

# Effect of public education investment on Family education investment

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WISE

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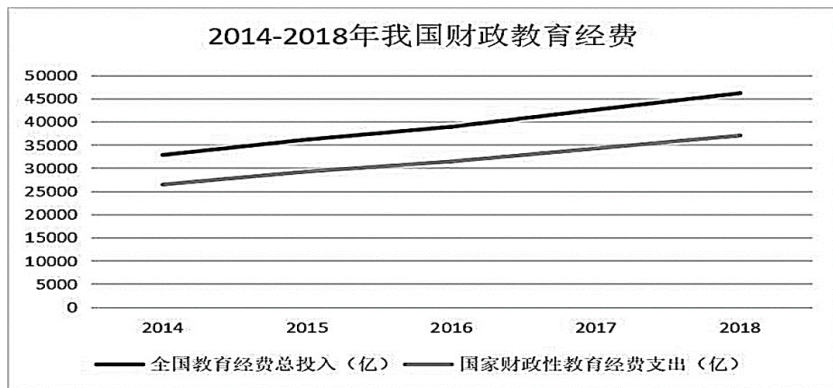
# Overview

- Introduction
- Data & Analysis
- Robustness Test
- Heterogeneity Analysis
- Conclusion

# Part 1: Introduction

# Total education investment

- Public education investment
- Social education investment
- Family funds investment



How does fiscal expenditure affect household consumption?

- Bailey(1971) and Barro(1974)
- Aschaue(1985) and Ho(2001): Substitution Effect
- Karras(1994) and Schclarek(2007): Complementary Effect

How does public education investment affect family education investment?

- Tilak(2002): Different income level
- Chen(2013): The difference between urban and rural areas
- Wu(2014): Substitution Effect
- Wei(2018): Complementary Effect

How does public education investment affect family education investment?

- No effect
- Substitution Effect: crowd-out
- Complementary Effect: crowd-in

# Part 2: Data & Analysis



## CFPS (China Family Panel Studies)

Nationally representative, annual longitudinal survey of Chinese communities, families, and individuals launched in 2010 by the Institute of Social Science Survey (ISSS) of Peking University, China. The CFPS is designed to collect individual-, family-, and community-level longitudinal data in contemporary China.

Year: 2014 2016 2018

# Data Preparation

- What we have:
  - cross-sectional CFPS data of the personal level of 2014,2016,2018
  - cross-sectional government data of investment of 2014,2016,2018
- Link:
  - family *id* in each year
  - year
- What we want:

Panel data containing both personal level and government level data of 2014,2016,2018
- How?

## Control Variables:

- Urban: 1:Yes 0:No
- Pri: the number of people studying in primary school in this family
- Jun: the number of people studying in middle school in this family
- Sen: the number of people studying in senior high school in this family
- Uni: the number of people studying in university or higher level in this family

## Control Variables:

- Fml: number of family members
- Pta-pre: The proportion of public education investment last year

## Dummy:

- Province :  $p_x$  stands for whether belong to this province: 1 for Yes and 0 for No

# Data Description

Variable	Obs	Mean	Std. Dev.	Min	Max
edc	30,372	1936.267	5414.964	0	191000
pc_pre	30,372	960.0061	488.409	111.74	2522.55
pta_pre	30,372	16.59395	2.253982	10.77	20.9
fml	30,372	3.824806	1.880731	1	21
pri	30,372	.1108587	.3427417	0	3
jun	30,372	.0924207	.3041521	0	3
sen	30,372	.064566	.2577939	0	3
uni	30,372	.0530094	.2342574	0	3

# Model Specification

$$EduExpense_{it} = \beta_1 EduInvestment_{it} + \beta_2 Urban + \beta_3 Primary + \beta_4 Middle + \beta_5 Senior + \beta_6 University + \beta_7 Famnumber + \beta_8 Pta + \alpha_i + \lambda_t + u_{it}$$

- Dependent Variables: The family 's education during last 12 months
- Variable of Interest: Educational financial investment last year in this provinc(take the logarithm)
- Hausman test  $\rightarrow$  we should use fixed effects model

