The Effect of Education on Rural Incomes in China

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Introduction

The 17th National Congress of the Chinese Communist Party reiterated the Party's emphasis on education as an investment in long-term productivity growth, as part of its "Scientific Outlook on Development"; however, improved education has been a goal of the CCP since the beginning of the reform period. During the early reform period, resources were concentrated on higher education, to the relative neglect of basic education (Naughton, 2007). In the 1990s, the central government began to shift resources towards improving basic education levels; one example of this change in emphasis was the "Two Basics", a promise made by the government to provide nine years of universal education to all of its citizens and eliminate illiteracy among the youth population (Ministry of Education, 2005). The National Report on Universal Education in China in 2005 touted the success of the "Two Basics" education initiative: illiteracy had been kept down to 4% amongst youth, and the proportion of China's population benefiting from nine years of compulsory education was reported to be 93.6% (Ministry of Education, 2005). Overall, China's recent performance in primary education places it above most developing countries and is more consistent with education in middle-income countries (CHDR, 2005). Education's effect on rural incomes has become an increasingly important subject of discussion, as China looks to improve the human capital of its citizens; subsequently, the different effects education can have on rural incomes and whether or not its aggregate effect is positive has become a worthwhile subject of investigation, and is the topic which will be discussed in this essay.

One effect of education on rural incomes is the improvement to the productivity of labour and can be measured by the rates of return to education, or how each year of schooling can affect earnings. Education also increases the likelihood of migration, as workers leave for urban areas in order to seek better employment opportunities; this reduces the total amount of labor and, more importantly, the amount of human capital in the countryside. Finally, educated rural workers that leave for urban areas can send back remittances and often return to their homes themselves; this infuses valuable resources and knowledge into rural areas.

Benefits of Education to Rural Income

Empirically, in other countries, increased education leads to improved productivity. Welch, in his organizing hypothesis, states that schooling has three effects on production. First, education improves the productivity of all inputs. Second, education improves allocative efficiency, allowing for a more optimal use of inputs. Finally, education leads to better exploitation of market conditions by entrepreneurs, better aligning supply and demand (Schultz, 1988). In this context, T.P. Schultz references several studies completed on the relationship between education and farmer productivity; he concludes that, averaging out the effects of education, farmers were 8.7% more productive if they had completed four years of basic schooling, compared to none (Schultz, 1988). Schultz also mentions the growing importance of

off-farm activities in providing additional income to rural households, and how additional schooling improves earnings from these activities (Schultz, 1988). Schultz, in his work, concludes that education improves earnings of a rural worker in on and off-farm activities.

Studies completed on rural China suggest that, traditionally, rates of return on education have been lower than in other developing countries. Alan de Brauw and Scott Rozelle claim that, with very few exceptions, most studies find returns to education in rural areas of China to be less than 5% (de Brauw, 2007). De Brauw and Rozelle posit that this could be because of the low importance placed on education in earning higher income, compared with other factors like Communist Party membership, during the 1980s and early 1990s. In addition, Haizheng Li and Aselia Urmanbetova find that returns to education are significantly lower in rural China than in urban China; they hypothesize that this may have been a result of an over-supply of labour, combined with non-profit goals associated with non-private firms and the low technology employed by rural companies compared to their urban counterparts, which results in experience over education being a more important factor in improving labour productivity (Li and Urmanbetova, 2005).

Restrictions as a result of the planned economy are another likely determinant in the low returns to education during the pre-reform and early reform periods. Returns to education are only fully capitalized in a market economy, in which producers demand labour with the highest productivity. Correspondingly, individuals must also believe that their investment in additional education, as well as the opportunity cost from lost income, will be repaid with higher future earnings. The above two conditions were obviously not realized in the rural labour market, which was strictly contained through the commune system and restrictions on migration.

Recent changes to the rural labour market suggest that, with the dismantling of the planned economy and increasing competition, market forces will serve to increase returns to education. Zhang, Huang and Rozelle's analysis of rural labour data concludes that this is indeed the case; returns to education have increased constantly during the reform period, reflecting the fact that workers are increasingly responding to market demands for higher-quality labour (Zhang, Huang, and Rozelle, 2002). The trio stated that during the 1980s, workers that had an education at middle school level and above actually made less money than those with only a basic education. During the period of 1988-1996, this situation rapidly reversed itself; real wages rose 10% faster for those with higher education compared to workers who only had elementary schooling (Zhang, Huang, and Rozelle, 2002). Rising returns to education mean that rural workers are finding it more and more valuable to invest in schooling.

