Kitchen Revolution, Mortality Rate and Women Empowerment

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Introduction

Economic growth and women empowerment

- Focus more on changes of education and income, less on kitchen environment

Air pollution and health outcomes

- Focus largely on ambient air pollution, with indoor air pollution remain understudied

Public infrastructure and economic outcomes

- West-to-East Gas Project: one of the largest public infrastructure related with energy and environment in China.

This Paper

- This paper estimates the impact of gas usage in the kitchen on mortality rate as well as subsequent economic outcomes.

Introduction

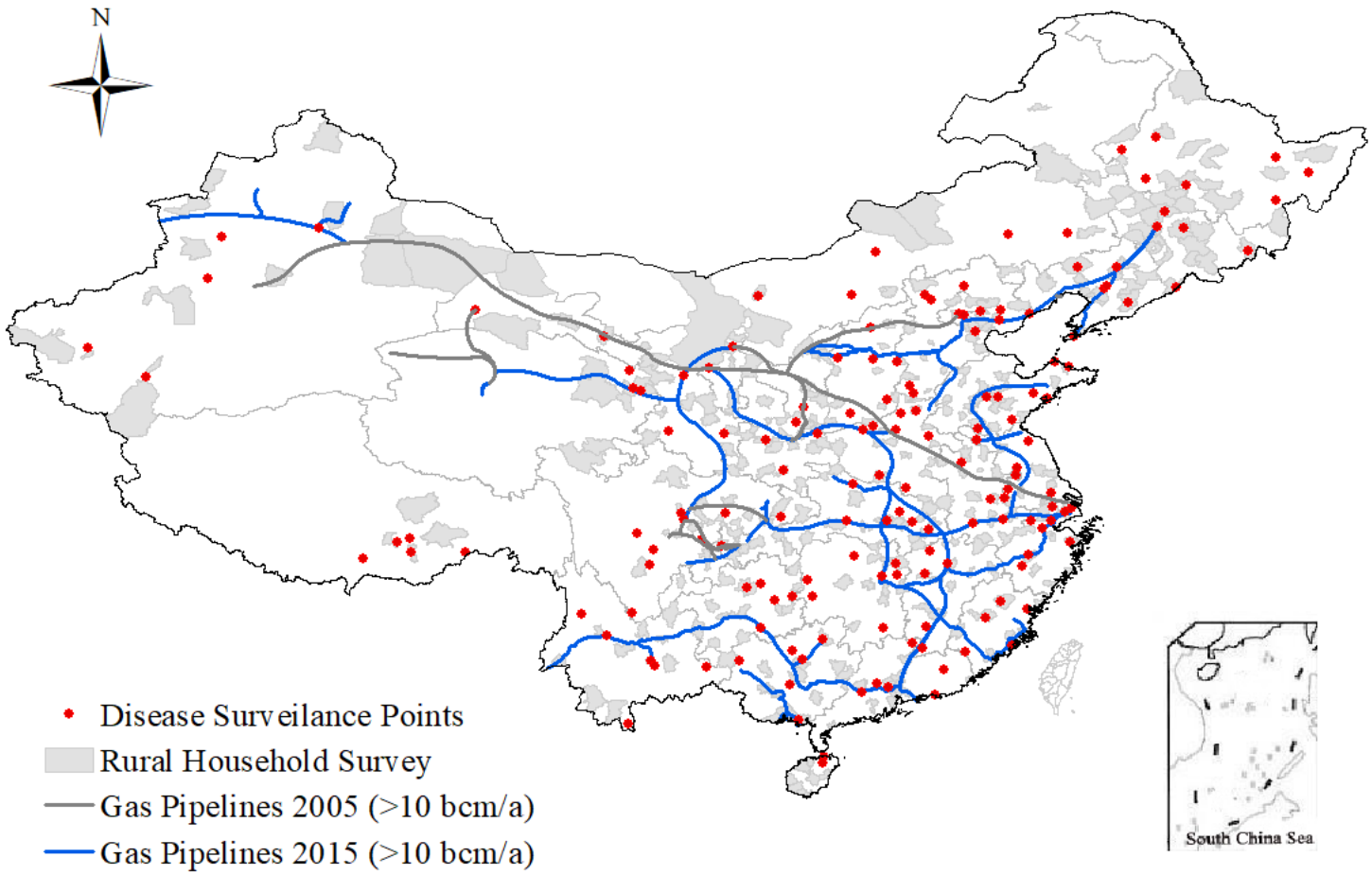
- **Identification**
- Roll out of natural gas pipelines (West-to-East Gas Project).

- **Findings**
- 1 The expansion of natural gas pipelines increases the gas usage in rural China.
- 2 The gas pipelines reduce mortality rate caused by cardiovascular and lung diseases but not other diseases.
- 3 The reduction of female death in rural areas is 3 times more than the urban ones.
- 4 Correspondingly, nonfarm working days among female population increases in rural China, suggesting economically dependence of women.
- 5 Finally, household income and consumption increases.

