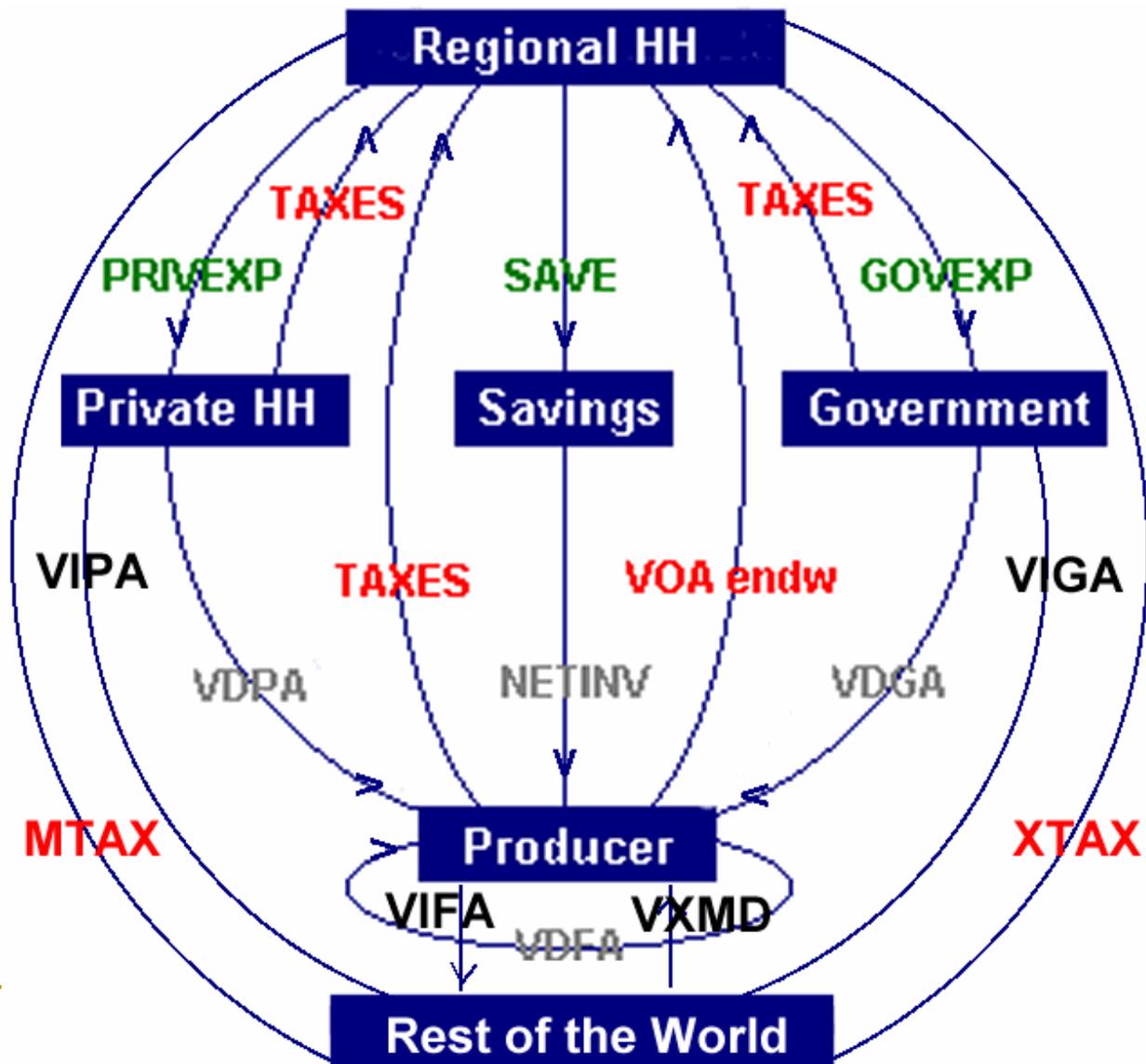# Household Behaviour

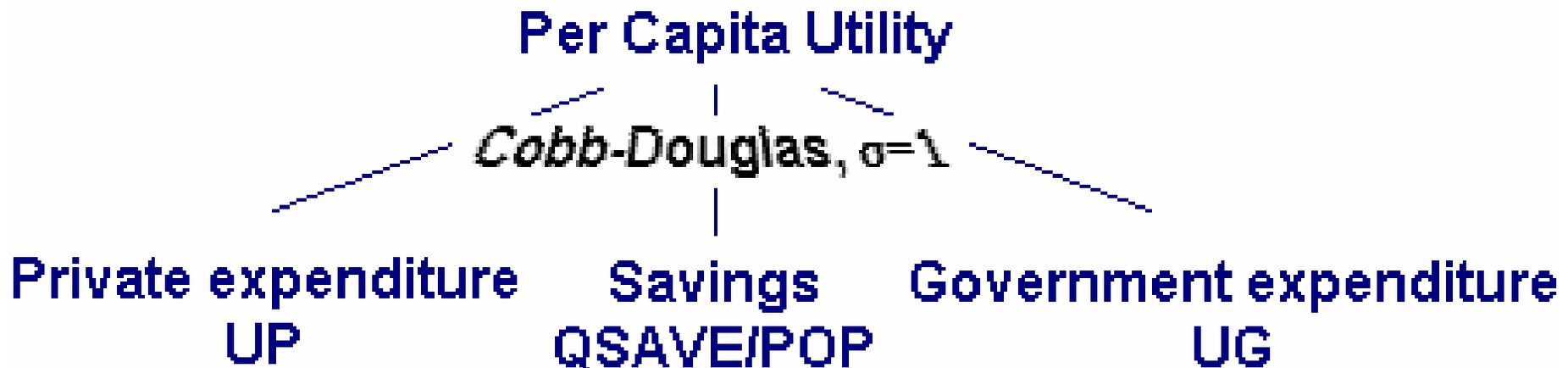# Multi Region Open Economy -

Demand side

- representation of consumer demands allows for differences in both the price and income responsiveness of demand in different regions

- depending upon level of development of the region

  - and the particular consumption patterns observed in that region

- non-homothetic preferences

  - captured through use of a constant difference of elasticities (CDE) function

