Research Showcase

Research Showcase

Science, Technology, and Innovation Policy

He, Alex Jingwei.

"Scaling-Up through Piloting: Dual-track Provider Payment Reforms in China's Health System."

Health Policy & Planning (2022).

Geographic distribution of DRG/DIP pilots in China.

This paper puts forth 'scaling up through piloting' as a distinctive pathway for the strategic management of scaling up in the health sector. It analyses the recent development of provider payment reforms in China, focusing particularly on the ongoing pilot programs, namely diagnosis-related groups (DRGs) and diagnosis-intervention packets (DIP), that are being piloted in a dual-track fashion since 2020. Data were drawn from extensive documentary analysis and 20 in-depth interviews with key stakeholders, including decision-makers and implementers. It is found that scaling up through piloting helps Chinese policymakers minimize the vast uncertainties associated with complex payment reforms and maximize the local adaptability of provider payment innovations. This pathway has forged a phased implementation process, allowing new payment models to be tested, evaluated, compared, and adjusted in a full spectrum of local contexts before a national rollout. Several key factors have been identified as crucial for strategic scaling-up: necessary central steering, a pragmatic piloting design, strong technical capacity, and effective policy learning mechanisms.

Sharif, Naubahar, and Athar Mansoor. "Pakistan Post and the Creation of an Innovative Business Model to Enhance Financial Inclusion." Public Sector Reforms in Pakistan: Hierarchies, Markets and Networks.

Cham: Springer International Publishing, 2022. 251-273.

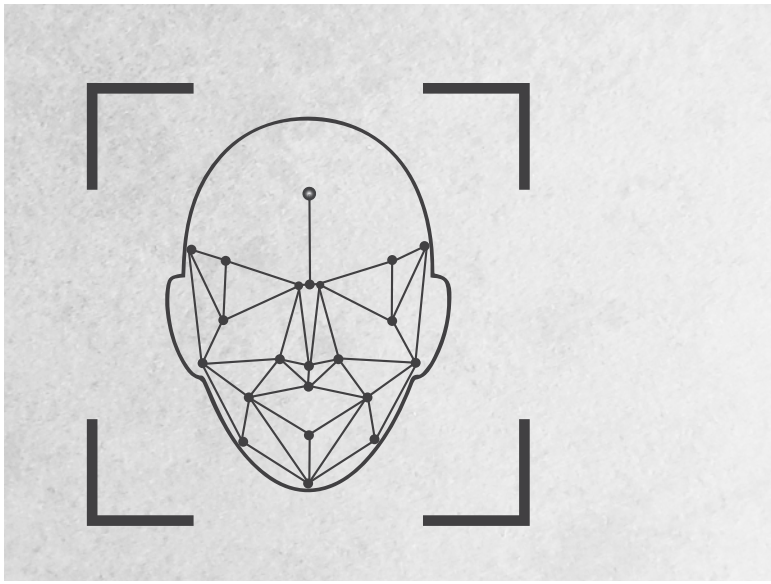
Mobile Money Solution

This book chapter investigates and analyses the efforts led by Pakistan Post to create a new business model characterized as a comprehensive public–private partnership (PPP) plan. This plan proposes combining Pakistan Post's network of post offices—which serve as savings banks—with mobile phone platforms, enabling people across Pakistan to access financial services either physically or virtually. Three key sets of issues were analyzed: First, the explication of the characteristics of this new information and communication technology (ICT)-driven PPP business model within the specific context of Pakistan and assessment of the extent of the model's reliance on ICT. Second, a dissection of the PPP model to understand the degree to which it suits Pakistan's prevailing socioeconomic context. Third, a discussion of the applicability of the model—under which mobile phones serve as a key tool for solving social problems and creating social enterprises—to other neighboring South Asian economies such as Bangladesh, Sri Lanka, Bhutan, and Nepal—which represent similar levels of socioeconomic development.

Research Showcase

Li, Z., Guo, Y., **Yarime, M., & Wu, X.** (2022). Policy Designs for Adaptive Governance of Disruptive Technologies: the Case of Facial Recognition Technology (FRT) in China.

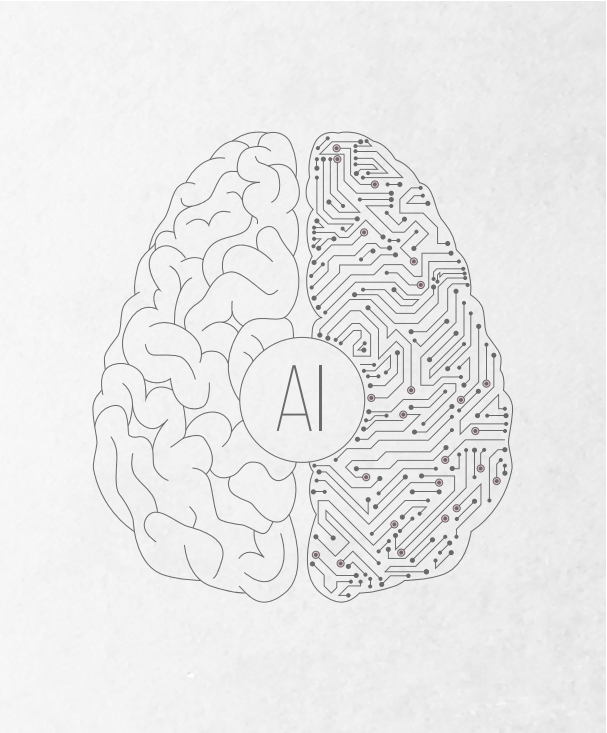
Policy Design and Practice, 1-14.



