Supplementary Material
Memory Matters for Cities

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MATHEMATICAL PROOFS

Average Age within the Memory Kernel

We consider the active population over the whole region as working population. The generation speed of population is $N^*\beta_2 + k\beta_1$. Thus the population is refreshing, leading to a constant expected age of

$$N^*/\beta'$$

for $\beta' := (N^*\beta_2 + k\beta_1)/N^* + k$. This leads to a practical implication that the working age allowed in cities shall be related with the sum of working offer from central government of a region. For instance, in the United States, the regressive value of β is around 0.04. We assume that the working years of a person is 40 years, the expected N^* for the United States is 1,600 units, i.e., 4 millions distributive working opportunities in all cities.

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