  - demand system enables non-homothetic demand to be calibrated to replicate a pre-specified vector of own-price and income elasticities of demand

The regional household

- Receives all income that is generated in a given economy (payments to primary factors and collects taxes) and pays subsidies

- Final demand is governed by an aggregate utility function (u) which consists of:
  - a composite of private consumption (up)
  - a composite of government consumption (ug),
  - savings (qsave)
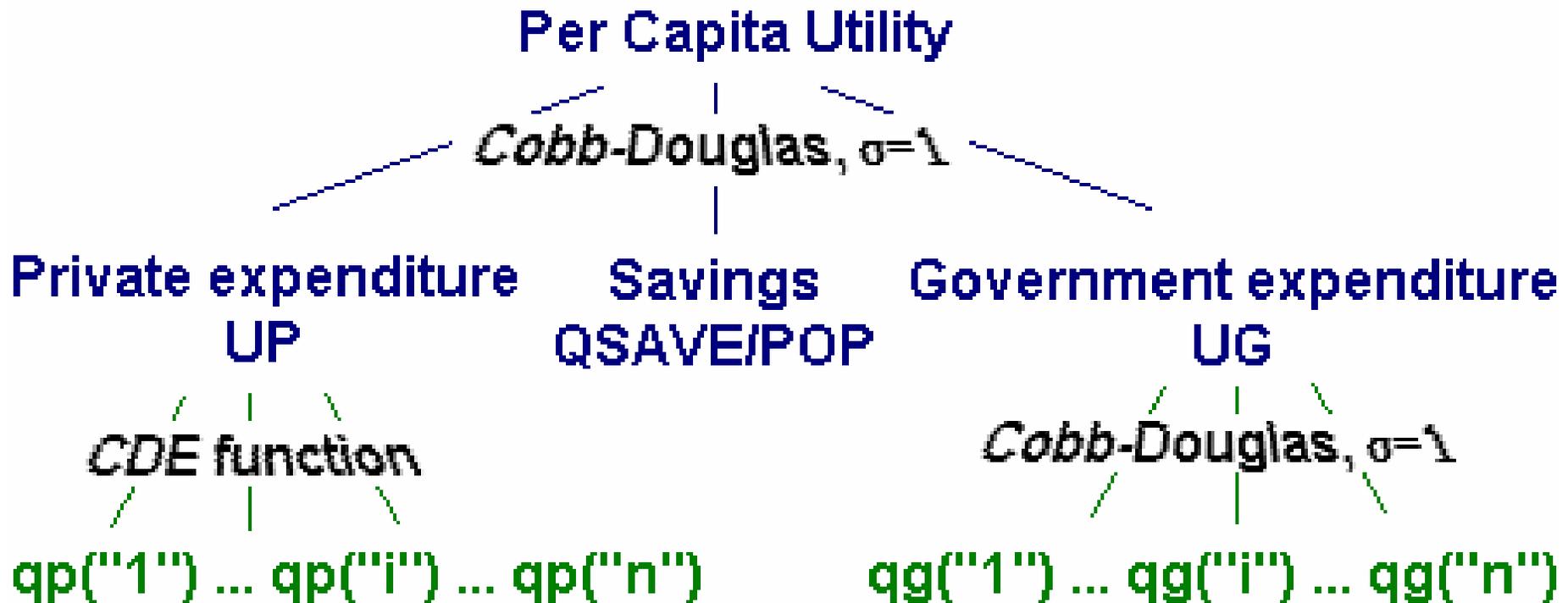
Tree structure of final demand