Recent regulations introduced by the Chinese government regarding big data technologies are welcome to those long concerned about the risks associated with their rapid deployment. However, these changes are not sufficient to safeguard privacy and data security. More importantly, these policies may not have fully accounted for the disruptive nature of these technologies. This paper examines the need and the potential for new approaches in policy design regarding disruptive technologies by examining the case of facial recognition technology (FRT) in China. It is argued that adaptive governance provides a useful framework for future policy design. Regulatory sandbox approach, policy mix, and stakeholder engagement are among key policy measures to overcome regulatory challenges.

Papyshev, Gleb, and Masaru Yarime. "The Limitation of Ethics-Based Approaches to Regulating Artificial Intelligence: Regulatory Gifting in the Context of Russia."

AI & SOCIETY (2022): 1-16.



This paper analyzes the emergence of the regulatory regime for artificial intelligence (AI) in Russia to illustrate the limitations of the unenforceable ethical approach implemented via industry self-regulation. Based on 50 interviews with policymakers, representatives of AI companies, and academics in the country, it shows that this regulatory regime was formed under the strong influence of Russian big tech companies, which saw an opportunity to avoid regulatory oversight by washing out concrete regulatory measures from the policy. This approach is part of a broader protectionist sanction-proofing strategy for the local IT sector designed by the government, which can be characterized by lifting regulatory barriers for local companies. Unenforceable ethics-based self-regulation is a regulatory gift from the Russian government to the industry. This gift was intentionally designed because the government thought that prioritizing local innovation over consumer protection would benefit the public. However, the gift can also unintentionally undermine the public interest by providing an opportunity for ethics washing.

Research Showcase

Papyshev, Gleb, and Masaru Yarime. "The State's Role in Governing Artificial Intelligence: Development, Control, and Promotion Through National Strategies."

Policy Design and Practice (2023): 1-24.

Develop		Control		Promote	
Primus inter pares	**Countries**	**Command and control**	**Countries**	**Oligopoly/Self-regulation**	**Countries**
The leading role of the state in facilitating and initiating AI projects; collaboration with different stakeholders; direct provision of state resources; prioritization of innovation over the protection of risks	Bulgaria; China; Czech Republic; Hungary; Japan; South Korea; Russia; Serbia	The leading role of the state as a guarantor that protects society from risks stemming from AI; rigorous regulatory frameworks; the state sets up the rules for the socio-technical system; prioritization of protection from risks over innovation	Austria; Belgium; Denmark; Estonia; Finland; Germany; Luxembourg; Malta; Mexico; Netherlands; Norway; Portugal; Sweden; Uruguay	Decentralized approach with the key role of the private sector; lack of policies and regulations; non-involvement of the state; self-organization and self-regulation by the industry; prioritization of innovation over protection from risks	Australia; India; Ireland; Lithuania; New Zealand; Saudi Arabia; Singapore; UK; US

This study investigates the texts of 31 national artificial intelligence (AI) strategies that numerous governments across the globe have issued, using qualitative content analysis and Latent Dirichlet Allocation (LDA) topic modeling methodologies. The findings of the qualitative content analysis highlight thirteen functions of the state, which include human capital, ethics, R&D, regulation, data, private sector support, public sector applications, diffusion and awareness, digital infrastructure, national security, national challenges, international cooperation, and financial support. These functions are combined into three general themes, representing the state's role: development, control, and promotion. LDA topic modeling results are also reflective of these themes. Each general theme is present in every national strategy's text, but with different proportions. The combined typology based on two methods reveals that the countries from the post-Soviet bloc and East Asia prioritize the theme "development," highlighting the high level of the state's involvement in AI innovation. It is found that the countries from the EU focus on "control," which reflects the union's hard stance on AI regulation, whereas countries like the UK, the US, and Ireland emphasize a more hands-off governance arrangement with the leading role of the private sector by prioritizing "promotion."

Thu, M. K., Beppu, S., **Yarime, M.**, & Shibayama, S. (2022). Role of Machine and Organizational Structure in Science.

Plos one, 17(8), e0272280.

