

The Economics of Urban Sprawl

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Patterns of urban expansion

Although **share of US land area occupied by cities is small** (around 2%), amount of developed is growing rapidly (at 2.5 percent per year over 1976-1992 period, for example).

In many cities, rate of spatial expansion **far exceeds rate of population growth**.

This process of urban sprawl has been **criticized** in the US, and criticism is now starting in other countries.

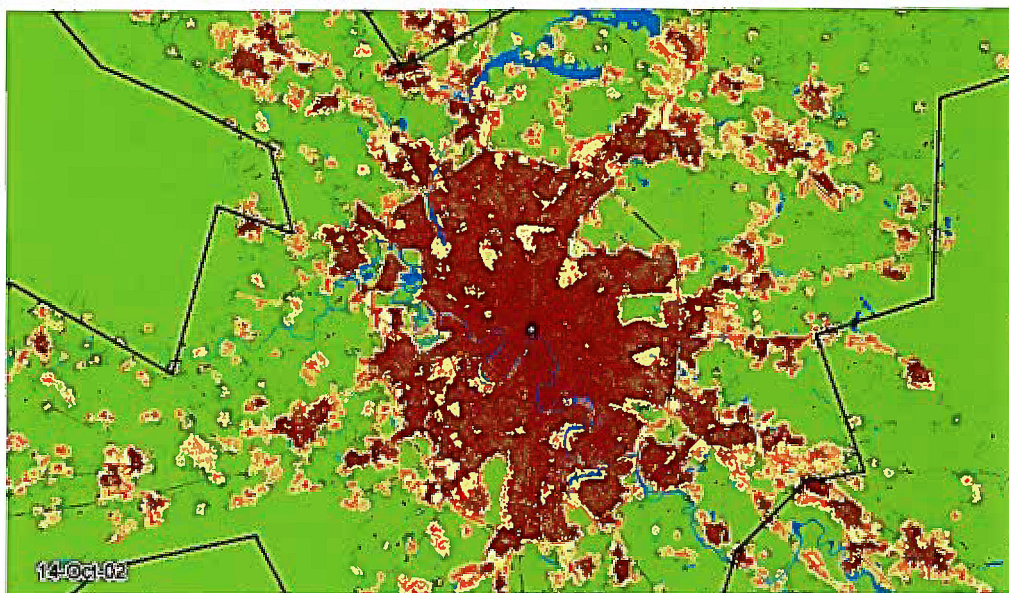
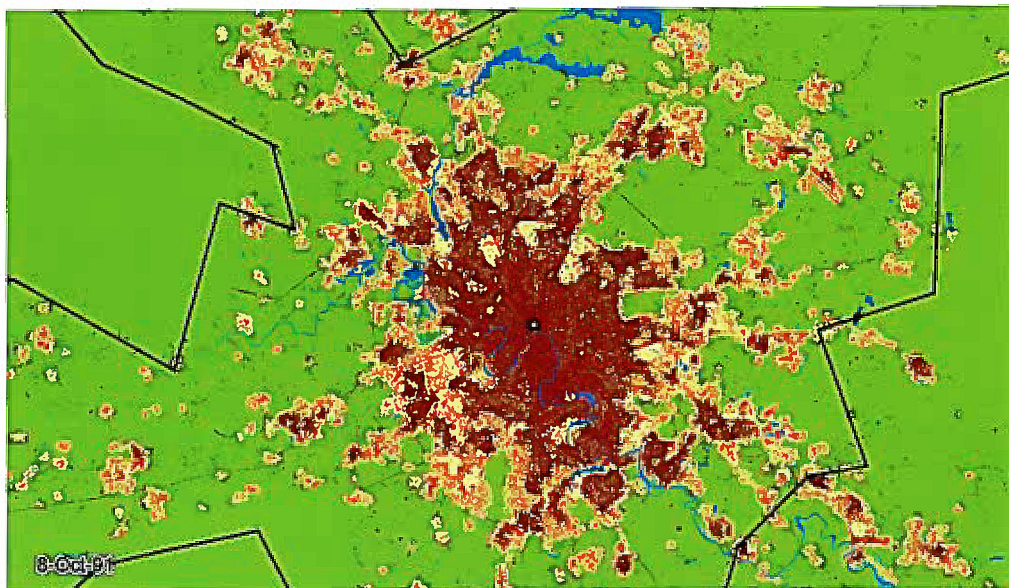
The case of Moscow

Moscow is no exception to the pattern of sprawl.

Data from Angel et al. (2012) show that, over the period 1991-2002,

- Moscow's population fell by 5% (to 9.144 million)
- The city's land area grew by 44%

Moscow, Russian Federation



Undesirable consequences of sprawl

Urban spatial expansion is viewed as **paving over the landscape**, leading to

- Undesirable loss of **farmland**
- Loss of **open space** and its benefits
- More **air pollution** from longer commutes
- Reduced incentives for downtown redevelopment (**blight**)

Sprawl is also alleged to have **undesirable behavioral impacts**:

- Less **social interaction**
- More **obesity**

Policy responses

In response to these concerns, **US land-use policies** increasingly restrict urban expansion.