# Result for Main Regression

	Test 1	Test 2	Test 3	Test 4	Test 5
ln(previous year's public education investment)	89.38207	228.2611***	-480.4966***	1259.703***	800.4404**
	(69.5222)	(70.57044)	(172.8922)	(394.3565)	(377.0605)
adjusted R-square	0.0001	0.2909	0.1755	0.021	0.1858
number of family members		297.1399***	263.6613***	343.2714***	226.6461***
pta_pre		-81.17336***	-3.020934	5.756746	13.38035
pri		724.5491***	-147.6921		-116.1768
jun		1711.428***	-244.188		-189.8925
sen		4613.156***	2009.116***		2072.676***
uni		10245.28***	9552.281***		9548.699***
urban		355.3704***	12.49071*	30.38048	103.1517
constant	1332.629***	-638.449	3620.045***	-8094.652***	-5520.134**
family fixed effect	x	x	√	√	√
province fixed effect	x	x	x	√	√
year fixed effect	x	x	x	√	√
*10% significance level					
**5% significance level					
***1% significance level					

# Part 3: Robustness Test



# Family Income & expenditure

Variable	Obs	Mean	Std. Dev.	Min	Max
finc	30,372	55247.21	98315.16	0	8336000
fexp	30,372	38746.42	63773.93	0	4500000

Family income during last 12 months

Family expenditure during last 12 months

# Family Income & expenditure

	Test 1
ln(previous year's public education investment)	792.4505**
	(376.9249)
adjusted R-square	0.186
family total income	-0.001256
familt total expenditure	0.0013449**
number of family members	222.417***
pta_pre	14.61528
pri	-116.5267
jun	-192.5342
sen	2076.743***
uni	9542.243***
constant	-5509.238**
family fixed effect	√
province fixed effect	√
year fixed effect	√
*10% significance level	
**5% significance level	
***1% significance level	

Family Income → 4 levels

- Top 25%
- Above average 25%
- Below average 25%
- Bottom 25%

	Test 1
ln(previous year's public education investment)	787.1278**
	(377.0954)
adjusted R-square	0.1861
number of family members	225.1683***
pta_pre	14.60676
pri	-116.6683
jun	-191.8234
sen	2071.943***
uni	9548.383***
fexp	0.001288*
bottom 25%	-31.11597
below average 25%	-104.3571
above average 25%	-67.92055
constant	-5455.013**
family fixed effect	√
province fixed effect	√
year fixed effect	√
*10% significance level	
**5% significance level	
***1% significance level	

# Region



	Test 1
ln(previous year's public education investment)	639.6968**
	(287.5525)
adjusted R-square	0.185
number of family members	232.6635***
pta_pre	24.87007
pri	-112.6572
jun	-186.3536
sen	2079.807***
uni	9553.229***
North China	1090.495
Northeast	1568.364**
East China	478.3871
Central & South China	273.0013
Southwest China	1206.441*
constant	-4990.916***
family fixed effect	√
province fixed effect	√
year fixed effect	√
*10% significance level	
**5% significance level	
***1% significance level	

# No Logarithm

	Test 1
previous year's public education investment	0.2336572 (0.3117179)
adjusted R-square	0.1856
number of family members	226.1444***
pta_pre	34.66548
pri	-116.4557
jun	-188.9816
sen	2074.402***
uni	9554.072***
constant	-941.886
family fixed effect	√
province fixed effect	√
year fixed effect	√
*10% significance level	
**5% significance level	
***1% significance level	

# Part 4: Heterogeneity Analysis



# Income

	Top 25%	Above Average 25%	Below average 25%	Bottom 25%
ln(Public Education Investment)	315.4482	1299.5110	1317.0700	845.2863
(last year)	(1090.513)	(1204.832)	(1220.672)	(738.9546)
Adjusted (Within) R <sup>2</sup>	0.0735	0.2416	0.2817	0.2226
Constant	-5334.488	-7515.039	-900.9055	-6232.33
Control Variables	√	√	√	√
Family Fixed Effect	√	√	√	√
Province Fixed Effect	√	√	√	√
Year Fixed Effect	√	√	√	√
*10% significance level				
**5% significance level				
***1% significance level				

	North China	Northeast	East China	Central China & South China	Southwest China	Northwest
ln(Public Education Investment)	-1467.629	1149.5260	326.8193	851.2579	706.827	-1218.49
(last year)	(1856.178)	(1730.691)	(1398.365)	(862.4591)	(1298.622)	(1651.264)
Adjusted (Within) R <sup>2</sup>	0.1812	0.1165	0.1496	0.1775	0.2477	0.2792
Constant	7875.117	-6373.281	-6526.492	-824.4563	-8207.152	5075.245
Control Variables	√	√	√	√	√	√
Family Fixed Effect	√	√	√	√	√	√
Province Fixed Effect	√	√	√	√	√	√
Year Fixed Effect	√	√	√	√	√	√
*10% significance level						
**5% significance level						
***1% significance level						

