Agent-based Modeling of Migrant Workers Residential Dynamics within a Mega-city Region: the Case of Pearl River Delta, China

C. Losavio[1] and J. Raimbault[1,2]
juste.raimbault@polytechnique.edu

[1]UMR CNRS 8504 Géographie-cités
[2]UMR-T IFSTTAR 9403 LVMT

Medium Project Seminar

4th December 2016

medium
New pathways for sustainable urban development in China's medium-sized cities

This Project is funded by the European Union

Qualitative introduction

Cinzia : $\simeq$ 3 slides

What is hybrid abm-pom

Model Structure

Model Evolution

Model Implementation

Netlogo / HPC openmole
image screenshot
synthetic data only for now

First Results : Statistical Convergence

First Results : Phase Diagrams

Perspectives

next steps : real land use data ; exploration of policies etc.

Conclusion

- All code and data available at
`https://github.com/JusteRaimbault/MigrationDynamics`

Reserve Slides

Discrete Choice Utilities

$$\Delta U_{i,j}^{(c)}(t) = \frac{Z_j^{(c)} - Z_i^{(c)}}{Z_0} + \frac{C_i^{(c)} - C_j^{(c)}}{C_0} - u_i^{(c)} - h_j^{(c)}$$

where $Z_i^{(c)}$ is generalized accessibility given by $Z_i^{(c)} = P_i \cdot \sum_k \left[E_k^{(c)} - W_k^{(c)} \right] \cdot \exp\left(\frac{-d_{ij}}{d_0} \right)$, with d_{ij} effective travel distance (in public transportation ; *point to be clarified : for higher classes, car may be an option*) and d_0 commuting characteristic distance ; $C_i^{(c)}$ is the cost of life which is a function of cell and city variables, that will be taken as $C_i^{(c)} \propto P_i^{\alpha_0} \cdot \tilde{P}_i^{\alpha_1} \cdot$; $u_i^{(c)}$ a baseline aversion to move and $h_j^{(c)}$ an exogenous variable corresponding to regulation policies ; Z_0 and C_0 dimensioning parameters.

Discrete Choice Probabilities

$$\mathbb{P}[i \to j|c] = \frac{\exp\left(\beta' \cdot \left[\Delta Z_{i,j}^{(c)} - \Delta C_{i,j}^{(c)} - \tilde{u}_i^{(c)} - \tilde{h}_j^{(c)}\right]\right)}{1 + \sum_k \exp\left(\beta' \cdot \left[\Delta Z_{i,k}^{(c)} - \Delta C_{i,k}^{(c)} - \tilde{h}_k^{(c)}\right]\right) - N \cdot \tilde{u}_i^{(c)}}$$

References I