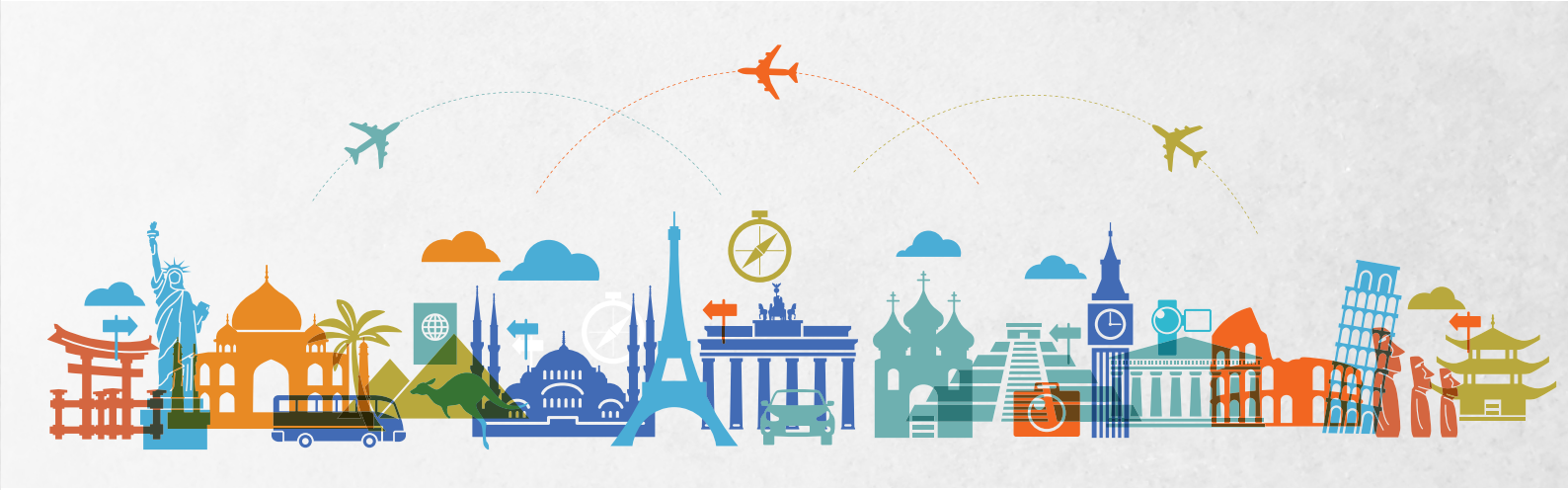
Machine learning related vs machine learning unrelated

This study investigates the team structure of machine learning (ML)-related projects and analyzes the contribution of ML to scientific knowledge production under different team structures, drawing on bibliometric analyses of 25,000 scientific publications in various disciplines. It is suggested by regression analyses that (1) interdisciplinary collaboration between domain scientists and computer scientists as well as the engagement of interdisciplinary individuals who have expertise in both domain and computer sciences are common in ML-related projects; (2) the engagement of interdisciplinary individuals seem more important in achieving high impact and novel discoveries, especially when a project employs computational and domain approaches interdependently; and (3) the contribution of ML and its implication to team structure depends on the depth of ML.

Research Showcase

Zhu, Pengyu, and Yuqing Guo. "Telecommuting and Trip Chaining: Pre-Pandemic Patterns and Implications for the Post-Pandemic World."

Transportation Research Part D: Transport and Environment 113 (2022): 103524.

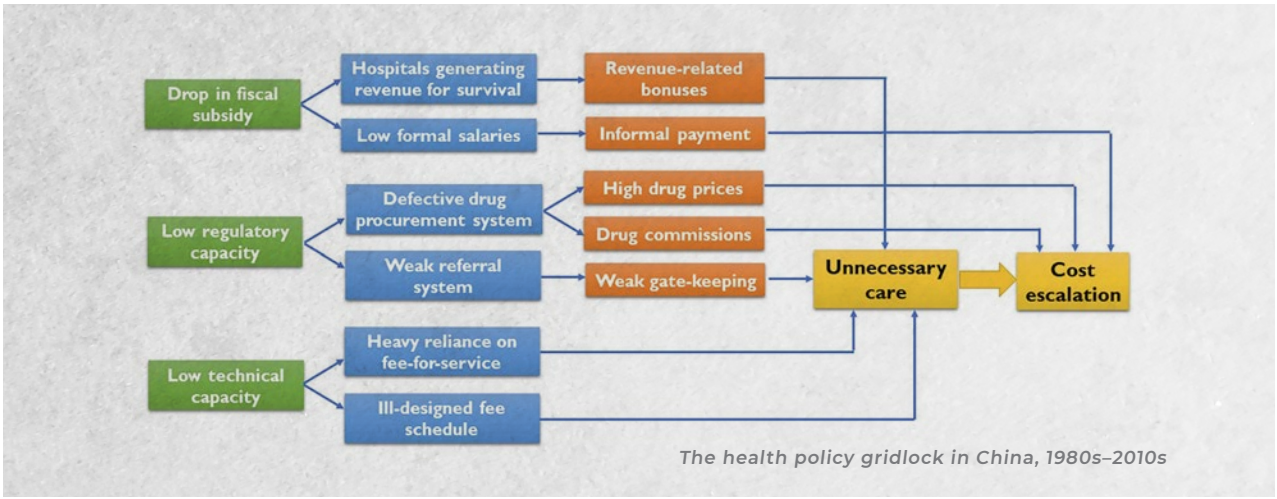


This paper investigates if there exist consistent modification influences of telecommuting on trip-chaining behavior in the decade prior to the pandemic using 2009 and 2017 U.S. National Household Travel Surveys, the findings show that telecommuting significantly increases people's propensity to chain trips, raises trip-chaining frequency, and encourages more complex trip chains. Furthermore, these impacts are significant on commuting days, which suggests that telecommuters still have different trip-chaining behavior than non-telecommuters on the days when they commute to the workplace. While trip chaining has been encouraged under pandemic conditions to minimize health risks, heightened health concerns will fade as the pandemic recedes. With telecommuting likely to persist, unraveling how trip-chaining behaviour had changed in response to telecommuting before the pandemic can help policymakers better understand the long-term changes in travel behavior in the post-pandemic world.

Urban and Social Policy

He, Jingwei Alex, Fan, Yumeng, and Su, Rui. (2022). Seeking Policy Solutions in a Complex System: Experimentalist Governance in China's Healthcare Reform.

Policy Sciences, 55(4), 755-776.



