Projections for World CGE Model Baselines

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GTAP Research Memorandum No. 22

September 2011

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1. Introduction

Dynamic CGE models are designed to quantify the effects of a policy at the time it is implemented but also several years ahead. A good way to examine the impacts of a specific policy is to compute the differences between a scenario where the policy examined is implemented – the policy simulation – and a counterfactual scenario where the policy examined is not implemented – the baseline scenario. A baseline depicts how the world economy might be expected to change, over a given period of time, if the policy were not implemented. The baseline scenario should therefore reflect as closely as possible the changes expected to occur in the world economy, excluding the particular policy of interest. The recent global financial crisis and ensuing economic crisis has accelerated a shift in the share of global economic output accounted for by emerging countries. It reinforces the argument for updating the global baseline of the dynamic GTAP model (GDyn) using the most recent projections.

While constructing a new baseline for the GDyn model, we spent a lot of time collecting projections and deciding which data to choose. We also developed programs to aggregate projections to any specific geographical aggregation of the GTAP Data Base. In order to help researchers in the construction of their own baselines, we created a baseline section[1] on the GTAP website where GTAP users can find the projections data and programs. The purpose of this paper is to document the data used in our new GDyn baseline and to provide a user guide of the baseline website. Our view is that sharing data and expertise with researchers working on baselines will help create reliable and defendable baseline scenarios.

The second section describes the macroeconomic projections collected. Special care was taken to collect recent, relatively long term projections and with a wide geographical coverage. We also outline the approach used to obtain projections for the 112 GTAP regions and a specific GTAP aggregation. The third section lists some sources of useful sectoral data which can also be

[1] Available at www.gtap.agecon.purdue.edu/models/Dynamic/Baseline/default.asp.

included in baselines. The second annex documents the aggregation programs from the 112 GTAP 7.1 regions to a specific geographical aggregation.

2. Macroeconomic projections

2.1. Data sources of macroeconomic data

Table 1: Macroeconomic data collected

Variable	Source	Time Coverage	Geographical coverage	Freely available?
Gross Domestic Product	CEPII (Fouré et al., 2010)	2005-2050	128 countries	Yes
	Oxford Economics (2011)	2005-2035	185 countries	On subscription only
	Economist Intelligence Unit (2010)	2005-2030	201 countries	On subscription only
	IMF (2011)	2005-2016	183 countries	Yes
Government and private consumption	Oxford Economics (2011)	2005-2035	81 countries	Yes
	Economist Intelligence Unit (2010)	2005-2030	73 countries	On subscription only
	IMF (2011)	2005-2016	176 countries	On subscription only
Savings and investment	CEPII (Fouré et al., 2010)	2005-2050	128 countries	Yes
	Oxford Economics (2011)	2005-2035	185 countries	On subscription only
	Economist Intelligence Unit (2010)	2005-2030	82 countries	On subscription only
	IMF (2011)	2005-2016	166 countries	Yes
Total population	CEPII (Fouré et al., 2010)	2005-2050	128 countries	Yes
	Oxford Economics (2011)	2005-2035	185 countries	On subscription only
	Economist Intelligence Unit (2010)	2005-2030	201 countries	On subscription only
	IMF (2011)	2005-2016	183 countries	Yes
	ILO (2009)	2005-2020	191 countries	Yes
	UN (2011)	2005-2100	197 countries	Yes
Labor force	CEPII (Fouré et al., 2010)	2005-2050	128 countries	Yes
	Oxford Economics (2011)	2005-2035	185 countries	On subscription only
	Economist Intelligence Unit (2010)	2005-2030	201 countries	On subscription only
	IMF (2011)	2005-2016	183 countries	Yes
	ILO (2009)	2005-2020	191 countries	Yes
	UN (2011)	2005-2100	197 countries	Yes
Imports and exports	Oxford Economics (2011)	2005-2035	65 countries	On subscription only
	Economist Intelligence Unit (2010)	2005-2030	81 countries	On subscription only
	IMF (2011)	2005-2016	173 countries	Yes
Completed tertiary education	IIASA (Samir et al., 2010)	2005-2050, five-yearly	123 countries	Yes

Table 1 provides a list of known potential sources of macroeconomic forecasts at the time of writing. As most world CGE models currently use GTAP 7.1 social accounting matrices (Narayana et al., 2008) and therefore use 2004 as base year, we did not mention data available prior to 2004 in the table above. Although the data described above contains actual data for the period from 2004 to 2010, we will use the term "projections" to refer to the data in Table 1. Our objective was to be able to obtain relatively long-term projections for the 112 regions of the GTAP 7.1 Data Base. Table 1 describes the "best" projections[2] we could find in terms of geographical coverage and time-range. When the "best" available projections were not freely available, we also provided a free alternative (for example IMF World Economic Outlook data for imports and exports).

