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ANARRES

ANARRES_t: Aggregating the Project Database

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Outline

- Introduction
- Project database
- Aggregation process
  - Aggregation scheme
  - Aggregation code
  - Output
    - `data_anar_t_***.gdx`
    - `data_anar_t_***.xlsx`
- Preparation of model database
  - `data_anar_t_***.xlsx`

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Introduction

- Database
- Model Database
  - Aggregation (maximum)
    - 15 commodities/activities
    - 5 factors
    - 9 regions (excl. Globe)
  - Model data files
- Model Calibration
- *Shocks and closures*
- *Analyses of results*

KISS
Bigger is not necessarily better, may just be confusing

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Project Database

- Source:
  - GTAP v 8.1 for 2007 (57C_5F_138R)
- Dimensions:
  - 28 commodities
  - 5 factors
  - 58 regions
- Format:
  - GDX
  - Excel
- Accounts:
  - Listed in Excel and Project Exercise document

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Aggregation process

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HERE BE DRAGONS!

care and attention to detail VERY important

YOU WILL MAKE MISTAKES

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Aggregation Code: Sets

```
* Sets for the UNAGGREGATED database     * Sets for the AGGREGATED database

 s              SAM accounts              sac              SAM accounts

 cc(s)          Composite Commodities     c(sac)           Composite Commodities
 aa(s)          Activities                a(sac)           Activities
 ff(s)          Factors                   f(sac)           Factors
 tmmtax(s)      Trade taxes               h(sac)           Household
 teetax(s)      Export taxes              g(sac)           Government accounts
 fftax(s)       Taxes on Factors          tmr(sac)         Trade taxes
 otppmarg(s)    All trade and transport   ter(sac)         Export taxes
 ww(s)          Rest of the World         tff(sac)         Taxes on Factors
 ii(s)          Investment                owatpmarg(sac)   All trade and transport
 kk             Regions                   w(sac)           Rest of the World
                                          i(sac)           Investment
* Declaring other sets                    r                Regions
 sn(s)          SAM accounts excl total  * Declaring other sets
                                          sacn(sac)        SAM accounts excl total
```

```
    * Mapping sets

     map_sac_s(sac,s)    Mapping to sac from s
     map_r_kk(r,kk)      Mapping to r from k
```

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Notes on Set Ordering in GAMS

- GAMS operates on a 'first in first out' basis
  - The order of output items is always controlled by the first time a symbol is seen
- GAMS uses a unique element list (UEL) to store set elements
  - A **single** list of all set elements
  - Elements enter the list in the **order** of their appearance
  - The UEL defines the order in which they will appear in the output i.e.,

first in, first out

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Files

Aggregation programme **data**

Project database

Aggregation programme **output**

Aggregation programme

Selected parts of the worksheets are locked

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Aggregation Scheme 1

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Slide 11: Aggregation Scheme 2

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Slide 12: Aggregation Scheme 3a

					MODEL				
Sectors	Description		Regions	Description		Factors	Description
agri	Agriculture		chn	China and Hong Kong		lnd	land
mins	Minerals		jpko	Japan and Korea		uskl	Unskilled labour
food	Food products		rasia	Rest of Asia		sklb	Skilled labour
lman	Light Manufacturing		india	India		capi	Capital
hman	Heavy Manufacturing		nafta	NAFTA		nres	Natural resources
elct	Electricity		ramer	Rest of Americas		
gasw	Gas and Water		eu27	EU 27		
cnst	Construction		rworl	Rest of the World		
trade	Trade		glo	GLOBE		
trans	Transport					
comm	Communication					
svcs	Services					

Only **THREE** effective categories for accounts in GTAP: Sectors, Regions, Factors