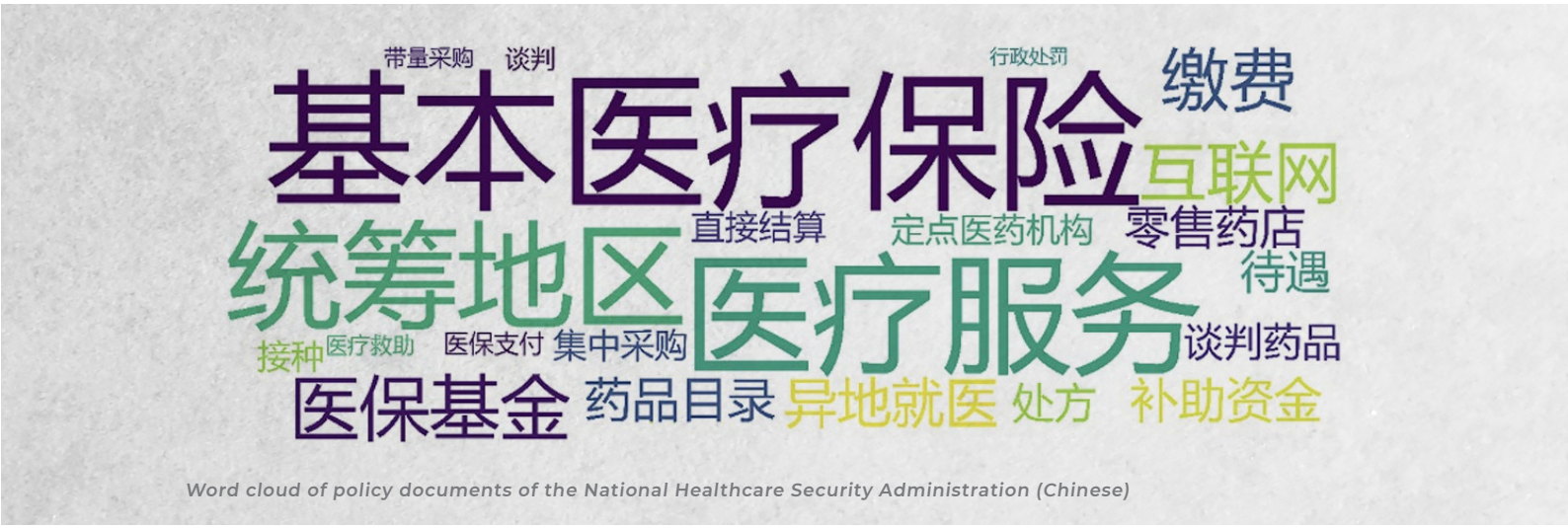
The health policy gridlock in China, 1980s–2010s

The paper tackles the problem of "wicked" policy problems proliferation in complex systems by an experimental approach that offers a conducive framework to seek policy solutions amidst high levels of complexity in a multilevel governance structure. Four distinctive experimental modalities are conceptualized based on varying levels of technical and interest complexity, which represent salient constraints for policy reforms in a complex system, especially in the health sector. The four modalities: trail-blazing pilots, crowdsourcing pilots, managed pilots, and road-testing pilots are all associated with distinct mechanisms of experimentation in a multilevel governance structure. Four illustrative cases from China's massive experimental program of public hospital reform are presented to demonstrate how experimentalist governance seeks policy solutions in the health sector. It is proven that governance can play an instrumental role in seeking solutions for difficult problems in a complex policy system.

Research Showcase

He, Alex Jingwei, Azad Singh Bali, and M. Ramesh. "Active Stewardship in Healthcare: Lessons From China's Health Policy Reforms."

Social Policy & Administration 56.6 (2022): 925-940.

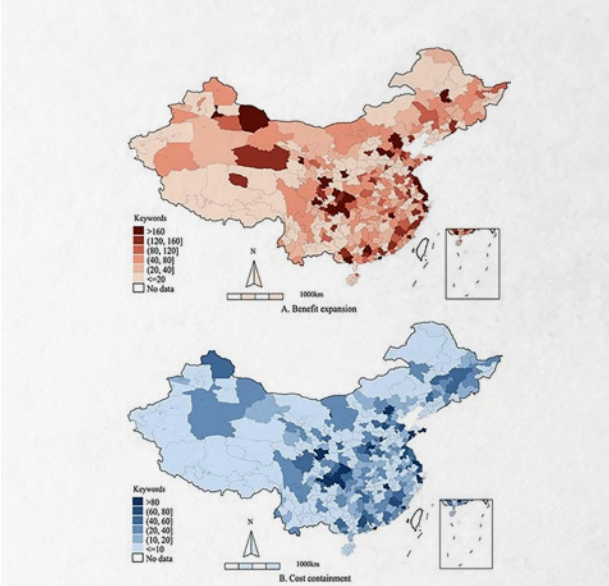


Word cloud of policy documents of the National Healthcare Security Administration (Chinese)

This paper conceptualizes the government's role in contemporary health policy as one of "active stewardship" wherein the government is a central actor steering and coordinating the sector through a portfolio of diverse policy tools. In this conceptualization, the government is not a passive participant—in merely financing, delivering, or regulating the sector—but a steersman at the helm that sets policy objectives and actively pursues them. It is argued that active stewardship is central to achieving contemporary health policy priorities of universal healthcare. By applying this conceptualization to China's recent healthcare forms, it is shown that the role of the government in governing the sector has changed substantially over time, particularly since 2009, and the changes are showing promising results. China's experience suggests that governments need to more actively guide and shape the behaviour of both public and private players in order to achieve the goals of universal health coverage. It also suggests that a high degree of policy capacity is essential if active stewardship is to be effective.

