



Development of NTA: Achievements and Future Prospects

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Outline

1. Introduction
2. Problem 1: missing social security data
3. Problem 2: Employment-based retirement pension
4. Examples of applications

1. Introduction

NTA has come a long way, let me report what the Taiwan team has done and will do

- In progress
 - ✓ NTA 1981-2015
 - ✓ An NTA operation manual in Chinese
- What is next
 - ✓ Time series analysis, Cohort analysis, Cross-country analysis ...
 - ✓ Many exciting applications are possible

Easy problems are already solved

- We discussed 5 data issues in 2015 – most of which are solved (see appendix)
- New problems keep emerging – some appear in only one year (e.g., invalid entries), or are easy to solve (e.g., missing micro or macro data) (also see appendix)
- But there are two hard problems, with serious consequences

Two hard problems

These will be discussed in Sec 2 and Sec 3

- No information of social insurances in 1981-1992, and yet these data are important in TG
- No information of certain retirement pensions in 1981-2015 , which are important source of income for the elderly

2. Missing social security data

Problem: No info of social insurances in 1981-1992

- No recording of who is under which type of social insurance in the questionnaire
- No recording of social benefits or premiums

Consequence: TG is inaccurate!

- In 1981, total social insurance benefits are almost 50% of all other public cash benefits!

2a. Who and which social insurance?

Fact: No recording of who is under which type of social insurance programs

Solution:

- We decide the type of each individual based on information of his sector, industry, occupation, ...
- We use a later year (1993) to verify, and found the % of Type 1 and Type 2 errors are basically acceptable for Gov Employee Insurance (GEI) and Servicemen Insurance (SI)
- As for Labor Insurance (LI) and Farmers' Insurance (FI), not everyone in the right employment status is insured.
- We estimate an age-varying “participation level” for 1993.

2b. How much is paid or received?

Fact: No recording of amount of social benefits or premiums

Solution:

- Macro data: We have the data
- Age profile: we use (i) individual age and wage, (ii) assumed soc insurance type, and adjust by (iii) “participation level” of 1993 (unsmoothed)
- The age profiles of some benefits thus estimated are very rough, because of (i) institutional arrangements (e.g., in GEI, forced retirement at age 65, and preferential package at age 55); (ii) small number of participants at certain ages (e.g., many missing cells in SI)

A note on the 1993 profile

- In short, we use the age-varying "participation level" of 1993 in 1981-1992, along with individual info of each year
- And we do the following:
 - (i) Smoothing by multiple sections, if necessary (e.g., non-old age LI benefit is smoothed separately by 15-49 and 50-90, for most years in 1981-1992)
 - (ii) Keep some ranges unsmoothed (e.g., old age GEI benefit is not smoothed after age 55, because of overly wide fluctuation)
- Is this reasonable? We hope so and will keep looking for better solution

3. elderly income under-estimated

Problem: employment-based retirement pension (EBP) are not considered in 1981-2015

- All EBPs are recorded as “wages” in working years, and only 2 types are matched by TG^- (before retirement) and TG^+ (after retirement)
- The receipt of the other 5 EBPs after retirement are NOT considered in NTA

Consequences

- elderly income is under-estimated, and their net TFW is over-estimated!
- In 2015, for age 65+, EBP is 17% of total consumption

Seven types of EBP

- The public EBP system is complicated
- 7 main types of EBP
 1. GEI old-age benefits (one-time)
 2. LI retirement benefit (one-time before 200
 3. Old Public Servant Pension Fund
 4. New Public Servant Pension Fund
 5. Preferential Interest Rate
 6. Old Labor Pension
 7. New Labor Pension

Our interpretation of EBP

Facts:

- All 7 EBPs are considered as “wages” in working years; and the receipt of 5 EBPs are NOT considered in NTA.

Our interpretation of EBP:

- An EBP is a “forced saving”, with the money deposited into an “invisible account” in working years, and “dis-saved” after retirement
- To a person at work, it is part of wage, and is also part of SF in RA , no revision needed
- To an elderly, it is an income, coming from an invisible savings account; we shall single out the amount from RA .
- Note that this income belongs to the elderly, who is not necessarily the household head
- Accordingly, TFW would have to change, with EBP included (while other asset income is still excluded).

