Economic Policy Uncertainty and Environmental Inequality: Effects and Mechanisms

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1.Introduction

Concerns about policy uncertainty have escalated since the global financial crisis of 2008, which required the frequent introduction of economic policies for economic stimulus. In addition, the persistence of unequal distribution of pollution among different populations, such as race, income, or educational attainment, remains a pressing concern (Banzhaf et al., 2019). Increasing evidence indicates that Economic Policy Uncertainty (EPU) can affect firms' decision-making and individual behaviors (Baker et al., 2016). A question arises about the extent to which EPU contributes to differential exposure to pollution and the underlying mechanisms driving this kind of environmental inequality.

In this study, we investigate the impact of EPU on differential exposure between high- and low-educated people. By using longitudinal survey data at the individual-level, provincial EPU index, and city-level SO_2 concentration dataset we examine if EPU increases the gap in air pollution exposure between the two groups. Moreover, we analyze the impact of EPU on environmental inequality via three mechanisms: firm emission channel, firm employment channel, and individual migration channel.

2. Data and methodology

An individual-level dataset on personal exposure to EPU and SO_2 throughout 2000 to 2015 is constructed. To investigate the impact of EPU on environmental inequality, we estimate the following baseline specification:

$$Exposure_{i,c,t} = \alpha_0 \ln(EPU_{p,t}) + \alpha_1 Education_i * \ln(EPU_{p,t}) + \upsilon_i + \eta_t + \epsilon_{i,t}$$

The dependent variable $Exposure_{i,c,t}$ is SO_2 concentration in city c where individual i live during year t. $EPU_{p,t}$ represents the level of EPU of province p in year t. $Education_i$ is a dummy variable for individual i's education attainment. This characteristic is evaluated at the baseline year to avoid the issue of contemporaneous demographics responding to the EPU. We also adjust for overall trends in individual behavior with year-fixed effects (η_t) and include individual fixed effects (η_t) to remove time-invariant differences between low- and high-educated people.

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To rule out concerns about omitted variable and bidirectional causation, we use world import demand by industry, and weight them by initial employment shares to derive province-level shift-share IV for EPU (Autor et al., 2013). The identification strategy is that when import demand among other countries changes, it will have an impact on domestic economy and further affect the domestic EPU. But other countries' import demand seems not directly related to differential exposure to pollution in China.

Building upon the fixed-effect model, we also estimate three mechanisms through which EPU affects differential exposure to pollution between two groups: the firm emission channel, the firm employment channel, and the individual migration channel.

3.Result

Table 1: Main Results

	(1)	(2)	(3)	(4)	(5)
	Panel A: Effects		Panel B: Mechanisms		
	OLS	IV	Firm Emission Channel	Firm Employment Channel	Individual Migration Channel
Dependent Variables:	SO2 Concentration	SO2 Concentration	IHS(SO2 Emission)	ln(High-educated Employees)	Migration(=1)
ln(EPU)	1.008***	1.945***	0.529**	-0.0210***	
	(-0.00318)	(-0.731)	(-0.253)	(-0.00605)	
Below high school # ln(EPU)	0.628***	1.098*	-0.00689**		
	(-0.0037)	(-0.588)	(-0.00689)		
Delta EPU (t - t-1)					-0.00038
					(-0.00028)
Above College # Delta EPU (t - t-1)					0.00104*
					(-0.00063)
Observations	30,858	30,858	526,250	14,045	11,265
F-stat of first stage		107.00			
Controls	YES	YES	YES	YES	YES
Individual FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Notes: Columns 1-2 estimate individual-level regressions to examine the effect of EPU on SO2 concentration. Columns 3-4 estimate firm-level regressions to examine the effect of EPU on SO2 emission and employment. Columns 5 estimates individual-level regression to examine the effect of EPU on migration activity. In Columns 3, the variable Below high school represents the share of individuals whose education level is below high school. Standard errors clustered at the individual level are reported in parentheses. *** p <0.01, ** p <0.05, * p <0.1.

In column (1) of Table 1, we observe a significant and positive effect of EPU on pollution exposure. Specifically, relative to high-educated people, a 1% increase in EPU leads to approximately 0.628 ug/m^3 increase in SO_2 concentration exposure for low-educated people. Column (2) shows a similar pattern when we use world import demand as shift-share IV. Panel B of Table 1 reports a mechanism analysis. In column (3), we demonstrate a positive effect of EPU on firm SO_2 emission. Although the interaction between the demographic share and EPU is significantly negative, the coefficient is small. In column (4), we find that firm will decrease the employment of high-educated employees when facing higher EPU. Moving to column (5), responding to higher EPU and fewer job opportunities, high-educated people are more likely to emigrate.

4.Conclusion

We found that increased EPU relatively widens the exposure gap to air pollution between low- and high-educated people. The result can be explained by the firm emission channel, the firm employment channel, and the individual migration behavior channel. Our findings demonstrate that economic policy stability can interact with demographic characteristics and impact the gap in exposure to pollution. For policymakers, it is worth considering how to mitigate this environmental impact when introducing economic policies.