The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Global Trade Analysis Project
https://www.gtap.agecon.purdue.edu/

This paper is from the
GTAP Annual Conference on Global Economic Analysis
https://www.gtap.agecon.purdue.edu/events/conferences/default.asp

TASTE

a program to adapt detailed trade and tariff data to GTAP-related purposes

April 2010

Mark Horridge, CoPS[1], Monash University, Melbourne

David Laborde, IFPRI[2], Washington

ABSTRACT

The GTAP project provides a coherent database to support CGE modelling of international trade and applied tariff changes at a 57-sector level of sectoral detail. Real-world tariff negotiations deal with bound rates, which form a ceiling on applied rates and (for a given exporter/ importer country pair) vary greatly within each of the GTAP sectors. Therefore, to compute applied tariff shocks for GTAP or similar models, we need much more detailed data on trade flows and on bound and applied rates.

Such a dataset, MAcMapHS6, includes HS6 level trade data for all trading pairs within 200 countries, together with estimates of applied and bound rates for each trade. It is internally consistent (exports=imports) and agrees with the GTAP dataset.

The MAcMapHS6 dataset is an impressive resource -- but presents barriers to entry. It consists of a huge (8 gigabyte) text file, too large to load into Excel or a text editor. To obtain or process this dataset raises technical problems which hitherto have been surmounted only by a few skilled teams from richer countries.

To lower these barriers, we present TASTE -- the Tariff Analytical and Simulation Tool for Economists -- which compresses the MAcMapHS6 dataset onto a single CD and allows the ordinary GTAP user to rapidly process the whole dataset. A set of rules about cuts in applied rates (as negotiated in Doha and similar processes) is specified by the user. Using an ordinary PC, TASTE takes 3 or 4 minutes to apply these rules to the 180 million trades described by MAcMapHS6. Resulting changes in applied rates are averaged to a user-specified level of sectoral and regional aggregation and are stored in a format which can be directly used by the standard GTAP model. TASTE does not rely on any other software.

TASTE also facilitates other uses of the MAcMapHS6 data. For example, it is easy to make an extract of the data which includes all trades within a GTAP sector. This could be used to prepare a special version of the GTAP model which modelled trade in one or a few GTAP sectors at the HS6 or HS4 level. The extra detail might be important if trade shares or import restrictions varied greatly amongst HS6 groups within a GTAP sector.

---

[1] CoPS is the Centre of Policy Studies, a centre of CGE modelling.

[2] IFPRI is the International Food Policy Research Institute, Washington, DC, one of 15 centers supported by the Consultative Group on International Agricultural Research (CGIAR).

Contents

1. INTRODUCTION 1
2. INSTALLATION 2
   - 2.1. Check for hard disk space 2
   - 2.2. Install from CD 2
   - 2.3. Make desktop shortcut and try out 2
3. OVERVIEW 3
   - 3.1. The MAcMapHS6 data 3
   - 3.2. Four levels of aggregation 4
   - 3.3. Supplied data files 4
   - 3.4. Input files that you can alter 4
4. SIMPLER TASKS 5
   - 4.1. Choose output folder 5
   - 4.2. Load AGG file 5
   - 4.3. Aggregating/Extracting Data 5
   - 4.4. Dump records 6
   - 4.5. Write XLS code file 6
   - 4.6. Split user sector 6
   - 4.7. Set formula to fill in missing bound rates 6
5. TARIFF CHANGE SCENARIOS 6
   - 5.1. The Rules file 6
   - 5.2. Tariff formulae 7
   - 5.3. Formulae which change applied rates, not bound rates 8
   - 5.4. Weighting scheme 9
   - 5.5. Output files from the tariff simulation 9
   - 5.6. Formulae which apply only to "sensitive products" 10
6. NOTES ..... ERROR! BOOKMARK NOT DEFINED.
7. REFERENCES 11

APPENDIX 1: MACMAPHS6 DATASET DESCRIPTION – MACMAPHS6V1 AND BOUND TARIFF DATA SET. 12

- Computing a consistent and exhaustive equivalent measure of applied protection: methodological choices in MAcMapHS6 Error! Bookmark not defined.
- Bound tariff dataset Error! Bookmark not defined.
- Aggregation methodology Error! Bookmark not defined.
- From MacMapHS6v1 to TASTE. A consistent aggregation scheme 12
- References 13
- Countries in MAcMapHS6v1 and reference groups 14

APPENDIX 2: UNIT VALUE CHOICE AND TARIFF CUTTING FORMULA 16

- Notations: 16
- Applying tariff cutting formula 17
- A numerical illustration 18
- Additional comments: Mixed tariffs 19

APPENDIX 3: SPECIFYING A TARIFF SCENARIO 19

- The later rule applies 20
- Other details 20
- Debugging 21

APPENDIX 4: EXAMPLE OF A TARIFF SCENARIO 21

APPENDIX 5: GIRARD AVERAGE BOUND RATES FOR EACH COUNTRY 22

APPENDIX 6: HOW THE TARIFF CALCULATION WORKS 22

- From changes in bound rates to changes in applied rates 22
- Averaging the changes in applied rates 23

APPENDIX 7: HOW TO REBUILD THE TASTE DATA FROM SCRATCH 23

- Stage 1: running read1.exe 23
- Stage 2: running read2.exe 23
- Using Mergedata to alter the MAcMapHS6 data 24

APPENDIX 8: USING VIEWHAR TO VIEW OR EXPORT DATA 25

- The Export Menu Item 25
- The File...Save As command 25
- Modifying data in a HAR file 25

DRAFT ONLY

The following document is a draft only. Details of TASTE may change in the future.

DATA YEAR

The current version of TASTE uses 2004 MAcMapHS6 data, and is designed to accompany the version 7 GTAP database. An earlier version of TASTE used 2001 data, and was designed to accompany the version 6 GTAP database.

An appropriate citation for this paper is:
Horridge, J.M. and Laborde, D., 2008, *TASTE: a program to adapt detailed trade and tariff data to GTAP-related purposes*, GTAP Technical Paper no XXX, Centre for Global Trade Analysis, Purdue University.

DISCLAIMER

Every care has taken in preparing the TASTE Program and its accompanying trade and tariff Data. However, neither the IFPRI, the Centre of Policy Studies and GTAP project supply any warranty, express or implied, for TASTE and its supporting Data. Any risk or damage arising from use of the Program or Data is the responsibility of the user. Data and tariff reduction formulae accompanying or contained in the Program should not be regarded as representative of any current negotiating framework or trade negotiations. Region labels do not imply any opinion on the legal status of any country or territory. Tariff-line data have been averaged to the 6-digit level -- so that results may differ from those obtained from tariff reduction formulas applied at the tariff-line level.

TASTE: a program to adapt detailed trade and tariff data to GTAP-related purposes[3]

Mark Horridge & David Laborde

1. Introduction

Detailed CGE analysis of complex, trade policy scenarios requires abundant trade and protection data -- which might be found from the COMTRADE, TRAINS, IDB, CTS or WITS data services maintained by international organizations.[4] Using such data is fairly hard work, however, since:

- The data are fairly raw. Inconsistencies (such as incomplete reporting) need to be addressed.
- Access to some of the data is restricted.
- The data is voluminous -- which could be a problem for those with a slower internet connection.
- It will usually need to be reformatted and aggregated, a task requiring some programming skills.

The result is that only skilled teams in a few richer countries are able to routinely produce detailed, internally-consistent databases of trade flows and protection levels.

The problem of the high bar to entry for CGE analysis of multilateral trade policies has been noted and addressed by the GTAP project. The GTAP database is internally consistent and contains a set of regional IO tables as well as trade matrices. 57 sectors and over 100 regions are distinguished. Sometimes, however, more sectoral detail is needed:

- To prepare files of tariff shocks, GTAP users need information about bound rates (not part of GTAP) at a detailed sectoral level – such as HS6.
- Some GTAP users would like to split up one or more of the supplied 57 sectors. To do this, they need trade matrices that are more detailed than those in the standard GTAP database.

The TASTE [Tariff Analytical and Simulation Tool for Economists] program, described below, addresses these needs. It consists of two parts:

- A huge database of bilateral trade flows and of applied and bound tariff rates distinguishing around 200 regions and 5000 HS6 goods. This data, based on a number of sources, has been carefully massaged and crafted by experts and then compressed to fit on a normal CD.
- The TASTE program itself reads the enormous MAcMapHS6 database and performs various operations, in particular:
  - Transformation of scenarios about formula-based changes in bound rates into files of percent change shocks to applied rates -- which could be used by RunGTAP. All the calculations take place at the HS6 level -- and are then aggregated to the appropriate level.
  - Generation of matrices of splitting weights which could be used to split a sector in the trade matrices of a GTAP model database.

TASTE requires no ancillary software such as SAS. It also runs faster than SAS or SQL-based systems. Nonetheless, TASTE has some limitations:

- It does not allow analysis below the HS6 level.
- It does not automate the preparation of tariff reduction scenarios that are phased in over time.
- It offers several in-built formulae (Swiss, Girard, etc) but no facility to create your own formulae.

To avoid these limits, analysts will need to use other software and programs which are more complex, but also more flexible.

[3] We acknowledge useful suggestions from Janine Pelikan and Martina Brockmeier of the von Thünen Institute, Braunschweig, and from Patrick Jomini and others of the Productivity Commission, Melbourne.

[4] National institutions have also tried to design user friendly access to protection dataset. For instance, the Integrated Tariff Analysis System (ITAS) is a suite of SAS and MS Excel programs that was developed by the Australian Productivity Commission to analyse the effects of different approaches to reducing tariffs in the context of multilateral liberalisation.

2. Installation

2.1. Check for hard disk space

Although compressed, the enormous amount of MAcMapHS6 data consumes considerable disk space. About 4 gigabytes of space is needed to install TASTE -- and more space will be needed to save output. Since it is always a bad idea to use a hard disk that is nearly full, this means that in practice you should have at least 8 gigabytes free. TASTE spends most of its time reading files, and performance will be improved if the main data file is not fragmented. Therefore, before installing, clean up your hard disk to free 8 gigabytes, if necessary, and consider defragmenting the disk so that the TASTE data files may be stored contiguously.

The disk-read bottleneck means that you should not install TASTE on a network or external drive -- the slower data transfer from these devices will cause sluggish performance.