# Urban

	Urban	Rural
ln(Public Education Investment)	862.3886	1280.269**
(last year)	(627.0403)	(502.3059)
Adjusted (Within) $R^2$	0.1457	0.2446
Constant	-5577.531	-5369.587
Control Variables	√	√
Family Fixed Effect	√	√
Province Fixed Effect	√	√
Year Fixed Effect	√	√
*10% significance level		
**5% significance level		
***1% significance level		

# Education Stage

	Primary	Junior	Senior	University or above
ln(Public Education Investment)	4145.468***	5690.358***	4743.128***	6831.986***
(last year)	(242.5616)	(493.6325)	(612.0709)	(894.0526)
Adjusted (Within) R <sup>2</sup>	0.9077	0.8908	0.8930	0.8519
Urban	182.717	80.62312	-326.5138	-329.21
Fml	-9.346402	-4.220768	-14.65098	-37.1525
Pta_pre	190.7646***	-166.4838***	-88.28429	-22.02707
Constant	-24187.48***	-26305.4***	-21924.76***	-31245.73***
Family Fixed Effect	√	√	√	√
Province Fixed Effect	√	√	√	√
Year Fixed Effect	√	√	√	√
*10% significance level				
**5% significance level				
***1% significance level				

# Education Stage

Check whether the effect on each education stage performs differently between urban and rural areas

Urban Areas	Primary	Junior	Senior	University or above
ln(Public Education Investment)	3914.014***	5237.454***	4799.617***	7193.199***
(last year)	(376.1731)	(689.1969)	(805.0242)	(1274.128)
Adjusted (Within) R <sup>2</sup>	0.8582	0.8030	0.8640	0.7275
Fml	-9.346402	70.38434	35.138	-252.9567
Pta_pre	190.7646***	69.65277**	-88.63398	-98.15537
Constant	-24187.48***	-22573.36***	-22549.01***	-31492.81***
Family Fixed Effect	√	√	√	√
Province Fixed Effect	√	√	√	√
Year Fixed Effect	√	√	√	√
*10% significance level				
**5% significance level				
***1% significance level				

# Education Stage

<b>Rural Areas</b>	<b>Primary</b>	<b>Junior</b>	<b>Senior</b>	<b>University or above</b>
ln(Public Education Inves (last year)	4143.601*** (327.8864)	6230.239*** (790.0898)	4998.918*** (1068.439)	5904.426*** (1151.495)
Adjusted (Within) R <sup>2</sup>	0.9299	0.9024	0.8578	0.7307
Fml	-27.95652	-53.55065	-70.79577	49.04829
Pta_pre	210.6887***	-161.3791**	-115.9835	158.2696
Constant	-24606.95***	-29574.38***	-22595.28***	-29314.62***
Family Fixed Effect	√	√	√	√
Province Fixed Effect	√	√	√	√
Year Fixed Effect	√	√	√	√
*10% significance level				
**5% significance level				
***1% significance level				

Family Education Investment last 12 months:

- Tutorial fee for children last 12 months
- School expenses for children last 12 months
- Other expenses for children last 12 months

# Education Investment

	<b>Tutorial Fee</b>	<b>School Fee</b>	<b>Other Cost</b>
In(Public Education Investment)	376.253***	378.605	41.84697
(last year)	(134.492)	(322.3137)	(63.83334)
Adjusted (Within) R <sup>2</sup>	0.0060	0.2023	0.0432
Urban	32.6164	10.89239	61.73765**
Fml	27.49103*	190.3235***	11.01681**
Pta_pre	3.291619	11.73093	1.292439
Pri	40.48356	-152.9721	-4.003721
Jun	-12.38196	-111.4646	-70.40488**
Sen	263.2239***	1651.683***	134.8425***
Uni	-10.29515	8747.739***	880.7802***
Constant	-2419.315***	-2884.17	-249.8933
Family Fixed Effect	√	√	√
Province Fixed Effect	√	√	√
Year Fixed Effect	√	√	√
*10% significance level			
**5% significance level			
***1% significance level			



# Part 5 : Conclusion

# Conclusion

- Generally Public education investment has crowd-in effect on family education investment.
- It shows a more crowd-in effect on urban family education investment, especially when the children are having compulsory education.
- It will show a more crowd-in effect on higher education than compulsory education.

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Thank you for listening  
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