

# **Returns to Education and Employment Outcomes: Evidence from CULS3**

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# **Presentation goals and outline**

**Goal: to provide preliminary empirical evidence and demonstrate features of returns to education and employment outcome**

**Outline :**

- **Statistical Description and Features**
- **Returns to Education of local and migrant wage workers**
- **Quantile Regression of local and migrant workers**
- **Returns to Education only Self-employed**
- **Returns to Education of Formal vs. Informal Employment only employed**
- **Returns to Education of Formal vs. Informal Jobs only employed**
- **Returns to Education of Formal vs. Informal Sectors**
- **Switching Regression Model for Formal and Informal Workers**
- **Returns to Education controlled city variables**
- **Preliminary conclusion**

## Statistical Description for women Aged 16 to 55 and Men aged 16 to 60

Variable	All	Local	Migrants
Age	38.5	39.5	33.8
Sex (male=1)	51.3%	51.4%	50.8%
Middle school and below	32.4%	28.1%	53.1%
Regular high school	29.5%	31.3%	21.3%
Vocational high school	9.11%	9.64%	6.64%
Vocational higher education	15.9%	17.1%	10.2%
Regular college and above	13.0%	13.9%	8.80%
Years of Schooling	11.9	12.2	10.6
Work experience	22.0	23.0	17.4
Proportion of children under 16 in the family	26.4%	25.2%	32.2%
Proportion of old people up 60 in the family	15.0%	13.4%	22.8%
Monthly wage (yuan/month)	2424.0	2394.1	2453.0
Weekly working hours (hour)	47.3	45.0	55.8
Hourly wage (yuan/hour)	11.9	12.8	10.9
Obs	11,041	5432	5640

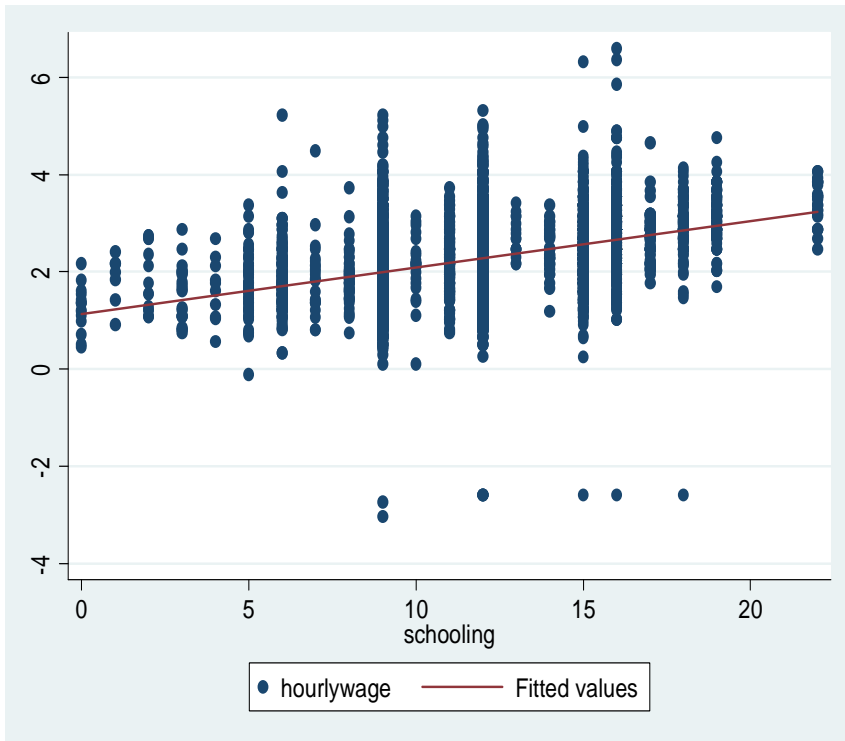
## Formal and Informal Workers Hourly Wage for Different Educational Levels