Policies include urban **growth boundaries**, public **purchases** of vacant land, development **fees**.

European policies have apparently been restrictive for longer (e.g. green belts in U.K.)

Sprawl **policies in Russia?**

Are sprawl criticisms correct?

Although sprawl criticisms may **sound right**, we might ask:

- Are the criticisms **well-founded** from an economic perspective?
- Do cities really take up **too much space**?
- Should **anti-sprawl measures** really be adopted?

The tools of **urban economics** give answers.

Basic urban model

In the urban model, **everyone commutes to jobs in the city center.**

To **compensate** for costly commutes, **urban land rent falls** as distance from the center increases.

Housing developers **compete with farmers** for use of the land.

Edge of city is where urban land rent falls to the **agricultural rent.**

Effects of urban characteristics on city's spatial size

Mathematical analysis of the model shows that

- Edge of city moves outward as the urban population rises
- Edge of city moves inward as the agricultural rent rises
- Edge of city moves inward as the cost of commuting rises
- Edge of city moves outward as the resident income rises

Second effect says that high-productivity agricultural land is more resistant to urban expansion than low-productivity land.

Allays concerns about farmland loss due to sprawl.

Main sources of sprawl

Model thus identifies **main sources** of urban spatial expansion experienced in US and elsewhere:

- **Rising city populations**
- **Rising incomes**
- **Falling commuting costs**, a result of highway investment

Sprawl is mainly driven by these **fundamental forces**.

Empirical evidence confirms the role of these forces (Brueckner and Fansler (1983) and later papers).

Market failures and sprawl

Although the fundamental forces clearly drive urban spatial expansion, could their effects be **distorted by market failures?**

A market failure is a force that **causes markets to create undesirable outcomes.**

Result would be cities that **take up more space than they should.**

Economists have identified several such market failures (Brueckner (2000)).

Failure to account for open-space benefits

Under one market failure, urban developers fail to take account of the **amenity benefits from open space** in their decisions.

True cost of switching an acre of farmland to urban use is **not just** forgone agricultural rent.

Open-space benefits **are lost too**.

Land developer **fails to consider** these benefits, implying **too much** development.

Remedies for overlooked open-space benefits

How to **reduce the resulting overexpansion** of city?

Charge **development tax** equal to lost open space benefits.

Or impose **urban growth boundary** (UGB), prohibiting expansion.

Potential criticism: people **may not care** about open space at urban fringe (city parks matter instead).

Zealous policymaker who does care and imposes UGB **causes social harm** in the form of higher rents.

Unpriced road congestion

Another market failure is **unpriced road congestion**.

With congestion externality, an added car on a freeway **slows down every other car slightly**, producing aggregate loss.

Social cost of commuting is then higher than **private cost**.

So **commute trips are too long** from society's point of view, and city is too spread out.

Remedy for unpriced road congestion

The remedy to impose a **congestion toll**, which **charges each driver** for externality damage.

Implemented in **London, Singapore, Stockholm** and perhaps soon in New York.

Effect is to **raise commuting cost**, leading to a **spatial shrinkage** of city.

UGB is **not a proper remedy** in this case.

Size of optimal toll?

There's little doubt about practical relevance of congestion externality.

Model simulations show that city radius is about 10% too large.

Required toll is about \$0.17 per mile; greatly increases central densities when imposed.

A third distortion comes from mispriced urban infrastructure, where new development does not pay its marginal cost and is thus perceived as too cheap.

Emissions externalities and sprawl

Emissions externalities, both from commuting and residences, can also lead to overexpansion of cities.

Borck and Brueckner (2016) show that **tax on driving** (not congestion toll) and **two different real estate taxes** are needed to correct externality.

Cause **spatial shrinkage** of the city.

Sprawl and blight

Brueckner and Helsley (2011) show, that with any of these market failures, **city center has inefficiently low building reinvestment**, implying blight.

Imposing corrective policy **reduces central blight** in each case.

Empirical support given by Hortas-Rico (2015), who shows that **cities with urban containment policies have lower blight**.

Urban sprawl and social interaction

Many commentators claim that low-density suburban living **reduces social interaction** by spreading people out.

Brueckner and Largey (2008) **provide a test** by combining individual social-interaction information from a US survey with census-tract density data.

Contrary to assertions, low density living raises social interaction.

Urban sprawl and obesity

Various studies explore the **connection between individual obesity and urban sprawl**.

Some studies by noneconomists show a **positive association between BMI (body mass index)** and the extent of sprawl.

Interpret as a causal link, but economic research by Eid et al. (2008) shows the **result is due to self-selection**: obese people choose to live in the suburbs.

Conclusion follows from **lack of change in body weight** among people moving from city center to suburbs.

Conclusion

Urban sprawl can be analyzed using the tools of urban economics.

Analysis shows that sprawl is mainly driven by fundamental forces (population, income and commuting cost).

But market failures cause expansion to be excessive.

Remedies can be identified, but overzealous attack on sprawl can reduce welfare.

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