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Modelling the actions and interactions of different parties in the transport and housing sectors



multi-scale infrastructure systems analytics

Whole system analysis for better infrastructure investment choices

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Construction

A profit maximising construction sector decides how many new houses to build in each region

Income and expenditure

Households' income depends on age (though percentile remains fixed), they pay taxes, and spend on essential and non-essential consumption before making their housing decisions

Household behaviour

Households without a house decide whether to buy or rent and where (residential choice), renters continue to pay rent until the end of their contracts, owner-occupiers decide whether to sell their current house, buy-to-let investors decide whether to buy new properties and where (investment choice) and whether to sell any of their owned properties

 Deciding where to invest on buy-to-let housing, depending on household's budget and expected capital and rental yield

Market mechanism

Iterated double auction

- Buyers try to obtain the highest possible quality that they can afford and at the minimum available price
- Sellers receiving a single bid directly accept it
- Sellers receiving multiple bids get to increase the price and randomly choose among the buyers still interested

Policy choices

Macroeconomic policy

The Central Bank and/or the Financial Regulator have a number of macroeconomic policy choices, such as: choosing the base interest rate, imposing maximum loan-to-value ratios for mortgages, or other affordability requirements.

Infrastructure policy

From local to central governments and departments, transport infrastructure investment can reduce the cost and/or the time needed to commute between any two regions.

Local policy

Both local and central governments and departments have a number of choices for regulating the construction sector, such as imposing social housing ratios and charges as Community Infrastructure Levy.

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