Per Capita Utility

Cobb-Douglas, $\sigma = 1$

Private expenditure
UP

Savings
QSAVE/POP

Government expenditure
UG

The Cobb-Douglas utility function implies constant expenditure shares across commodities

Tree structure of final demand

Per Capita Utility

Cobb-Douglas, $\sigma=1$

Private expenditure
UP

Savings
QSAVE/POP

Government expenditure
UG

CDE function

Cobb-Douglas, $\sigma=1$

qp("1") ... qp("i") ... qp("n")

qg("1") ... qg("i") ... qg("n")

Individual commodities

The Cobb-Douglas utility
Function for UG implies constant
expenditure shares across commodities

- qp is then allocated between domestically-produced and imported products
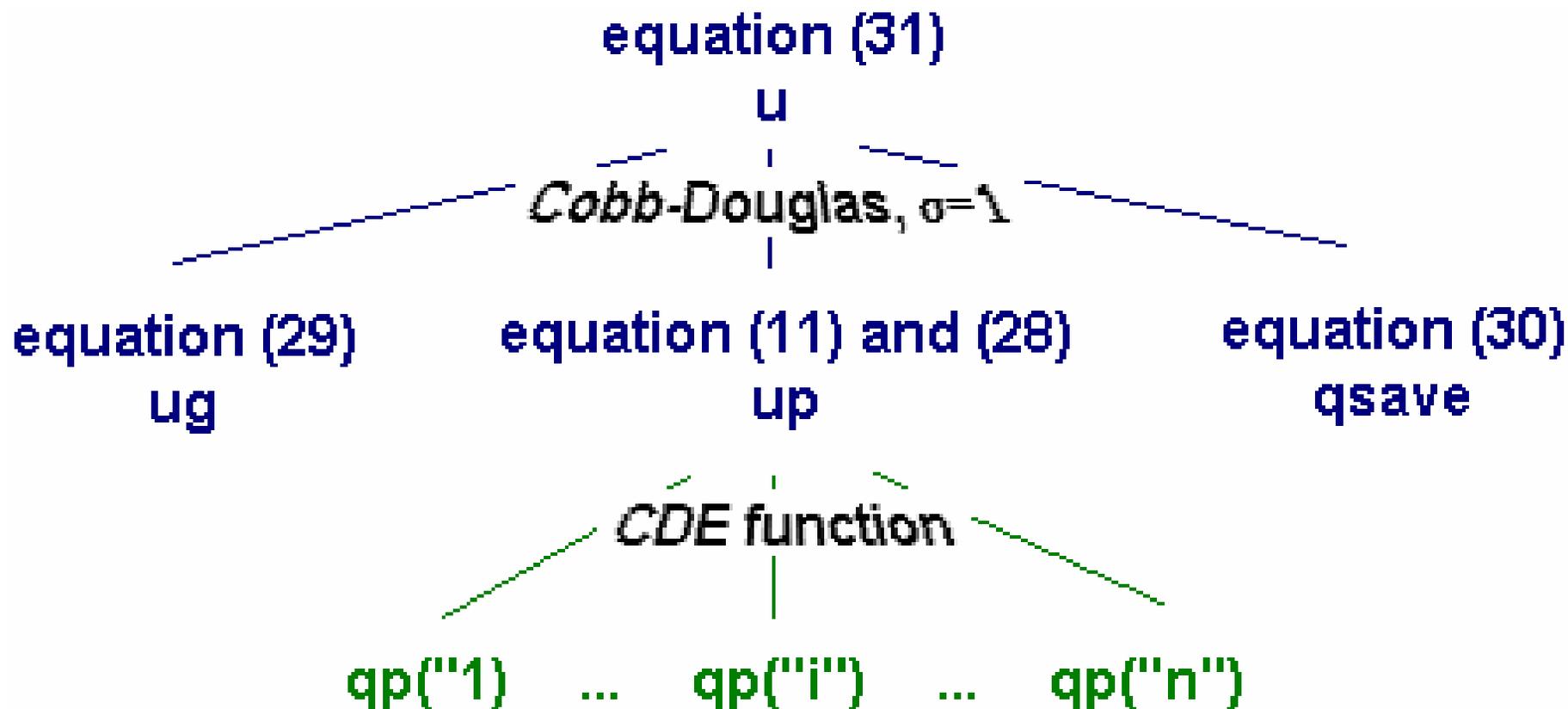- ESUBD is the substitution elasticity