Yue, Sicular, Li, and Gustafsson discover an interesting fact about returns to education; they find that returns to education increase with one's level of education (Sicular et al.2005). One possible implication of increasing marginal returns to education is that inequality builds between workers with low levels of education and workers with high levels of education (Sicular et al. 2005); it becomes imperative, therefore, to provide a basic amount of education to rural workers, in order to minimize inequality and extend the opportunity to further capitalize on increasing marginal returns with the possibility of entering post-secondary institutions.

Off-farm work can be an important source of additional income for rural households. Between 1985 and 1996, off-farm employment increased from 67 million to 130 million. By 2000, off-farm employment had exploded to 400 million people, or 40% of total labourers (Zhang, Huang, and Rozelle, 2002); this illustrates the growing importance of off-farm work for rural labourers. Data from the National Bureau of Statistics also shows a clear trend in the growing importance of off-farm additional income to rural households. In 1980, the China Statistical Yearbook reported that 78% of the composite of rural household net income came from agriculture; by 2005, the percentage of composite rural household net income had dropped to 45% (See Table 1). The above data suggests that, as China's labour markets go through reforms, rural workers once bound to communes are finding more lucrative alternatives to farming.

Table 1. Composition of Rural Household Income (percent)

Year	Wages	Agriculture	Other
1980	10	78	12
1985	18	66	16
1990	20	66	14
1995	22	61	17
2000	31	48	21
2005	36	45	19

CSY data, from in-class handout

Zhang, Huang, and Rozelle conduct an econometric analysis to determine the effect of education on off-farm employment. The trio finds that during the early reform period in 1988, the effect of education was very insignificant compared to one's village of origin in determining off-farm work status; however, by 1996, education is found to be a significant determining factor in finding off-farm employment (Zhang, Huang, and Rozelle, 2002). In addition, each additional year of education was found to increase the probability of obtaining an off-farm job by 6-10%, during the period of 1992-1996 (Zhang, Huang, and Rozelle, 2002). The results of the econometric analysis suggest that workers with more education find off-farm employment more easily. The above conclusion, combined with the increasing value of non-agricultural income to rural households, indicate that more investment in rural education will increase incomes and employment opportunities for rural workers in the off-farm sector.

Rural-Urban Migration

One traditional result of improved education has been rural-urban migration, as rural labour moves away from agricultural activities to obtain wage-paying jobs. Intuitively, the main factor in deciding to move to cities must be that better-educated workers do not have as many

opportunities in their rural homes. T.P. Shultz demonstrates this inequality in education returns using data from the 1973 census of Colombia. He finds that on average, rates of return to education in rural areas for men are only one half the returns for men in urban areas (Schultz, 1988). The data results indicate that well-educated workers stand to gain from incurring the costs of migration, in order to gain entry to the higher-wage urban labour market. Schultz references several other studies in which rural migrants quickly obtain income parity with urban workers; for example, Yap (1977), in a paper which was referenced by Schultz, states that rural migrants in Brazil achieve income parity within ten years (Schultz, 1988). Well-educated workers are also better-equipped to undertake a job search in a new environment, and find it easier mentally to adapt to a new environment (Zhao, 1999).

Geographical variation may play a role in deciding the role of education in affecting migration. Different regions may have varying migration costs, quality of education in rural and urban sectors, and available opportunities for better-educated workers. Indeed, it is difficult to correlate returns to education across countries, as each nation has a specific set of circumstances which dictate a person's willingness to migrate as a result of schooling. In particular, rural China has undergone a very unique series of events which have shaped the current migration decision for educated individuals.

Rural China, prior to 1978, was under strict control. The central government wanted to limit the size of the urban population, which was guaranteed a certain standard of living; as a result, rural-urban migration was virtually non-existent. Zhao (1999) claims that the government used two tools to help them limit rural population mobility: collectivization, and the hukou system. First experimented with during the disastrous Great Leap Forward, the collectivization of farming meant that each rural household was assigned to a commune. Everything, from farm tools to cooking utensils, was ostensibly shared in a commune, so that each household became tied to the system. Instead of being paid in money in exchange for goods produced, farmers were allocated work points; this was a consequence of the Maoist way of thinking at the time, which discouraged material rewards or incentives. A result of the work points system was that farmers could not readily use their earnings to pay for migration costs. Unfortunately, even the willingness and the ability to pay for migration would not have guaranteed a farmer the right to move to a city.

