### Introduction

- Recent work by Kim, Kratena and Hewings (2014) investigated the long-term economic impact of socio-demographic changes in Chicago by incorporating a consumer demand system by households of different age and income into the REIM.
- Based on the extended REIM by Kim et al. (2014), the effects of disaggregation by age are evaluated in terms of their impact on forecasts of the regional economy.
- Contributions of this paper are as follows:
  - Differences resulting from forecasts generated by a model with and without a disaggregated households have not been the focus of much attention in studies of the heterogeneity of consumer demand.
  - Prediction accuracy of the REIMs has been analyzed mostly in the context of integration strategy for interindustry spillovers.

### Model comparison

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<td>expenditure data</td>
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(C) – (A) = Difference due to methodology and population ageing
(C) – (B) = Difference due to population ageing
(A) – (B) = Difference due to methodology

### Aggregate vs. disaggregate demand systems

- Two AIDS models are estimated under different hypothetical circumstances depending on data availability and heterogeneity assumptions:
  1. All households are homogeneous and only aggregate consumption expenditure data are available (AM)
  2. Age of household heads is recognized and the expenditure data by age group are available (DM)
- In the integrated models for the two cases, total expenditures are linked to the income endogenously determined in the REIM framework.

### Prediction accuracy measures

1. Root mean squared errors (RMSE)
2. The method by Fair and Shiller (1990)
   - A variant of encompassing tests (Davison and MacKinnon, 1981) for non-nested models.
   - Unlike the RMSE, this approach statistically determines whether a model encompasses a competing model in terms of information relevant to prediction.

### Effects of household disaggregation

- **Baseline**: Deviation from the DM - decomposition of sources of differences (the long-range forecasts for 2012-2040):

  - Four models are targeted for a comparison of prediction accuracy: the original model (CREIM), AM, DMf and DM.
  - Output, income and employment in 45 sectors are chosen for comparison: a total of 135 variables

  - **Prediction accuracy measure I: RMSE**

  - **Prediction accuracy measure I: Fair and Shiller (1990)**

### Conclusions

- The DM is capable of capturing marginal impacts of a change in age structure unlike the AM and the CREIM.
- Total effects of household disaggregation in the DM are largely attributable to changes in model specification and data.
- According to the Fair and Shiller’s (1990) method, forecasting gains do exist in the DM as well as the AM against the original model.
- However, the DM's forecasting gains are negligible compared to the AM.