2.2. Install from CD

- Create a new folder C:\TASTE (or similar short and simple name).
- Copy all the files from the CD into C:\TASTE.
- Unzip TASTE.zip into C:\TASTE.
- Open a DOS box (console) in C:\TASTE.
- Enter the command: `UNPACK.BAT`

UNPACK may take from 2 to 5 minutes to extract the file records.dat from the archive file records.7z. When it is finished you should see a list of files similar to that below:

TASTE.doc	this document
TASTE.exe	the TASTE program file
TASTE.chm	the TASTE online help file
moreinfo.dat	binary file: contains names of regions and sectors, and mappings
records.dat	large binary file (about 2.5 GB) containing MAcMapHS6 data
tarfsim.pas	part of the source code
read2.har	HAR file containing scale factors needed to make MAcMapHS6 reference group or trade weights consistent with the GTAP trade matrix.
default.agg	sample GTAP aggregation file
AveBoundRate.txt	average bound rates for each country, used in Girard formula
rules.txt	sample tariff scenario file
readme.txt, 7za.exe	needed only for installation
Datadev.zip	optional additional files needed to regenerate data
unpack.bat, records.7z	needed only for installation

2.3. Make desktop shortcut and try out

You could create a desktop shortcut to TASTE.exe, or you could run it from the command line. The initial screen should resemble Figure 1 below.

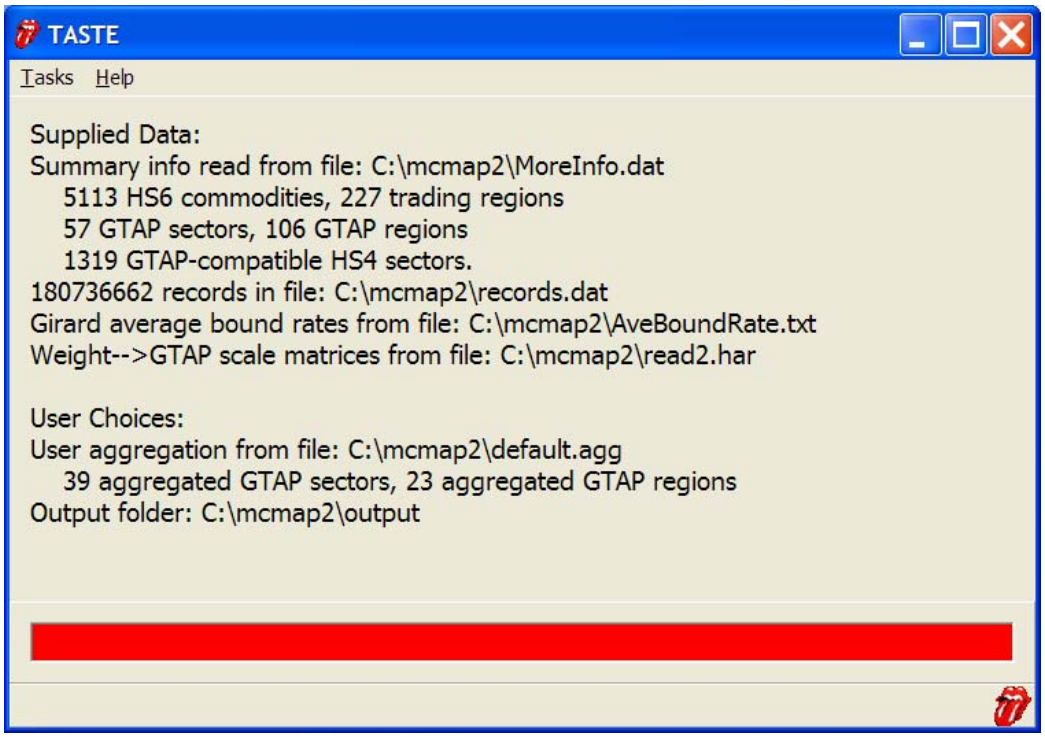


Figure 1: TASTE startup screen

Illustration A: Tariff cut

From the Task menu item, try 'Tariff scenario'. Choose whether tariff rates are to be averaged using 'trade' or 'reference group' weights. Depending on your PC[5], TASTE will take between 25 seconds and 5 minutes to process all trade records, applying the tariff-cutting rules specified in the text file 'rules.txt' You can edit this file (as described below) to apply a different tariff scenario. Output will be stored in the file 'tarfsim.har' which you can examine with ViewHAR.

Illustration B: Generate information to split a user sector

From the Task menu item, try 'Split user sector'. Select the aggregated sector 'TCF'. Depending on your PC, TASTE will take between 1 and 3 minutes to process all trade records, aggregating regions to the user level, and selecting for output all HS6 goods corresponding to the chosen sector. Output will be stored in the file 'splitcom.har' which you can examine with ViewHAR[6].

3. Overview

3.1. The MAcMapHS6 data

In this section we briefly describe the underlying data, to inform our discussion of the TASTE program. A more detailed description will be found in Appendix 1.

The MAcMapHS6 data consists of many millions of records distinguishing around 170 regions and 5000 HS6 goods (services trade is not covered). Each record contains the following information:

- Reporter importing country code
- hs6 product code
- Partner exporting country code
- w_RG Reference Group weight
- w_Tr Trade Value, $US million, CIF
- UT_uv Applied tariff rate, 0.3 means 30%

[5] It will help if (a) you close other programs before running TASTE, and (b) you have a gigabyte or more of RAM installed.

[6] The TASTE package includes a copy of the ViewHAR HAR file viewer. You could make a desktop shortcut to ViewHAR, if you do not already have one. Appendix 8 contains a brief introduction to using ViewHAR.

- mfn_uvm MFN applied tariff rate
- CTS_uvm Announced bound tariff rate
- Structure variable used when changing tariffs with an ad valorem and a specific component. It is usually 1, meaning that the tariff is wholly ad valorem.

Two points to note are:

- Although based on official data, these records have been adjusted, averaged, and otherwise massaged by MAcMapHS6 experts. They will surely not precisely agree with official data, and may not agree with all GTAP database numbers.
- The data are LARGE – they would occupy 9 gigabytes as a text file and will not fit in Excel. The impossibility of seeing ALL the numbers means that you are always at a distance from the data. TASTE offers several ways of peeping at excerpts of the data.

3.2. Four levels of aggregation

It is important to understand that TASTE works at four levels of detail:

- the original (MAcMapHS6) level with around 170 regions and 5000 HS6 goods;
- the GTAP level with around 100 regions and 57 sectors;
- the user level: an aggregation of the GTAP sectors and regions, with perhaps 25 regions and 40 sectors. This aggregation is used for running GTAP model simulations. The mapping from GTAP to user categories is defined by an AGG file output by the GTAPAgg program.
- for sectors, there is also a modified HS4 level of detail. Nearly all HS4 sectors fit completely within 1 GTAP sector. The remaining HS4 have been split between the relevant GTAP sectors. The result is a list of 1319 sectors which could be cleanly aggregated to either the pure HS4 or the GTAP sectors.

Most calculations consist of a single pass through all the data at the most detailed (MAcMapHS6) level. Results from this pass are then aggregated and presented at the user (or sometimes the GTAP) level of detail. This will include zero results for services trade (omitted from the MAcMapHS6 records). GTAP or user level services commodities have been retained in the dimensions of output matrices merely as a computing convenience.

3.3. Supplied data files

The MAcMapHS6 data is contained in two binary files supplied with the TASTE program.

moreinfo.dat	binary file: contains names of regions and sectors, and mappings
records.dat	large binary file (about 2.5 GB) containing MAcMapHS6 data

Both files are of a special format that only be read by TASTE. The format is optimized to save disk space and to speed up reading the data.

A HAR file, read2.har, contains scale factors needed to make MAcMapHS6 trade or reference group weights consistent with the GTAP trade matrix.

3.4. Input files that you can alter

Examples are also supplied of three user-configurable files:

default.agg	sample GTAP aggregation file
rules.txt	sample tariff scenario file
AveBoundRate.txt	average bound rates for each country, used in Girard formula

The first, AGG, file would normally be produced automatically when you ran GTAPAgg to aggregate the GTAP database prior to a simulation. It allows TASTE to output results at the level of aggregation needed by the GTAP model user.

The second file defines the details of a tariff-cutting scenario at the original region and HS6 level of detail. The format of this file is further described below.

The file AveBoundRate.txt contains average bound rates (using no weights) for each country, using the current formula for missing bound rates. See Appendix 5 for more details.

4. Simpler Tasks

This section describes simpler tasks in TASTE. Tariff simulations are described in the next section.

4.1. Choose output folder

All output files have fixed names and will be created by default in a sub-folder called Output underneath the TASTE folder. However, you can choose another folder for output.

4.2. Load AGG file

The AGG file is used to specify the user aggregation, ie, your way of grouping the standard GTAP sectors and regions. It is the same file used (or produced) by the GTAPAgg program. Currently TASTE insists that this AGG file refers to the original GTAP regions of Release 7 of the GTAP database.[7]

4.3. Aggregating/Extracting Data

You can create excerpts or summaries of the database using HS6 sectors and original regions, or using the GTAP level of aggregation, the user level of aggregation, or (for sectors) the modified HS4 level. The summaries show:
1: trade flows (using either trade weights or reference
2: applied tariff rates and/or bound tariff rates
3: the product of the above items: applied and/or bound tariff revenue
Items 2 and 3 are optional, but if you want 2 you need to select 3 also (3 is used to work out 2).

Because the MAcMapHS6 database is so large, it is not possible to extract ALL data at the MOST detailed level. Instead, you must choose to extract data for a subset of sectors or regions, or you can choose for results to be aggregated in various ways. TASTE allows you a range of options.

Your choice (of what to extract) is made separately for sectors, for exporting regions, and for importing regions. For each of these, you must choose:

- whether to extract data for all sectors/regions, or for a subset only.
  - if you chose a subset, you have to specify that subset
- whether the selected results are to be displayed at the original level of detail, or instead are aggregated to some coarser level of detail.

Then you must choose which values are used for trade flows:

- trade flow weights (w_Tr); or
- reference group weights (w_Rg)

And you can choose for these weights to be adjusted (scaled) so that they would add up to the trade flows in the GTAP database (VIWS).

Lastly, you can choose to extract additional data about applied or bound tariff rates. In each case you can compute the tariff revenue (rate X trade flow), and the actual rate. (TASTE computes aggregate rates as a ratio of tax revenue to trade value, so you need to select revenue if you want the rate).

Under 32-bit Windows, no program can use more than 2GB of memory, so TASTE prevents you choosing an output array greater than around 1GB (less if your PC has less than 2GB of RAM). To reduce output size within the limit, you could:

- request results for only some sectors/regions.
- request a coarser level of detail.
- request less tariff information

The output file will be called AggregN.HAR in the output folder, where N is a digit that keeps increasing (until you delete some files).