The hukou, or household registration, system was another method used by the central government to ensure that rural workers did not migrate. A hukou, also known as an urban residence permit, was required if one wanted to live and work permanently in a city, with all the attendant benefits conferred upon urban residents, such as healthcare. The only way for a rural worker to obtain a hukou was to apply for one through a convoluted procedure spanning multiple bureaucracies; it was a process designed to make ownership of a hukou as difficult as possible. In addition, household status, urban or rural, was inherited through one's mother; this meant that a woman could not ensure her children of urban status simply by marrying a city resident (Naughton, 2007).

As a result of the government-imposed restrictions against urban-rural migration, the income gap between rural and urban areas increased; in fact, by 1980, the ratio of per capita urban to rural incomes had risen to 3.09 (Zhao, 1999). The differences in earnings created a large demand for

urban permits from higher-educated individuals who found limited opportunities within the restricted commune structure. Finally, should a migrant be able to relocate to a city, he would find himself at a considerable disadvantage competing against urban workers; many urban enterprises practiced discriminatory hiring practices. The refusal to hire migrants stems from state-owned enterprises' obligation to provide social services to employees; thus, the government discouraged such SOEs from hiring migrants as a way to limit the amount of employees being supported by the system. The migration controls also meant that education became irrelevant in the decision to migrate, as migration costs were too high for the vast majority of rural workers to afford.

During the 1980s, migration controls began to relax. Zhao brings up the household responsibility system (HRS) as an example. The HRS allowed rural households more freedom to purchase necessities such as food and loosened restrictions created by the collectivization system (Zhao, 1999). The HRS, and other gradual relaxations of the planned economy by the CCP, reduced the cost of migrating to a city. In addition, Knight and Song (2001) have found that discrimination against migrants has relaxed, which improves the probability of a migrant finding an urban job, increasing the returns to migration (de Brauw et al. 2002). A predictable result of the increased labour mobility has been more migration from rural workers seeking to capitalize on higher earnings in the urban sector; population census data indicates that the migrant population increased from 20 million in 1990 to 79 million in 2000 (de Brauw and Giles, 2006). Another factor in explaining the increasing migration of the 1990s is the establishment of migrant networks; a survey of migrants showed that over 90% of migrants moved to a city where they knew someone from their home village (de Brauw and Giles, 2006). China's dismantling of its mobility restrictions on rural workers has lowered the opportunity cost enough so that migration has become a feasible option.

Education in the post-reform period has been shown to have a positive relationship with migration. De Brauw and Giles state, however, that much of the effect of education relates to the attainment of middle-school education as compared to those who do not have even basic levels of schooling. As a case in point, de Brauw and Giles mention that in the China Urban Labor Survey, approximately 82% of the rural-urban migrant respondents had at most a middle school education (de Brauw and Giles, 2006). The above survey data implies that after a certain level, additional education plays no role in inducing further migration; however, this does not mean that having a high school or higher level of education does not affect the migration decision or the level of wages a migrant earns. A further statistic illustrates the situation more clearly: 21% of workers who take part in off-farm work in rural areas have a high school education, compared with only 14% of migrant workers (de Brauw and Giles, 2006). A possible explanation for the low numbers of workers with high school education could be the low returns from the additional schooling. Obtaining a middle school education is sufficient to secure a job in an urban area that is much more lucrative than anything offered by their rural home; any jobs requiring a higher level of education likely go to urban workers, who tend to be better educated. The majority of urban residents have completed high school, which is a stepping stone for post-secondary education. An implication of the current situation is that rural workers consider the opportunity cost of additional education past the middle-school level too high, since many of the high-skill jobs in cities are reserved for urban workers. The choice of rural workers not to obtain high school

education could also be tied into the increasing cost of post-secondary education; de Brauw references a study conducted by Du and Giles which find that tuition between 1996 and 2001 increased by 600 percent (de Brauw and Giles, 2006). The combination of employment restrictions imposed by urban firms and the increasing cost of post-secondary and hence high school education suggests that there exists a human capital gap between urban and rural workers. A possible solution to lessening this human capital gap is to reduce the opportunity cost additional education by lowering university tuition and increasing universal education beyond middle-school.