Liu, Kai, Wenting Liu, and **Alex Jingwei He.** "Evaluating Health Policies with Subnational Disparities: a Text-Mining Analysis of the Urban Employee Basic Medical Insurance Scheme in China."

Health Policy and Planning 38.1 (2023): 83-96.



Local policy discrepancy in the UEBMI reforms

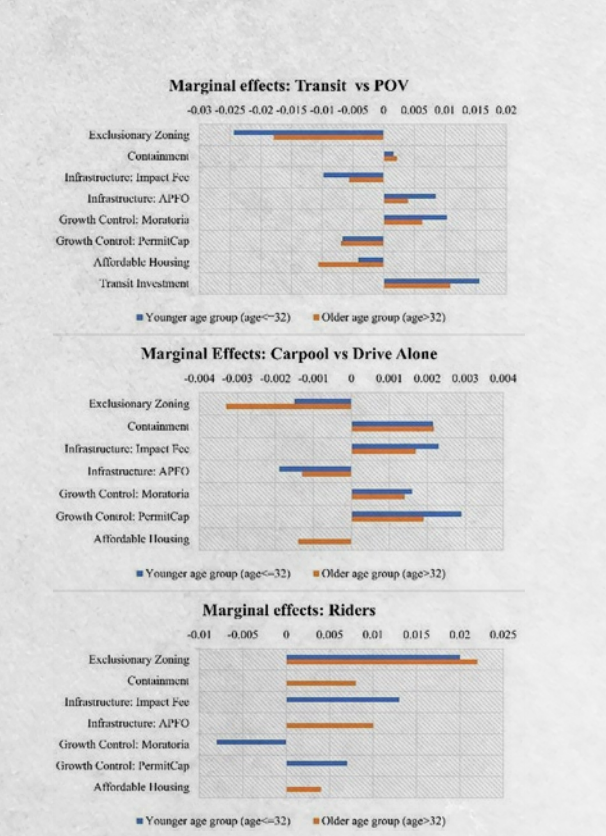
This paper studies heterogeneous effects and distinct policy choices across localities under the same generic policy. By using the emerging 'text-as-data' methodology and drawing from subnational policy documents, this study developed a novel approach to policy measurement by analyzing policy big data. This approach is applied to examine the impacts of China's Urban Employee Basic Medical Insurance (UEBMI) on individuals' out-of-pocket (OOP) spending. Substantial disparities are found in policy choices across prefectures when categorizing the UEBMI policy framework into benefit-expansion and cost-containment reforms. Overall, the UEBMI policies lowered enrollees' OOP spending in prefectures that embraced both benefit-expansion and cost-containment reforms. In contrast, the policies produced ill effects on OOP spending of UEBMI enrollees and uninsured workers in prefectures that carried out only benefit-expansion or cost-containment reforms. The micro-level impacts of UEBMI enrolment on OOP spending were conditional on whether prefectural benefit expansion and cost-containment reforms were undertaken in concert. Only in prefectures that promulgated both types of reforms did UEBMI enrolment reduce OOP spending. These findings contribute to a comprehensive text-mining measurement approach to locally diverse policy efforts and an integration of macro-level policy analysis and micro-level individual analysis. Contextualizing policy measurements would improve the methodological rigour of health policy evaluations. This paper concludes with implications for health policymakers in China and beyond.

Research Showcase

Zhu, P., Tan, X., Zhao, S., Shi, S., & Wang, M. (2022). Land Use Regulations, Transit Investment, and Commuting Preferences.

Land Use Policy, 122, 106343.

This paper examines how various local land use regulations and transit investment, both measured at the aggregated metropolitan level, have affected people's long-term travel behaviors over a 15-year period, and how these impacts differ between younger and older age groups. This study combines a set of land use regulation indices measured at the metropolitan level in 2003 with 15 years of travel data (2005–2019) from a pooled representative sample of over 8 million workers in the 50 largest U.S. metropolitan areas. Results show several local anti-sprawl land use regulations (e.g., growth containment, adequate public facilities, and moratoria), when combined at the metropolitan level, effectively reduced driving notwithstanding their marginal effects. Government investment in public transit also significantly increased commuters' likelihood of using public transit and, carpooling, as well as increased carpool group size. Moreover, the commuting mode choices of younger workers are more responsive to transit improvements and land use regulations. Urban planners should commit to regional cooperative planning to promote effective land use regulations at the metropolitan level. Regional collaborative entities, such as metropolitan planning organizations should play a larger role in coordinating local land use planning and regulations. To reduce automobile dependency, planners should commit to improving public transit through enhanced financial assistance, harnessing land use regulations in a more targeted way, and accommodating the needs of different age cohorts.



Marginal effects for the older and younger age groups

Zhu, P., Tan, X., Wang, M., Guo, F., Shi, S., & Li, Z. (2023). The Impact of Mass Gatherings on The Local Transmission of COVID-19 and The Implications for Social Distancing Policies: Evidence from Hong Kong.

Plos one, 18(2), e0279539.