2.2. Obtaining projections for the 112 GTAP 7.1 regions

The 112 GTAP 7.1 regions are composed of 226 individual countries. An attempt was made to collect projections for all 226 countries.[3] Since projections were not available for all of these countries, we had to make assumptions and use special techniques to fill missing data. The approach used is outlined below.[4]

Scaling

One would expect the projections to be consistent with the GTAP Data Base in 2004. In some cases, projections data were not consistent with the country-data used to construct the GTAP 7.1 Data Base. For example 2004 US GDP should equal US GDP in GTAP, however GDP is continuously being revised and hence differences are likely to arise merely because they were taken from different revisions. To ensure consistency, projections were scaled to be equal to the GTAP 7.1 country-data.[5]

[2] One of the objectives of the baseline website is that GTAP users can continuously update the list of the "best" projections available to improve baseline data quality.
[3] A list of the 226 individual countries can be found in Annex 1.
[4] The same approach was followed for all projections except the tertiary education projections from IIASA which were used to split labor between skilled and unskilled labor as described in section 1.4.
[5] Except for savings projections, for which there were no GTAP country-data available. The savings data values are determined as a residual in the construction of the GTAP data base.

Converting shares into values

Some projections (savings and investment projections for example) were expressed in percentage of GDP. We converted them into values[6] using real GDP projections. Unless stated otherwise, the shares were converted using the same source of projections.

Converting growth rates into values

World Economic Outlook (IMF, 2011) contained only projections of the growth rates of the imports and exports (in volume) not their values. Projections values were required to fill missing countries growth rates using weighted-average regional growth rates. These values were obtained by applying the projections growth rates to the GTAP 7.1 country data for the base year.

Filling in missing countries

After dividing the world into 18 aggregated regions (see Table 7 in Annex 1), we calculated the weighted-average growth rates of the aggregated region with all the projections available. For those countries for which data were not available, we assumed that their growth rate was equal to the growth rate of the aggregated region to which they belonged.

Extrapolation

Unlike the previous dynamic GTAP baseline (Walmsley, 2006), it is now possible to use a combination of projections for the main macroeconomic variables over the next 20 years without needing to extrapolate the data (Chappuis and Walmsley, 2011). However, it can be useful to extrapolate the projections to compare the different sources. The easiest way to extrapolate is to assume a constant growth rate, equal to the growth rate for the latest available data. Alternatively, fixing a parameter in the model and letting the model endogenously determine the variable often leads to more convincing projections.[7]

[6] All values are expressed in 2004 US dollars consistently with GTAP 7.1 Data Base.

[7] For example, extrapolating technical change growth rate often leads to more convincing GDP projections than extrapolating GDP growth rates.

This process enabled us to obtain yearly projections values for each of the GTAP 226 standard countries list.

Aggregating the 226 countries into the 112 GTAP 7.1 regions

We finally aggregated the 226 countries to obtain projections of GDP, government consumption, savings, investment, total population, labor force, imports and exports for each of the 112 GTAP regions.

2.3. Splitting labor between skilled and unskilled labor

In GDyn like in most CGE models, labor force is split between skilled and unskilled labor. Recent projections of skilled labor were unfortunately not directly available. Assumptions had therefore to be made to build a set of skilled labor projections using recent IIASA educational attainment projections (Samir et al., 2010) and CEPII labor force projections (Fouré et al., 2010).

The educational attainment projections

IIASA educational attainment projections (Samir et al., 2010) provide projections for 120 countries by five-year age groups, sex and four levels of educational attainment for the years 2005-2050. These levels of education attainment are described in Table 2.

Table 2: Education categories

Category	Definition
No education (E1)	No formal education or less than one year primary
Primary (E2)	Uncompleted primary , completed primary (ISCED 1), and uncompleted lower secondary
Secondary (E3)	Completed lower secondary (ISCED 2), uncompleted and completed higher secondary (ISCED 3/4), and uncompleted tertiary education
OECD (2009)	Completed tertiary education (ISCED 5/6)

Source: Reproduced from Samir et al. (2010)

Their projections were produced using demographic multi-state, cohort component methods and taking into account differentials in fertility and mortality by education levels. The authors describe four education scenarios:

- Two pessimistic scenarios: “the constant enrollment number (CEN)” and the “constant enrollment ratio (CER)” scenarios,
- One “central” scenario: the “global education trend (GET)” scenario
- One optimistic scenario: the “fast-track (FT)” scenario.

We used projections from the “global education trend (GET)” scenario, which assumes that “a country’s educational expansion will converge on an expansion trajectory based on the historical global trend”. They are expressed in terms of the share of population aged from 15 to 64 having attained each of the education categories every five years from 2000 to 2050.