Accounts used by anar_t are based on these 3 categories with prefixes

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Aggregation Scheme 3b

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Aggregation Scheme 4

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Aggregation Scheme 5

Fixed & Locked

Computed & Locked

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Special set elements

glo – GLOBE regions

institution and tax accounts

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Aggregation Code: Parameters

```
*##### Base Data
* Transactions
 SAM_anar_t_8(s,s,kk)     UNAggregate SAM for regions k
* Elasticities from GTAP using Region specific weights
 ESUBD2(s,kk)        LOADED Armington CES for domestic_import allocation
 ESUBM2(s,kk)        LOADED Armington CES regional allocation of imports
 ESUBVA2(s,kk)       LOADED CES between primary factors in production
* Other data
 fsk(kk)             UNAggregated capital stocks
 pop(kk)             UNAggregated  population stocks

*##### Aggregated data
* Transactions
 SAMG(sac,sac,r)   Aggregate SAM derived
    ******
* Elasticities
 ESUBD(sac,r)      MODEL Armington CES for domestic_import allocation
 ESUBM(sac,r)      MODEL Armington CES regional allocation of imports
 ESUBVA(sac,r)     MODEL CES between primary factors in production
* Other data
 FS_K(r)           Aggregated capital stocks
 popn(r)           Aggregated  population stocks
```

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Aggregation Code: Data Load

```
$SETGLOBAL agg_schem data_samagg_anar_t_8_12_5_9


*#### 1. DATA  ENTRY SECTION ########

*---- 1a. Excel workbook sets and data converted to gdx here

* Convert Excel workbook data to GDX here

$CALL "GDXXRW i=Agg_sets\%agg_schem%.xlsx o=data_in.gdx INDEX=LAYOUT!A4
                                                 trace=3"
$if errorLevel 1 $abort problems with GDXXRW

*---- 1b. All sets from excel are assigned here
```

'Your' Excel workbook

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Aggregation Code: Data Export

$SETGLOBAL   data_out   data_anar_t_12_5_9

```
*#################### EXPORT OF RESULT FILES ####################
*#######  Export new aggregation to GDX ##################
*## Writing out the NEW SAM and data to GDX

Execute_Unload  'output\%data_out%.gdx',
* Aggregate SAM
SAMG
* Aggregated GTAP Elasticities
ESUBD
ESUBM
ESUBVA
* Aggregate capital stocks
FS_K
* Aggregated populations
popn
* common instruction for unloading sets to GDX
sac
```

'Your' model database

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Aggregation Code: Data Export

$SETGLOBAL   data_out   data_anar_t_12_5_9

```
*#################### EXPORT DATA FOR MODEL EXCEL ####################

* Writing out the sets
* SAM set
Execute "GDXXRW i=output\%data_out%.gdx o=output\%data_out%.xlsx set=sac Rng=sets!A5 rdim=1"
* region set
Execute "GDXXRW i=output\%data_out%.gdx o=output\%data_out%.xlsx set=r Rng=sets!D5 rdim=1"

* reference set
Execute "GDXXRW i=output\%data_out%.gdx o=output\%data_out%.xlsx set=r Rng=sets!G5 rdim=1"

* SAM major sub sets
Execute "GDXXRW i=output\%data_out%.gdx o=output\%data_out%.xlsx set=c Rng=sets!I5 rdim=1"
Execute "GDXXRW i=output\%data_out%.gdx o=output\%data_out%.xlsx set=a Rng=sets!R5 rdim=1"
Execute "GDXXRW i=……
```

Depends on a structured Excel workbook

'Your' model database

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Slide 21: Model Database

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Slide 22: Model Excel Workbook: Sets — USE copy and paste. sac and first level subsets, e.g., c, a, etc., already written out during aggregation process

