Consumption stagnation of the Millennials: An Age-Period-Cohort Analysis

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1. Introduction

Given that the Great Recession of recent years have inflicted severe but unequal losses across different cohorts, a commonly asked question in many countries is: Are the Millennials the new Lost Generation? More deeply, the question is: Does it matter when one is born regarding lifetime welfare?

Here we conduct an Age-Period-Cohort (APC) analysis of the real consumption of different cohorts, as consumption is the most commonly used indicator of welfare, and it is necessary to distinguish between the impacts of age, time and cohort in such analysis. We look into all cohorts in the observation period, but focus on younger households whose heads are the so-called Millennials (born in 1981-2000).

2. Data

Household survey data of 1976–2016 of Taiwan are examined. We choose Taiwan not only because of its high data quality, but also because the island economy has gone through rapid changes in economic growth (from super-high growth to stagnation), social development (e.g., family nuclearization) and demographics (e.g., lowest-low fertility and population decrease), so that the results may offer rich policy implications relevant to a great variety of societies today.

The sample size is around 16,000 household each year. We define birth cohorts by the birth year of the household head, and restrict attention to households with heads aged between age 20 and 75 (inclusive). Typical cohort-year cells contain between 300–400 households, but are smaller at young and old ages, which also have less time periods due to the 20–75 age constraint.

The consumption figure we use is non-durable consumption measured as the total expenditure on all goods less expenditures on furniture and family facilities, purchases of personal transportation equipment, and purchases of recreating facilities. These nominal data are converted into 2016 NT$ by CPI for ease of comparison.

3. Methodology

We experiment with a number of APC models, each of which tries to solve the identification problem of perfect linear dependence among age, period and cohort. We

begin with the classic APC model of Deaton and Paxson (1997), called DP later, in which the year dummies are transformed, so that time effect is orthogonal to a time trend, and time effects sum to zero.

Yet this treatment may only fit a short period without large changes over time. As our data span 40 years, we need a model with minimal assumptions. Hence we try the Intrinsic Estimator (IE) approach next. This approach yields a unique solution to the model and is the unique estimable function of both the linear and nonlinear components of the APC model determined by the Moore-Penrose generalized inverse.

As both DP and IE (as well as other methods, such as Constrained Coefficient GLIM…) get mixed receptions, we also make refinements in three aspects, to match real-life scenarios better. First, we break the 40 years into sub-periods and conduct estimation separately, if a regime change is obvious (e.g., high economic growth vs stagnation). Second, we include additional explanatory variables (such as gender, family size, or education level) in APC-Characteristics or Hierarchical-APC models. Third, we use an alternative data set, such as National Transfer Accounts (NTA), which are individual-based, rather than household-based.

4. Preliminary findings

Figure 1 (on p.3) shows the real consumption figures of various cohorts. It is clear from the curves at the right that there has been a long upward trend in consumption, which present a strong challenge to the consumption smoothing predictions of the classical Permanent Income Hypothesis. However, beyond the 1947-1956 cohort, the consumption curves lie above earlier decades only at younger ages and the peak continues to shift to the left. That is to sat, younger cohorts, do not see continuous income growth as their seniors do, which is most likely a result of economic stagnation and consumption stagnation.

Results of the APC analysis are shown in Figure 2 (on p.4), with DP results on the left, and IE results on the right; on top is the age effect, followed by the period effect, and then the cohort effect. With the DP method, the time effect is deliberately reduced, by design; the age effect is positive and increasing until about age 60, then reduces slightly; the cohort effects are larger the younger the cohort. The income effect coming from economic growth seems to be reflected in the cohort effect, but the stagnation in real-life does not seem to show up anywhere.

Results of the IE method are more intuitive and reasonable. The age profile rises then falls, which differs from classical consumption theories, but is consistent with some recent studies based on aforementioned NTA data. The time effect increases until late 1990s, then fluctuate slightly. The cohort effect shows a decrease for those born before WWII, and then a continuous increase until the 1970 cohort. Here, the

changes in income growth in history seem to be captured by both time and cohort effects. The impression that the currently younger households do not fare better than older cohorts is thus partially confirmed.

