T16P09 / Sustainable Development and Environment Policy

Topic : T16 / Sustainable Development and Policy

Chair : Namrata Chindarkar (Lee Kuan Yew School of Public Policy)

Second Chair : Sonia Akter

Third Chair : Yvonne Chen (National University of Singapore)

GENERAL OBJECTIVES, RESEARCH QUESTIONS AND SCIENTIFIC RELEVANCE

Note: This Panel is eligible for the GCPSE (UNDP) Grant.

With the adoption of the sustainable development goals (SDGs), development policy has once again taken centre stage in the public policy agenda. Development policies are now reoriented towards engaging multiple sectors and actors to achieve the 17 interconnected and integrated SDGs. Infrastructure development, for instance, is not only about promoting economic growth but also about ensuring environmental protection, alleviating poverty, and attaining gender equity. This panel weaves together several related research themes:

1. Which public policies have been effective in bringing about sustainable development and how?

2. How can public policies provide the necessary regulatory and institutional frameworks to promote sustainable development?

3. How have multiple actors – government, civil society, private sector – come together in achieving sustainable development?

Policy topics of interest are human capital (health, education, training and skills development), infrastructure (water, energy, railroads, and sanitation), gender, poverty and inequality, food security, community-led development, private sector engagement, and institutions. Of particular interest are empirical papers that employ rigorous econometric and evaluation techniques while being grounded in sound economic and development theory. However, papers using innovative mixed methods approaches may be submitted. Themes listed above are not exhaustive.

CALL FOR PAPERS

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Session 1

Wednesday, June 28th 16:15 to 18:15 (Block B 5 - 2)

Discussants

Yvonne Chen (National University of Singapore)

Sonia Akter

Classifying the Cities by Examining the Environmental Kuznets Curve for Low-carbon Development in China

Chao Zhang (Tsinghua University)

Xufeng Zhu (Tsinghua University)

China is the largest carbon dioxide (CO2) emitter worldwide, triggering strong needs for low-carbon development. According to the Paris Agreement, China is proposed to take the initiatives to improve its own mitigation contribution for addressing climate change and transform its current economic growth pattern. However, with limited awareness on local level CO2 emissions, the central government could hardly decompose its mitigation plan into local administrative units. Moreover, there is a lack of precise-data based research on proposing unified benchmarking scheme for examining the low-carbon development status. In this research, based on the bottom-up monitoring data of CO2 emission from 1.5 million enterprises conducted by the Ministry of Environmental Protection (MEP) in China, a 1-km grid CO2 emissions warehouse was interpolated for prefectural cities all over China. Based on these city-level GDP and CO2 emissions data, the authors test the Environmental Kuznets Curve (EKC) by spatial econometric modeling, hypothesizing an inverted-U-shaped relationship between environmental pollution and economic growth. The research reveals an uneven city scale landscape of low-carbon development status, which shows that resource-intensive cities dragging the low-carbon development down, while the majority part of service-oriented coastal area and several sparsely populated western cities have passed the turning point of EKC and leading the low-carbon development in China. Altogether, this research offers a pivotal and feasible method for the study of finer city level CO2 emission and highlights approaches for decomposing the CO2 mitigation target under the scenario of achieving the Paris Agreement. This research especially matches the panel of Sustainable Development and Policy, under the T16P18 - Environmental Policy, considering the research provides an innovative strategy and benchmarking method for policy actors to promote the modification of low-carbon development policy. It also puts forward a big-data based scientific decision making mechanisms serving as policy advocacy tools for environmental protection.

Government administrative rank and industrial pollution in China

Hualiu Yang

This study investigates how China’s administrative hierarchy influences industrial pollution emissions. The argument is that lower ranked cities would have a higher industrial pollution level even if they reach the same income per capita level as higher ranked cities. This essay will investigate two channels through which administrative rank affects a local industrial pollution. First, a higher level city with more resources are able to attract less pollution intensive firms (industry structure), achieve higher production efficiency (technology), and perform better on pollution regulation enforcement leading to a local market with less pollution intensive industries. The other channel is the institutional quality of a city. Administrative rank enhances the quality in governance institutions (i.e., the local government and the local market) due to the

resources advantage. The higher institutional quality leads to more efficient local spending and a spending structure towards more to the public services that are able to internalize the market externalities. The Chinese city-level data from 2003-2010 will be used to test these two channels through which the city administrative rank matters to the local industrial SO2 emissions. The policy implication from this study is that the Chinese central government needs to keep its efforts on containing this inequality within the administrative hierarchy for the benefits of itself (i.e., stability) and the benefits of the people located at lower level cities.

Using self-reported well-being assessment to value air quality in China

Jie-Sheng Tan-Soo

Recovering credible valuation of air quality is a cornerstone of environmental regulations as these estimates aid policymakers in deciding the tradeoff between economic growth and pollution control. Such estimates are widely available in the developing world where air quality is at relatively more acceptable levels. In contrast, due to data availability issues, there are very few studies of air quality valuation for developing countries, where pollution problems are at its worst. We contribute to the thin literature by assembling a unique dataset from China to examine the relationship between self-reported happiness and health status with air quality, and derive a willingness-to-pay measure for air quality. First, using households' locations, we are able to determine air quality exposure for each household. Second, we can also recover the wind speed of the general location where the household is at. Wind speed acts as an instrument as air pollution is often correlated with desirable features such as economic activities or proximity to city centers. Contrary to intuition, we find that self-reported well-being is most highly associated with air quality at the hour during which the survey was field. The relationship weakens as we use increasingly lagged measurements of air quality measurements. This suggests that air quality may affect one's mental well-being, even for acute exposure. Using these results, we recover Chinese residents' marginal willingness-to-pay (MWTP) for PM2.5 at 1,111 RMB/year. This is approximately 1.6% of household income.