The HAR output files follow a MAcMapHS6 convention: importing regions are often called "Reporters" or "Rep" while exporting regions are often called "Partners" or "Par".

[7] TASTE is set up to work with a particular release of the GTAP database. Since GTAP keeps adding new base regions, you might find that an AGG file prepared by you had the wrong number of base regions. To fix this problem, you could use AggEdit, a program which converts AGG files to match another version of the GTAP database. You should find AggEdit.Exe in your TASTE folder.

4.4. Dump records

This command is intended for debugging purposes. It writes a text file which is an excerpt of the original MAcMapHS6 data used by TASTE. Only records corresponding to a particular combination of: GTAP sector/exporting region/importing region will be written. You can choose which sector and regions will be extracted. The output file will be called DUMP.TXT, in the output folder, and is a tab-delimited text file that can be imported into Excel. If you

4.5. Write XLS code file

Creates an Excel file, codes.xls (in output folder), that lists the original regions and HS6 categories, and shows how they fit into the GTAP categories.

4.6. Split user sector

This command is intended to provide weights with which you can disaggregate one sector in the trade and tariff revenue matrices of your GTAP model database. You choose which aggregated sector is to be split. The output HAR file contains trade and tariff revenue arrays for each HS6 sector in the selected sector. Regions are grouped according to the user aggregation. The output is intended, with minor processing, to be used by the SplitCom program to disaggregate a GTAP sector. It will be stored in the file 'splitcom.har' (in the output folder) which you can examine with ViewHAR.

4.7. Set formula to fill in missing bound rates

The bound rate CTS_uvm is missing for a few records. In that case it is estimated from the AVE of the MFN rate, using world unit value, as follows:

CTS_uvm := MAX(A**MFN_UVM* + B , C)

You can choose values for A, B and C.

5. Tariff change scenarios

TASTE allows you to translate a scenario of changes in bound rates, described at the HS6, 200-country level of detail, into a matrix of changes in bilateral applied rates, averaged to the user level of detail. The latter matrix contains percent changes in power of the tariff, and could be used directly to shock the GTAP model.

Since there are about 200 million HS6 country combinations, it would be impossible to specify each tariff change individually. Instead, TASTE follows the system used in trade negotiations: a set of tariff-cutting formulae is used; each formula applies to groups of[8] commodities and importing or exporting countries. A text file, constructed or adapted by you, is used to define the groups of nations and goods, and to say which formulae apply to which groups.

5.1. The Rules file

When you run a tariff change scenario, you must specify a file of tariff change rules. A working example is supplied, called **rules.txt**. A fragment of such a file could contain:

```
RGROUP: BalticStates [EST+LVA+LTU] ! Estonia, Latvia and Lithuania
CGROUP: WineSpirit [2204+2205+2205+2206+2208] ! excludes 2207 industrial alcohol
TRULE: [WineSpirit][BalticStates][WORLD] swiss 0.2 0.1
TRULE: [WineSpirit][LVA][EST] swiss 0.1 0.05
```

The fragment illustrates the 3 possible statement types that might appear in the rules file:

- the RGROUP statement defines a region group (`BalticStates`) as the union ('+' symbol) of several individual regions. Anything following '!' is ignored as a comment.
- the CGROUP statement defines a commodity group (WineSpirit) by combining several HS6 subgroups. The code '2204' automatically includes all 6-digit HS6 codes that start with '2204'.
- the TRULE statement defines a tariff-cutting rule. 3 ranges are given, for commodities, exporting regions, and importing regions. The first TRULE applies to all WineSpirit exported by BalticStates (the WORLD group, covering all regions, is one of several 'built-in' groups). After the ranges comes

[8] or perhaps individual.

the name of a formula -- here 'Swiss', but several other choices are possible. Each formula requires 1 to 3 parameter numbers; the last number is usually a cap.

The final tariff rule, covering WineSpirit sent from Latvia to Estonia[9], seems to conflict with the preceding rule (which covered all WineSpirit exported by any BalticStates). In such a case, *the later rule applies*. That is, when two rules overlap, the overlapping part is governed by the later rule[10]. This makes it possible to allow for exceptions: first, blanket rules are specified; then the more detailed rules which over-ride the blanket rules.

The syntax of the rules statement is completely described in Appendix 3. In addition to the '+' symbol (denoting set union), the symbols '-' (set complement) and '^' (set intersection) are supported. You may specify up to 500 RGROUP, 500 CGROUP, or 2000 TRULE statements. Hence it is possible to build up fairly complex liberalization scenarios.

5.2. Tariff formulae

At present[11], 8 tariff formulae are provided, namely: NONE, EQUALS, MIN, SWISS, FSWISS, GIRARD, LINEAR and TIERED. All of derive a new bound rate (t_1) from an old bound rate (t_0), using one or two additional numbers (P1 and P2). All rates are simple shares, eg: 0.15 means a 15% tariff**. Some formulae include an additional cap rate: set this very high (e.g. 10) to disactivate it.**

5.2.1. NONE

This simply sets the new bound rate to the old rate:

$t_1 = t_0$

```
Example: TRULE: [NAGR][WTO][LowBinding] NONE
```

The main use of the NONE rule is to exclude a combination of regions/sectors from a previously specified rule (see below).

5.2.2. EQUALS

This merely sets the new bound rate to a given number:

$t_1 = P1$

```
Example: TRULE: [NAGR][LDC][KOR] Equals 0.1 ! set to 10%
```

5.2.3. MIN

This is given by:

$t_1 = MIN(P1,t_0)$

ie, the tariff is capped at P1.

```
Example: TRULE: [NAGR][WTO-LDC][DEVELOPED+KOR] MIN 0.1 ! Cap at 10%
```

5.2.4. SWISS

This is given by:

$t_1 = Min[P1*t_0/(P1+t_0), P2]$

P1 may be interpreted as a maximum tariff rate. P2 is an additional cap (inactive if P2>P1).

```
Example: TRULE: [NAGR][WTO-LDC][DEVELOPED+KOR] swiss  0.1  0.1
```

5.2.5.FSWISS

The Flexible Swiss formula, proposed by Francois and Martin (2003), is given by:

$t_1 = Min[P1*t_0/(P1*P2+t_0), P3]$

where P2 is probably>1. If P2=1, it reduces to the ordinary Swiss formula. P3 is an additional cap.

```
Example: TRULE: [WTOAGRIC][DEVELOPING][DEVELOPED] FSwiss  0.23  1.5 0.16
```

5.2.6. GIRARD

This is given by:

$t_1 = Min[[P1*t_A]*t_0/([P1*t_A]+t_0), P2]$

[9] The ordering in the TRULE statement: commodity/sourcereg/destreg is the same as that in the output matrices and the same as in the GTAP model and data.

[10] When a tariff simulation is run, TASTE produces a report file called 'rulereport.txt' that shows which rules overlap.

[11] Other formulae might be provided later.

where t_A is the unweighted average tariff for the country in question (automatically known to TASTE). P2 is an additional cap. Note that where we see P1 in the Swiss formula, P1*t_A is used in the Girard formula.

The t_A values are listed in the codes.xls file produced by the Write XLS Code File command.

```
Example: TRULE: [ALLPROD][WTO][WTO] Girard  0.23  0.01
```

5.2.7. LINEAR

This is given by:

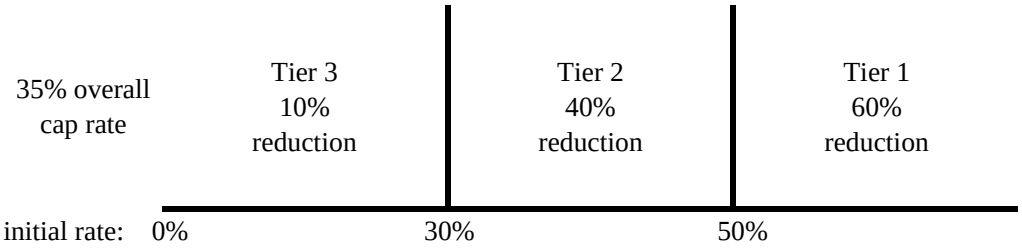
$t_1 = \text{Min}[P1 + P2*t_0, P3]$

ie, P3 is a cap

```
Example: TRULE: [ALLPROD][WORLD][WORLD] Linear  0 1 0.2
```

5.2.8.TIERED

A tiered formula may be specified, as suggested by the diagram below:



The diagram shows a rule with 3 tiers: a 60% cut for rates initially above 50%; a 40% cut for other rates above 30%; and a 10% cut in the remaining (lower) tariffs.

To represent such a scheme in TASTE, we would write the formula as

Tiered	**3**	**0.6**	**0.5**	**0.4**	**0.3**	**0.1**	**0.35**
	no. of tiers	cut for Tier 1 (highest rates)	lower bound of Tier 1	cut for Tier 2 (middle Tier)	lower bound of Tier 2	cut for last Tier 3 (lowest rates)	overall cap rate

The first number (3) is the number of tiers. The second number (0.6) is the size of the cut in the highest tier. The third number (0.5) is the lower boundary of the highest tier. Similarly, the fourth and fifth numbers show, respectively, the size of the cut (0.4) and the lower boundary (0.3) for the middle tier. The sixth number shows the cut (0.1) for the lowest tier. The final, seventh, number shows the overall cap (0.35) rate.

Again, for example, we may write:

```
TRULE: [TCF][LDC][OECD] Tiered 2 0.5 0.4 0.25 0.30
```

which applies to TCF produced in LCD and used by OECD. Here, the formula has two tiers: a 50% cut on rates above 40%, and 25% cut for other (lower) rates, with overall cap of 30%.

Again the pattern of numbers is:

N tiers, cut, bound, cut, bound,.....cut, cap

So if there are N tiers, there altogether (1+2*N) numbers following the word 'tiered'. **Warning: check carefully the order in which cuts and bounds are listed: it may be different to the way you expect or are used to.**

Pursuing the last example, a tariff initially 42% (>40) would be cut by half to become 21%. A tariff initially 32% (<40) would be cut by one quarter to become 24% -- so the tariff which initially was the *lower* of the two, is, after the cuts, the *higher* of the two. A mathematician would say that this tiered formula was "non-monotonic", ie, it is not order-preserving. In spite of this problem, such formulae have been proposed in trade negotiations[12].