Further studies by subperiod, with extra explanatory variables, and with alternative consumption statistics may help to shed more light on our initial questions.

5. Concluding remarks

We begin with the question whether it matters when one is born. The answer is "yes", and with a more plausible pattern under the IE method, showing a disadvantage of young household heads relative to senior cohorts. There are two implications.

First, although we can observe only the young ages of the younger household heads so far, it would be worthwhile to explore the potential for them to recover, and the policies to help if they cannot recover in the future.

Second, methodologically, the IE approach seems more appropriate when we look into a long time series with significant regime changes. In contrast, conventional approaches such as the DP method may suffer from built-in restrictions.

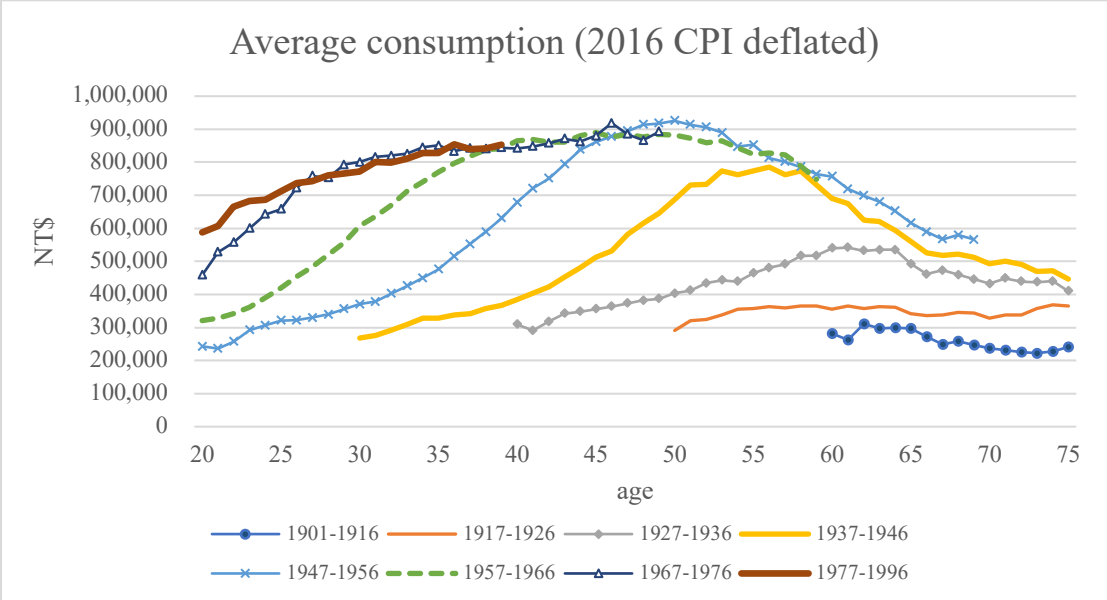
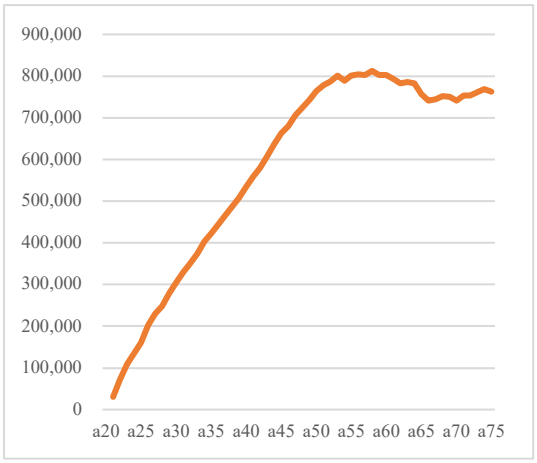
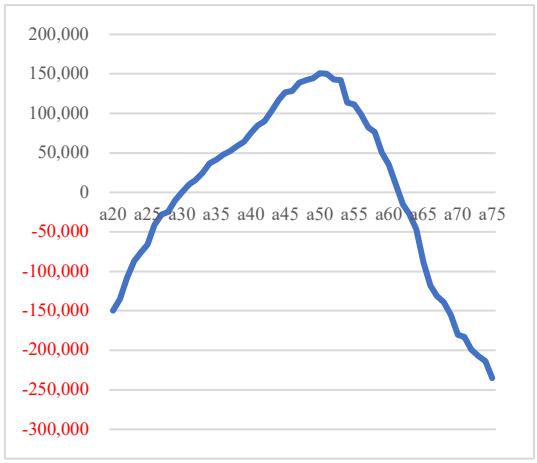