From tertiary educated to skilled labor

In the GTAP 7.1 Data Base, the splitting of labor is made on the basis of occupation classifications following International Labor Organization (ILO) classification between the skilled labor (professional workers) and the unskilled labor (production workers) categories. Our assumption here is that skilled labor population will grow at the same rate as the tertiary educated population. In spite of its obvious limitations, this approach enabled us to use recent projections for a high number of countries of education attainment, which can be considered as the main driver of human capital.

Constructing base year data for 226 countries with the GMig2 Data Base

Even if we just use the growth rates of the tertiary educated, we needed values for base year consistent with the GTAP 7.1 Data Base to compute weighted-average regional growth rates to fill missing countries growth rates. Since the total number of workers and the number of skilled workers are not included in the GTAP 7.1 Data Base[8], we used the GMig2 Data Base (Walmsley et al., 2007) which contains skilled and unskilled labor population data for the 112 GTAP regions. Base year data for total and skilled labor populations were obtained by extrapolating the regional participation rates and the skilled labor to total labor ratio from the 112 regions to the 226 countries.

Calculating skilled labor projections

We first calculated projections of the labor force population having completed tertiary education. For this, we multiplied projections of the share of population aged 15 to 64 having completed tertiary education[9] with labor CEPII labor force projections[10] (Foure et al., 2010). Since the IIASA dataset only contained five-yearly projections, we assumed that the growth rates were constant over five-year periods to obtain yearly growth rates. We then applied these growth rates to the base year skilled labor force data obtained using the GMig2 Data Base. The approach described in section 2.2 was then followed to fill in missing countries and aggregate the projections to the 112 GTAP 7.1 regions.

Calculating unskilled labor projections

The unskilled labor projections were finally calculated as a difference between CEPII total labor force population projections and the skilled labor population projections.

2.4. Obtaining projections for a specific aggregation of the GTAP 7.1 Data Base

The reason for constructing a set of macroeconomic projections for the 112 GTAP regions is to easily obtain projections for the aggregation most suitable to the policy question examined. The GEMPACK aggregation programs are freely available on the baseline website. The Annex 2 describes how to use these programs to obtain projections values and growth rates for any GTAP aggregation obtained with GTAPAgg.

[8] The GTAP 7.1 Data Base only contains payments to skilled and unskilled labor (variable EVOA).
[9] ISCED 5/6 variable ("Completed tertiary education") in the central IIASA scenario (GET scenario).

3. Sectoral data

3.1. Energy projections

Table 3: Energy data collected

Variable	Source	Time Coverage	Geographical coverage	Freely available?
Energy prices	US Energy Information Administration (2010) (oil only)	2007-2035, five-yearly	World price	Yes
	Oxford Economics (2011) (oil, gas and coal)	2005-2035	World price	On subscription only
Energy supplies and demands	US Energy Information Administration (2010)	2007-2035, five-yearly	18 regions	Yes
	Oxford Economics (2011)	2005-2035	30 regions	On subscription only
	International Energy Agency (2010)	2005-2030, five-yearly	18 regions	On subscription only
Energy efficiency	CEPII (Foure et al., 2010)	2005-2050	128 countries	Yes

Since we did not have a special focus on the energy sectors, the list above is far from being exhaustive. However, even without much energy modeling details like in the standard version of the GDyn model, it can be useful to include projections about energy prices expectations for example, since changes in energy prices will have indeed significant impacts on relative prices in other sectors.

3.2. Sectoral output projections

Table 4: Sectoral output data collected

Variable	Source	Time Coverage	Geographical coverage	Freely available?
Sectoral output projections	Oxford Economics (2011), "Global Industry databank"	2005-2035	76 countries	On subscription only

Analyzing historical data shows that different sectors inside a given country do not grow at the same pace. For this reason, the consequences of trade liberalization for example can differ in function to this variability of growth rates across sectors. A good baseline scenario should therefore include differentiated sectoral growth rates. However, it is hard to target exogenously these growth rates. The variability across sectors can be due to different factors on the supply side (sectoral productivity and relative prices evolution) or on the demand side (consumers taste changes).

[10] Alternatively other labor projection sources could be used.

3.3. Sectoral productivity data

Table 5: Sectoral productivity data collected

Variable	Source	Time Coverage	Geographical coverage	Freely available?
Agricultural total factor productivity	Ludena et al. (2007)	2000-2040, ten-yearly	8 regions	Yes
Sectoral labor productivity	OECD (2009)	Historical: 2000-2008	28 countries	Yes

The STAN Data Base labor productivity index (OECD, 2009) is only a very imperfect measure of productivity across sectors calculated as the real output per employee. This Data Base only contains historical data but shows considerable variability in productivity gains across sectors. It can provide estimates of ratios of sectoral productivity growth relative to economy-wide productivity growth. This variability across sectors can then be combined with economy-wide productivity projections using the approach of Kets and Lejour (2003).