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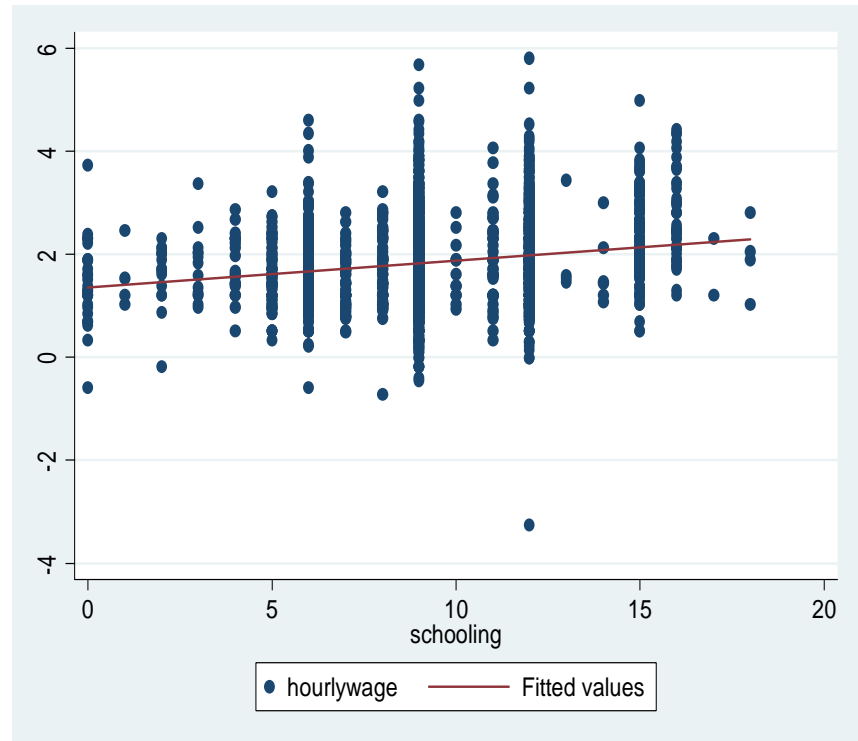
	Formal workers	Informal workers (include self-work)	Informal workers (exclude self-work)
Middle school and below	11.61	7.14	6.80
Regular high school	12.91	8.19	8.02
Vocational high school	12.03	8.89	8.82
Vocational higher education	15.86	10.30	9.76
Regular college and above	21.72	16.90	16.46

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it's obvious to exist difference for different educational levels.