What we propose to do

First, we estimate the variables in the normal way

$$(C_a - YL_a) = RA_a + TG_a + (TFB_a + TFW_a) \quad a=0, 1, \dots, 90$$

Then we single out EBP, and re-estimate TFW

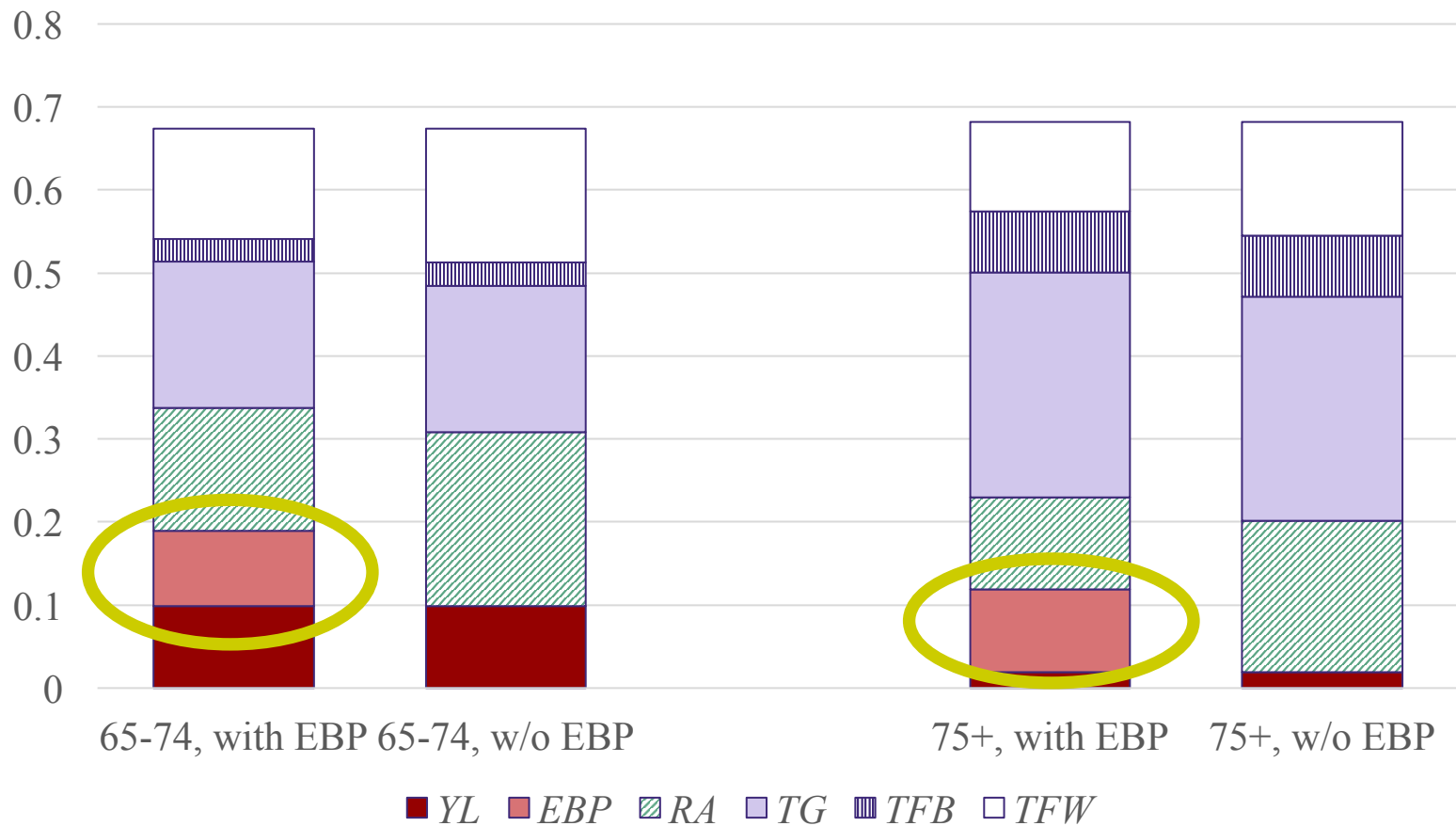
$$(C_a - YL_a) = RA'_a + EBP + TG_a + (TFB_a + TFW'_a)$$

where (i) $RA'_a = RA_a - EBP - TFW'_a + TFW_a$

(ii) $\sum TFW_a = 0 = \sum TFW'_a$

To an elderly, when EBP (rose color) is considered,
TFW (white color) becomes smaller

In 2015, with or without *EBP*



How does EBP makes a difference?

Difference from standard NTA

- An elderly looks poorer in standard NTA, but has more resources at his disposal in the new calculation
- This is because in the standard calculation, the retirement income is implicitly included in RA under household head (who may be the adult child, not the retired)
- Is this reasonable? **Yes**, we think so but are open to suggestions

4. What to do next?

- Once 1981-2015 data are ready, we can do time series, cohort analysis and cross-country comparisons
- Some topics we have in mind now
 1. Do we owe the future generations? Generational Accounting with historical data
 2. Why do Taiwanese consume more over time?