Ludena et al. (2007) have made projections of total factor productivity in three broad agricultural sectors: crops, ruminants and non-ruminants livestock in 8 large world regions. These projections can be very useful to obtain differentiated evolution of prices across sectors.

4. Conclusion

A defendable baseline needs to be based on the most recent projections. We provided in this document a list of potential sources of macroeconomic and sectoral sources at the time of the writing. We also described the approach we used to fill in missing countries and aggregate projections.

We also created a baseline page on the GTAP website where people working on baseline can contribute other useful projection sources and baselines documentations. This baseline page includes aggregation programs to help GTAP users in constructing their own baseline.

In addition to the geographical and time coverage of the projections sources used, it is essential to have a critical look at the quality of the projections. The consistency of projections between themselves should also be closely examined. For example, using optimistic projections for GDP growth with pessimistic labor force growth can lead to implausible assumptions about technological change.

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6. Annex 1

Table 6: 226 GTAP 7.1 individual countries

	Country	ISO code		Country	ISO code		Country	ISO code
1	Afghanistan	afg	77	Greece	grc	153	Oman	omn
2	Albania	alb	78	Greenland	grl	154	Pakistan	pak
3	Algeria	dza	79	Grenada	grd	155	Palau	plw
4	American Samoa	asm	80	Guadeloupe	glp	156	Panama	pan
5	Andorra	and	81	Guam	gum	157	Papua New Guinea	png
6	Angola	ago	82	Guatemala	gtm	158	Paraguay	pry
7	Anguilla	aia	83	Guinea	gin	159	Peru	per
8	Antigua/Barbuda	atg	84	Guinea-Bissau	gnb	160	Philippines	phl
9	Argentina	arg	85	Guyana	guy	161	Poland	pol
10	Armenia	arm	86	Haiti	hti	162	Portugal	prt
11	Aruba	abw	87	Honduras	hnd	163	Puerto Rico	pri
12	Australia	aus	88	Hong Kong	hkg	164	Qatar	qat
13	Austria	aut	89	Hungary	hun	165	Reunion	reu
14	Azerbaijan	aze	90	Iceland	isl	166	Romania	rom
15	Bahamas	bhs	91	India	ind	167	Russian Federation	rus
16	Bahrain	bhr	92	Indonesia	idn	168	Rwanda	rwa
17	Bangladesh	bgd	93	Iran	irn	169	Saint Helena	shn
18	Barbados	brb	94	Iraq	irq	170	Saint Kitts/Nevis	kna
19	Belarus	blr	95	Ireland	irl	171	Saint Lucia	lca
20	Belgium	bel	96	Israel	isr	172	Saint Pierre/Miquelon	spm
21	Belize	blz	97	Italy	ita	173	Saint Vincent/Grenadines	vct
22	Benin	ben	98	Jamaica	jam	174	Samoa	wsm
23	Bermuda	bmu	99	Japan	jpn	175	San Marino	smr
24	Bhutan	btn	100	Jordan	jor	176	Sao Tome/Principe	stp
25	Bolivia	bol	101	Kazakhstan	kaz	177	Saudi Arabia	sau
26	Bosnia/Herzegovina	bih	102	Kenya	ken	178	Senegal	sen
27	Botswana	bwa	103	Kiribati	kir	179	Serbia and Montenegro	scg
28	Brazil	bra	104	Kuwait	kwt	180	Seychelles	syc
29	Brunei Darussalam	brn	105	Kyrgyzstan	kgz	181	Sierra Leone	sle
30	Bulgaria	bgr	106	Laos	lao	182	Singapore	sgp
31	Burkina Faso	bfa	107	Latvia	lva	183	Slovakia	svk
32	Burundi	bdi	108	Lebanon	lbn	184	Slovenia	svn
33	Cambodia	khm	109	Lesotho	lso	185	Solomon Islands	slb
34	Cameroon	cmr	110	Liberia	lbr	186	Somalia	som
35	Canada	can	111	Libya	lby	187	South Africa	zaf
36	Cape Verde	cpv	112	Liechtenstein	lie	188	SouthKorea	kor