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Session 2

Thursday, June 29th 08:15 to 10:15 (Block B 5 - 2)

Discussants

Jie-Sheng Tan-Soo

Yvonne Chen (National University of Singapore)

Gender differences in mathematics performance: Evidence from Rural India

Karan Singhal (Indian Institute of Management)

Upasak Das (University of Pennsylvania)

Performance in mathematics at school and early ages is positively associated with higher earnings for an individual. Studies have found that female students report high anxiety over mathematics than the male students. These differences might lead to a significant drop in skills developed by a female student and further affect performance in mathematics and related subjects, which negatively affect future earnings and their economic wellbeing. This paper draws motivation from this aspect and attempts to examine gender disparity in mathematics scores among rural children at an all-India level. More specifically it attempts to find if mathematics score for female children is lesser in comparison to the male children with respect to standardised tests that has conducted all over India in 2011-12. Our findings from rural India show significant chances of female children scoring poorly in mathematics as compared to a similar male child. This difference is largely not observable for reading skills and observable to a smaller extent with respect to writing skills. The results largely remain the same under various specifications- within social groups, type of school attendance, expenditure quantiles, and birth orders. Further, our inferences also hold for girls and boys belonging to the same household. These findings corroborate with the limited evidence which examines the prevalence of gender differences in math and higher mathematical anxiety among girl students in other countries and schooling levels. We explore many mechanisms but apart from ruling out any biological differences, we are unable to isolate a single one due to the paucity of data. However, such differences do warrant immediate attention through affirmative action policies to both test and monitor these differences and design interventions such as changes in delivery or pedagogy of the subject to understand this gap better.

Social cohesion and community-shared adaptation financing in the coast of Bangladesh

Sonia Akter

In the absence of an internationally agreed multilateral framework for climate financing, mobilization of internal resource for funding adaptation initiatives in low income countries is becoming increasingly important. In this context, the concept of community-shared adaptation financing for large-scale infrastructure projects, in the form of cost sharing by the beneficiaries or local user group, can be considered as a stopgap measure. This study examines the acceptability of this concept to the local population and identifies factors that may potentially hinder the prospect of such a financing model being widely popular. The study uses household level data obtained through a contingent valuation survey administered in a tropical cyclone prone coastal district of Bangladesh. Four hundred randomly sampled male and female inhabitants of the district were asked to pay a one-off surcharge to co-finance the government led Coastal Embankment Improvement Project which aims to reconstruct and rehabilitate coastal embankments to increase resilience against climate change risks. Over two-thirds of the sampled population were willing to

pay the surcharge and the average willingness to pay per household was US$50 (3% of the annual average household income). In addition to individual level risk exposure (measured by economic damage cost), risk preference and risk perception; social cohesion index measuring social solidarity and trust played a significant positive role in determining household willingness to pay for the project. As theoretically expected, the social cohesion index was significantly negatively correlated with religious diversity and income inequality. These findings imply considerable support for community-shared adaptation financing in the coastal region of Bangladesh. However, the effectiveness of this model hinges crucially on the level of social cohesion in a community and as such, this model is less likely to be popular in areas that are characterized by high income inequality and high degree of religious fragmentation.

Effect of Rural Electrification on Farm Investments in India

Yvonne Chen (National University of Singapore)

Namrata Chindarkar (Lee Kuan Yew School of Public Policy)

According to Census of India (2011), about two-thirds of India's population depends directly or indirectly on agriculture and related activities for their livelihoods. However, low farm productivity continues to plague the agricultural sector resulting in slow growth and widening of income inequality between rural and urban areas. One of key factors contributing to low farm productivity is lack of reliable farm electricity. High voltage and uninterrupted farm electricity supply is required to run irrigation equipment and farm tools. However, farm electricity in much of rural India continues to be highly subsidized creating financial pressures on public utility companies and consequently affecting transmission and distribution (T&D). The result has been unreliable, low voltage, and infrequent electricity to farms, which in turn affects productivity. A related issue is managing groundwater withdrawal for irrigation. Supplying unlimited farm electricity may not be desirable as it is likely to cause groundwater exploitation, which will also affect farm productivity in the medium- to long-run. To balance the two issues of supplying reliable farm electricity and sustainable use of groundwater, the state government of Gujarat launched the Jyotigram Yojana (JGY) in October 2003. Under JGY, farms received 8 hours of high quality and uninterrupted electricity supply as per a pre-determined schedule. It is yet unknown whether this policy change has indeed resulted in improved farm outcomes and greater welfare for farm households. By matching the exact village-level program rollout dates to the 2004-05 and 2011-12 India Human Development Survey (IHDS), we examine the impact of JGY on various investment decisions of farm households related to productivity and on farm profits. Using a difference-in-difference framework, we find that JGY has led to significant increase in net farm income and net animal income for small land owners. Farm households across land size significantly reduced hired labor. Our results suggest that improving reliability of farm electricity can result in significant welfare gains for farm households.