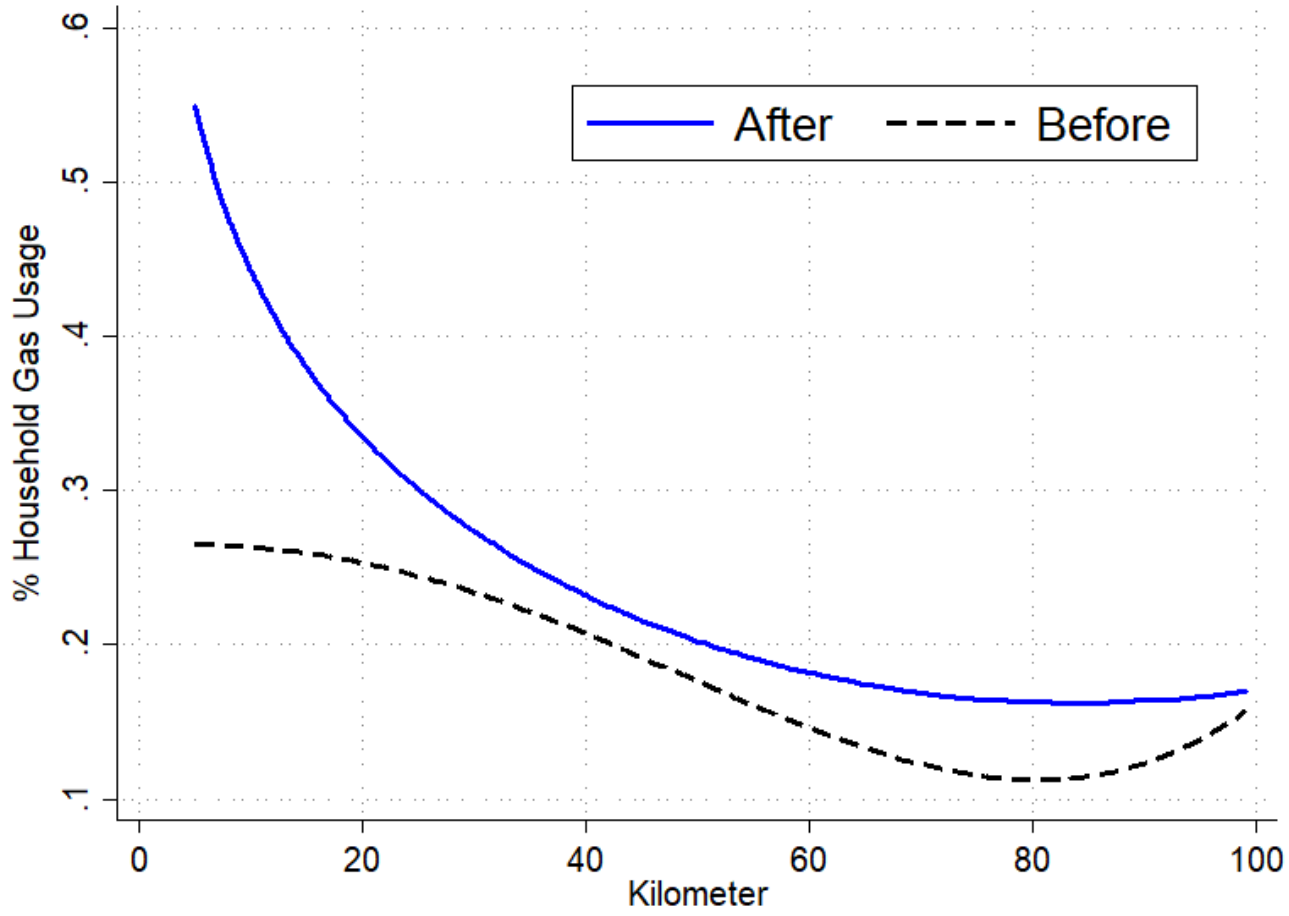
DATA

- *Disease Surveillance Point (DSP):* death information by gender, age and causes of death; 161 counties; weekly data 2004-2015.
- *Rural Fixed Point Survey (RFPS):* household and individual information in 341 counties; annual data 2004-2015.
- *Natural Gas Pipeline Data:* center for geographic analysis at Harvard University.
- *Other Data:* remote sensing PM2.5 and weather conditions.