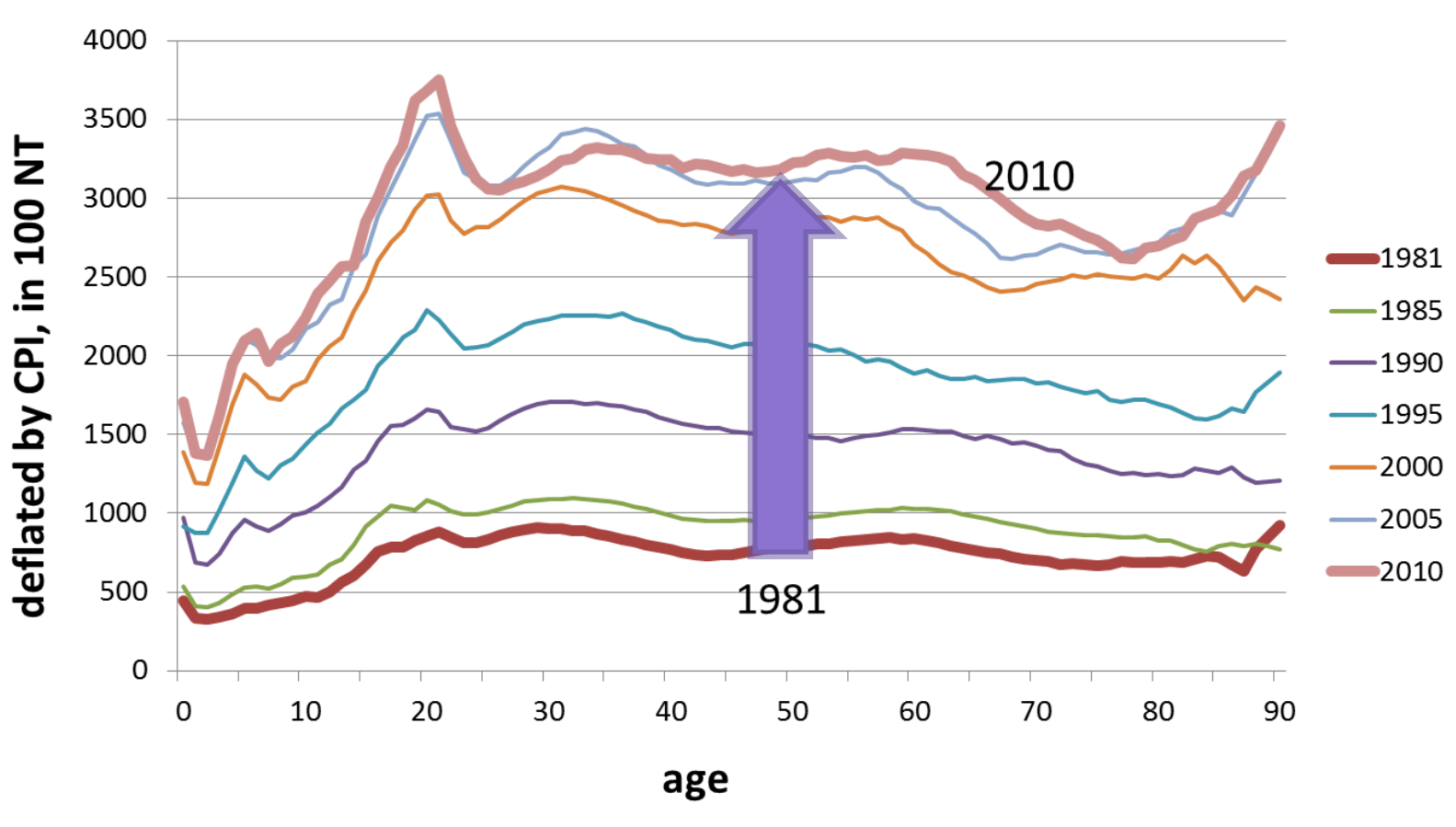
Example 1: using historical NTA data in Generational Accounting

- GA offers a clear and concrete indicator, *GI*, of public finance solvency and generational equity
- NTA provides the necessary age-specific data, and its framework helps to clarify the obscurity in GA, by not overlooking most of the in-kind transfers
- But GA is only good for comparing the new-born cohort and future cohorts.
- With historical NTA data (1981-2015), we can compare the generational inequity of current cohorts and future cohorts