The same constrictions that serve as a disincentive for high school education also reduce the returns to education from migration, since rural migrants only have access to lower-paying jobs than urban workers. Nonetheless, there exists much evidence which shows that migration is positively correlated with education. De Brauw, Huang, Rozelle, Zhang and Zhang in their paper, "The Evolution of China's Rural Labor Markets during the Reforms", find in their regression analysis of variables affecting migration that the coefficient of years of education is 1.16; in other words, each year of education increases the probability of migration in an individual by 16 percent (de Brauw et al. 2002). Conversely, Zhao finds that formal education has a very small, albeit positive, effect on the migration decision; primary and middle schooling improved the likelihood of migration by only 1.9% (Zhao, 1999). Zhao admits that her results are contrary to even her earlier paper, which concluded that schooling had a large positive effect on permanent migration (Zhao, 1999). One possible explanation for the above inconsistency may be Zhao's use of data from Sichuan; educated workers from the province simply preferred off-farm work to migratory work. Zhao's findings from the Sichuan data illustrate the point that the effect of education on migration, like returns to education, depends partly on location.

In addition, de Brauw, Huang, and Rozelle experiment with data to determine that younger people are more likely to migrate; in fact, the regression showed that each additional year in age decreased the probability of migration by 6% (de Brauw et al. 2002). The trend of younger migrants indicates that the relative profitability of participating in agricultural activities and rural off-farm jobs is falling compared to urban jobs. As the younger generation of rural workers realizes the existence of the rural-urban wage gap, they will choose to migrate, rather than staying in their rural homes; it is therefore in the best interests of rural workers for the central government to increase education in rural areas so that migrants will have increased competitiveness with urban workers.

Return Migration and Remittances

Two important factors for consideration when calculating the effect of migration on rural incomes are return migration and remittances. Return migrants can be useful for rural areas, as they bring back valuable experience, capital, and knowledge to their homes. Zhao, in her paper "Return Migration in China", finds that return migration has increased in recent years; out of all workers that had migrated, 38.4% chose to return home permanently (Zhao, 2002). Several variables have an effect on the decision for return migration; in general, increases in age and education, and getting married increases the probability that a migrant will return home (Zhao, 2002). Education, in particular, had a significant effect on the probability of returning. An illiterate worker had a

4.1% chance of return migration, compared to 33.9% for primary school graduates, 37.4% for middle school graduates, and 40.2% for high school graduates (Zhao, 2002). Zhao postulates that the reason for the correlation between education and return migration is the lack of employment suitable for a worker's education level; this corresponds with other studies which indicate that migrant work tends to be less skill-based than work for urban workers. In terms of the effect of return migration, Zhao analyzed the employment activities of return migrants and concluded that migration experience itself has little to no effect on the types of work return migrants obtain (Zhao, 2002). Investment, therefore, must be the primary contribution to rural productivity that return migrants provide. Research indicates that return migrants invest most heavily in farming machines. More farming machinery means agricultural productivity improves, furthering China's modernization.

Remittances refer to income sent by migrants back to their rural homes. In China, one possible reason for migrants continuing to send a portion of their earnings back to family is the deep-seated sense of familial loyalty, stemming from the Confucian notion of filial piety; sons are expected to care for their parents as they reach old age, as opposed to the converse in most other countries. Liu and Reilly suggest that remittances may also be a type of repayment to the family for the investment in education and costs of migration that the family paid for the migrant (Liu and Reilly, 2004). Other reasons for remittances include spousal and child support.

Liu and Reilly analyze the variables affecting remittances in detail. First, they find that migrants who undertook training and education prior to migration send almost 50% more in remittances than those migrants who did not (Liu and Reilly, 2004). In addition, possession of a temporary resident card reduces the amount of remittances sent home. The pair also determines a positive relationship between migrant income and the amount of remittances sent; for every one percent increase in income, a migrant sent back an additional 17 yuan per year (Liu and Reilly, 2004). In total, Liu and Reilly estimate that the mean remittance value for migrants was 2,110 yuan (Liu and Reilly, 2004). Lu and Song calculated that the average income of a rural migrant worker was approximately 762 yuan per month, or 9,144 yuan per year (Lu and Song, 2006). The above two results signify that on average, a migrant sends back a significant portion of their annual income: approximately 23.1%.

Combined Effects of Education

The past several sections focused on independent analyses of the different variables affecting rural income; specifically, the effect of education on each variable. Combining all the above analyses can produce a complete framework in which to view the overall effect of education on rural incomes.

Education can directly affect farm productivity; from empirical evidence, a year of education can improve agricultural returns by 8.7% per year of schooling. Off-farm employment produces higher earnings than agriculture, and education was shown to improve the likelihood of obtaining such an off-farm job by 6-10% per year of schooling, or an average of 8%. Perhaps more importantly, education has a positive impact on migration: 16% per year of schooling, if de Brauw, Huang, and Rozelle's findings are considered to be reliable. Migration itself can have

externalities on rural income, such as return migration, which infuses the rural economy with additional investment and knowledge. Migration can also lead to remittances, which can be approximately 23.1% of annual income, further improving the household income of the rural migrant. Education's direct effect on rural income as a result of increased migration can be seen as the movement from a rural income to a rural migrant income: from 2,936 yuan a year (Naughton, 2007) to 9,144 yuan a year. While the direct benefits of return migration are not easily translatable to income, remittances are more quantitative. Remittances improve the household income of a rural migrant's family, but not the individual income of the migrant.