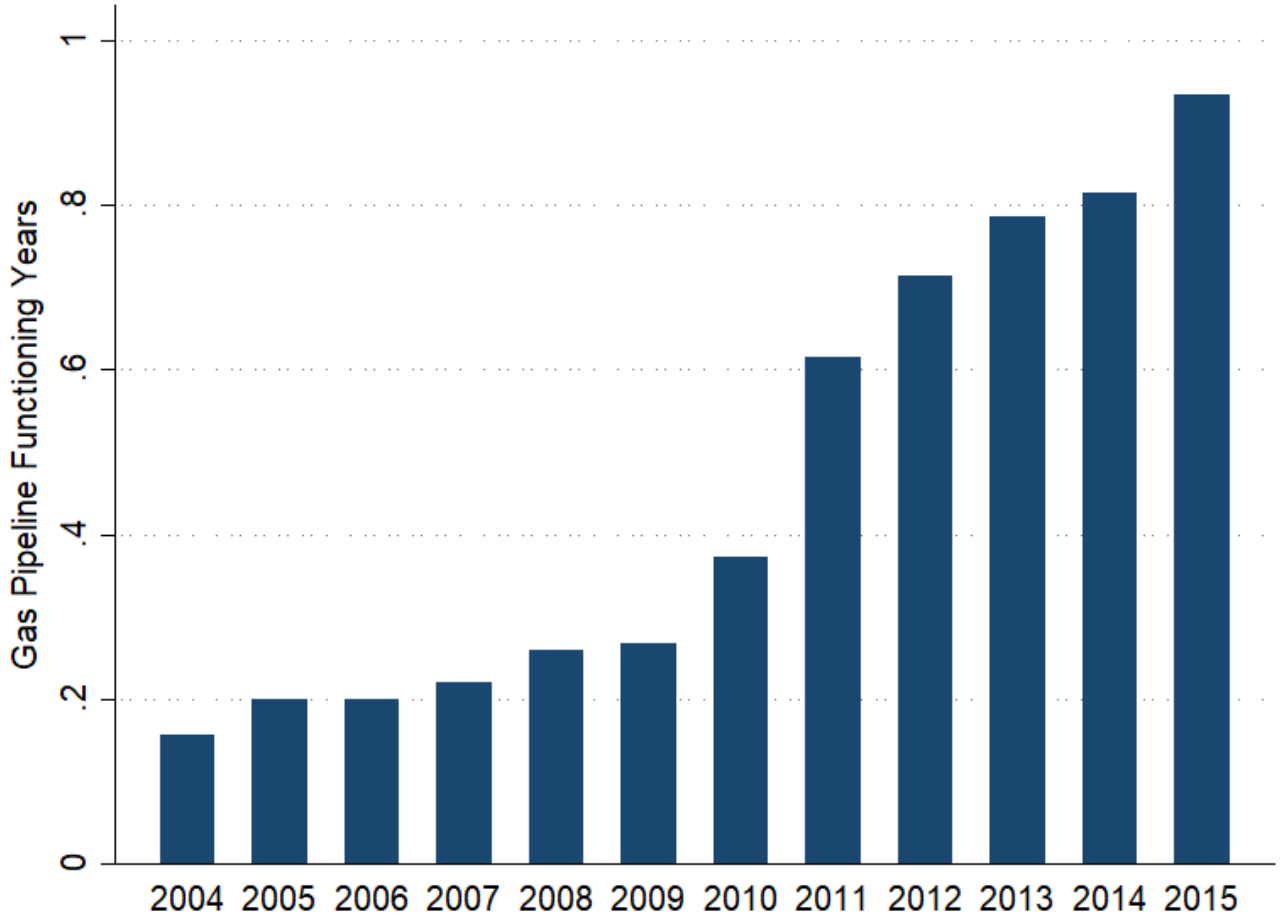
Sample Distribution



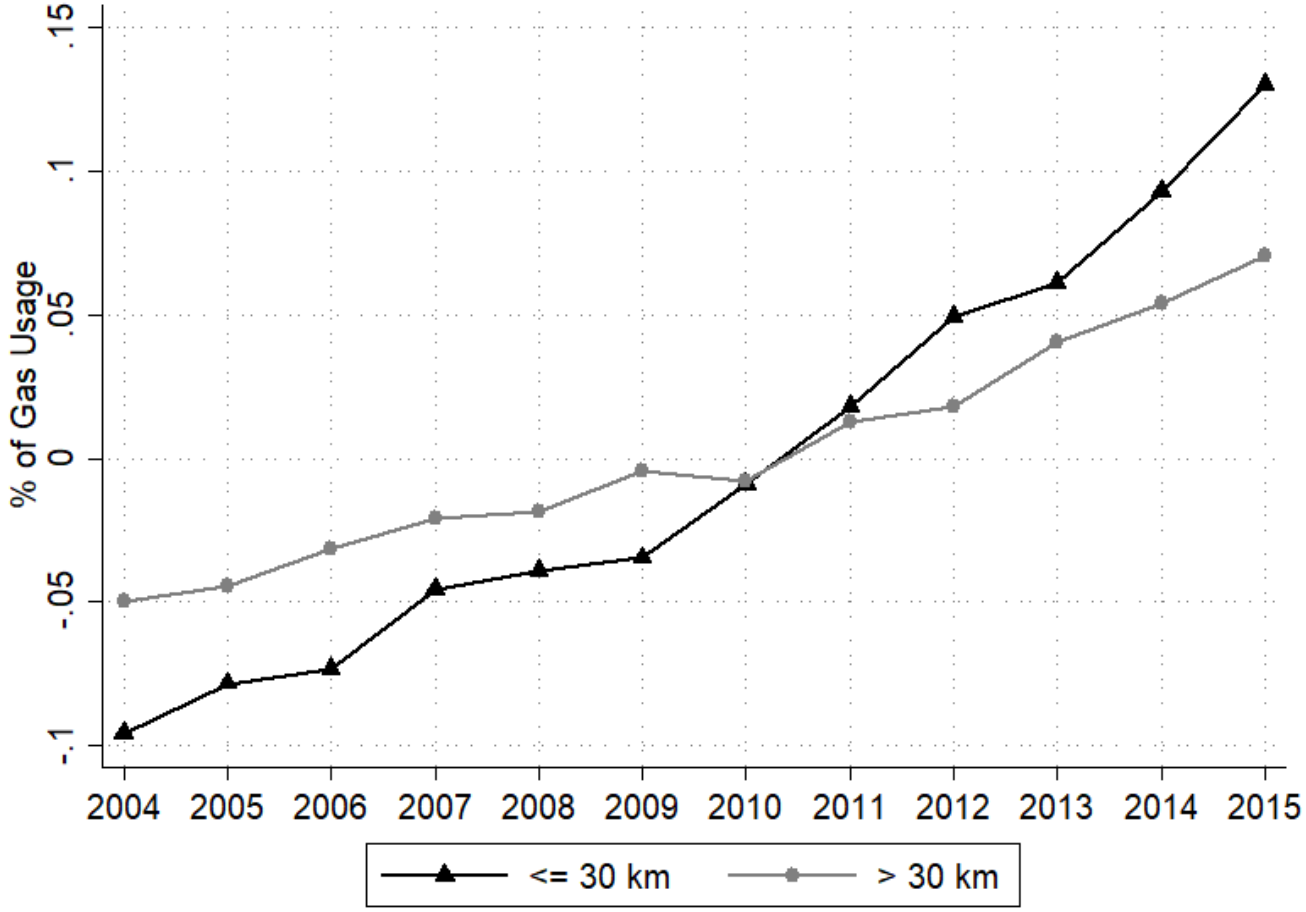
% Gas Usage by Distance in rural China



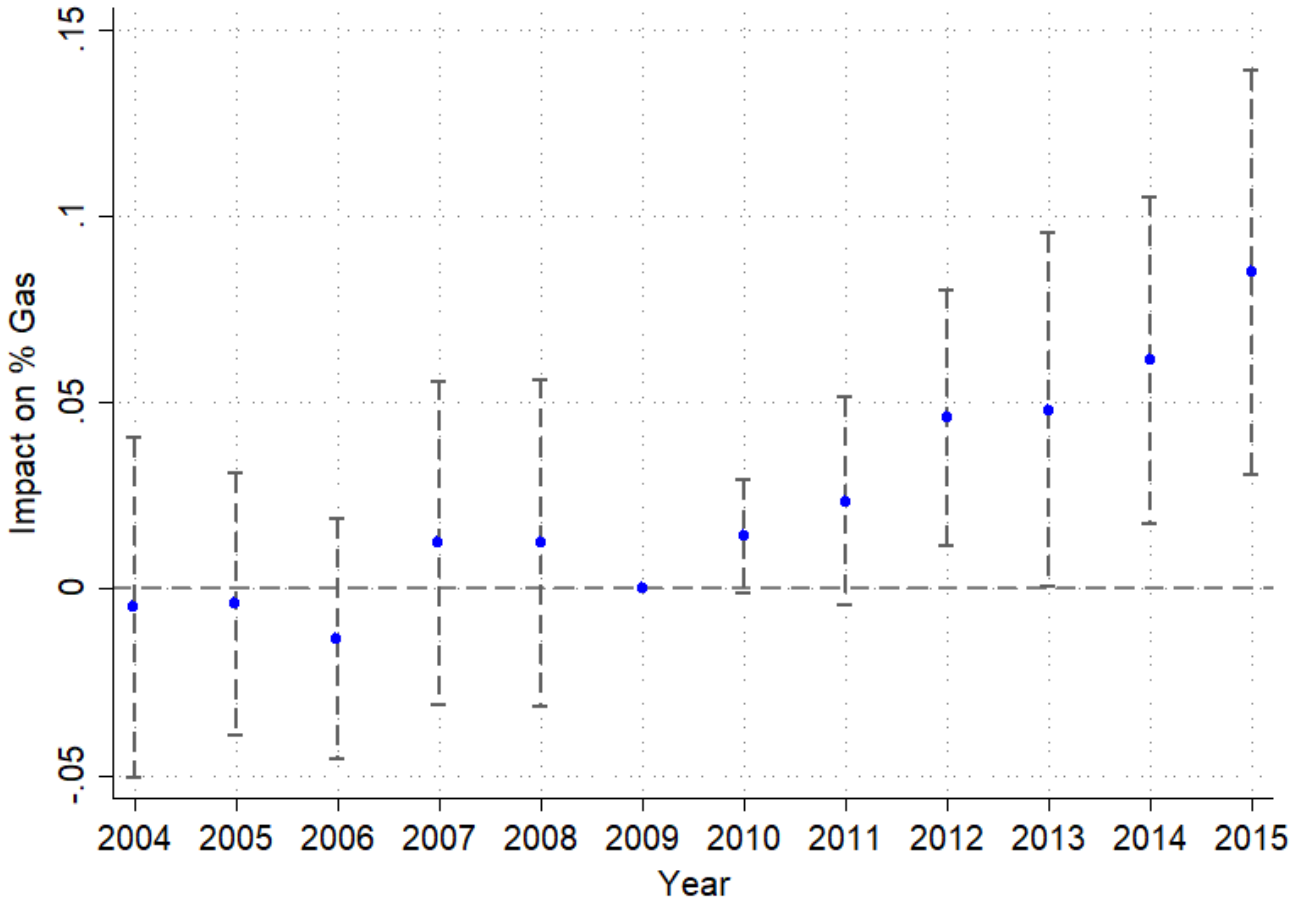
Gas Pipelines Functioning Year



% Gas Usage in rural China



% Gas Usage in rural China

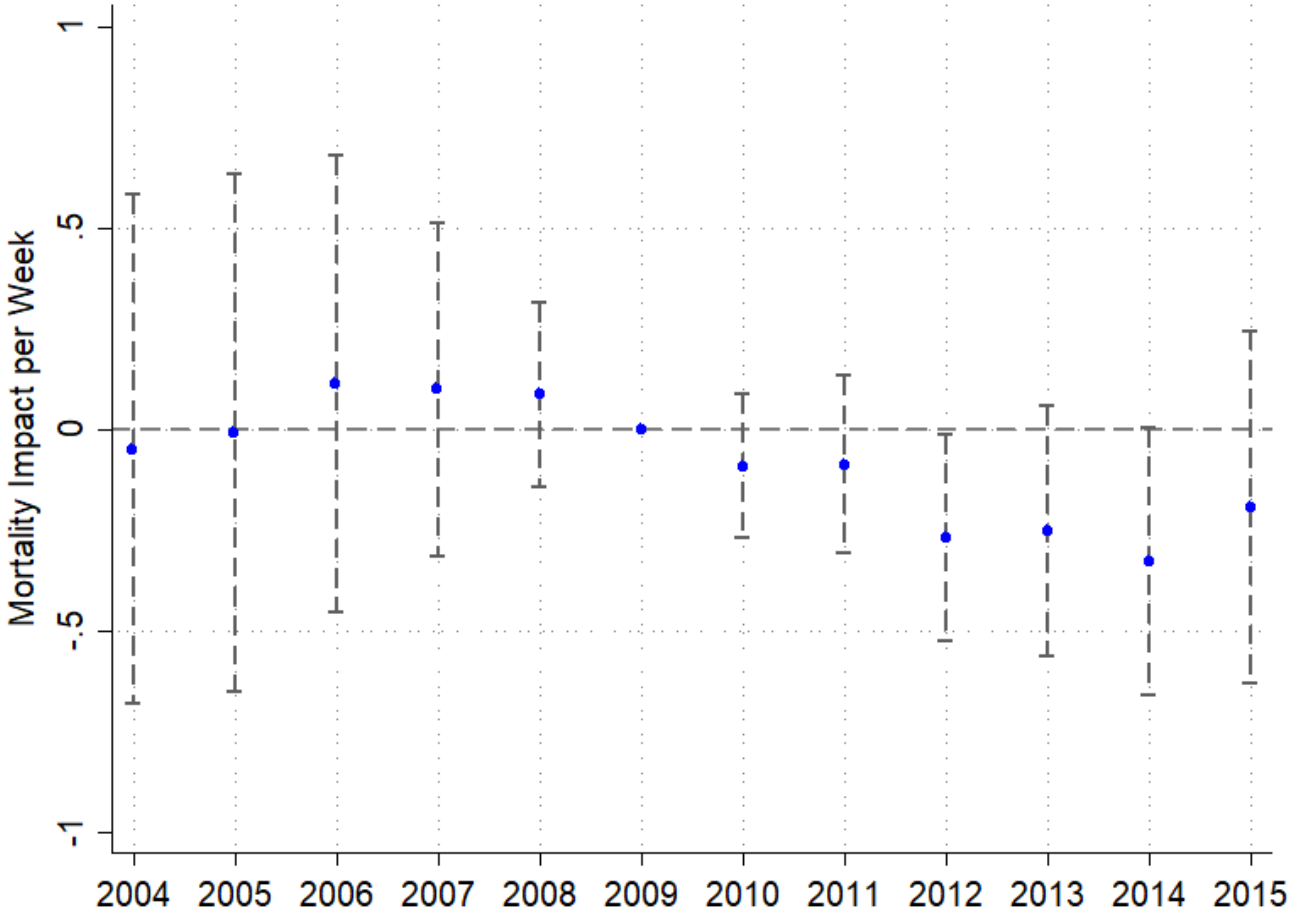


Difference-in-Difference