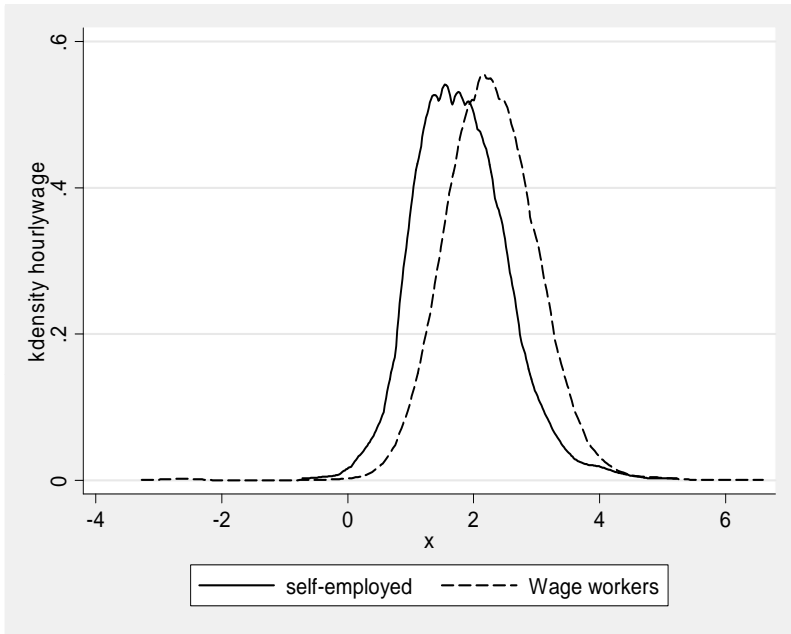


**Log Hourly wage plot in formal sector by schooling years**

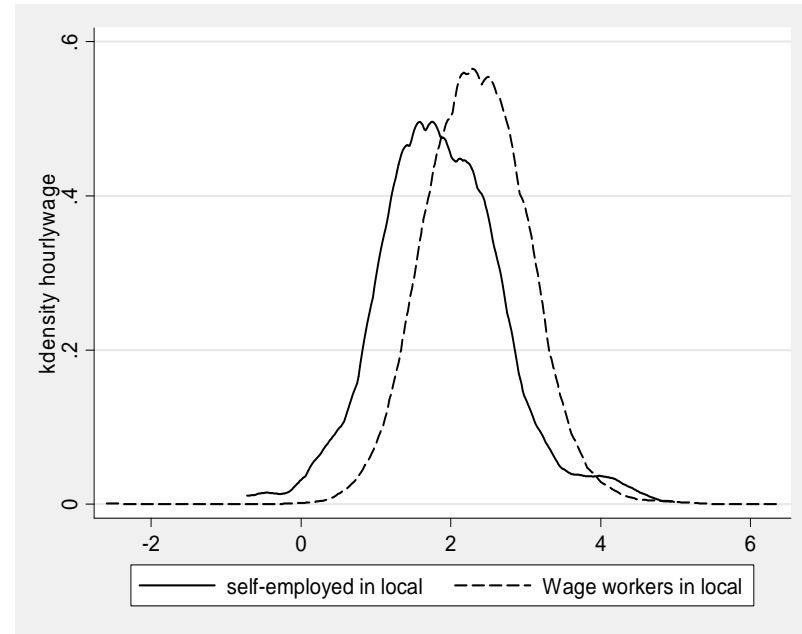


**Log Hourly wage plot in informal sector by schooling years**

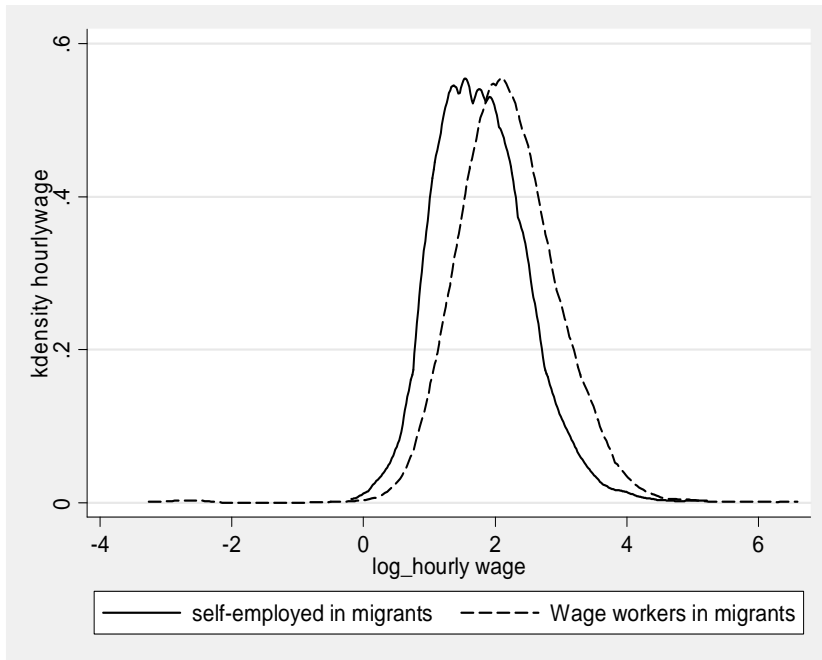
These two figures show the line of fitted value in the informal sector tend more horizontal than formal sector, the slop of fitted value line in the formal sector is evident bigger than informal sector.