37	Cayman Islands	cym	113	Lithuania	ltu	189	Spain	esp
38	Central African Republic	caf	114	Luxembourg	lux	190	Sri Lanka	lka
39	Chad	tcd	115	Macau	mac	191	Sudan	sdn
40	Chile	chl	116	Macedonia	mkd	192	Suriname	sur
41	China	chn	117	Madagascar	mdg	193	Swaziland	swz
42	Colombia	col	118	Malawi	mwi	194	Sweden	swe
43	Comoros	com	119	Malaysia	mys	195	Switzerland	che
44	Congo DR-Kinshasa	cod	120	Maldives	mdv	196	Syria	syr
45	Congo-Brazzaville	cog	121	Mali	mli	197	Taiwan	twn
46	Cook Islands	cok	122	Malta	mlt	198	Tajikistan	tjk
47	Costa Rica	cri	123	Marshall Islands	mhl	199	Tanzania	tza
48	Cote d Ivoire	civ	124	Martinique	mtq	200	Thailand	tha
49	Croatia	hrv	125	Mauritania	mrt	201	Timor Leste	tls
50	Cuba	cub	126	Mauritius	mus	202	Togo	tgo
51	Cyprus	cyp	127	Mayotte	myt	203	Tokelau	tkl
52	Czech Republic	cze	128	Mexico	mex	204	Tonga	ton
53	Denmark	dnk	129	Micronesia Federated States	fsm	205	Trinidad and Tobago	tto
54	Djibouti	dji	130	Moldova	mda	206	Tunisia	tun
55	Dominica	dma	131	Monaco	mco	207	Turkey	tur
56	Dominican Republic	dom	132	Mongolia	mng	208	Turkmenistan	tkm
57	Ecuador	ecu	133	Montserrat	msr	209	Turks/Caicos	tca
58	Egypt	egy	134	Morocco	mar	210	Tuvalu	tuv
59	El Salvador	slv	135	Mozambique	moz	211	Uganda	uga
60	Equatorial Guinea	gnq	136	Myanmar	mmr	212	Ukraine	ukr
61	Eritrea	eri	137	Namibia	nam	213	United Arab Emirates	are
62	Estonia	est	138	Nauru	nru	214	United Kingdom	gbr
63	Ethiopia	eth	139	Nepal	npl	215	United States of America	usa
64	Falkland Islands (Malvinas)	flk	140	Netherlands	nld	216	Uruguay	ury
65	Faroe Islands	fro	141	Netherlands Antilles	ant	217	Uzbekistan	uzb
66	Fiji	fji	142	New Caledonia	ncl	218	Vanuatu	vut
67	Finland	fin	143	New Zealand	nzl	219	Venezuela	ven
68	France	fra	144	Nicaragua	nic	220	Vietnam	vnm
69	French Guiana	guf	145	Niger	ner	221	Virgin Islands British	vgb
70	French Polynesia	pyf	146	Nigeria	nga	222	Virgin Islands U.S.	vir
71	Gabon	gab	147	Niue	niu	223	Wallis and Futuna	wlf
72	Gambia	gmb	148	Norfolk Island	nfk	224	Yemen	yem
73	Georgia	geo	149	North Korea	prk	225	Zambia	zmb
74	Germany	deu	150	Northern Mariana Islands	mnp	226	Zimbabwe	zwe
75	Ghana	gha	151	Norway	nor			
76	Gibraltar	gib	152	Occupied Palestine	pse			

Table 7: Aggregated regions.

Aggregated region	Individual countries
Oceania	AUS, NZL, ASM, COK, FJI, PYF, GUM, KIR, MHL, FSM, NRU, NCL, NFK, MNP, NIU, PLW, PNG, WSM, SLB, TKL, TON, TUV, VUT, WLF
East Asia	CHN, HKG, JPN, KOR, TWN, MAC, MNG, PRK
South-East Asia	IDN, MYS, PHL, SGP, THA, VNM, BRN, KHM, LAO, MMR, TLS
South Asia	BGD, IND, LKA, AFG, BTN, MDV, NPL, PAK
North America	CAN, USA, MEX, BMU, GRL, SPM
South America	COL, PER, VEN, BOL, ECU, ARG, BRA, CHL, URY, FLK, GUF, GUY, PRY, SUR
Central America	BLZ, CRI, SLV, GTM, HND, NIC, PAN
Caribbean	ATG, BHS, BRB, DMA, DOM, GRD, HTI, JAM, PRI, KNA, LCA, VCT, TTO, VIR, AIA, ABW, CYM, CUB, GLP, MTQ, MSR, ANT, TCA, VGB
Europe	AUT, BEL, DNK, FIN, FRA, DEU, GBR, GRC, IRL, ITA, LUX, NLD, PRT, ESP, SWE, CHE, ISL, LIE, NOR, AND, BIH, FRO, GIB, MKD, MCO, SMR, SCG
Eastern Europe	ALB, BGR, HRV, CYP, CZE, HUN, MLT, POL, ROM, SVK, SVN, EST, LVA, LTU
Former Soviet Union	RUS, ARM, AZE, BLR, GEO, KAZ, KGZ, MDA, TJK, TKM, UKR, UZB
Middle East	TUR, BHR, IRN, IRQ, ISR, JOR, KWT, LBN, PSE, OMN, QAT, SAU, SYR, ARE, YEM
North Africa	MAR, TUN, DZA, EGY, LBY
Southern Africa	BWA, ZAF, LSO, NAM, SWZ, MWI, MOZ, ZMB, ZWE, AGO, MUS, SYC, REU
Central East Africa	TZA, COD, MDG, UGA, BDI, CMR, CAF, TCD, COM, COG, DJI, GNQ, ERI, ETH, GAB, GMB, KEN, MYT, RWA, SHN, STP, SOM, SDN
Western Africa	BEN, BFA, CPV, CIV, GHA, GIN, GNB, LBR, MLI, MRT, NER, NGA, SEN, SLE, TGO