5.3. Formulae which change applied rates, not bound rates

Each of the supplied tariff formulae has an alternate form, which directly changes applied rates and is particularly useful for implementing regional trade agreements. The name of the alternate formula is

[12] The file 'rulereport.txt', produced when a tariff simulation is run, shows how each rule relates final to initial rates, and, for tiered formulae, summarizes in words which cuts apply to which tiers.

produced by prefixing 'A' to the name of the usual formula. So the alternate formula names are ANONE, AEQUALS, AMIN, ASWISS, AFSWISS, AGIRARD, ALINEAR and ATIERED. These have the same syntax and work the same way as the formulae described above, except that they will change applied rates, not bound rates. That is:

- Bound rates will not be changed
- Applied rates will follow the given rule, if that rule implies a tariff cut (applied rates will not rise).

These "A" formulae will affect applied rates much more strongly than the usual formulae which cut bound rates, and only affect applied rates if bound rates fall below old applied rates.

5.3.1. ALINEAR Example

Like the LINEAR formula, this is given by:

$t_1 = \text{Min}[P1 + P2*t_0, P3]$

The difference is that here t_1 and t_0 are ***applied*** rates. Bound rates are unaffected.

```
Example: TRULE: [ALLPROD][WORLD][WORLD] ALinear  0 1 0.2
```

5.4. Weighting scheme

TASTE internally computes changes in bound rates at the MAcMapHS6 (HS6, 200-country) level of detail. To present results, the changes are averaged to the user level of detail. To calculate these averages (adding over HS6 commodities and over regions) some weights must be used, and TASTE offers two weighting schemes:

(a) the w_tr or trade weights

(b) the w_rg or 'reference group' weights; these are adjusted by MAcMapHS6 to address:
   - data problems, such as volatility between years, or inconsistencies between reporting by importers and exporters.
   - the problem that trade weights will tend to minimize the effect (on an average rate) of a trade-prohibiting tariff on one HS6 commodity.

TASTE makes you choose which of these two weighting schemes are to be used. Potentially, neither set of weights is consistent with the GTAP data, giving rise to potential problems of aggregation bias: tariff shocks might be wrongly influenced by the level of user aggregation. To combat this problem, you have the option of scaling the chosen set of weights so that they sum to the GTAP database trade matrix VIWS.

When you look at the results in ViewHAR, the **History** command shows which weighting scheme was used and if scaling was chosen.

5.5. Output files from the tariff simulation

Output files will normally be stored in C:\TASTE\output, unless you selected another output folder.

The main HAR file

The main output from the tariff simulation is Tarfsim.har, which you can examine in ViewHAR. It contains 4 headers:

At header CUM the ACCUM array is the work array constructed by TASTE as it read through all the MAcMapHS6 records. It has diagnostic value, and would also be useful to work out various average tariff rates (such as the average tariff levied on USA exports). ACCUM is presented at the user level of aggregation. For each good (Com), exporting (Par) and importing (Rep) region, 8 numbers are presented:

- 1:Weight,
- 2:OldApplRev, 3:NewApplRev, 4:OldBoundRev, 5:NewBoundRev,
- 6:NCases, 7:NRises, 8:NFalls

The first number, Weight, is the sum over all applicable records of the chosen weights (trade flow, or reference group): according to user choice, these may have been scaled to match totals in the GTAP data base. The next 4, revenue, numbers are the sum over all applicable records of the product of individual weights and various tariff rates (old/new, bound/applied). The "bound" revenue is of course a fiction, used to compute the weighted average bound rate. The last three numbers are observation counts: Ncases is the number of applicable records, while NRises and NFalls show how many applied rates rose or fell[13].

[13] As the rules are implemented currently, applied rates do never rise !

The next header, CUM2, contains the same first 3 numbers as the ACCUM array [Weight, OldApplRev, NewApplRev], except that they are presented at the HS6 level of detail. You could compute HS6 changes in applied tariff rates from these numbers. Perhaps these results might guide you in deciding which HS6 products might be exempted from tariff cutting rules.

The next header, CUM3, is presented at the HS6 level of detail, and distinguishes original importing (reporting) regions. It is designed to assist in setting special rules for "sensitive products", as described in the next section.

The next header, RATE, contain the RATES array, showing average tariff rates computed from the ACCUM numbers. Again, old/new and bound/applied rates are shown.

Finally, the SHOK header contain the POWTARFSHOK array, showing percent changes in the powers of the applied rates. This array can be used directly to apply shocks to the GTAP CGE model.

Other diagnostic files

The tariff simulation also produces several text files for diagnostic purposes; these are:

- groups1.txt shows the membership of inbuilt and user-defined groups of commodities or regions, used to set up the rules for tariff changes.
- groups2.txt is similar to groups1.txt, but contains descriptions of the commodities and regions.
- rulereport.txt lists the tariff rules, shows how they overlap, and how each rule would alter a range of initial bound rates.
- trace.txt is produced if the user selected the “trace” option. It reports the rates calculation in detail for every original record that falls within a selected combination of GTAP com/exporter/importer. The file is more legible if pasted into Excel.
- AveBoundRate.txt (in the output folder) contains average bound rates (using no weights) for each country, using the current formula for missing bound rates. See Appendix 5.
- nodedata.txt is used to check on TASTE’s mechanism for deciding which rule applies to which original record. It is really only of interest to the original programmers of TASTE. If the “average nodes per list” exceeds 6, you might consider reformulating your tariff rules so that they overlap less.

5.6. Formulae which apply only to "sensitive products"

Note: as of December 2009 this feature is under development, and may change.

5.6.1. Background

Negotiated tariff-cutting rules usually are accompanied by a list of exemptions – called "sensitive products". These are lists of HS6 products (differing by importer). Sensitive products are partially or wholly exempted from the agreed tariff-cutting. TASTE supports this idea as described below.

5.6.2. The SENS matrix and TRULE1 tariff-cutting rules

Supplied with TASTE is a file SENS.HAR containing a header SENS. This SENS matrix is read when TASTE starts up and contains, for each HS6 commodity and each original importing region:

- the value 1 if that commodity is sensitive for that importing region
- the value 0 in other cases

The SENS matrix will contain a recommended or plausible list of sensitive products constructed by David Laborde[14]. However, you may edit the matrix to implement a different list.

To make use of the SENS matrix you would include "*trule1*" statements in your tariff scenario. The *trule1* statement work exactly as the *trule* statement described above except that:

- New keyword "*trule1*" will apply its rule only to trade for which HS6/importer cell in SENS is 1

The intention is that the main tariff-cut rules are specified first as "*trule*"; followed by *trule1* rules which apply only to sensitive products. The *trule1* rules would usually specify smaller tariff cuts, or no tariff cuts.

For example, if the *last* line in your file of tariff-cutting rules was:

```
TRULE1: [ALLPROD][WORLD][WORLD] None
```

there would be NO tariff cut applied to any trade for which Hs6/importer cell in SENS is 1.

[14] The matrix is based on

The supplied file *rulesens.txt* demonstrates the use of the trule1/SENS combination.

5.6.3. The CUM3 output array

In the main output from the tariff simulation, Tarfsim.har, there is a header CUM3 which is designed for sensitive products simulations. For each HS6 commodity and each original importing region, it shows:

1. SENS: the value in the current SENS matrix
2. Trade: the trade weight (perhaps scaled)
3. OldAppliedRev: pre-sim tariff revenue, using Applied rates
4. OldBoundRev: pre-sim tariff revenue if Bound rates were applied in full
5. NewAppliedRev: post-sim tariff revenue, using Applied rates
6. NewBoundRev: post-sim tariff revenue if Bound rates were applied in full
7. NARSens0: post-sim tariff revenue, using Applied rates, but ignoring any *trule1* rules (ie, assuming SENS=0)
8. NBRSens0: post-sim tariff revenue, using Bound rates, but ignoring any *trule1* rules rules (ie, assuming SENS=0)
9. NARSens1: post-sim tariff revenue, using Applied rates, assuming that SENS=1
10. NBRSens1: post-sim tariff revenue, using Bound rates, assuming that SENS=1

Above:

- Items 2-10 are values cumulated by adding over all source (exporting) regions.
- To calculate rates for Tariff revenue Items 3-10, divide the revenue by Item 2, the trade flow.
- If there are any *trule1* formulae, Items 4 and 5 reflect trule1 formulae and current SENS values.
- Items 2-6 may be of interest even if there are no *trule1* formulae.
- Items 7-10 are designed to guide alternate settings of the SENS matrix. They are calculated ignoring current SENS value.
- Items 7 and 8 show what new tariff revenue *would be* if SENS=0.
- Items 9 and 10 show what new tariff revenue *would be* if SENS=1.
- For cells covered by NO *trule1* formula, items 7 and 9 should be the same as item 5, and items 8 and 10 should be the same as item 6.
- For cells covered by some *trule1* formula, *just one* of items 7 and 9 should be the same as item 5, and *just one* of items 8 and 10 should be the same as item 6.

The difference between items 7 and 9 shows how much tariff revenue might be recouped if that commodity/region was declared to be sensitive. That revenue change might guide editing of a revised SENS matrix.

As stated above, as of December 2009 this feature is under development. We may later add more items to the list above, giving further assistance in contructing a new SENS matrix. We might indeed add as a final item, a new suggested SENS value which is conditional on the given trule and trule1 formulae.

References

Bchir M.H., S. Jean and David Laborde, 2006. Binding Overhang and Tariff-Cutting Formulas, *Review of World Economics* (Weltwirtschaftliches Archiv), Springer, vol. 127(2), pages 207-232, July.

Bouët Antoine and Yvan Decreux and Lionel Fontagné and Sébastien Jean and David Laborde, 2008. "Assessing Applied Protection across the World," Review of International Economics, Blackwell Publishing, vol. 16(5), pages 850-863, November.

Boumellassa, Houssein and Debucquet, David Laborde and Mitaritonna, Cristina, 2009. "*A picture of tariff protection across the World in 2004: MAcMap-HS6, Version 2*" IFPRI discussion papers 903, International Food Policy Research Institute (IFPRI).

Dimaranan B.V., McDougall R.A. (2002), Global Trade, Assistance and Production: The GTAP 5 Data Base. Center for Global Trade Analysis, Purdue University.

Forbes, M.D., Fry, J.M., Jomini, P.A. and Strzelecki, A. 2004, *An Integrated Tariff Analysis System: Software and Database*, Productivity Commission Staff Working Paper, Melbourne, November. [http://www.pc.gov.au/trade/itas2]

Francois, J. and Martin, W. 2003, *Formula approaches for market access negotiations*, The World Economy, vol. 26, no. 1, pp. 1–28.

