Two excellent papers!

Impressive data collection, interpretation efforts, and statistical treatment

- Panel data on particulate concentration, transport, as well as country and high-resolution indicators
- A global database on tall buildings and bedrock depths. A convincing IV strategy.

Robust modelling frameworks to test policy-relevant counterfactuals

- A sophisticated augmented IAM (SEPIA) to look into the impacts of taxes on oil, coal, or agricultural by-product burning
- A simple but powerful monocentric model to look into the indirect benefits of tall buildings and land use regulation removal

Key building blocks to look into climate change mitigation strategies
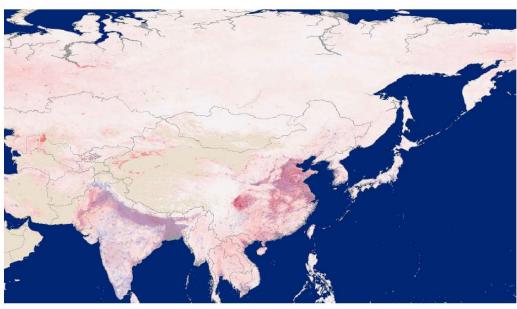
- Mitigating air pollution: one of the key co-benefits of CO_2 mitigation efforts and a very important goal in its own right
- The potential benefits from tall buildings in terms of densification and intensive land use in cities

(-> both stop one step (or two) short of discussing climate mitigation)

But,… very different topics and scales

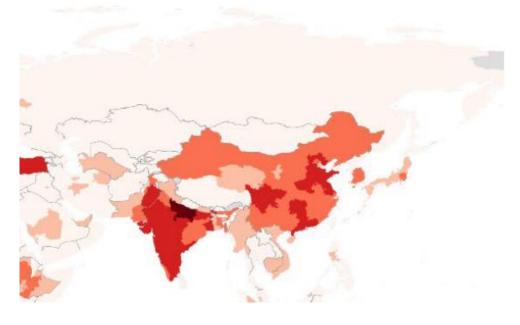- Cannot do them justice by trying to discuss them together

Paper 1: Are all particulate emissions created equal? How does it work?

(c) Exposure, 2010

Aldeco, Barrage, Turner, Equilibrium Particulate Exposure, 2023, draft (paper 1)

0 - 5 m
5 - 24 m
24 - 61 m
61 - 125 m
125 - 231 m

Population exposure to PM 2,5 (millions)
Rentschler, Jun, and Nadia Leonova. 2022. "Air Pollution and Poverty : PM2.5 Exposure in 211 Countries and Territories." *Policy Research Working Papers,* no. 10005.

- Impossible to compare these maps and in both cases India and China seem particularly affected
- But India seems to have higher population exposure to PM 2.5 (right) than to all particulates (left).
- Is this purely measurement differences (pop aggregation, dates) or are there differences in sub-categories of particulates?
- Do all particulates behave in the same manner? Do they all have similar health consequences? Should we focus on one or several of these particulates?

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Paper 1: What are the implications for CO_2 emissions?

- Studying particulate pollution is important in its own right given the health consequences (3 million people killed annually (Brauer et al., 2015)) and their economic costs

- But it is also very relevant for climate change as pollution decrease is often discussed as the main co-benefit of climate change mitigation action

- In this paper, natural gas, because it does not emit any particulates, is bundled with green energy and renewables. And (I imagine) that wood burning contributes to PM whereas it is generally measured as neutral from a CO2 standpoint

- Can the model also be tailored to look at CO_2 emissions?

- Are there any potential tradeoffs between the objectives of reducing particulate exposure and CO_2 emissions?

Paper 1: some additional thoughts/questions

- Is it average concentrations that matter? Or spikes in pollution? This has important consequences for policy recommendations!

- Political economy implications? Would any of these policies be less politically contentious?
    - Oil tax: impacts ordinary people owning a car?
    - Coal tax: impacts all people and firms?
    - ag burning: impacts mostly rural people with less voice?

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Paper 2: Tall buildings or density?

Modulations morphologiques de la densité

- Habitat intermédiaire
- Maisons
- Appartements

Grande hauteur
Faible emprise au sol
76 logements/ha

Faible hauteur
Forte emprise au sol
76 logements/ha

Hauteur moyenne
Emprise au sol moyenne
76 logements/ha

1) Articles 5 à 10 des règlements
des plans locaux d'urbanisme ou
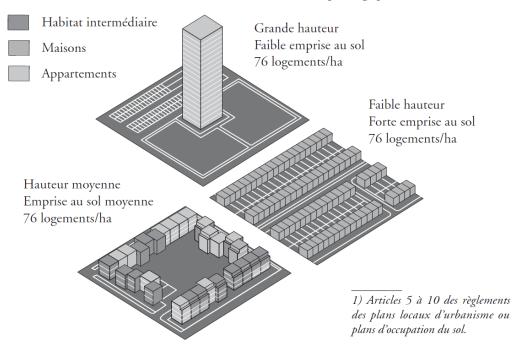plans d'occupation du sol.