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Model Excel Workbook: Maps

USE copy and paste

EXCEPTION: element of *c*
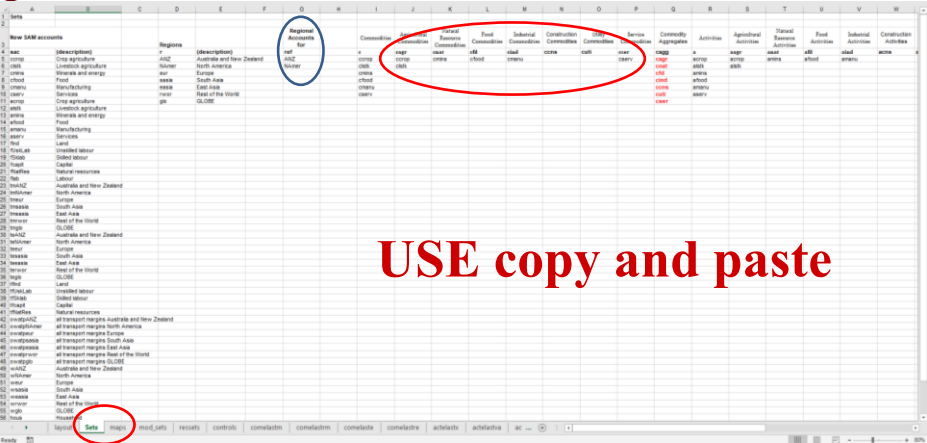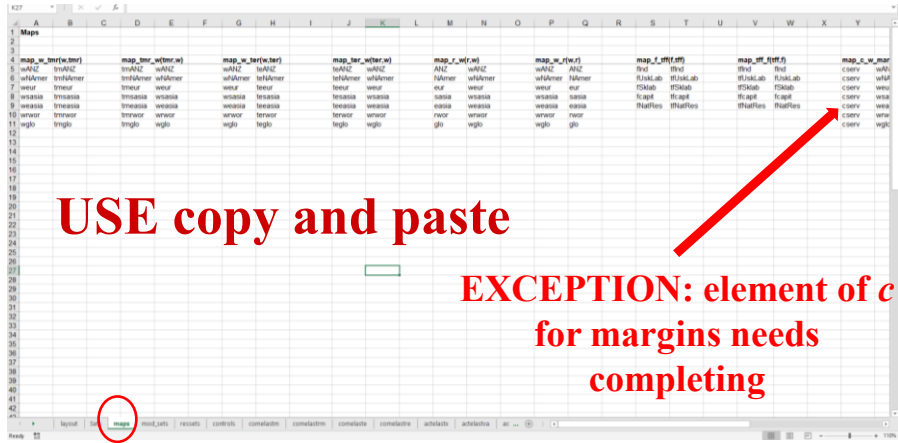**for margins needs**
completing

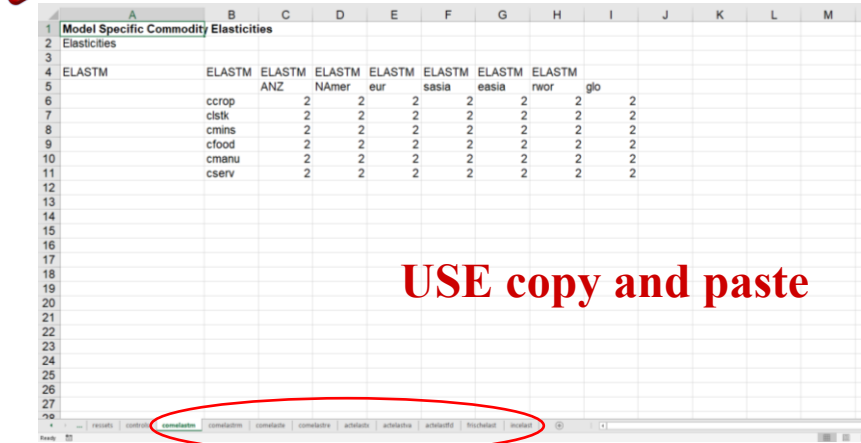**the set elements have all been assigned in the worksheet 'sets'**

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Model Excel Workbook: Elasticities

USE copy and paste

ALL elasticity parameters will need to be adjusted: comelastm, comelastrm, comelaste, comelastre, actelastx, actelastva, frishcelast and incelast aggregation process

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SOME MISTAKES MAY NOT HAVE BEEN DETECTED

The model should find any remaining mistakes, BUT….

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ANARRES_t: Aggregating the Project Database

The End

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