effect in China is likely to be caused by the distorted learning effect while having a job, and thus, it is harmful to the lifelong learning system.

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## Policy Implications

### Policy implications for China and other countries

In order to improve the efficiency of lifelong learning in general, and schooling while at work in particular, policies should aim at:

- Reduce the implicit cost for employers to arrange for their employees to study while on the job
  - Provide more flexibility in the schooling
  - Encourage more transparency regarding degrees earned while holding a job.
- Enforcement of the same rigorous academic standard that is applied for regular students.

Modern Internet-based distance learning can provide an effective mechanism to accomplish these goals, both in terms of providing more flexibility for on-job students and by implementing the same learning requirements and standards.

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## Project Identity

LLLight'in'Europe is an FP7 research project supported by the European Union, which has investigated the relevance and impact of lifelong learning and 21st century skills on innovation, productivity and employability. Against the background of increasingly complex tasks and jobs, understanding which skills impact individuals and organizations, and how such skills can be supported, has important policy implications. LLLight'in'Europe pioneered the use of an instrument to test complex problem solving skills of adults in their work environment. This allowed for the first time insights into the development of professional and learning paths of employed individuals and entrepreneurs and the role that problem solving skills play. Additionally, LLLight'in'Europe draws on a series of databases on adult competences from across the world to conduct rich analyses of skills and their impact.

These analyses were conducted in concert with different disciplines. Economists have been analyzing the impact of cognitive skills on wages and growth; sociologists have been investigating how public policies can support the development of such skills and lifelong learning; innovation researchers have been tracking the relationships between problem solving skills, lifelong learning and entrepreneurship at the organizational level;. educational scientists have investigated how successful enterprises support their workforce's competences; cognitive psychologists have researched on the development and implications of cognitive skills relevant for modern occupations and tasks; and an analysis from the perspective of business ethics has clarified the role and scope of employers' responsibility in fostering skills acquisition in their workforce. The team has carried out its research and analyses on the value of skills and lifelong learning in EU countries, USA, China, Latin America and Africa.

The result is a multi-disciplinary analysis of the process of adult learning and problem solving in its different nuances, and of the levers which can support the development of these skills for both those who are already in jobs, and for those who are (re)entering the labor market, as well as the development of effective HR strategies and public policy schemes to support them.

Coordinator	Zeppelin University
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EU Project Officer	Monica Menapace
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This policy brief is part of the publication suite of the FP7 Project LLLight'in'Europe. The publication suite consists of 21 policy briefs, 6 thematic reports and 1 synthesis report. The 21 policy briefs discuss findings and policy implications proceeding from the project's research; they are organized along three level of analyses (persons; enterprise; country) and seven topics.

01	Resources of society for learning
02	<b>Institutions of learning</b>
03	Circumstances of learning
04	Role of transversal skills
05	Role of job-specific skills
06	Productivity of skills
07	Outcomes of skills

This policy brief discusses findings related to **Institutions of learning** at the analysis level **persons**. For further publications and multimedia material related to the project, please visit [www.lllightineurope.com](http://www.lllightineurope.com)