This paper examines the impacts of mass gatherings on the local transmission of COVID-19 and evaluates the importance of social distancing policies. With an aggregated dataset of epidemiological, city-level meteorological, and socioeconomic data, a Synthetic Control Method (SCM) is used for constructing a 'synthetic Hong Kong' from over 200 Chinese cities. This counterfactual control unit is used to simulate COVID-19 infection patterns (i.e., the number of total cases and daily new cases) in the absence of mass gatherings. Comparing the hypothetical trends and the actual ones, our results indicate that the infection rate observed in Hong Kong is substantially higher than that in the counterfactual control unit (2.63% vs. 0.07%). As estimated, mass gatherings increased the number of new infections by 62 cases (or 87.58% of total new cases) over the 10–day period and by 737 cases (or 97.23%) over the 30-day period. These findings suggest the necessity of tightening social distancing policies, especially the prohibition on group gathering regulation (POGGR), to prevent and control COVID-19 outbreaks.

Research Showcase

Zhu, P., Wang, K., Ho, S. N. R., & **Tan, X.** (2023). How is Commute Mode Choice Related to Built Environment in a High-Density Urban Context?

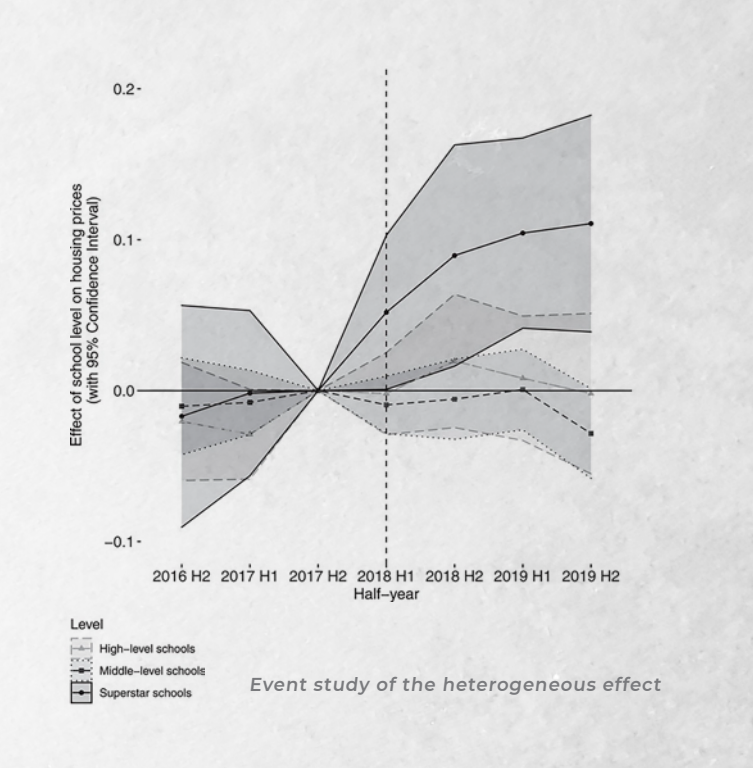
Cities, 134, 104180.

Map showing the tertiary planning units/ street block (TPUSB) and tertiary planning units (TPU) boundaries

This paper addresses the unique challenges and problems associated with the built environment and travel behavior in extremely dense urban settings, using Hong Kong as a case study. In addition to investigating how built environment features are related to the choices between public transport and cars, public transportation is divided into three sub-modes to study the impacts of the built environment. Furthermore, how these relationships differ between millennials and older generations was tested. Results indicate that built environment characteristics are more influential in people's choices among different public transport sub-modes than in their choice between public transport and cars. Compared to older commuters, millennials' choices of rail-based and mixed-mode public transport are more susceptible to built environment attributes whereas their effects on road-based transit usage are stronger for older commuters. These investigations provide important insights into individuals' commute mode choices in highly dense, transit-dominated urban contexts, and hence provide more reliable grounds for policymaking to encourage the usage of specific public transit sub-modes, and to meet the needs of different age groups.

Zhu, Pengyu, Yi Zhang, and Juan Wang. "Canceling The Admission Priority of Private Schools Enlarges Housing Price Gap in Public School Districts: Evidence from Shanghai's New Admission Policy."

Real Estate Economics 51.1 (2023): 49-67.