International Trade Center. 2006. User Guide - Market Access Map: Making Tariffs and Market Access Barriers Transparent. Market Analysis Section, Division of Product and Market Development, International Trade Center, Geneva, December. Available online at http://www.macmap.org/User%20Guides/MAcMap-userguide-EN.pdf

Laborde, D., Martin W. And Van Der Mensbrugghe D. "*Implications of the 2008 Doha Draft Agricultural and Non-agricultural Market Access Modalities for Developing Countries*" IFPRI Discussion Paper, forthcoming.

Appendix 1: MAcMapHS6 Dataset description – MacMapHS6v2 and bound tariff data set.

The MAcMap project is based on a joint effort devoted by the International Trade Centre –ITC– (United Nations Conference on Trade And Development –UNCTAD– & World Trade Organization –WTO–, Geneva), the Centre d'Etudes Prospectives et d'Informations Internationales –CEPII– (Paris) and the International Food Policy Research Institute (IFPRI) to systematically collect detailed and exhaustive information on the level of applied trade policy.[15] The purpose is not only to provide a measure of border protection, but also to pave the way for well-suited economic analysis of the consequences of trade liberalization, in particular through CGE analysis.

Although several databases provided information on trade policies (TRAINS, AMAD, ITAS[16]), no well-suited, comprehensive assessment of AVE applied protection across the world was available. This resulted, in particular, in most assessment of the impact of multilateral trade liberalization being carried out without taking into account specific tariffs, nor trade preferences.[17] MAcMap is the first database gathering such information worldwide in a consistent and tractable way. Beyond proper collection and harmonization of information, however, the development of MAcMap also aimed at dealing with the main methodological hurdles encountered when trying to produce tariff data well-suited for large-scale analysis, in a particular as far as AVE calculation and aggregation are concerned.

TASTE relies on MAcMapHS6v2, a database at the HS-6 level, intended to provide a set of consistent and exhaustive AVEs of applied border protection across the world (163 reporting countries are covered, for 5,111 products, with 208 partners) in 2004[18]

In addition to the applied protection, any WTO negotiation assessment requires to have a bound tariff dataset compatible with the applied protection data. Methodology used is described in Bchir et al (2006) and summarized here.

Finally, the MAcMapHS6 dataset is associated to an original aggregation method, the "reference group" weights, aimed to reduce the traditional endogeneity bias of trade weighted average. Using this aggregation strategy is offered by TASTE.

All relevant information about the different datasets and aggregation methodologies is described in Boumelassa, Laborde and Mitaritonna (2009).[19]

[15] See http://www.ifpri.org/book-5078/ourwork/program/macmap-hs6

[16] see Fry et al., 2004

[17] None of these two aspects were accounted for in the tariff data included in the GTAP 5 database (Global Trade Analysis Project, see Dimaranan and McDougall, 2002), which has been the workhorse for founding empirically the assessments of the impact of multilateral liberalisation.

[18] This specific database is in particular the source for protection data in the 7th release of the GTAP database.

[19] http://www.ifpri.org/publication/picture-tariff-protection-across-world-2004

From MacMapHS6 to TASTE. A consistent aggregation scheme

Since MAcMapHS6 relies on an average of BACI trade data and GTAP uses its own trade information, mainly based on Mark Gehlhar's contribution, a scaling procedure should be applied to bridge the gap between trade information and allow TASTE to reproduce GTAP trade weighted aggregate tariffs.

Unfortunately, a simple direct scaling of MAcMapHS6's trade to reproduce GTAP's VIWS (the CIF import value) is not sufficient. The GTAP building process goes through different steps using Mark Gehlhar's dataset to make a first aggregation of MAcMap data, then adds additional trade information (energy, treatment of travelers' expenditure) to finally get the VIWS matrix.

The final trade weights include in TASTE are defined by:

$$
\begin{aligned}
tr^{final}_{h,c,d} &= tr^{baci}_{h,c,d} \frac{tr^{GTAP}_{i,r,s}}{\sum_{h \in H(i), c \in C(r), d \in D(s)} tr^{baci2}_{h,c,d}} \frac{tr^{MG}_{i,c,d}}{\sum_{h \in H(i)} tr^{baci}_{h,c,d}} \\
&= tr^{baci}_{h,c,d} \frac{tr^{GTAP}_{i,r,s}}{\sum_{c \in C(r), d \in D(s)} tr^{MG}_{i,c,d}} \frac{tr^{MG}_{i,c,d}}{\sum_{h \in H(i)} tr^{baci}_{h,c,d}}
\end{aligned}
$$

With tr^{final} the TASTE trade weights, tr^{GTAP} the VIWS data from GTAP database, tr^{MG} Mark Gehlhar's dataset, H the index for the HS6 product set, c and d the exporting and importing countries, i the GTAP sector, and r and s the exporting and importing GTAP regions.

Countries in MAcMapHS6v2 and reference groups

Group A

American samoa	Gibraltar	Northern mariana islands
Andorra	Greece	Norway
Anguilla	Greenland	Oman
Aruba	Guam	Palau
Australia	Hong kong	Poland
Austria	Hungary	Portugal
Bahamas	Iceland	Puerto rico
Bahrain	Ireland	Qatar
Barbados	Israel	San marino
Belgium	Italy	Singapore
Bermuda	Japan	Slovakia (slovak republic)
Canada	Korea	Slovenia
Cayman islands	Kuwait	Spain
Cook islands	Latvia	St. pierre and miquelon
Cyprus	Liechtenstein	Sweden
Czech republic	Lithuania	Switzerland
Denmark	Luxembourg	Taiwan
Estonia	Macau	Turks and caicos islands
Falkland islands	Malta	United arab emirates
Faroe islands	Marshall islands	United kingdom
Finland	Mayotte	United states of america
France	Micronesia	Virgin islands (british)
French guiana	Netherlands	Virgin islands (u.s.)
French polynesia	New caledonia	Wallis and futuna island
Germany	New zealand	

Group B

Antigua and barbuda	Croatia	Saint kitts and nevis
Argentina	Grenada	Saudi arabia
Belarus	Malaysia	Seychelles
Botswana	Mauritius	South africa
Brunei darussalam	Mexico	Trinidad and tobago
Chile	Netherland antilles	Uruguay
Costa rica	Russian federation	

Group C

Albania	Fiji	Panama
Algeria	Gabon	Paraguay
Angola	Georgia	Peru
Armenia	Guatemala	Philippines
Azerbaijan	Guyana	Romania
Belize	Indonesia	Saint lucia
Bosnia and herzegovina	Iran	Saint vincent and the grenade
Brazil	Jamaica	Samoa
Bulgaria	Jordan	Sri lanka
Cape verde	Kazakstan	Swaziland
China	Kyrgyzstan	Syrian arab republic
Colombia	Lebanon	Thailand
Cuba	Libyan arab jamahiriya	Tonga
Dominica	Macedonia	Tunisia
Dominican republic	Maldives	Turkey
East timor	Morocco	Turkmenistan
Ecuador	Myanmar	Ukraine
Egypt	Namibia	Vanuatu
El salvador	Nauru	Venezuela
Equatorial guinea	Palestinian territory	Yugoslavia

Group D

Afghanistan	Honduras	Papua new guinea
Bangladesh	India	Rwanda
Bolivia	Iraq	Sao tome and principe
Cambodia	Kiribati	Senegal
Cameroon	Korea, dem. people's re	Solomon islands
Central african republic	Lao people's democratic	Suriname
Comoros	Lesotho	Togo
Côte d'ivoire	Mauritania	Uganda
Djibouti	Moldova, rep.of	Uzbekistan
Gambia	Mongolia	Viet nam
Ghana	Nepal	Western sahara
Guinea	Nicaragua	Zimbabwe
Haiti	Pakistan	

Group E

Benin	Guinea-bissau	Sierra leone
Bhutan	Kenya	Somalia
Burkina faso	Liberia	Sudan
Burundi	Madagascar	Tajikistan
Chad	Malawi	Tanzania
Congo	Mali	Yemen
Congo (democratic republic)	Mozambique	Zambia
Eritrea	Niger	
Ethiopia	Nigeria	

Appendix 2: Unit value choice and tariff cutting formula

Notations:

Variable	Definition	Dimension
CTS_ADV	Bound rate - Ad Valorem Component	hs6, reporter
CTS_SPE	Bound rate - Specific Component	hs6, reporter
MFN_ADV	MFN applied rate - Ad Valorem Component	hs6, reporter
MFN_SPE	MFN applied rate - Specific Component	hs6, reporter
UT_ADV	Preferential rate - Ad Valorem Component	hs6, reporter, partner
UT_SPE	Preferential rate - Specific Component	hs6, reporter, partner
uvm	world unit value (median - trade weighted - three year average)	hs6
uv	Exporter Reference Group unit values	hs6, partner's RefGroup
uvr	Importer unit values (median - trade weighted - three year average)	hs6, reporter
uve	Exporter unit values (median - trade weighted - three year average)	hs6,partner
uvb	Bilateral unit values (median - trade weighted - three year average)	hs6, reporter, partner
XXX_uv*	Ad Valorem Equivalent (AVE) of tariff XXX (=CTS/MFN/UT) using unit value uv* (=uvm/uv/uvn/...)	hs6,reporter,*

For modelling reasons, descriptive works or to apply non linear tariff cutting formulas, we need to compute the *ad-valorem* equivalent (*AVE*) of a mixed or a compound tariff. The major difficulty is to choose the right unit value to convert the specific component of the tariff. Taking a too large *uv*, will lead to overestimating the protection, and the reverse. Two principles should be kept in mind when dealing with *uv* and *AVEs*:

1. Unit values are noisy and different methods could be used to solve this problem. Looking at bilateral unit values, even after taking a three year average, makes appear an incredibly high volatility. If it is legitimate to expect unit values evolving with the partner, the quality of the traded good , the pricing to market firms' behaviour, it seems very unrealistic to accept a coefficient of variation of 10 000% for a homogenous product like the sugar. Since unit values are the ratio of the value of trade divided by the traded quantity and that quantity is badly registered, the unit values reflect the noise coming from low quality data on quantity. So, we have to make a trade-off between keeping the maximum of information (i.e. bilateral UV) and the needed robustness of UV and AVE. For checking the last objective, we have to discard some information or to compute UV on a larger set of values. The current solution used in MAcMApHS6 is the Exporter Reference Group unit values (ERGUV). Unit values are computed by group of exporters (trade weighted median). The ERGUVs are more robust than bilateral unit values or exporter specific unit values but keep some specificities of the exporter based on its reference group (richest countries; highly opened, middle income countries; less opened, middle income countries; highly opened, low income countries; less opened, low income countries). Moreover, a filter is applied to bind the unit values used to a range between 1/3 of the world (median) unit value and 3 times the world unit value.
2. Several unit value concepts are relevant, given the issue under study:
   - Looking at effective protection faced, unit values related to the exporter's specificities are required. Indeed, a specific tariff has more protectionist effects towards a low-price producer. So, a specific tariff's AVE should be dependent on the exporter. The choice of *uvb*, *uve* or *uv* could be done.
   - In a multilateral negotiations framework, we need to have a single AVE per MFN tariff. So, the choice of *uvr* or *uvm* seems relevant. It is noteworthy to see that WTO's principles to select *uvr*

and not *uvm* will be more favourable for protectionist countries since the unit value could be endogenous and positively correlated to the tariffs (quality effects, rents behaviour).