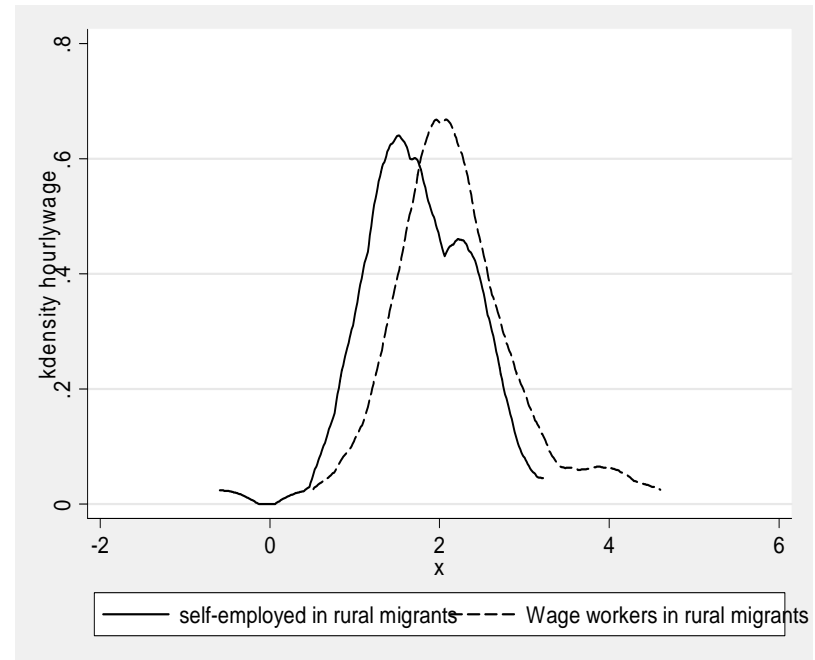
Wage workers and self-employed for full sample



Wage workers and self-employed for local residents

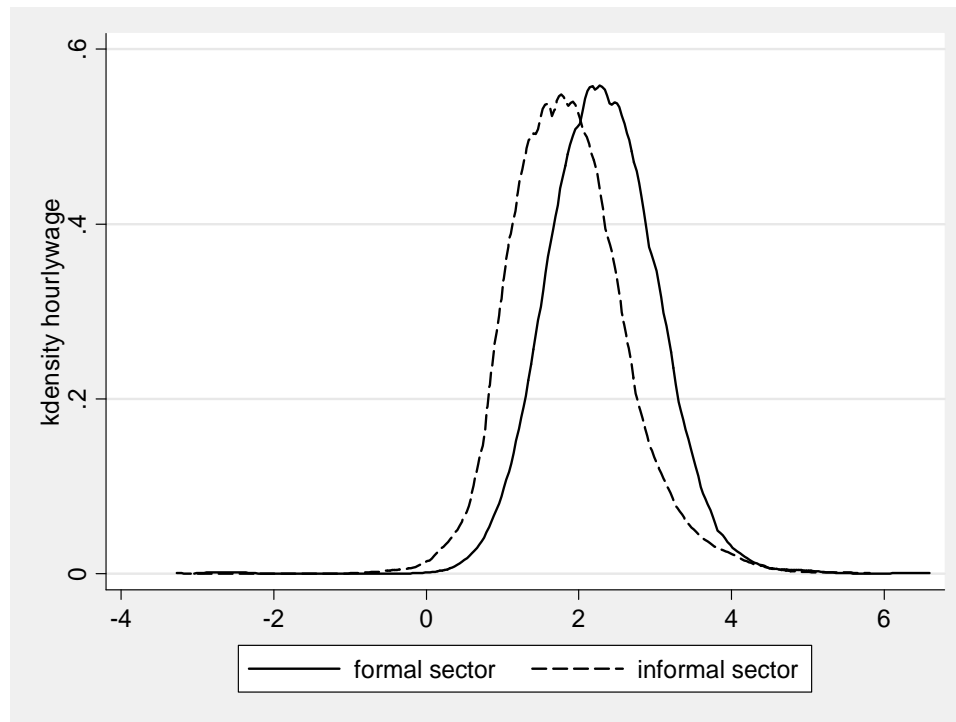


Wage workers and self-employed for migrants



Wage workers and self-employed for rural migrants

The density of log-hourly wages in the formal and informal sector overlap to large extent.