Finally, a basic model of the effect of education on the individual income of a rural worker can be established:

Variable	Explanation
IND_INC	Average individual income of a rural worker (including the possibility of becoming a rural migrant)
YR_SCH	Years of education
PRB_MIG	Probability of migrating, with no years of education
PRB_OFF	Probability of obtaining off-farm work, with no years of education
OFF_INC	Income from off-farm rural employment
AG_INC	Income from agricultural activities
MIG_ING	Income as a rural migrant

$$IND\_INC = (1 - 0.16*YR\_SCH*PRB\_MIG)[(0.087*YR\_SCH)*AG\_INC + (0.08*YR\_SCH+PRB\_OFF)*OFF\_INC] + (0.16*YR\_SCH*PRB\_MIG)*MIG\_INC$$

Externalities such as return migration and remittances are not included; although they have a positive benefit on household income and farm productivity, they do not improve the individual income of the rural worker. In addition, income as a rural migrant is also dependent on education. Unfortunately, the direct relationship between education and migrant income is difficult to capture, because of the discriminatory hiring practices of urban firms, which tend to hire migrant labour for lower-skilled jobs compared to jobs that urban workers would receive. It seems likely that increased education benefits a migrant, but only to a certain degree, after which additional schooling would be meaningless. De Brauw's findings agree: while a large number of migrants have a middle-school education, the proportion of migrants with a high-school education is considerably smaller.

While education improves farm productivity and can lead to off-farm rural work, the primary benefit of education seems to be that it improves the probability of migration. Migrant income is significantly higher than average rural incomes, suggesting that there exist inequalities between

the urban and rural labour markets; such an inequality induces rural workers to move to cities. In addition to the higher income from obtaining a job in an urban area, there are additional, less tangible, benefits to rural areas from migration: return migration and remittances. Both return migration and remittances can improve farm productivity, which is a necessary stage in China's modernization process.

The model demonstrates that education has a multiple effect on rural incomes, and that each year of additional education will result in overlapping positive shifts in different aspects of rural individual incomes.

Conclusion

The "Scientific Outlook on Development" focuses on fostering long-term economic growth by concentrating on efficiency of inputs, as opposed to quantity; education, predictably, is a key component in improving the productivity of China's workers by increasing human capital. Hu Jintao, in his speech to the 17th National Party Congress, states that, "The modern system of national education will be further improved, a basic system for lifelong education will be in place, the educational attainment of the whole nation will rise to a much higher level, and the training of innovative personnel will be improved markedly" (Hu, 2007). Hu's speech reflects the Chinese government's promise to provide nine years of compulsory education to the entire country.

Despite the recent commitment made by China towards education, it is clear that much remains to be done. For example, in a recent survey, 19% of rural females and 8% of rural males were illiterate, compared with 7% and 2% for urban females and urban males, respectively (Naughton, 2007). The above statistic illustrates two realities of education in modern China: girls tend to receive less education than boys, and urban dwellers have a higher rate of education than rural residents. Additionally, migrants often do not receive the same access to education for their children as urban citizens in the same city. Education in China, therefore, is very unequally distributed. Another issue with education in China is the lack of money being spent. Even though the central government is responsible for dictating policy regarding education, it is the local governments which provide funding for and organizes education; education spending in China, as a result, was only 3% of GDP during the 1990s, which is a small proportion compared to other similar countries (Naughton, 2007). The gap between policy and practice is one of many instances where policy set out by the central government is not carried out by localities, due to conflicts of interest, lack of incentive, and corruption.

Until China lowers the cost of education to rural workers and subsidizes local governments for the costs of providing education, rural workers will continue to receive less schooling than their urban counterparts, resulting in a competitive disadvantage, which is exacerbated by the increasing marginal returns to education.

The findings represented in this essay demonstrate that education has multiple positive effects on rural incomes, and increases the opportunities available to rural workers by improving the benefits of migration. Unfortunately, the insufficient resources spent on education and the inequalities mentioned above prevent the full benefits of education from being transferred to the

countryside, and indicate that Hu was correct in targeting education as a potential engine to sustain China's rapid economic growth in the future.

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