Figure 1. Consumption over the lifecycle, by cohort of household head

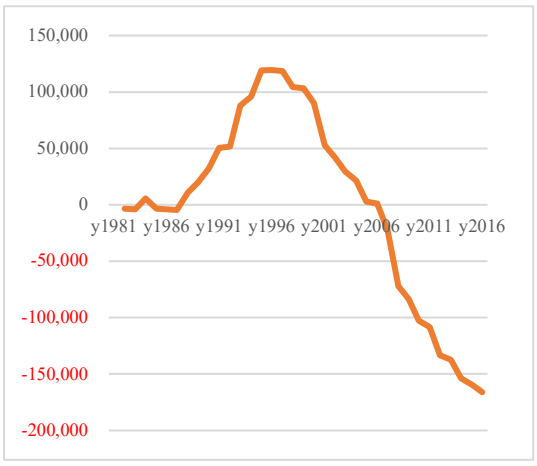
Age effect: DP



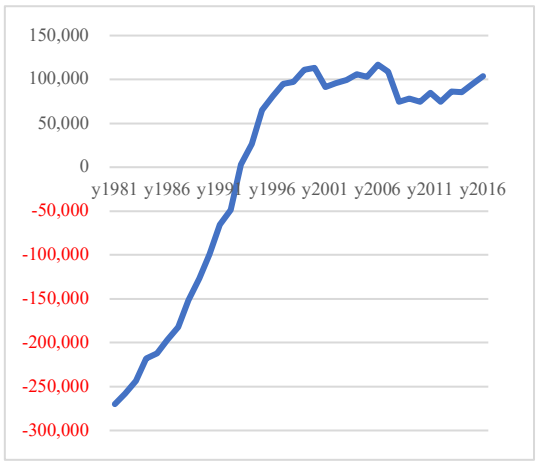
Age effect: IE



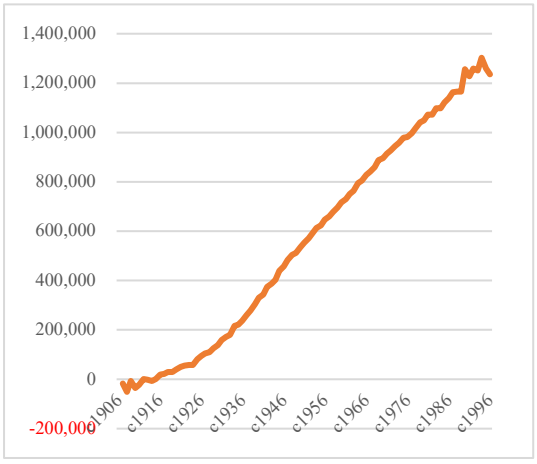
Period effect: DP



Period effect: IE



Cohort effect: DP



Cohort effect:IE

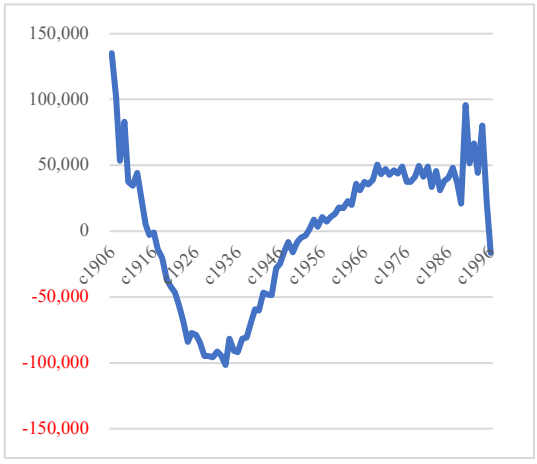


Figure 2. Age, period, cohort effects in consumption by DP and IE approaches