7. Annex 2: How to use the baseline programs to obtain projections for a specific aggregation of the GTAP Data Base?

Structure of the programs

The **src** folder contains the tablo files **aggproj.tab** and **qfactsup.tab** (and their executable version .axs, .axt. and .exe). **Aggproj.tab** reads projections for the 112 GTAP 7.1 regions and aggregates them into projections for a specific regional aggregation. **Qfactsup.tab** creates a matrix containing unskilled and skilled labor projections growth rates to shock the variable qfactup in the GDyn model (ENDW*REG*YRS dimensions).

The **in** folder contains the projections for the 112 GTAP 7.1 regions.

The **lcl** folder contains the file **sets.har** and years sets. **Sets.har** contains the regional mapping and the year sets contain the mappings from projections years to simulation years.

The **aggcmf** folder contains the command files calling data files and the executable version of **aggproj.tab**.

The **qfactcmf** folder contains the command files calling data files and the executable version of **qfactsup.tab**.

The **out** folder will contain the aggregated projections.

What files do you have to worry about?

The only files you need to change are the files **sets.har** and the year sets in the **lcl** folder.

sets.har

To aggregate the projections to a specific regional aggregation, you just need to create your new aggregation with GTAPAgg and replace **sets.har** by the new **sets.har** obtained from GTAPAgg. This file will contain the regional mapping from the 112 GTAP 7.1 regions to your new aggregation (header MAPR).

Year sets: years2100.har, yearsCEPII.har, years.har and yearsWEO.har

Time periods can be aggregated into periods longer than one year by modifying the year sets. We chose to use different year sets according to the length of the time coverage of the projections:

- until 2100 for the UN population projections: **years2100.har**,
- until 2050 for the CEPII projections: **yearsCEPII.har**,
- until 2016 for the 2011 *World Economic Outlook* projections: **yearsWEO.har**,
- until 2030 for other projections: **years.har**.

The year set file called is defined in the corresponding command file.

For example, in **GDPweo.cmf** by the line:

```
file YRSET  = in\yearsWEO.har;
```

yearsWEO.har in C:\Aggregation programs\AggGTAP\lcl

File Contents Edit Sets Export Import History Search Aggregation Programs Help

	Header	Type	Dimension	Coeff	Total	Name
1	BSYR	1C	1 length 12			Base Year
2	YEAR	1C	13 length 12			Years of interest
3	GDYR	1C	6 length 12			Aggregated years
4	MAPY	1C	13 length 12			Mapping YEAR to GDYR

Figure 1: Contents of yearsWEO.har

yearsWEO.har contains 4 arrays:

- the base year of the projections: header BSYR,
- the time coverage of the projections: header YEAR,
- the simulation years for GDyn: header GDYR,
- and the mapping from projections years to simulation years: MAPY.

GDYR only contains six years labels:

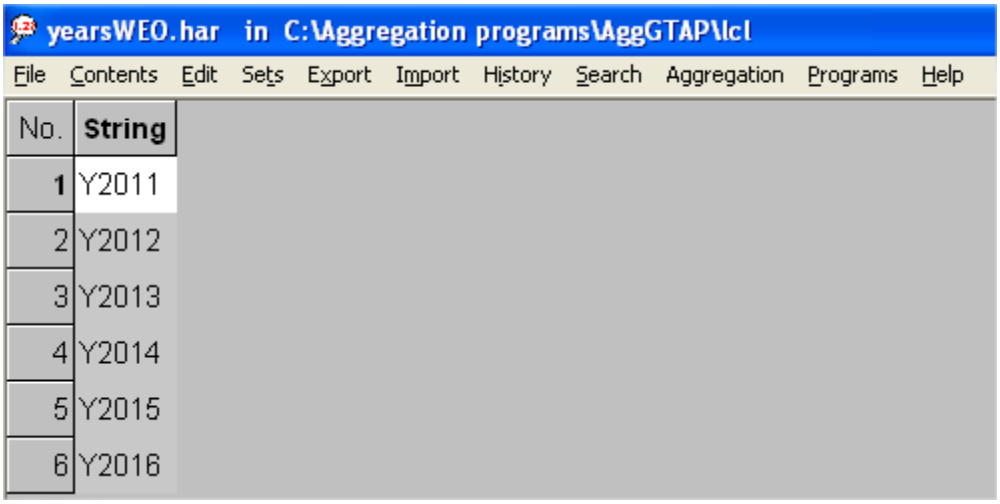


Figure 2: Header GDYR.