Describing the current MAcMapHS6's methodology, we will focus on *uv*, for relevant applied AVE, and *uvm* for multilateral talks. Let's note that in the future, *uvm* will be replaced by *uv_wto* to stick with the existing WTO's guidelines (*uv_wto* is a function of *uvr* and *uvm* but also of the gap on AVE resulting from the use of both unit value system).

Applying tariff cutting formula

If applying a tariff cutting formula to an ad-valorem tariff is straightforward, things could become more complex when specific components are involved.

General principle

A tariff cutting non-linear formula *f(.)* will transform the base rate (the current bound rate if the product is bounded) to a new bound rate (*nbr*) that will cap the MFN rate (*final_MFN*). Finally no applied rate should be larger than this new MFN rate.

Related to the binding power of the commitment, we assume that no AVE applied tariff computed with WTO's official unit values, whatever its structure, could be above the official WTO's AVE. Following our notation it implies that $UT_uvm \leq CTS_uvm$ for every WTO's trade relations. However, we could have $UT_uv > CTS_uvm$. Indeed, it seems that the UVs used for the official AVEs computation are the most objective figures to know if a country is checking its commitments or not.

Base rate	New Bound rate
br	$f(br)$
Initial MFN rate	New MFN rate
mfn	$Min(mfn, f(br))$
Initial Preferential rate	New Preferential rate
$pref$	$Min(pref, Min(mfn, f(br))$

We assume that the structure of a tariff will not be changed by the liberalization process. If the tariff cut leads to a reduction of the MFN applied tariff, its structure (the size of the Ad valorem component relative to the Specific one) will be the same, meaning that each component is reduced proportionally by the same coefficient than the AVE:

$$\frac{Final_MFN_uvm}{MFN_uvm} = k \Rightarrow \begin{cases} Final_MFN_ADV = k \times MFN_ADV \\ Final_MFN_SPE = k \times MFN_SPE \end{cases}$$
$$\forall k \leq 1$$

The constant MFN structure assumption is simplistic and neutral. However, it may be possible for some countries to reduce more the ad-valorem component then the specific one, keeping the total AVE value equals to the new commitment. Indeed, specific tariffs have in reality more protectionist effects than ad valorem ones.

Since preferential tariffs are sometimes correlated with the MFN tariffs, we should take this into consideration (preferential rates expressed as a percentage of the MFN, or just equal to the specific components or the ad-valorem one) when applying a tariff cutting formula. However, since the basic distribution of MAcMapHS6 does not contain this kind of information, we assume that:

- a cut in MFN applied tariff will not have systematic effect on preferential applied rates.
- the preferential AVE will be capped by the MFN AVE using partner specific unit value *i.e.* $Final_UT_uv \leq MFN_UT_uv$. Indeed, in the other case, the exporter should prefer to ask for the MFN rate than the preferential one.

Finally, we avoid the case where the new WTO commitments will drive a change to the national tariff schedule, switching specific tariffs to mixed ones e.g.

Initial definition	*New definition*
$\$4/ton$	$\$4/ton\ MAX\ f(CTS_uvm)$

The pure ad-valorem case

Here, the situation is straightforward and the result is independent of the choice of *uv*.

Base rate	New Bound rate
$CTS_uvm = CTS_ADV$	$f(CTS_uvm)$
Initial MFN rate	New MFN rate
$MFN_uvm = MFN_uv = MFN_ADV$	$Min(MFN_uvm, f(CTS_uvm))$
Initial Preferential rate	New Preferential rate
$UT_uvm = UT_uv = UT_ADV$	$Min(UT_uvm, Min(MFN_uvm, f(CTS_uvm)))$

Here, the final applied rate could be computed directly: *Min(UT_uvm, f(CTS_uvm))*.

The pure specific case

If the value of the *uv* is important for computing the AVE of the bound tariff, the determination of the final applied tariff is not impacted by the differences between different unit values given the fact that the reduction rate of the bound tariff is applied to its specific, and single component. This specific value will cap the MFN and preferential ones. There is no structural effect.

Base rate	New Bound rate
$CTS_uvm = \frac{CTS_SPE}{uvm}$	$f(CTS_uvm)$
Initial MFN rate	New MFN rate
$MFN_uvm = \frac{MFN_SPE}{uvm}$ $MFN_uv = \frac{MFN_SPE}{uv}$	$Final_MFN_uvm = Min(MFN_uvm, f(CTS_uvm))$ $Final_MFN_uv = \frac{Final_MFN_uvm}{MFN_uvm} \times MFN_uv$ $Final_MFN_SPE = \frac{Final_MFN_uvm}{MFN_uvm} \times MFN_SPE$
Initial Preferential rate	New Preferential rate
$UT_uvm = \frac{UT_SPE}{uvm}$ $UT_uv = \frac{UT_SPE}{uv}$	$Final_UT_uv = Min(UT_uv, Final_MFN_uv)$ $Final_UT_uv = Min(UT_uv, MFN_uv \times \frac{Min(MFN_uvm, f(CTS_uvm))}{MFN_uvm})$ $Final_UT_uv = Min(UT_uv, Min(MFN_uvm, f(CTS_uvm)) \times \frac{uvm}{uv})$ $Final_UT_SPE = Min(UT_SPE, Min(MFN_SPE, f(CTS_uvm) \times \frac{CTS_SPE}{CTS_uvm}))$

The compound case

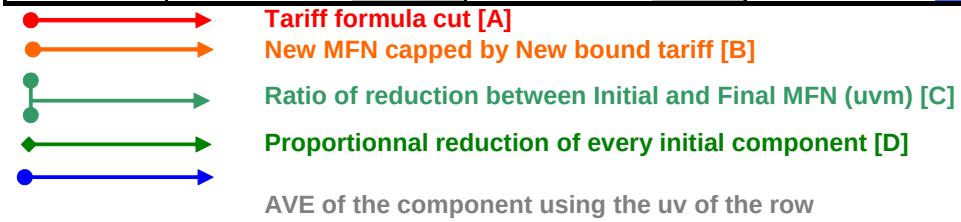
In this case, a structure effect appears given the fact that the weight of AVE of the specific component is not the same in the *MFN_uvm* and the *MFN_uv* tariffs.

Base rate	New Bound rate
$CTS_uvm = CTS_ADV + \frac{CTS_SPE}{uvm}$	$f(CTS_uvm)$
Initial MFN rate	New MFN rate
$MFN_uvm = MFN_ADV + \frac{MFN_SPE}{uvm}$ $MFN_uv = MFN_ADV + \frac{MFN_SPE}{uv}$	$Final_MFN_uvm = Min(MFN_uvm, f(CTS_uvm))$ $Final_MFN_uv = MFN_uv \times \frac{Final_MFN_uvm}{MFN_uvm}$
Initial Preferential rate	New Preferential rate
$UT_uvm = UT_ADV + \frac{UT_SPE}{uvm}$ $UT_uv = UT_ADV + \frac{UT_SPE}{uv}$	$Final_UT_uv = Min(UT_uv, Final_MFN_uv)$ $Final_UT_uv = Min(UT_uv, MFN_uv \times \frac{Min(MFN_uvm, f(CTS_uvm))}{MFN_uvm})$ $Final_UT_uv = Min(UT_uv, Min(MFN_uvm, f(CTS_uvm) \times \underbrace{\frac{MFN_ADV + \frac{MFN_SPE}{uv}}{MFN_ADV + \frac{MFN_SPE}{uvm}}}_{\text{Structure effects}}))$

A numerical illustration

Starting from a bound tariff of 100% + $1/ton, a MFN applied tariff of 75% + $1/ton and a preferential rate of 50% + $1/ton, the following table displays the different operations made to determine the final applied tariffs given the *uvm*, *uv1*, *uv2* unit values. In the present case, we see that if a Swiss formula (α=50% will result in a cut of the bound tariff of 80%, the binding overhang reduces this cut to 77.14%for the AVE of the MFN tariff. Finally, the preferential rate will fall by 72.3% to 74.9% given the *uv* used. Indeed, the share of the specific component in the AVE is not the same for the MFN and the preferential tariffs and the *uv* choice bring distortions due to the non homogeneous structure of the tariff. We can notice that if for some *uvs* the preferential (bilateral) rate is above the bound AVE, it is not the case when using the official *uvs*. So, the importing country still check is multilateral commitments.

		Base Rate			Initial MFN			Initial Applied		
		100%	$1.00	AVE	75%	$1.00	AVE	50%	$1.00	AVE
uvm	$1.00	100%	100%	200%	75%	100%	175%	50%	100%	150%
uv1	$1.50				75%	67%	142%	50%	67%	117%
uv2	$0.50				75%	200%	275%	50%	200%	250%
		Final Rate			Final MFN			Final Applied		
		20.0%	$0.20	AVE	17.1%	$0.23	AVE			AVE
uvm	$1.00	20%	20%	40%	17%	23%	40%	13%	27%	40%
uv1	$1.50				17%	15%	32%	14%	19%	32%
uv2	$0.50				17%	46%	63%	13%	50%	63%



Additional comments: Mixed tariffs

The MAcMapHS6 methodology is aimed at limiting problems coming from AVE conversion. To achieve this goal, the *ad valorem* component of a mixed tariff is always preferred and kept. For example, a tariff defined as 3€/Ton or 14% whichever is higher will be transformed as a simple 14%. In the case where the operator will be "whichever is lower", the same rate (14%) will be used.

This approach allows us to discard the problem of applying tariff line unit values for which volatility is higher and trade information could not be cross-checked with mirror flows. However, we lose here a part of the available information.