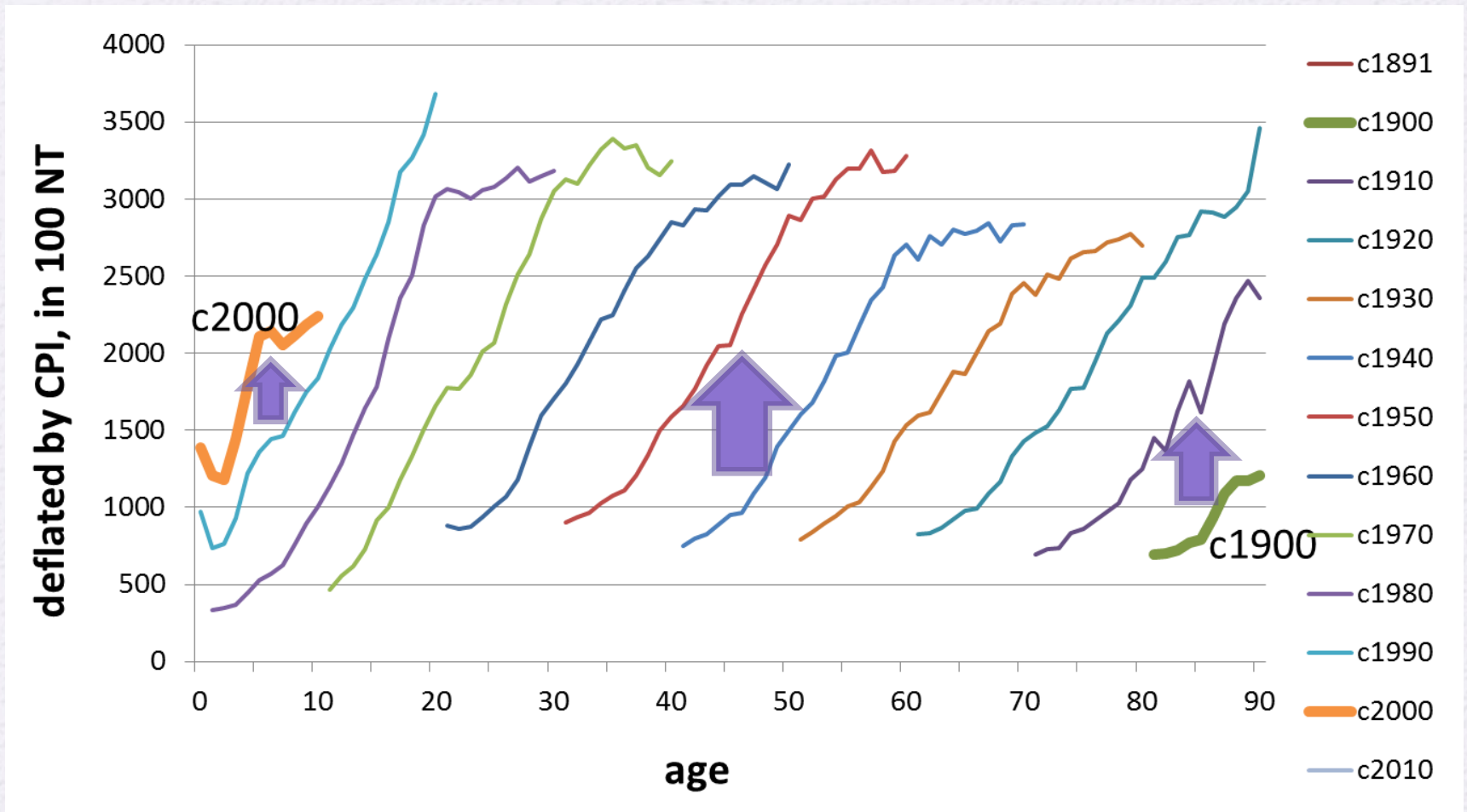
Example 2: cohort analysis

- Fact: People in Taiwan consume more over time, in real terms, than other countries
- Implication: There is either cohort and/or period effect, or age-composition effect
- Questions:
 1. How to decompose age, period, cohort effects?
 2. Are the changes similar to other countries?
 3. How to explain?

Rise in real per capita CF in 1981-2010



Rise in per capita CF, by cohort – Why?