The model will therefore run simulations during six periods – one 7-year period and five one-year periods. Following RunDynam convention, the value under the label Y2011 will be the value of the shock to apply to move from the 2004 data to the 2011 data.

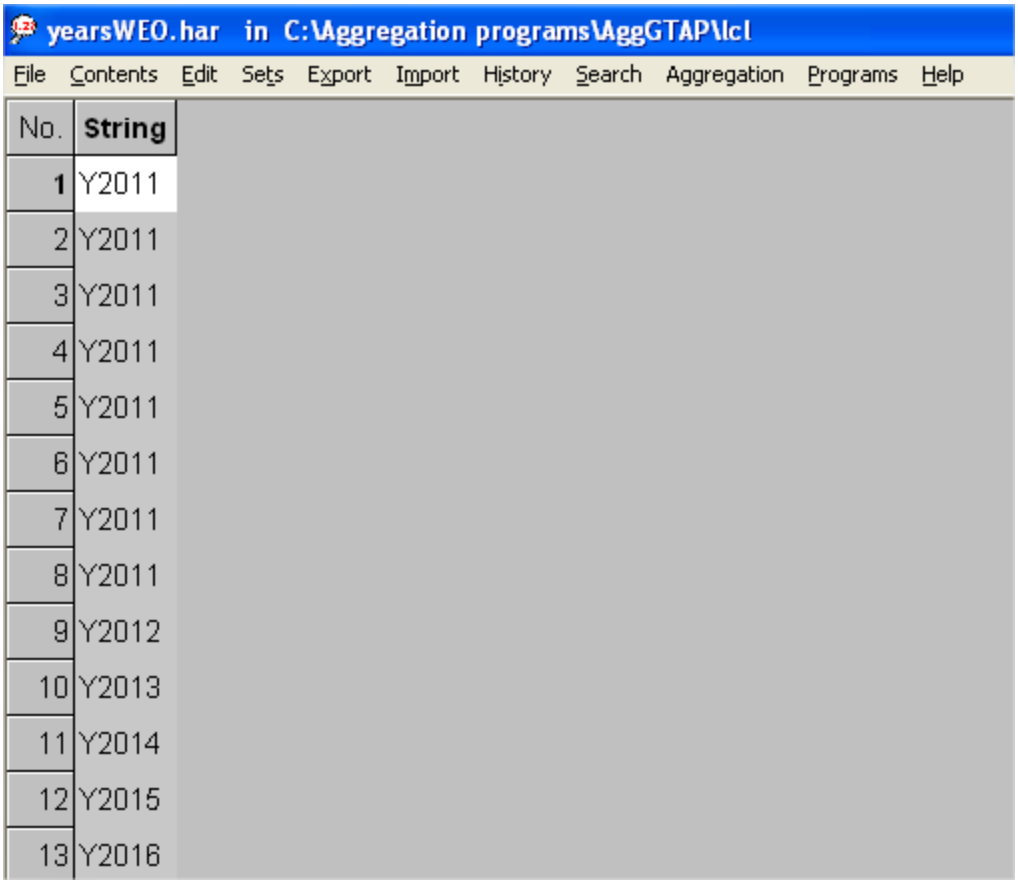
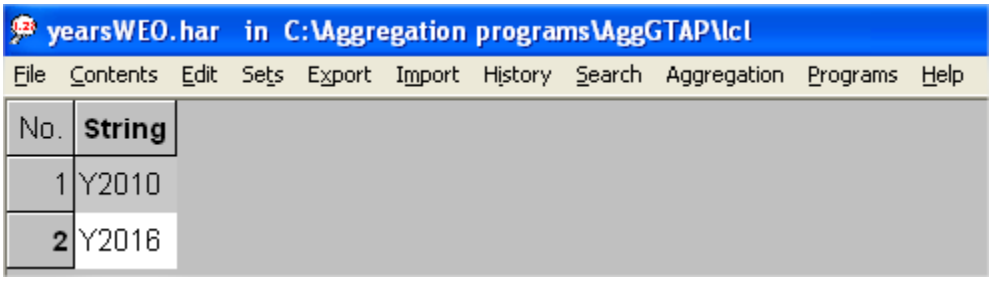


Figure 3: Header MAPYR

In MAPYR, the eight first elements of YEARS are mapped to the element “Y2011” of GDYR.