## Returns to Education by OLS and Heckman from Pooled Sample

	OLS		Heckman	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Schooling	0.1048	0.000	0.1076	0.000
experience	0.0259	0.000	0.0334	0.000
experience2	-0.0005	0.000	-0.0008	0.000
Sex	0.2157	0.000	0.2686	0.000
City dummy		Yes		Yes
_cons	0.9373	0.000	0.7852	0.000
<i>Select function</i>				
				Yes
lambda			0.1856***	0.0642(Std.)
Obs	10844		10844	

## Returns to Education Both Local Workers and Migrants Workers Exclude Self-employed ( I )

	Local		Migrant	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Schooling	0.1141	0.000	0.0939	0.000
Experience	0.0333	0.000	0.0364	0.000
experience2	-0.0007	0.000	-0.0009	0.000
Sex	0.2581	0.000	0.2774	0.000
City dummy		Yes		Yes
_cons	0.6891	0.000	0.9829	0.000
<i>Select function</i>		Yes		Yes
lambda	0.1897**	0.0933(Std.)	0.1112***	0.0390(Std.)
Obs		4812		3587

## Returns to Education Both Local Workers and Migrants Workers Exclude Self-employed( II )

	Local		Migrant	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Regular high school	0.2012	0.000	0.2092	0.000
Vocational high school	0.3525	0.000	0.2553	0.000
Vocational higher education	0.6026	0.000	0.5709	0.000
College and above	0.8894	0.000	0.9383	0.000
experience	0.0343	0.000	0.0418	0.000
experience2	-0.0007	0.000	-0.0011	0.000
Sex	0.1976	0.000	0.2813	0.000
City dummy		Yes		Yes
_cons	1.8094	0.000	1.7524	0.000
<i>Select function</i>		Yes		Yes
lambda	-0.1289*	0.0684(Std.)	0.0737*	0.0370(Std.)
Obs		4812		3587

## Quantile Regression in the Local Workers for Different Percentiles

	Quant 10	Quant 25	Quant 50	Quant 75	Quant 90
Schooling	0.1184***	0.1186***	0.1223***	0.1103***	0.0987***
Experience	0.0370***	0.0353***	0.0336***	0.0294***	0.0271***
experience2	-0.0010***	-0.0008***	-0.0007***	-0.0005***	-0.0004***
Sex	0.1881***	0.2239***	0.2260***	0.2316***	0.2139***
Wuhan (shanghai=0)	-0.5622***	-0.4658***	-0.4624***	-0.4525***	-0.4556***
Shenyang (shanghai=0)	-0.6479***	-0.6007***	-0.5393***	-0.5579***	-0.5035***
Fuzhou (shanghai=0)	-0.3144***	-0.2202***	-0.2352***	-0.2528***	-0.2137***
Xian (shanghai=0)	-0.7003***	-0.6219***	-0.6240***	-0.6011***	-0.6035***
Guangzhou (shanghai=0)	-0.0477	0.0047	0.0000	0.0515	0.1626***
_cons	0.1820**	0.3499***	0.6132***	1.0994***	1.5423***
Obs	5342	5342	5342	5342	5342

## Quantile Regression in the Migrant workers for Different Percentiles

	Quant 10	Quant 25	Quant 50	Quant 75	Quant 90
Schooling	0.0794***	0.0803***	0.0859***	0.0849***	0.0825***
Experience	0.0202***	0.0214***	0.0254***	0.0264***	0.0310***
experience2	-0.0005***	-0.0006***	-0.0006***	-0.0006***	-0.0006***
Sex	0.1116***	0.1739***	0.2430***	0.2685***	0.2441***
Wuhan (shanghai=0)	-0.6424***	-0.6692***	-0.6769***	-0.6437***	-0.6242***
Shenyang (shanghai=0)	-0.5104***	-0.5034***	-0.5173***	-0.4941***	-0.4767***
Fuzhou (shanghai=0)	-0.2484***	-0.2847***	-0.3068***	-0.3219***	-0.2947***
Xian (shanghai=0)	-0.7614***	-0.7690***	-0.7524***	-0.6742***	-0.6519***
Guangzhou (shanghai=0)	0.0276	0.0033	0.0194	0.0980**	0.1532**
_cons	0.6993***	0.9819***	1.1725***	1.4861***	1.8227***
Obs	5502	5502	5502	5502	5502

Quantile Regression shows returns to education has significant difference in different quantile point of wage distribution in both local workers and migrants.