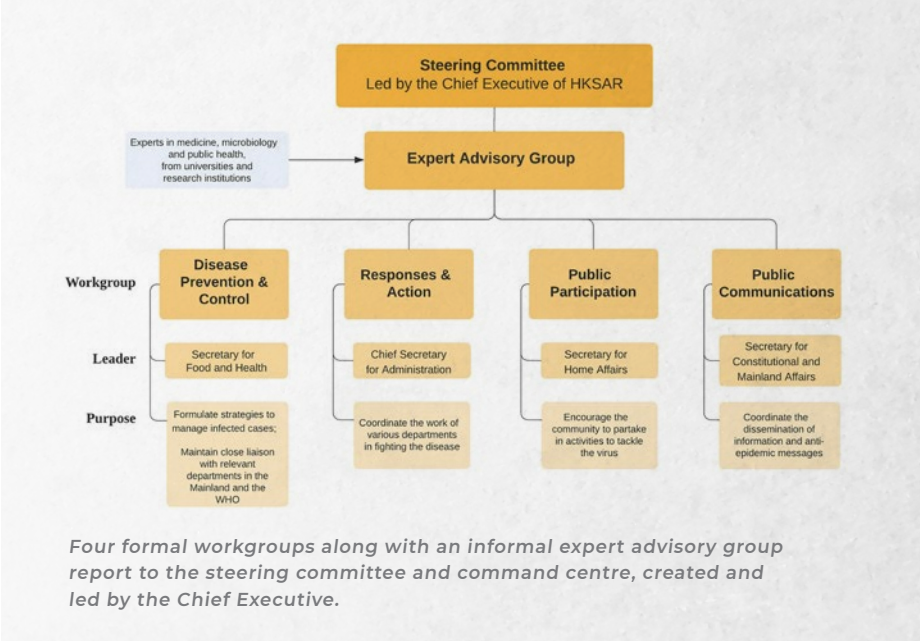
Event study of the heterogeneous effect

In this paper, the authors studied the effect of Shanghai's unique admission policy measure for adjusting private and public school competition and discouraging private school choice priority to promote education equity. By examining the impact of the new admission policy on the capitalization of public education quality, boundary fixed effect and Difference in Differences (DID) analysis were applied to housing transaction records before and after the policy. The admission policy on average led to an additional 2% housing price premium for every standard deviation increase in public school quality. However, this average increase in premium was mainly driven by elite (top 5%) school districts, where an additional 8.6% housing price premium was generated by the policy. Housing prices in nonelite school districts, on the other hand, demonstrated no significant changes. These results indicate that the policy enlarges the housing price gap among school districts with different education quality. Thus, rather than promoting education equity, this policy may overall worsen the housing affordability in good public school districts and make access to quality education more exclusive.

Research Showcase

Matus, K., Sharif, N., Li, A., Cai, Z., Lee, W. H., & Song, M. (2023). From SARS to COVID-19: the Role of Experience and Experts in Hong Kong's Initial Policy Response to an Emerging Pandemic.

Humanities and Social Sciences Communications, 10(1), 1-16.



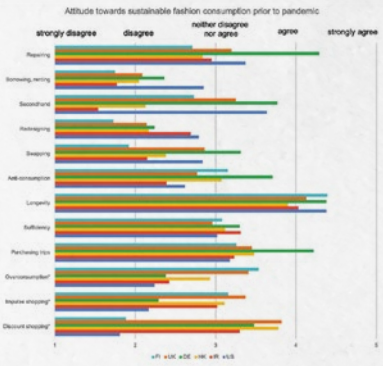
Four formal workgroups along with an informal expert advisory group report to the steering committee and command centre, created and led by the Chief Executive.

This paper studies how scientific advice was offered and how public health decisions were made under the context of the Covid-19 Pandemic outbreak in Hong Kong, at a time when trust in the Hong Kong government by Hong Kong people has hit an all-time low this research investigates the evolution of Hong Kong's science advisory mechanisms for public health from before SARS, after SARS, and during COVID-19 in 2020, including the roles of key organizations and departments, the establishment of new centers and committees, and the creation of workgroups and expert advisory panels. This paper compares and analyses the reasons behind these differences in science advisory mechanisms between SARS and COVID-19. The findings from this research reinforce the unquestionable need for robust science advisory structures and knowledgeable scientific experts to solve health-related crises, though more research is required to understand the ways in which science advice influences both policy decisions and public acceptance of these policies.

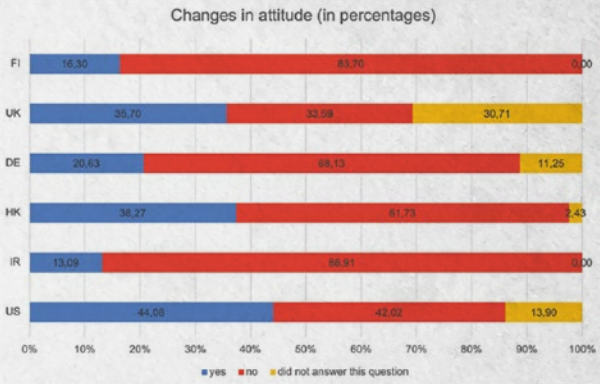
Environmental Policy and Sustainability

Iran, S., Martinez, C. M. J., Vladimirova, K., Wallaschkowski, S., Diddi, S., Henninger, C. E., Helen McCormick, **Kira Matus,** Meike Sauerwein, Renu Singh, Loredana Tiedke, (2022). When Mortality Knocks: Pandemic-Inspired Attitude Shifts towards Ssustainable Clothing Consumption in Six Countries.

International Journal of Sustainable Fashion & Textiles, 1(1), 9-39.



*Attitudes towards sustainable clothing consumption before the pandemic (*reverse items).*



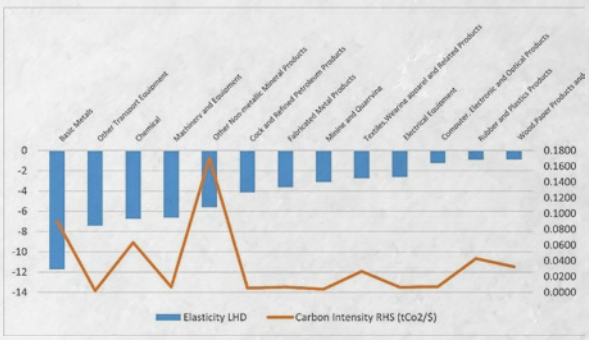
Changes in attitude toward clothing during the pandemic

This paper studies how the change and disruption of the routine lives of citizens globally due to the COVID-19 Pandemic has impacted consumers' attitudes toward fashion and consumption practices, using terror management theory across six different countries, from the Middle East, Southeast Asia, Europe, and North America. A structured qualitative study with closed, open-ended, and multiple-choice questions was completed by a sample of consumers (N = 3748) across these countries. Among all participants, one-third reported that the pandemic had affected their attitude toward clothing and this study was mainly conducted to investigate the nature of those attitude changes. Qualitative analysis identified patterns of change in consumers' attitudes towards clothing (e.g., minimalism, grateful mindset, conscious mindset, decreased fashion desire, longevity, and style confidence), which reveal the potential for a lasting shift towards more sustainable consumption patterns. The results of this study highlight valuable managerial implications that the industry needs to respond to this shift in consumers' attitudes and move towards more sustainable business models and processes. These results are also relevant for predicting future consumption patterns, especially considering that pandemics may become a more regular part of life.