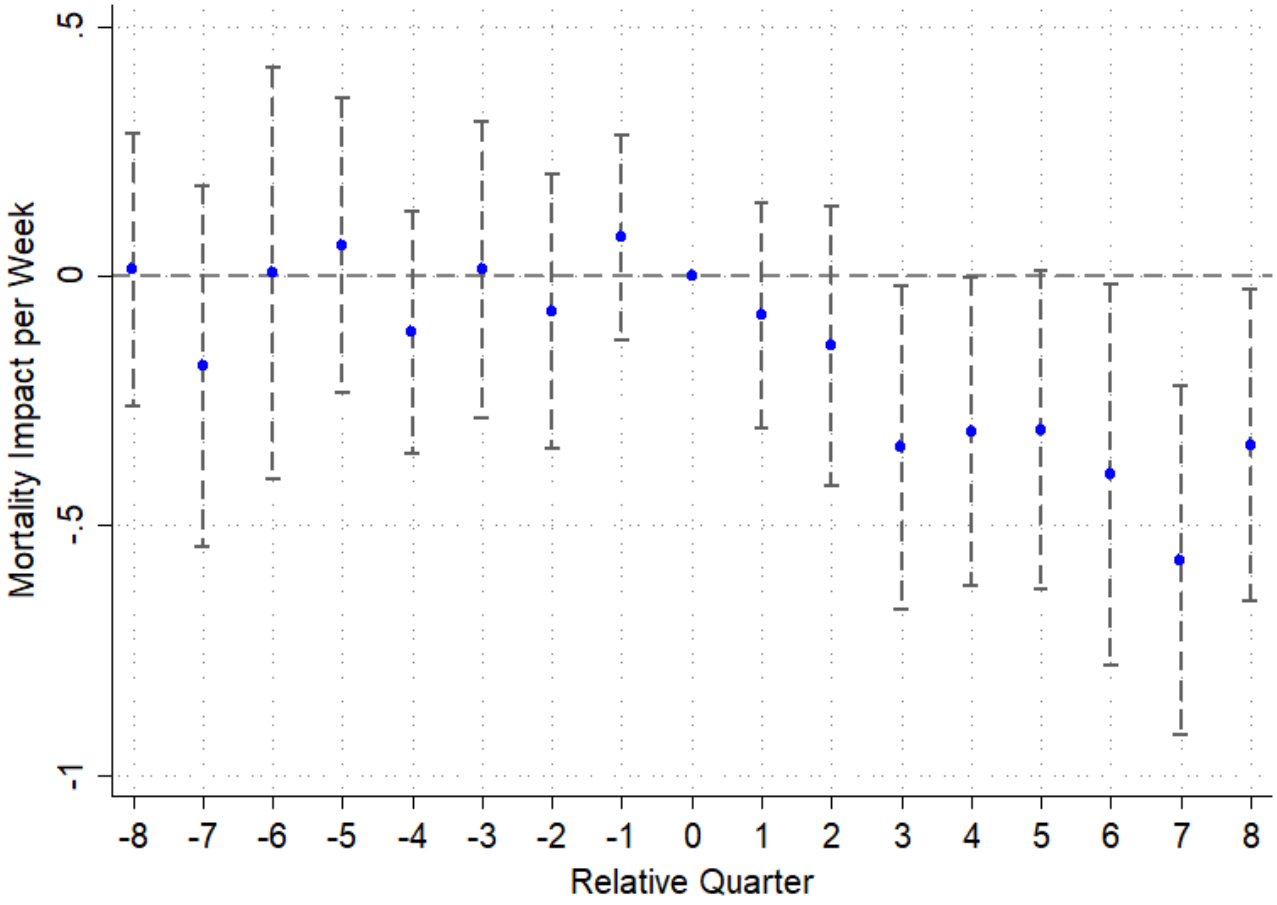
$$y_{it} = \beta \cdot Treat_{it} + X_{it}\alpha + \gamma_i + \lambda_t + \varepsilon_{it} \qquad (1)$$

- *y:* death rate caused by cardiovascular and lung' s diseases for county *i* in year-week *t* as well as death rate caused by other diseases; labor supply, income and consumption.
- *Treat:* equals one if the natural gas pipeline functions in the treatment group and zero otherwise.
- The treatment group is defined as those with distances less than 30 kilometers.
- *X:* a vector of control variables including outdoor air pollution, temperature and precipitation.
- *γ:* county fixed effects; *λ:* year-week fixed effects.
- Standard errors clustered at the county level. Regression weighted by population.