## Returns to Education of Self-employed

Years of Schooling		Level of Education	
<i>Wage function</i>		<i>Wage function</i>	
Schooling	0.0713***	Regular high school	0.2648***
experience	0.0234**	Vocational high school	0.1806***
experience2	-0.0006***	Vocational higher education	0.5010***
Sex	0.2524***	College and above	0.8274***
City dummy	Yes	experience	0.0253***
_cons	1.1475***	experience2	-0.0007***
<i>Select function</i>	Yes	Sex	0.2456***
lambda	0.6164***	City dummy	Yes
Obs	2487	<i>Select function</i>	Yes
		lambda	-0.4195***
		Obs	2487

## Returns to Education of Formal vs. Informal Employment

### Exclude Self-employed ( I )

	Formal employment		Informal employment	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Schooling	0.0928	0.000	0.0732	0.000
experience	0.0193	0.000	0.0319	0.000
experience2	-0.0004	0.000	-0.0009	0.000
Sex	0.2011	0.000	0.2110	0.000
City dummy		Yes		Yes
_cons	1.1973	0.000	1.1650	0.000
<i>Select function</i>		Yes		Yes
lambda	-0.1189*	0.0837(Std.)	-0.2178*	0.1086(Std.)
Obs		5772		2744

## Returns to Education of Formal vs. Informal Employment Exclude Self-employed ( II )

	Formal employment		Informal employment	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Regular high school	0.1496	0.000	0.1484	0.000
Vocational high school	0.2220	0.000	0.2566	0.000
Vocational higher education	0.4810	0.000	0.4625	0.000
College and above	0.7564	0.000	0.8492	0.000
experience	0.0248	0.000	0.0390	0.000
experience2	-0.0005	0.000	-0.0011	0.000
Sex	0.2014	0.000	0.2271	0.000
City dummy		Yes		Yes
_cons	2.0286	0.000	1.7260	0.000
<i>Select function</i>		Yes		Yes
lambda	-0.1136*	0.0794(Std.)	-0.2854**	0.1277(Std.)
Obs		5772		2744



**Returns to Education of Formal vs. Informal Jobs**  
**Exclude Self-employed ( I )**

	Formal jobs		Informal jobs	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Schooling	0.0949	0.000	0.0666	0.000
experience	0.0194	0.000	0.0324	0.000
experience2	-0.0004	0.000	-0.0008	0.000
Sex	0.2031	0.000	0.1833	0.000
City dummy		Yes		Yes
_cons	1.1357	0.000	-0.0223	0.609
<i>Select function</i>				
		Yes		Yes
lambda	0.0970*	0.0673(Std.)	0.1351*	0.0931(Std.)
Obs		5956		2528

**Returns to Education of Formal vs. Informal Jobs  
Exclude Self-employed ( II )**

	Formal jobs		Informal jobs	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Regular high school	0.1939	0.000	0.0780	0.014
Vocational high school	0.2370	0.000	0.2684	0.000
Vocational higher education	0.5067	0.000	0.4357	0.000
College and above	0.7824	0.000	0.7480	0.000
experience	0.0234	0.000	0.0383	0.000
experience2	-0.0005	0.000	-0.0009	0.000
Sex	0.2035	0.000	0.1951	0.000
City dummy		Yes		Yes
_cons	1.9790	0.000	1.6566	0.000
<i>Select function</i>		Yes		Yes
lambda	-0.1037*	0.0664 (Std.)	0.1393*	0.0941(Std.)
Obs		5956		2565

## Returns to Education of Formal vs. Informal Sectors ( I )

	Formal Sectors		Informal Sectors	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Schooling	0.1060	0.000	0.0669	0.000
experience	0.0272	0.000	0.0231	0.001
experience2	-0.0005	0.000	-0.0006	0.000
Sex	0.2052	0.000	0.2607	0.000
City dummy		Yes		Yes
_cons	0.9159	0.000	1.2481	0.000
<i>Select function</i>				
		Yes		Yes
lambda	0.2144*	0.1357(Std.)	0.4728***	0.1093(Std.)
Obs		7541		3409