Appendix: Data problems we had in 2015

- Issue 1: data access restriction (no access outside of gov building)
- Issue 2: over-aggregation (e.g., benefits of LI, GEI... are bundled)
- Issue 3: un-allocated amount (40% of NP benefit is un-allocated)
- Issue 4: unclear definition (who pays NHI premium for whom unknown)
- Issue 5: macro data consistency (switching between SNA68/93/08)

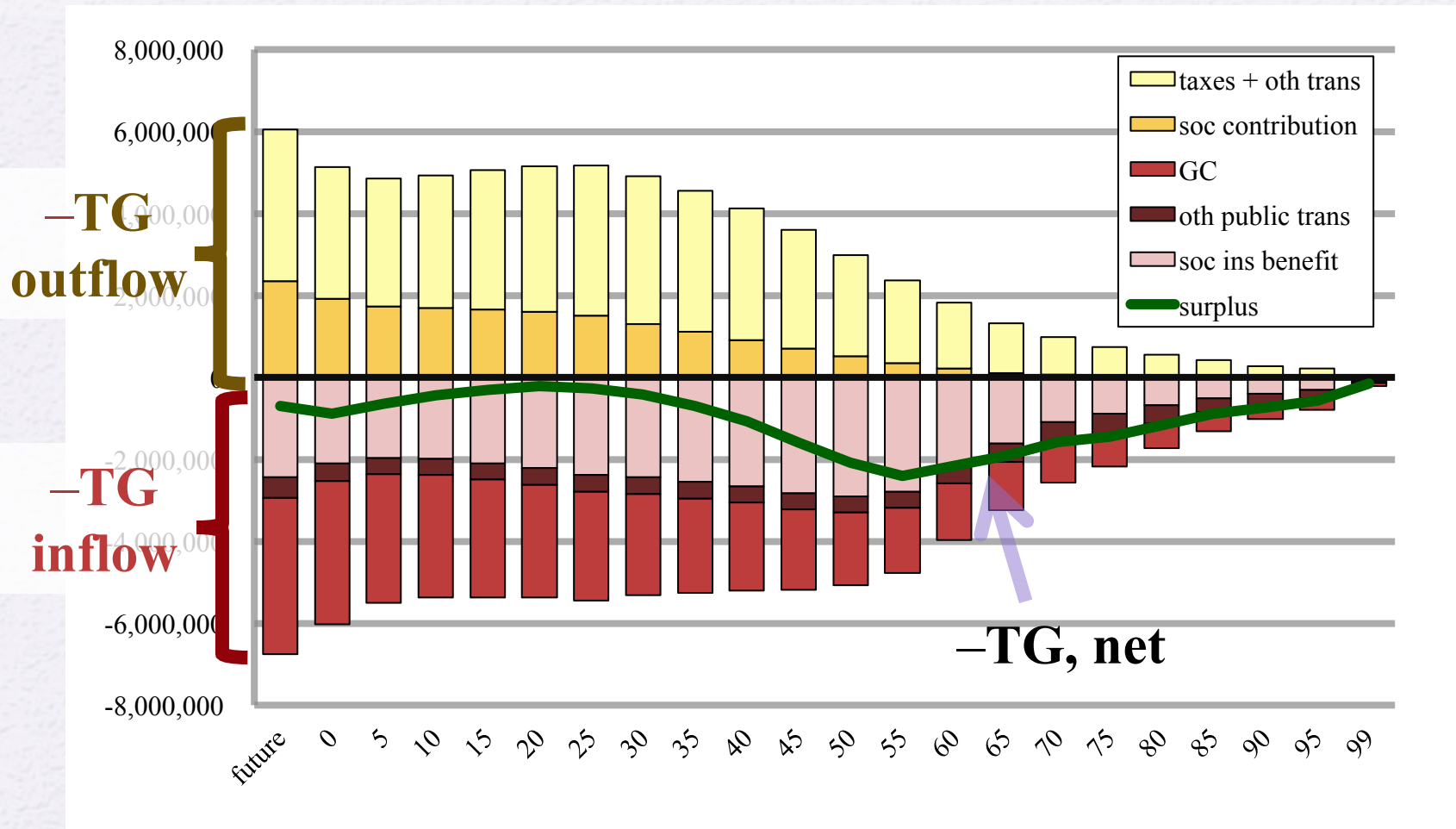
→ **Mostly solved**, by

1. negotiating patiently with the government (for a couple of months, we called up the DGBAS every day...)
2. finding new ways to identify who is paying and how much

Appendix: New data problems – easy ones

- We began with a few years (1981, 1998, 2010, 2014...) and had good results
 - ✓ We were lucky, as these were “good” years
- New, year-specific problems keep emerging unexpectedly when we deal with other years:
 - ✓ missing micro data, or missing macro data (unless these variables are relatively unimportant, we try our best to fill the hole by digging out useful data from other sources)
 - ✓ invalid entries, despite of many pre-tests (e.g., there were 6 entries with $rel==0$ in 2002, which were fine, but then we get wild TFW flows)
 - ✓ and more

Appendix: Reorganizing GA results by NTA terms



Appendix: Compare N_0 and N_f^* ($=N_f+GG$)