 # private consumption demand for aggregate imports. (HT 49) #
(**all**,i,TRAD_COMM)(**all**,s,REG)
  qpm(i,s) = qp(i,s) + ESUBD(i) * **[**pp(i,s) - ppm(i,s)**]**;

 # private consumption demand for domestic goods. (HT 48) #
(**all**,i,TRAD_COMM)(**all**,s,REG)
  qpd(i,s) = qp(i,s) + ESUBD(i) * **[**pp(i,s) - ppd(i,s)**]**;

- Modeling final demand through this regional household has some advantages:
  - Regional income can be used to compute the equivalent variation as a measure of regional welfare
  - No need for detailed domestic accounts for direct taxes and transfers
- And some disadvantages:
  - No tracking of individual taxes or subsidies
  - No link between government expenditures and tax revenues
  - No explicit government budget or constraint

- Click on **View|TAB files|Main Model**
- On toolbar, click on '**Search|Find**'
- Type in 'expenditure of regional'
- Click on '**Find**'

Private household behavior

equation (31)
u

Cobb-Douglas, $\sigma=1$

equation (29)   equation (11) and (28)   equation (30)
ug   up   qsave

CDE function

qp("1)   ...   qp("i")   ...   qp("n")

- Open up GTAP.TAB

- Search for PRIVDMNDS

- Gives change in private per capita consumption as function of price (EP) and income (EY) elasticities

- EP and EY are calculated elsewhere in GTAP.TAB as functions of the parameters SUBPAR and INCPAR

Private household behavior

- The formulae for calibrating EP and EY varies with the form chosen for private household preferences, e.g. in this case with expenditure shares and relative prices

- The demand elasticities (EP and EY) are related to the preference parameters of the CDE function

Equation PRIVDMNDS
 # private consumption demands for composite commodities (HT 46) #

(**all**,i,TRAD_COMM)(**all**,r,REG)

   qp(i,r) - pop(r)
 = **sum{**k,TRAD_COMM, EP(i,k,r)*pp(k,r)**}** + EY(i,r)***[**yp(r) - pop(r)**]**;

   Private consumption demands for composite commodities. Demand system is
   on a per capita basis. Here, yp(r) - pop(r) is % change in per capita
   income.

To change the elasticities, you have to recompute SUBPAR and INCPAR. The latter are
calibrated to get as close as possible to target values of the elasticities.

Savings & Investment

- Regional savings are collected by a 'Global Savings Bank'

- These are then allocated as investments across regions according to 2 alternative rules:

- 1. Regional composition of capital stocks held constant. The regional and global net investment move together (RORDELTA =0)

- 2. Allocated so that rates of return across regions are constant (RORDELTA =1)

- See RORDELTA in the parameters set (row 10)
  - The parameter RORFLEX determines how rate of return diminishes as investment increases

Summary of Demand

- Regional household=source of final demand

- Cobb Douglas demands for private, gov't and savings

- Specification of government demand is CD

- Specification of private household demand is via non-homothetic CDE functional form

What are private household consumption shares in the base data?

- Open **GTAP.TAB**
- Search for CONSHR
  - Its computation uses the variable VPA
- Search in GTAP.TAB for VPA
  - It is the sum of VDPA and VIPA
- Go back to RunGTAP
  - **View|Base Data|Core Data**
  - Open the data for VDPA
  - On toolbar, click on **Export|Copy Screen**
- Now open Excel, and paste!
- Repeat for VIPA
- In Excel, apply the formula for VPA
- [In this way, you can tabulate, or graph, any of the base data]