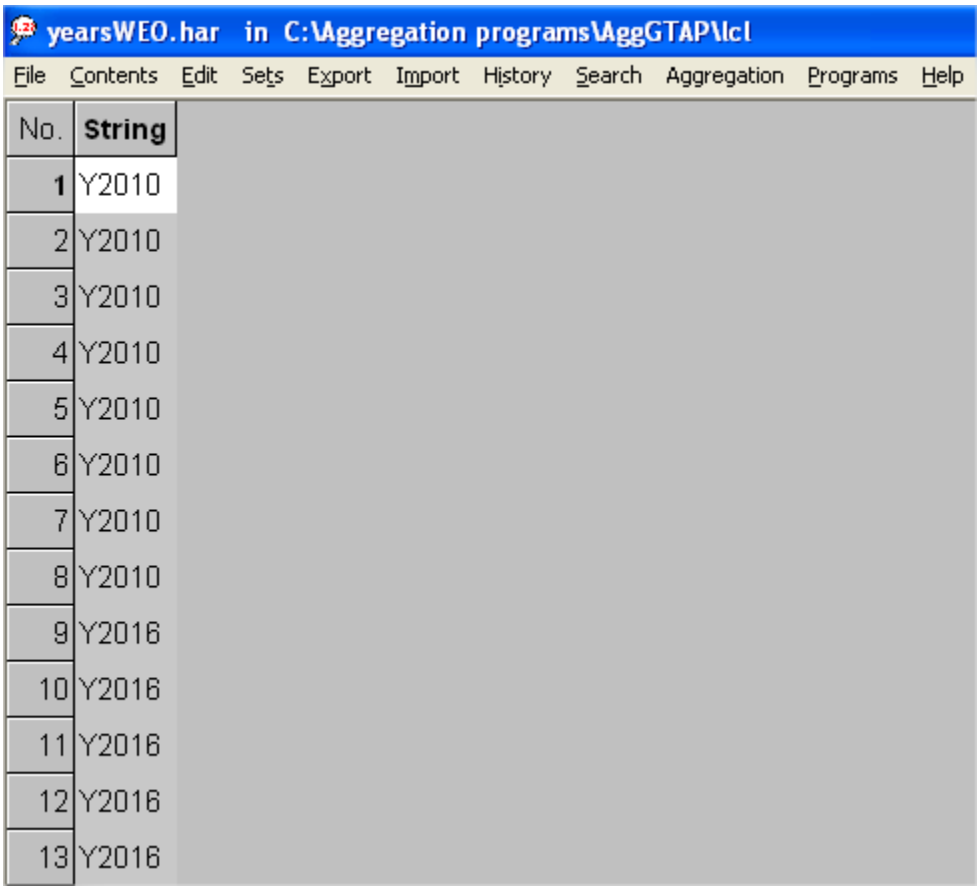
The only arrays that you need to modify are GDYR and MAPYR. For example, if you want to run the simulations during two six-year periods – from 2004 to 2010 and from 2010 to 2016 – you need to modify GDYR and MAPYR to obtain:


yearsWEO.har in C:\Aggregation programs\AggGTAP\lcl

File Contents Edit Sets Export Import History Search Aggregation Programs Help

No.	String
1	Y2010
2	Y2016

Figure 4: New header GDYR.


yearsWEO.har in C:\Aggregation programs\AggGTAP\lcl

File Contents Edit Sets Export Import History Search Aggregation Programs Help

No.	String
1	Y2010
2	Y2010
3	Y2010
4	Y2010
5	Y2010
6	Y2010
7	Y2010
8	Y2010
9	Y2016
10	Y2016
11	Y2016
12	Y2016
13	Y2016

Figure 5: New header MAPYR.

How do you run the aggregation?

You just need to open a DOS box in the aggregation programs directory, type aggGTAP and press ENTER to launch the batch file **aggGTAP.bat** to obtain projections for your specific aggregation in the **out** folder. It will also produce the two log files: **agg.log** and **qfactsup.log** in the **aggGTAP** folder.

The aggregated projections header array files contain four arrays:

- GROWA: yearly projections growth rates,
- GROW: projections growth rates for aggregation years,
- VALU: yearly projections values,
- SUMM: summary array of the projections.

SUMM contains the yearly projections growth rates (METH = agg), the number of countries which had to be filled or extrapolated (METH = flag) and the total numbers of countries in the aggregated region (METH = NoCTRY).