Death Rate


Mortality Impact per Week
1
.5
0
-.5
-1
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

Death Rate

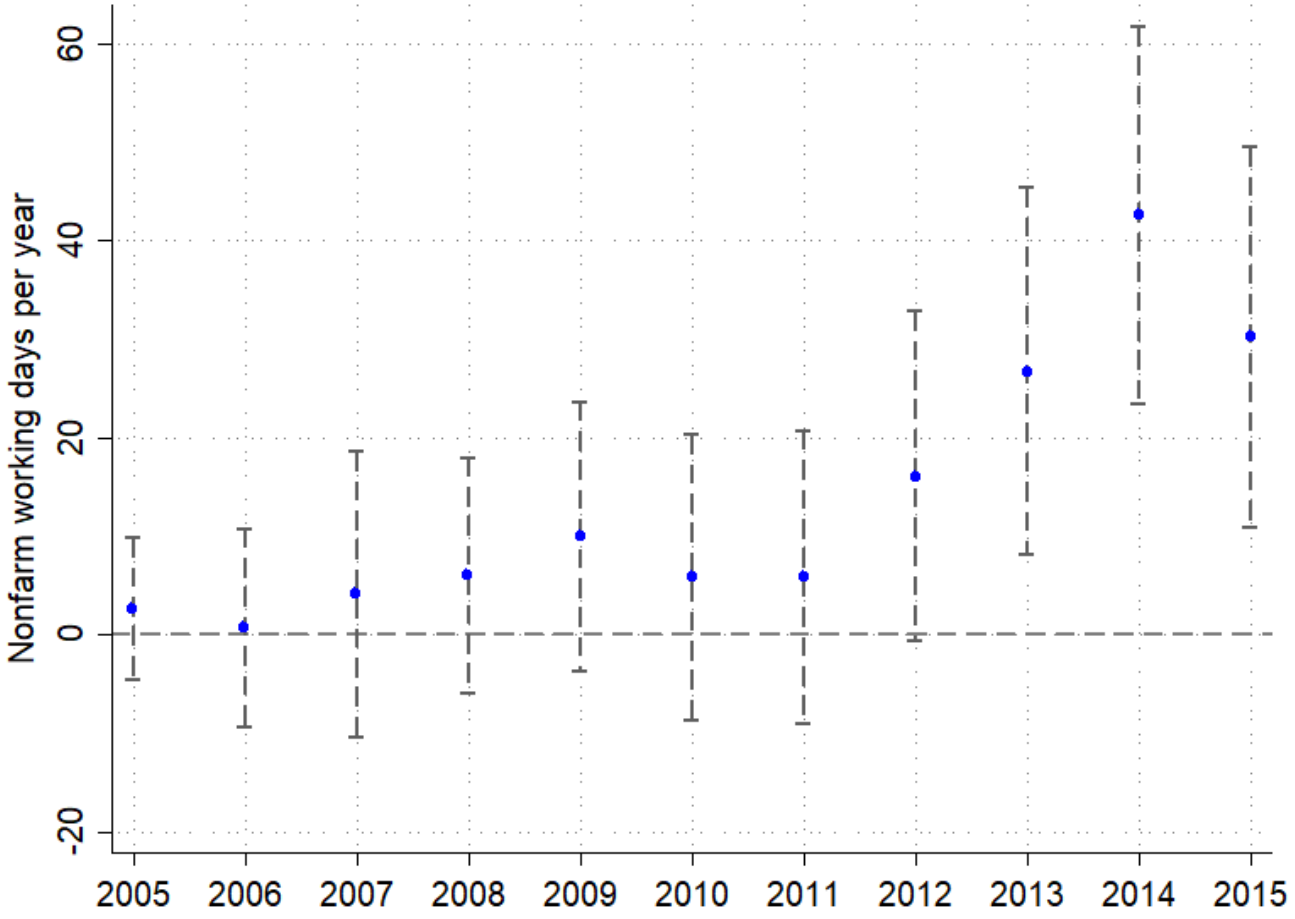

Mortality Impact per Week
.5
0
-.5
-1
-8
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
Relative Quarter