## Returns to Education of Formal vs. Informal Sectors ( II )

	Formal Sectors		Informal Sectors	
	Coef.	P> z	Coef.	P> z
<i>Wage function</i>				
Regular high school	0.2213	0.000	0.2040	0.000
Vocational high school	0.3106	0.000	0.1924	0.001
Vocational higher education	0.5957	0.000	0.4284	0.000
College and above	0.9014	0.000	0.8021	0.000
experience	0.0319	0.000	0.0271	0.000
experience2	-0.0006	0.000	-0.0007	0.000
Sex	0.2070	0.000	0.2752	0.000
City dummy		Yes		Yes
_cons	1.8355	0.000	1.7681	0.000
<i>Select function</i>		Yes		Yes
lambda	0.1120*	0.0536(Std.)	0.4829***	0.0971(Std.)
Obs		7541		3409

## Estimating Results of **Switching Regression Model** for Formal and Informal Workers

Variable	Coefficients	Std. Err
Log hourlywage (formemp=1)		
Schooling	0.0833***	0.0061
experience	0.0242***	0.0030
experience2	-0.0005***	0.0001
Sex ( male=1)	0.1658***	0.0357
Household size	-0.0104	0.0104
Share male labourer	0.0296**	0.0149
Mean education of other labor	-0.0285*	0.0152
Highest education of other labor	0.0444***	0.0134
Mean age of other labor	-0.0017***	0.0003
Log hourlywage (informemp=0)		
Schooling	0.0427***	0.0067
experience	0.0236***	0.0031
experience2	-0.0006***	0.0001
Sex ( male=1)	0.2919***	0.0408
Household size	-0.0089	0.0118
Share male labourer	-0.0381**	0.0167
Mean education of other labor	0.0526**	0.0228
Highest education of other labor	-0.0330*	0.0190
Mean age of other labor	-0.0008***	0.0003
infemp (selection equation)	yes	yes
Obs	10843	

## Estimating Results of Returns to Education **controlled city variables**

	Coefficients	Std. Err
Regular high school(edug2)	0.6911***	0.0604
Vocational high school(edug3)	0.6614***	0.0788
Vocational higher education (edug4)	0.9502***	0.0561
College and above(edug5)	1.1405***	0.0564
infemp* city_infshare*edug2	1.4190***	0.4847
infemp* city_infshare*edug3	0.0189	0.7111
infemp* city_infshare*edug4	1.3241**	0.6758
infemp* city_infshare*edug5	-1.7734**	0.8704
infemp* city_infshare	-2.3153***	0.1046
infemp*edug2	-0.2124**	0.0852
infemp*edug3	0.0466	0.1379
infemp*edug4	-0.2651**	0.1165
infemp*edug5	0.3134**	0.1474
city_infshare *edug2	-3.3100***	0.3291
city_infshare *edug3	-2.8091***	0.3865
city_infshare *edug4	-3.2404***	0.3013
city_infshare *edug5	-2.6361***	0.3146
_cons	2.1505***	0.0175
Obs		10845

## Preliminary conclusion

- Firstly, there is a general trend that returns to education increases with improving level of education or education in China urban by migration (by local-migrants), employment (by formal-informal), jobs (by formal-informal) and sector (by formal-informal). Specifically, wage returns to education in the pooled sample, local labor and migrants exclude self-employed workers are respective 10.76%, 11.4% and 9.39%.
- Secondly, returns to vocational education has obviously increased in different labor group, especially in the level vocational high school and vocational higher education. In addition, returns to vocational high school are higher than that of regular high school. But at similar educational level, returns to educations of informal sector is still below than formal sector.

- Thirdly, it is clearly from quantile regression results that returns to education has significant difference in different quantile point of wage distribution in both local labor and migrants. Returns to education present considerable gap between formal employment and informal employment if using to switching regression model, compared to no control whether or not any other family member is a formal worker. Individual's returns to education has evident growth if certain city variables are controlled, compared to pure Mincer equation.
- Finally, Earnings of informal sector in urban China share similar features with some other developing countries, for example, Monthly wages reflect earning opportunities in the informal employment better than hourly wages. Not all employment of informal sector or informal employment is inferior to employment of formal sector with regard to wage. Despite the evident difference in mean earning, densities of informal and formal sector log-earning overlap to large extent. Wage dispersion is greater in the informal sector compared to formal sector.



Thanks!