Appendix 3: Specifying a tariff scenario

A tariff rule is specified as follows:

```
TRULE: [WineSpirit][EST][LVA] swiss 0.1 0.05
```

The expressions in square brackets, called *ranges*, refer to groups of commodities or regions (or, sometimes, to individual commodities or regions). The first range refers to sectors, the second to exporting regions, and the third to importing regions.

Groups of regions may be referenced by:

- one or more original region codes, separated by '+'
- predefined groups such as the GTAP region codes, or aggregations of these defined by the user aggregation[20]
- the built-in groups:
  (a) 'WORLD', covering all regions
  (b) 'WTO', covering all countries in the WTO [1 in WTO membership column in codes.xls].
  (c) 'LDC', covering all LDC countries.
  (d) 'DEVELOPING', covering all developing countries, even South Korea.
  (e) 'DEVELOPED', covering all countries not in the two previous groups.
- groups defined using the RGROUP statements

Groups of commodities may be referenced by:

- the original 6-digit HS6 codes
- abbreviations of these codes: for example '0205' matches any HS6 code beginning with these 4 digits; and '28' matches any HS6 code beginning with these 2 digits.

[20] It is possible (though poor style) for the user's AGG file to give aggregate regions the same name as one original GTAP regions. For example, you could have an aggregate region CHN consisting of GTAP regions CHN and HKG (China and Hong Kong). In that case TASTE uses the GTAP definition of CHN, ignoring that from the AGG file.

- predefined groups such as the GTAP sector codes, or aggregations of these defined by the user aggregation
- the built-in groups
  (a) 'ALLPROD', covering all goods
  (b) 'WTOAGRIC', covering all goods defined as agricultural by the WTO
- groups defined using the CGROUP statements

So we could set some tariffs with:

```
TRULE: [B_T][XER][EST] swiss 0.1 0.05
```

covering all imports of the GTAP beverages and tobacco group into Estonia from XER, GTAP's 'rest of Europe'.

An RGROUP statement might read:

```
RGROUP: BalticStates [EST+LVA+LTU] ! Estonia, Latvia and Lithuania
```

As well as '+', the '-' and '^' symbols can be used to separate regions within a range:

```
RGROUP: NAMADev [DEVELOPING-KOR] ! for NAMA, S.Korea is not “developing”
RGROUP: Foreign [WORLD-GBR] ! Everywhere except UK
RGROUP: RichOECD [Rich^OECD] ! OECD regions which are rich
```

A range is evaluated left to right, so in:

```
RGROUP: RichOECD [Rich^OECD+AGO] ! OECD regions which are rich; and Angola
```

the range is evaluated (Rich^OECD)+AGO not Rich^(OECD+AGO)[21]

It is legal (although odd!) to define groups which turn out to be empty:

```
RGROUP: AfriRich [Rich^Africa] ! Rich African countries
```

The later rule applies

In cases such as

```
TRULE: [WineSpirit][BalticStates][WORLD] swiss 0.2 0.1
TRULE: [WineSpirit][LVA][WORLD] swiss 0.1 0.05
```

where the second rule includes some elements covered in the first rule, *the later rule applies* to the common elements. Normally you would specify more general rules first, followed by more detailed rules, which act as exceptions to preceding rules.

Some combinations of commodities/regions may be covered by no rule at all; here TASTE assumes that bound rates are unchanged by the simulation. In some cases we may need to explicitly specify such not-covered combinations, using the NONE tariff formula. For example:

```
TRULE: [FoodProds][WORLD][Europe] EQUALS 0 ! all food duty-free into Europe
TRULE: [180690][WORLD-EUROPE][BEL] NONE  ! except for nonEU chocolates to Belgium
```

The last example also shows how groups such as "WORLD-EUROPE" can be specified within a TRULE statement, instead of defining them beforehand with a RGROUP statement.

Other details

- Comments: Any text following an exclamation mark '!' is stripped off (ie, treated as a comment and ignored).
- Line continuation: If (after comments are stripped off) the last character in a line is underscore (_), the text is assumed to continue onto the next line.
- Blank lines are ignored.
- A file in the output folder, echorules.txt, shows the rules after the preceding 3 operations have been applied.
- Please avoid using Asian or accented characters.
- No line length limit is imposed, but we suggest that very long lines are avoided. To define groups with very many members, define several sub-groups ... then unite them.
- No text in the rule file is case-sensitive (TASTE converts each line internally to upper-case).

[21] There is no 'operator precedence'.

- Group names must consist of alphanumeric characters A..Z and 0..9, must begin with a letter, and cannot be longer than 12 characters.
- An error occurs if you define a group with the same name as an original region or sector, or with a built-in name (eg, WORLD), or with the same name as a group given by the GTAP or user aggregation, or which has been used in a previous RGROUP or CGROUP statement.

Debugging

You can specify a large number of groups and rules to build up very complex tariff scenarios. Since the rules and groups interact, there could be some doubt as to which rules cover which cases. When you run a tariff scenario, TASTE creates several text files in the output folder to use as debugging aids -- to check that rules are applied as you hope:

- Two files, groups1.txt and groups2.txt, list the membership of all pre-defined (built-in) and user-defined sector and region groups (groups1.txt is more concise than groups2.txt). The pre-defined groups are listed first. Use these files to help check your group definitions.
- The file rulereport.txt lists the TRULE statements, shows how they overlap, and how each rule would alter a range of initial bound rates
- Optionally, a file called trace.txt shows which rule applied to, and steps in the tariff calculation for, every record covered by a particular combination of: GTAP sector/importing region/exporting region. You can choose which sector and regions will be traced.

Appendix 4: Example of a tariff scenario

```
! Built-in region groups:
!  'WORLD', covering all regions
!  'WTO', covering all countries in the WTO
!  'LDC', covering all LDC countries
!  'DEVELOPING', covering all developing countries, even South Korea
!  'DEVELOPED', covering all countries not in the two previous groups
! Built-in commodity groups
!  'ALLPROD', covering all goods
!  'WTOAGRIC', covering all goods defined as agricultural by the WTO

RGROUP: SVE
[ATG+BRB+BOL+DMA+DOM+SLV+FJI+GRD+GTM+HND+MUS+MNG+NIC+PNG+PRY+KNA+LCA+VCT+TTO]
  ! Small and vulnerable
RGROUP: LowBinding [CMR+LKA+COG+CUB+GHA+CIV+KEN+MAC+MUS+NGA+ZWE+SUR]
  ! Countries with a low binding rate – Paragraph 6 of NAMA framework
RGROUP: NAMADev [DEVELOPING-KOR] ! for NAMA, S.Korea is not "developing"

RGROUP: SVEorLDC [SVE+LDC]

CGROUP: NAGR [ALLPROD-WTOAGRIC] ! not WTO agricultural

! NAMA treatment
TRULE: [NAGR][WTO-LDC][DEVELOPED+KOR] swiss  0.1  0.1
TRULE: [NAGR][WTO-LDC][NAMADev]       swiss  0.2  0.2

! AMA treatment
TRULE: [WTOAGRIC][WTO-LDC][DEVELOPED] TIERED 4 0.75 .75 0.65 0.5 0.55 0.2 0.45 1
  ! Dvped countries formula
TRULE: [WTOAGRIC][WTO-LDC][DEVELOPING] TIERED 4 0.4 1.3 0.35 0.8 0.3 0.3 0.25 1.5
  ! Dvping countries formula
```

```
! Special LDC initiative
TRULE: [ALLPROD][LDC][WTO] EQUALS 0

! Exclusion from liberalization
TRULE: [ALLPROD][WTO][SVEorLDC] NONE
TRULE: [NAGR][WTO][LowBinding] NONE
```

Appendix 5: Girard average bound rates for each country

The Girard formula uses a region-specific "average bound rate" -- read from the supplied file AveBoundRate.txt. As supplied, these averages are an unweighted average of the bound rates applying to the flows in records.dat. Where the bound rate is unknown, the default missing bound rate formula has been used.

You could edit AveBoundRate.txt if you had a different idea about average bound rates. Alternatively, you might prefer a non-default setting for the missing bound rate formula -- which would (slightly) affect the average bound rates. To assist in this situation, TASTE writes to the output folder a new version of AveBoundRate.txt, based on the *current* setting for the missing bound rate formula. To make use of these revised estimates, you would need to copy this file into the main TASTE folder.

Appendix 6: How the tariff calculation works

Conceptually, the tariff calculation consists of two stages:

- At the detailed, HS6/original region level, changes in bound rates are translated into changes in applied rates.
- Changes in applied rates are averaged and presented at the user level of aggregation

We describe these in turn.

From changes in bound rates to changes in applied rates

The procedure uses the following values from a single record:

```
w_RG, w_Tr, UT_uv, mfn_uvm, CTS_uvm, structure
```

From these, we work out the following:

```
OldBoundRate, OldAppliedRate, NewBoundRate, NewAppliedRate
```

Above, "Old" means "pre-simulation" or "no change in commitments", while "New" means "post-simulation" or "with new commitments".

The existing (committed) bound rate is CTS_uvm, but occasionally this is missing (stored as -1), in which case we apply a formula:

```
if (CTS_uvm < 0) then OldBoundRate := MAX(ctsmissA * mfn_uvm + ctsmissB, ctsmissC)
else OldBoundRate := CTS_uvm;
```

By default, ctsmissA=1, ctsmissB=0 and ctsmissC=0.5, but you can alter these values.

Our final answer compares applied rates arising from current commitments with applied rates arising from different commitments. So, first we work out the effect of applying existing commitments:

```
OldAppliedRate := Min(ut_uv, OldBoundRate * structure)
```

ut_uv is the current applied rate. The 'structure' allows for tariffs which are wholly or partly specific -- it is explained further in Appendix 2. It usually has the value 1, corresponding to a purely ad valorem tariff.

Next we apply a "formula" (eg, Swiss) to get NewBoundRate from OldBoundRate. The formula will have one or two parameters -- the second parameter will often be a cap (maximum) rate. Different formula will be used for different groups of commodities and regions.

Reductions in the bound rate will only affect the applied rate if the new bound rate is less than the existing applied rate:

```
NewAppliedRate := Min(OldAppliedRate, NewBoundRate * structure)
```

As the records are processed we accumulate trade flows, and old and new tariff revenue (trade flow * applied rate) at the user (aggregated GTAP) level of detail.

Averaging the changes in applied rates

Answers are presented at the user level of aggregation, and consist of old/new and bound/applied rates. In each case, the average rate is computed as a weighted average using either the trade flows w_tr or the reference group weights w_rg. Optionally, either set of weights may be scaled by a matrix with the same dimensions as the GTAP database trade matrix VIWS, so that the weights sum to VIWS.