Death Rate

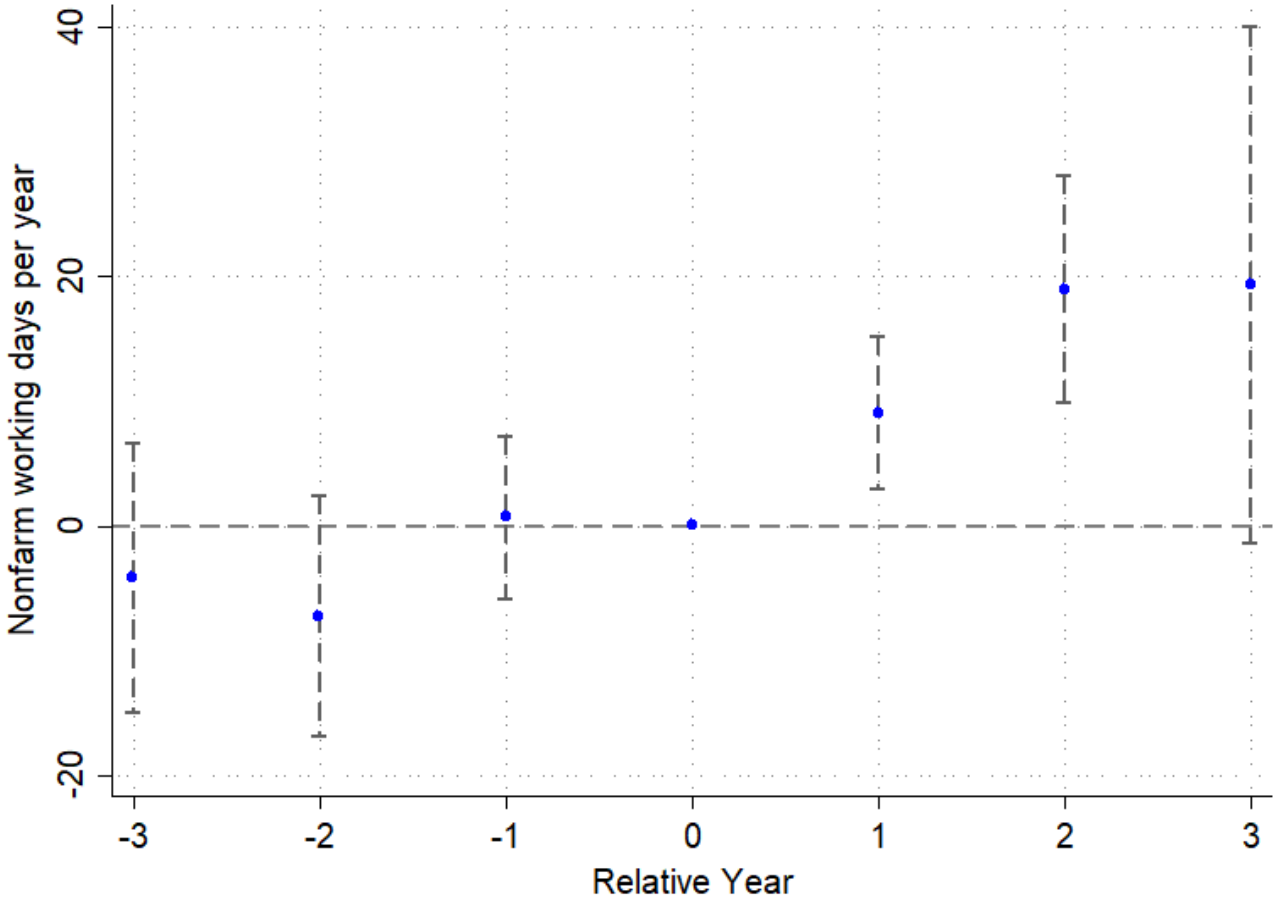
	Rural & Urban			Rural			Urban		
	All	Female	Male	All	Female	Male	All	Female	Male
Panel A: cardiovascular and lung' s diseases									
Treat	-0.600**	-0.828**	-0.508*	-1.109***	-2.385***	-0.727	-0.512*	-0.730**	-0.415
	(0.298)	(0.332)	(0.293)	(0.382)	(0.301)	(0.471)	(0.292)	(0.322)	(0.284)
Mean	5.794	6.463	5.826	5.257	5.843	5.28	5.257	5.843	5.28
Panel B: other diseases									
Treat	-0.057	-0.100	-0.031	0.280	-0.033	0.473	-0.145	-0.198	-0.137
	(0.288)	(0.325)	(0.297)	(0.259)	(0.201)	(0.363)	(0.306)	(0.332)	(0.319)
Mean	3.969	3.845	4.397	4.249	4.078	4.776	3.741	3.657	4.091
Obs.	51,797	51,797	51,797	22,464	22,464	22,464	29,333	29,333	29,333

- The gas pipelines reduce 0.8 death caused by cardiovascular and lung diseases per 100,000 population (12.8%).
- The reduction of female death in rural areas is 3.3 times more than the urban ones.
- The impact on the male population in urban areas are smallest