Research Showcase

Zhao, Bei, and **Masaru Yarime.** "The Impacts of Carbon Tariffs on International Trade Flows and Carbon Emissions: An Analysis Integrating Trade Elasticities With an Application to US-China trade."

Energy Economics 115 (2022): 106337.

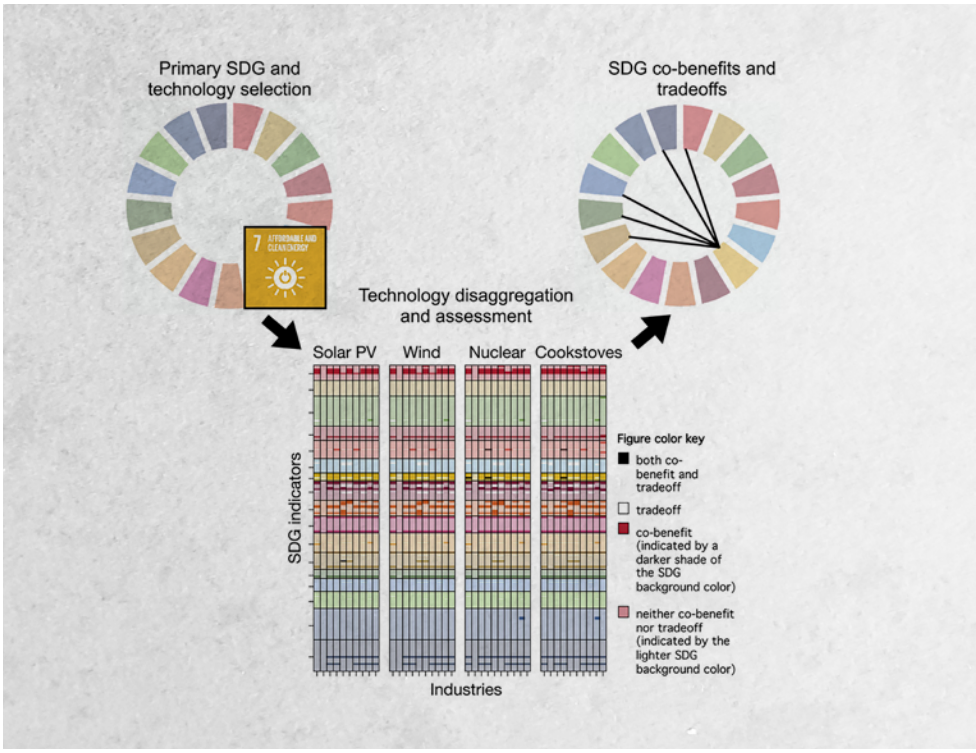


Trade elasticities and carbon intensities

This paper aims at reducing the gap between trade economics and environment studies by integrating trade elasticities into the analysis of carbon tariffs' impacts on trade flows and carbon emissions embodied in exports. We start by adopting the gravity trade model and constructing a panel data set of 63 countries from 2005 to 2015 to calculate the trade elasticities across 13 industries. With a simple model that translates carbon tariffs into tariffs, the cross-country and cross-industry impacts of carbon tariffs were evaluated. A model to forecast the effect of carbon tariffs on China-US trade under different scenarios is also provided. It was discovered that industries' trade elasticities and carbon intensities play an essential role in determining carbon tariffs' impacts. It is also shown that the threshold carbon tariffs for the 13 industries with an average of $42/tCO2. It is found that if the U.S. stopped importing from China by replacing all Chinese exports with its domestic productions, it would emit 88.8% fewer carbon emissions than China does, which would contribute to a 0.65% decrease in world carbon emissions. Other scenarios of replacing all Chinese exports with Canadian, Japanese, or Mexican exports show similar results. This paper illuminates the critical importance of incorporating trade elasticities when designing carbon tariffs.

Klemun, M. M., Ojanperä, S., & Schweikert, A. (2023). Toward Evaluating the Effect of Technology Choices on Linkages between Sustainable Development Goals.

iScience, 26(2), 105727.



Linkages between the Sustainable Development Goals (SDGs) have sparked research interest because a better understanding of SDG co-benefits may enable faster progress on multiple sustainability fronts. However, SDG linkages are typically analyzed without considering the technologies used to implement a primary SDG, which may have secondary effects on other SDGs. Here, we outline an approach to study this problem by connecting the industries and services required to produce technology to the United Nations SDG indicator framework, using SDG7 and four energy technologies as an illustrative case. We find that all technologies in our set involve potential co-benefits with SDGs 1, 8–10, 12–13, and 17, and trade-offs with SDGs 6, 8–9, 11–12, and 14–15. Deployment services primarily induce co-benefits; manufacturing has mixed impacts. Our work sheds light on the technology characteristics (e.g., scale, high- or low-tech) that influence linkages while also pointing to SDG-relevant characteristics not captured by UN indicators.