IAURIF, 2005, "Apprehender la densité. 2. Les indicateurs de densité", Note Rapide sur l'Occupation des Sols n383

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IAURIF, 2005, "Apprehender la densité. 2. Les indicateurs de densité", Note Rapide sur l'Occupation des Sols n383

Les Olympiades, Paris 13th.

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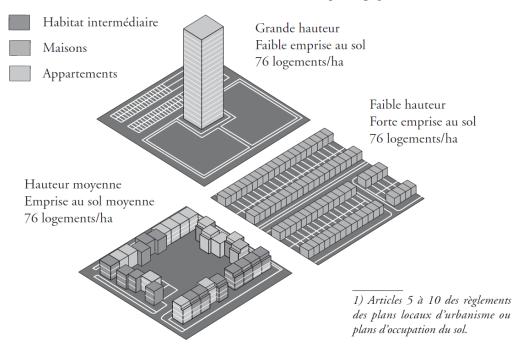de densité", Note Rapide sur l'Occupation des Sols n383

Les Olympiades, Paris 13th.

- Is it tall buildings that enable city compactness? Or simply floor space density?
- Or is it tall buildings associated with no or low land use regulations (open spaces, parking space,…)?

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Paper 2: Cost-efficiency of compactness? A case for public policies?

- The paper investigates the impact of declining height elasticity of construction cost with potential for reducing negative externalities (sprawl, CO_2 emissions,…) and creating positive impacts (lower rents, higher land values).
- Is there a case for subsidizing tall buildings? For taxing low density urban development?
    - E.g.: Avner Viguié, Hallegatte, 2013 for example look at a tax on low density construction

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- If you had 1$ to spend would it be more efficient to subsidize construction (tall buildings)? Or subsidize public transport?

	Without the public transport subsidy	With a lump sum transfer	With a generalized construction subsidy	With a targeted construction subsidy
Urban sprawl				
Average distance to the city center	-6.97%	-3.65%	-7.10%	-8.73%
Urbanized area	-0.40%	1.71%	-0.51%	-0.76%
Average density in the urban area	0.40%	-1.68%	0.51%	0.77%
Climate change / CO$_2$ emissions				
Public transport mode share	-19.15%	-18.95%	-19.14%	-19.18%
CO$_2$ emissions from commuting	1.28%	5.11%	1.12%	-0.69%
Welfare				
Household utility	-3.73%	1.30%	-2.67%	-2.69%

Case study on the urban area of Buenos Aires
Simulations looking at the impacts of a public transport subsidy removal associated or not with compensating policies

Avner, Paolo, Shomik Raj Mehndiratta, Vincent Viguie, and Stephane Hallegatte. 2017. "Buses, Houses or Cash ? Socio-Economic, Spatial and Environmental Consequences of Reforming Public Transport Subsidies in Buenos Aires." *World Bank Policy Research Working Paper*, no. 8166 (August): 1-54.

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Paper 2: Some additional thoughts

- **Thinking more globally: Are there any differences in municipal costs associated with skyscrapers vs other types of buildings?**

    - **If tall buildings lead to less sprawl than probably savings on infrastructure (sewage, roads,...)**

    - **But are there any increased costs locally? (maybe more parks? Maybe more schools?)**

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References

Avner, Paolo, Vincent Viguié, and Stéphane Hallegatte. 2013. "Modélisation de l'effet d'une Taxe Sur La Construction: Le Versement Pour Sous-Densité." *Revue de l'OFCE* N° 128 (2): 341-64. https://doi.org/10.3917/reof.128.0341.

Avner, Paolo, Shomik Raj Mehndiratta, Vincent Viguie, and Stephane Hallegatte. 2017. "Buses, Houses or Cash ? Socio-Economic, Spatial and Environmental Consequences of Reforming Public Transport Subsidies in Buenos Aires." *World Bank Policy Research Working Paper*, no. 8166 (August): 1-54.

Brauer et al. Ambient air pollution exposure estimation for the global burden of disease 2013. Environmental Science & Technology, 50(1):79-88, 2015.

Rentschler, Jun, and Nadia Leonova. 2022. "Air Pollution and Poverty : PM2.5 Exposure in 211 Countries and Territories." *Policy Research Working Papers*, no. 10005. https://openknowledge.worldbank.org/handle/10986/37322.

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Thank you!

Paolo Avner
Senior Economist
GFDRR
pavner@worldbank.org

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