Non-Farm Labor Supply



Non-Farm Labor Supply

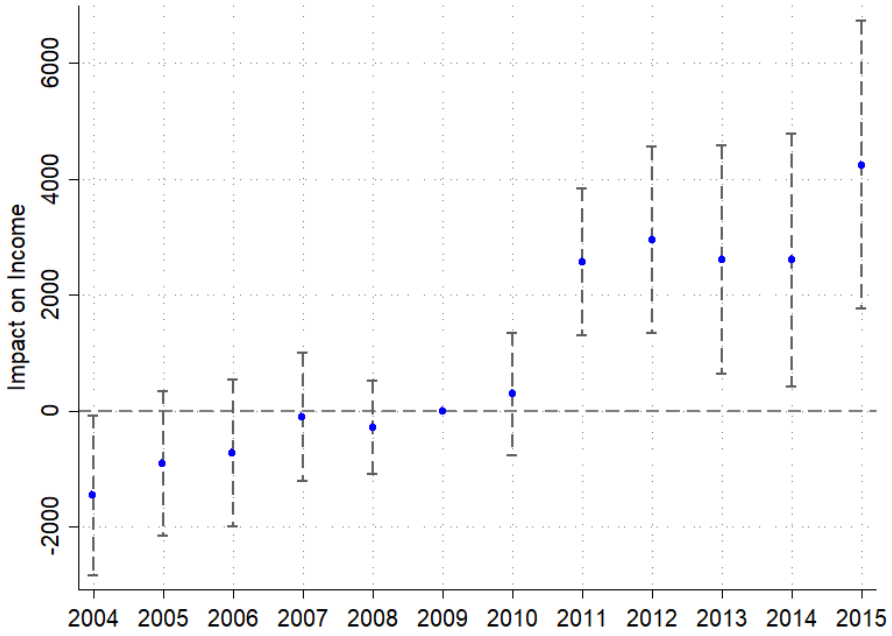


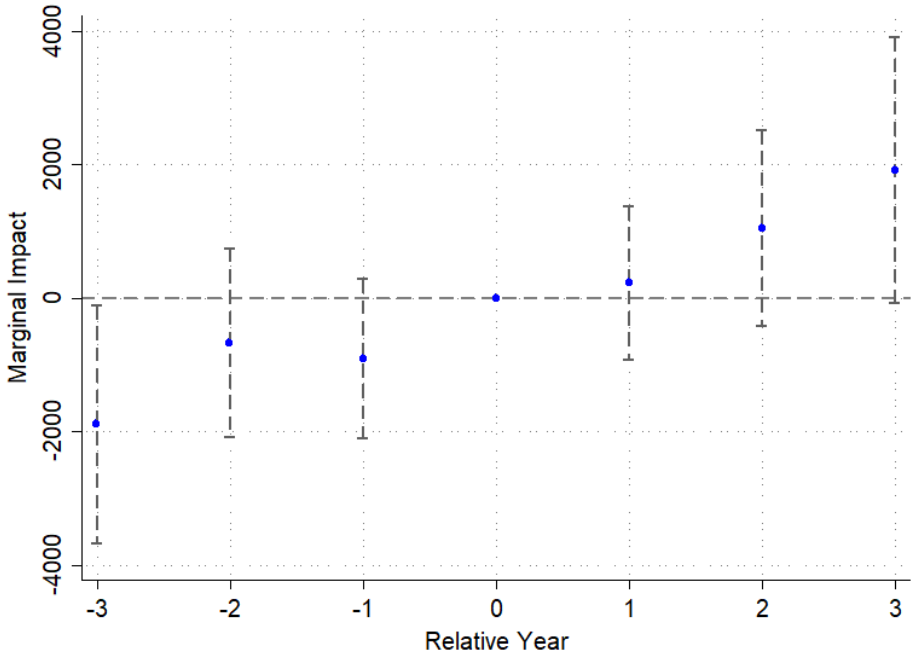
Non-Farm Labor Supply

	Nonfarm Working Days			Farm Working Days		
VARIABLE	All	Female	Male	All	Female	Male
Treat	10.387	17.624**	4.639	8.392*	7.714	9.171*
	(6.631)	(8.089)	(6.039)	(4.745)	(4.832)	(5.080)
Mean	167.788	160.377	173.453	108.097	115.642	100.755
Obs.	204,814	88,694	116,120	344,315	169,804	174,511

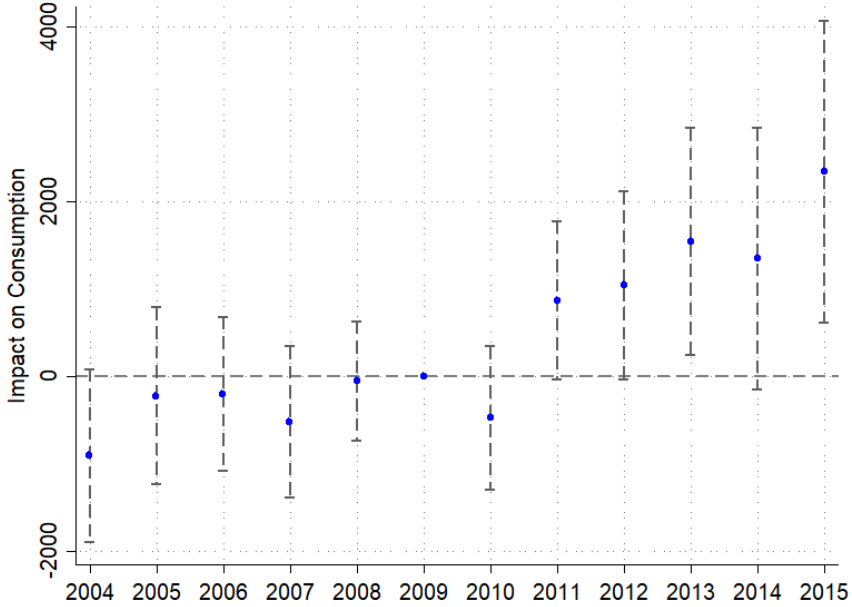
- The gas pipelines increase 17.6 nonfarm working days among female population in rural China (10.9%).

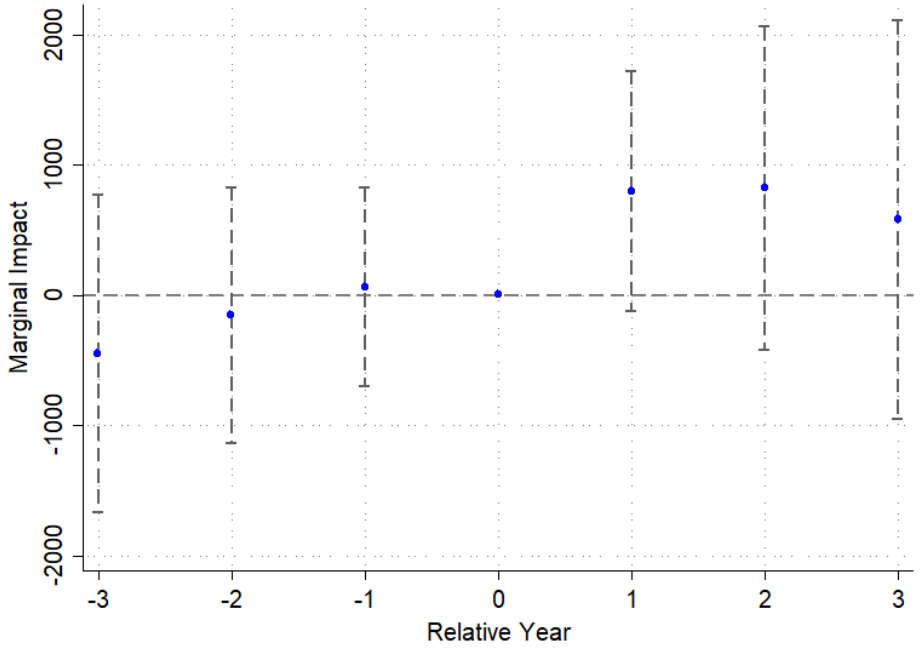
Impact on Income





Impact on Consumption





Income and Consumption

VARIABLE	Income	Consumption
Treat	2,231**	1246**
	(1,069)	(702)
Mean	31385	18787
Obs.	173,429	173,922

- The gas pipelines increase net income by 2231 yuan (7.1%) and consumption by 1246 yuan (6.6%) in rural China.

Conclusion

- **This paper** estimates the impact of gas usage in the kitchen on mortality rate, labor supply, income and consumption in rural China, using the roll out of natural gas pipelines in China as a quasi-experiment.

- **Findings**
- 1 The natural gas pipelines increase the gas usage by 20% in rural China.
- 2 The gas pipelines reduce 12.8% mortality rate caused by cardiovascular and lung diseases but not other diseases.
- 3 The reduction of female death in rural areas is 3 times more than the urban ones.
- 4 Correspondingly, nonfarm working days among female population increases 10.9% in rural China, suggesting economically dependence of women.
- 5 Finally, household income increases by 7.1% and consumption increases by 6.6%.