The Effects of Air Pollution on Education and Human Capital: Evidence from Prefecture-Level Cities in China

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**Abstract**

This analysis investigates the impact of pollution on human capital stocks in Chinese cities. Using panel data, from multiple data sources, on 283 prefecture-level Chinese cities for the years 2004-2013, we conduct an econometric analysis on the effects of pollution on human capital stocks. Our findings show evidence that pollution has negative effects on the human capital stocks of these cities. These negative effects are mostly found in terms of average wages and the number of college graduates in cities that are more heavily polluted. We find that a 1000-ton increase in SO2 emissions predicts a decrease in college graduates by about 7%, while a 1000-ton increase in NOx emissions predicts a decrease in annual average wages by 4 Yuan.

**Introduction**

- 9.9% annual average growth rate (GDP)
- Largest polluter in the world
- Costs of air pollution estimated to be 6.5% of GDP
- Estimated total returns to human capital in China is between 30% and 40%
- Industrial/Agricultural sectors very energy inefficient
- Transportation pollutants increasing China 2030 (2012): World Bank 6 strategies to improve Chinese economy:
  - Further market oriented reforms
  - Increase innovation
  - Decrease "tycoons" development
  - Equal social security
  - Reform financial system
  - Strengthen environmental enforcement

Our basic economic model is as follows:  
\[
\text{HumanCapital} = f(\text{Pollution}, \ldots)
\]

And our basic econometric model is:  
\[
\text{HumanCapital} = \beta_0 + \beta_1 \text{Pollution} + \beta_2 X_2 + \ldots + e
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**Results**

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**Conclusion**

Our estimated results, from all of our data sources, show that there are negative effects of air pollution on some of our human capital variables. Specifically, we find that there are significant effects of air pollution on annual average wages and the number of college graduates. Our results using junior secondary, primary and pre-school enrollment numbers as our dependent variables found few significant results. Overall, however, our results do appear to provide evidence that worse air pollution in Chinese cities can lead to lower human capital stocks. We find that a 1000-ton increase in SO2 emissions predicts a decrease in college graduates by about 7%, while a 1000-ton increase in NOx emissions predicts a decrease in annual average wages by 4 Yuan.

**References**


