Life-Cycle Deficit over Time in Mexico: A Pooled Time Series Cross-Section Analysis

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Contribution

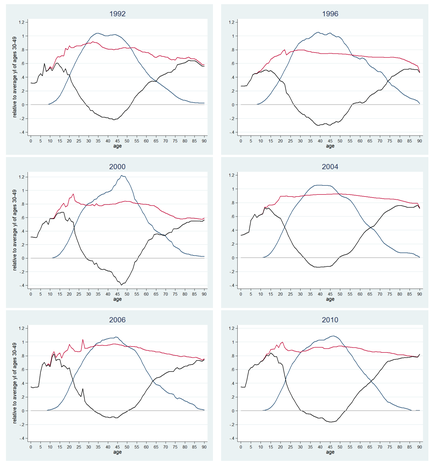
1. More efficient use of cross-sectional data to estimate National Transfers Accounts (NTA).
2. Specification of a *Hierarchical Age-Period-Cohort (HAPC)* model to account for cohort and period effects.
3. Proper assesment of variability of economic accounts over time, by age and cohort.

Introduction

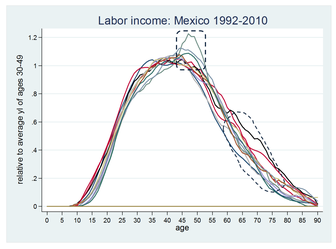
1. Bi-annual Cross-sectional data (from 1992 to 2010) are used to allocate economic flows across age.
2. No period or cohort effects are taken into account in the standard NTA framework.
3. Quality of data and high variability may affect age allocation and proper interpretation.

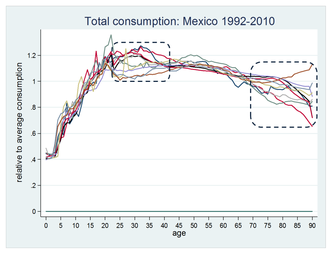
Lifecycle Deficit

Cross-sectional estimates:



Labor income and Consumption





Hierarchical APC: CCREM

Following Yang and Land (2008), I specify a *Cross-Classified Random-Effects Model* (CCREM) for an specific NTA flow account (Y):

Level 1 "Within-Cell" Model:

$$Y_{ijk} = \beta_{0ijk} + \beta_{1ijk}x_{ijk} + e_{ijk}, e_{ijk} \sim N(0, \sigma^2) \quad (1)$$

Level 2 "Between-Cell" Model:

$$\beta_{0ijk} = \gamma_0 + \mu_{0j} + \nu_{0k}, \nu_{0j}\ N(0, \tau_\nu). \quad (2)$$

Combined Model:

$$Y_{ijk} = \gamma_0 + \beta_{1ijk}x_{ijk} + \mu_{0j} + \nu_{0k} + e_{ijk}, \quad (3)$$

for $i = 1, 2, ..., n_{jk}$ individuals within cohort j ($j = 1, ..., 23$) and period k ($k = 1, ..., 10$). x_{ijk} represents additional explanatory variables.

CCFEM

Alternatively, in a *Cross-Classified Fixed-Effects Model* (CCFEM), μ_{0j}, and ν_{0k} are assumed fixed and unique to each of the respective cohorts and period. The estimation requires two sets of indicator/dummy variables for $J-1$ cohorts (Coh_j) and $K-1$ periods (Per_k). Therefore, equation 2 changes to:

$$\beta_{0ijk} = \gamma_0 + \gamma_{1j}\sum_{j=1}^{22} Coh_j + \gamma_{2k}\sum_{k=1}^{9} Per_k, \quad (4)$$

Substituting expression 4 into equation 3 yields the combined CCFEM:

$$Y_{ijk} = \gamma_0 + \beta_{1ijk}x_{ijk} + \gamma_{1j}\sum_{j=1}^{22} Coh_j + \gamma_{2k}\sum_{k=1}^{9} Per_k + e_{ijk}. \quad (5)$$

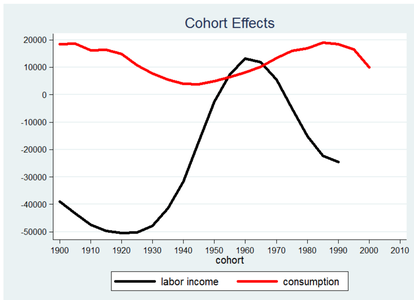
Methodoly: Combining HAPC and NTA models

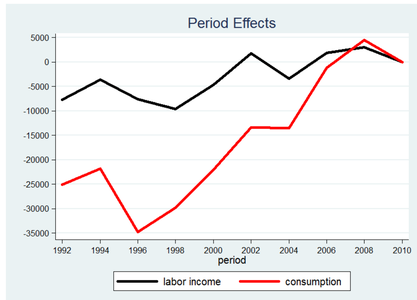
1. Follow the *standard* NTA methodology:
   - Allocation by age of every component of the lifecycle deficit (using cross sectional data),
   - Smooth* and macro-control of age profiles using National Accounts;
2. Apply CCFEM and CCREM for every component obtained in step 1:

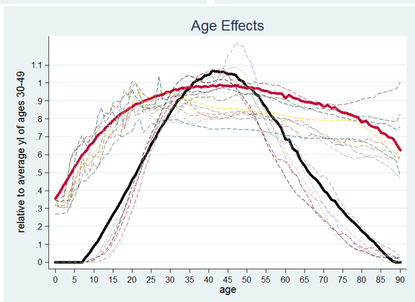
   For example: the components of labor income are: earnings, self-employed labor income, and fringe benefits.
   - Compare the fit of CCFEM and CCREM,
   - Estimate age, period, and cohort effects using the best-fitted model.

Preliminary results

1. Cohorts born during the *Mexican Miracle* period (1940-1970) experienced real increases in their labor income, but it deteriorated for those born after 1970.
2. Economic events effecting labor income and consumption during the 1992-2010 period: a) 1994-1995 economic crisis in Mexico, b) the U.S. recesion of 2001-2002, and c) the 2008 U.S. financial crisis.
3. After controlling for age, age^2, period, and cohort effects, the results predict high labor income for young and elderly.







Conclusions & Future Work

1. Combination of NTA and HAPC models to analyze cohort and period effects.
2. CCFEM uses cross-sectional data more efficiently.
3. This methodology will be applied to the analysis of transfers and asset-based reallocations in Mexico.

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