Changes in applied rates are also translated into percent changes in the power of the tariff, for use in the GTAP model.

Appendix 7: How to rebuild the TASTE data from scratch

As mentioned above the TASTE database (Records.dat and MoreInfo.dat) is created from a huge text file of records, using several programs. These programs are supplied with TASTE. so you could (in principle) generate another TASTE database. In this section we describe the various files required, and tell how to run the programs that generate Records.dat and MoreInfo.dat.

Your TASTE folder should contain a zip file, Datadev.zip. Unzip this into a new, empty, folder. It contains:

File_A.txt	HS6 codes and labels: column 1 contains integer HS6 codes *in ascending order*.
File_B.txt	HS4 codes and labels: column 1 contains integer HS4 codes *in ascending order*.
File_C.txt	region codes and labels: column 1 contains integer region codes *in ascending order*.
GTAPCom.txt	GTAP sector codes and labels: *in GTAP order*
GTAPReg.txt	GTAP region codes and labels: *in GTAP order*
MoreInfo0.dat	used by read2 program
VIWS.HAR	trade matrix extracted from GTAP database
read1.exe	first processing program
read2.exe	second processing program
mergedata.exe	program to add or change records
sample.exe	program to extract a range of consecutive records from NoMiss.txt

To regenerate the TASTE data, you need all the above files PLUS a huge text file called NOMISS.TXT which contains the raw MAcMapHS6 data. The process, illustrated in the figure below, has two stages: read1 and read2. All of the TXT files used by read1 and read2 are tab-delimited text files with a header row. Each row has the same number of fields (there must be **no** missing values).

NOMISS.TXT is too big to open with a text editor, but you can use NotePad to examine the others. You may find it easier to paste their contents into Excel and examine the data there. To see the structure of NOMISS.TXT, examine the file dump.txt which you can make with TASTE's Dump Records command. NOMISS.TXT has the same format as dump.txt.

Stage 1: running read1.exe

To perform this stage, you need all the files in Datadev.zip plus the huge text data file NOMISS.TXT. If you had this file (which is unlikely), you could, from the DOS prompt, run read1.exe to generate records.dat and moreinfo0.dat. Either type ‘read1’ from the DOS prompt, or type ‘read1 DROP’ to discard very tiny trade flows.

Stage 2: running read2.exe

To perform this stage, you need all the files in Datadev.zip plus the binary file Records.dat which is supplied with TASTE.

You would run read2.exe to generate read2.har, moreinfo.dat and AveBoundRate.txt. Then copy these 3 files into the TASTE folder (records.dat is not altered).

Using Read2 to incorporate new GTAP regions

Your TASTE installation was designed to work with a specific GTAP database. You might acquire a revised GTAP database (maybe with more regions or sectors.) You can use read2.exe to refresh the TASTE datafiles so they match the newer GTAP database (ie, regenerate MoreInfo.dat).

A typical situation might be that you wished to use a newer version of the GTAP database that distinguished more regions. You would:

- replace the file VIWS.HAR with the VIWS header from the newer GTAP data
- edit GTAPREG.TXT so that its regions exactly matched (including the order) those of VIWS.har.
- edit column 3 of File_C.TXT so some original regions map to the new GTAP regions.

Then, from the DOS prompt, run read2.exe to generate read2.har, moreinfo.dat and AveBoundRate.txt. Copy these 3 files into the TASTE folder.

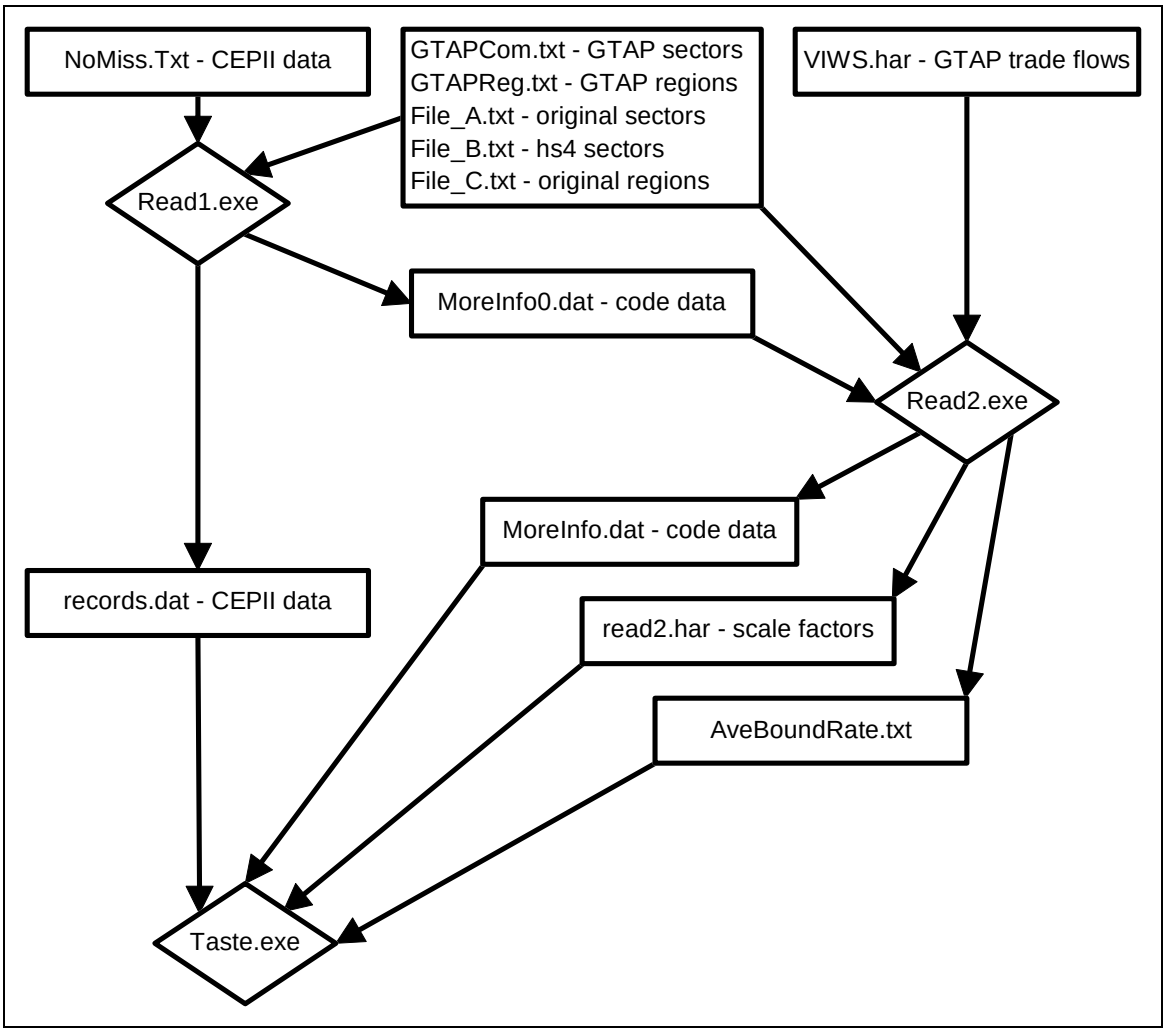


Figure 2: The Data Process

Using Mergedata to alter the MAcMapHS6 data

You can use Mergedata to replace or add records to the Records.dat file. Your new or replacement records should be contained in a text file with just the same format as the file dump.txt which you can make with TASTE's Dump Records command. In fact the easiest way to create such a file would be to create it with Dump Records, then edit it (carefully). The file should contain fewer than 1 million records. We'll suppose the file is called NewData.txt.

Mergedata also reads the file Moreinfo0.dat (in Datadev.zip) and the binary file Records.dat which is supplied with TASTE. To run it, type from DOS:

mergedata NewData.txt

The program should produce:

merged.dat	to be a replacement for records.dat
MoreInfoA.dat	to be a replacement for MoreInfo0.dat

Then you should manually move the old records.dat and MoreInfo0.dat somewhere safe, then rename merged.dat to records.dat, and rename MoreInfoA.dat to MoreInfo0.dat.

Then you should run read2 as explained in the previous section to generate read2.har, moreinfo.dat and AveBoundRate.txt. Copy these 3 files plus the new records.dat into the TASTE folder.

Appendix 8: Using ViewHAR to view or export data

Usually TASTE results are placed into a file of HAR format, which you can view with the supplied ViewHAR program. ViewHAR comes with a lengthy online help file; we present below some introductory notes.

After ViewHAR opens a HAR file, it displays a "contents" list of data items, called "headers". One header is always the "selected" item. Click on another header to select it.

If you click again on the selected item (or click twice on any item), the contents screen is replaced by the "data" screen, showing values of the selected header.

At top right of the data screen, combo boxes (dropdown lists) can be used to select a particular slice or sum of the array. These are needed to present particular views of 3- or 4 –dimensional arrays (in this case you cannot see all the numbers at once).

Hover your mouse (without clicking) over the other buttons and controls on the toolbars above and below the data table – you should see a small hint message which tells what that button does.

ViewHAR offers two ways to convert the data into some other format:

The Export Menu Item

The **Export** command is used to copy the currently visible data to the clipboard, whence you can paste it into Excel. You can also save the screen to a CSV file which Excel can open. It may be a good idea to increase the number of displayed decimal places before exporting.

For 3-dimensional arrays, or if you want to save all data items at once, the Export command is unsuitable – try the **File...Save As** command described next.

The File...Save As command

ViewHAR has two modes: Simplified and Advanced: the **File...Save As** command is only available in advanced mode. If the **File...Save As** command is not visible, you must first select the menu command **File...Use Advanced, Editing Menu**.

The **File..Save As** command allows you to save either the whole file, or just the currently selected header in one of 5 formats:

- as a Header Array file.
- as a GEMPACK text file (close to a CSV file)
- as an Excel file (one sheet per header, no. of columns may be limited, and 3-dimensional arrays are presented as a sequence of 2-dimensional matrices).
- as a GDX (GAMS) file (the pre-2008 GDX format, which post-2008 GAMS can still read).
- as a Database text file. This format works best when you save only the selected header. It is a one-number-per-line sparse text format, which could (perhaps after minor edits) be read by Stata or most database programs. You can also easily use it to create an Excel Pivot Table. First, open the text file in Excel (an Import Wizard may guide you). Then select the text data in the Excel sheet. Then, use the Pivot Wizard to guide your next steps. If you are new to Pivot Tables, it may be hard going at first -- but the results are worth it.

Modifying data in a HAR file

See the ViewHAR online help topic "Modifying files".