

Chapter 2

Data base summary: macro data

Robert McDougall and Aziz Elbehri

The goal of this chapter is to provide an overview of the macroeconomic features of the data base. Accordingly, we present a breakdown of both the uses and the sources of GDP in each of the 45 GTAP regions. (The reader is referred to the glossary at the front of this document for a detailed explanation of the three letter country codes used by GTAP.)

2.1 Uses of GDP

Table 2.1 reports expenditures on private household consumption (C), investment (I), and government purchases of goods and services (G), along with *f.o.b.* exports (X) and *c.i.f.* imports (M) of merchandise and non-factor services. All figures are in millions of 1995 \$US. The total is obtained as follows: $GDP = C + I + G + X - M$. Sources of these figures will be described in more detail in subsequent chapters. Suffice it to say that C, I, and G come from the World Bank (see chapter 17) while X and M are obtained by an aggregation of the reconciled bilateral trade data from the UN's COMTRADE data base (see chapter 11A).

Perusal of the totals in table 2.1 reveals the dominance of the multi-trillion dollar economies of the US, the EU-15, and Japan. Combined, they represent 72% of world GDP. Table 2.2 takes this same information and puts it on a share-basis. This reveals a wide variation in the uses of GDP across regions. For example, the share of investment in regional GDP ranges from a low of 12% in Argentina to a high of 43.1% in Thailand. The latter figure is indicative of generally high investment

rates in the East Asian economies. Thailand, Korea, Hong Kong, China, Vietnam, and Malaysia all have investment rates falling in the 35–43% range.

The figure on government expenditure is not a complete measure of the role of government activity in the economy, as this only captures the direct consumption of goods and services by the government sector. The production of services by government, as well as government transfers, is omitted from G. Nevertheless, government consumption absorbs a significant share of GDP in many economies. This figure is in excess of 20% in Scandinavian countries, the Middle East, North Africa, and Rest of Africa as a whole. On the other hand, it is under 10% in Japan, Thailand, Indonesia, Mexico, Argentina, Venezuela, Chile, and the Rest of South America.

The share of trade in GDP exhibits the greatest variation of all across regions. This share is by far the highest for Singapore, which acts as a hub for a great deal of trade in Southeast Asia. Thus a large share of the imports into Singapore is simply re-exported to another destination. Hong Kong also plays this role, with much of China's trade passing through this region. However, as will be discussed in chapter 11B, Hong Kong's re-exports have been placed on a direct trade basis for version 4 data set and re-export markups were estimated based on recently released trade data at 8-digit level. Malaysia, Thailand, Vietnam, Philippines, Taiwan, the Central American/Caribbean region, and the Rest of South America also show very large trade shares. These regions are followed by Korea, Canada, Scandinavian countries, REU, and East European countries where trade represents about one-third of GDP.

Finally, we turn to the share of private consumption in regional GDP. Low levels of government purchases combine with large trade deficits to fuel high consumption shares in the Central America/Caribbean and Rest of South America, Philippines as well as Hong Kong. Mexico, Venezuela, Argentina, Uruguay, the Rest of South Asia, and the Rest of Sub-Saharan Africa also show high private consumption shares, offset by low investment and government shares.

2.2 *Sources of GDP*

Table 2.3 displays the sources of GDP for each of the 45 GTAP regions. These include payments to labor (unskilled and skilled), capital, agricultural land, natural resources, as well as indirect taxes. The labor split between skilled and unskilled categories is a new feature of GTAP version 4 data base and is fully described in chapter 18. The sources of the basic labor-capital splits are the individual region input-output (I/O) tables. In these source tables it is customary to identify payments to labor, with the residual of value added being assigned to capital, in the case of non-agricultural sectors. It is important to bear in mind that, in most cases, we have not been able to disentangle returns to self-employed labor from returns to capital, and so we have overstated the relative importance of the capital input in these economies. In the case of agricultural sectors, volatile factor returns and the presence of agricultural land have led us to adopt a different approach

(see chapter 17). Here, we rely on econometrically estimated cost functions to determine the average primary factor shares in value-added.

Scrutiny of table 2.4 shows that labor's share in GDP is highest in the high-income high-wage economies: Australia, Japan, Taiwan, Canada, USA, and Western Europe. The Central/Eastern European economies and the Former Soviet Union also show very high labor shares. For skilled labor, payment share to GDP exceeds 20% in Australia, USA, and Western Europe. The shares of agricultural land in GDP are a function of the estimated cost shares for each region, in combination with the overall share of agriculture in GDP. It is the latter that differs most strongly across economies in the GTAP data base. The large share of agriculture in the Indonesian, Indian, Sri Lankan, and Rest of South Asian economies translates into agricultural land shares in GDP of between 7 and 10%. Other Asian economies like China, Vietnam, Thailand, Malaysia, and Korea account for between 4 and 6% of GDP from agricultural land. Of course with the accumulation of labor and capital over time, we expect this share to diminish rapidly. This is indeed the case, as can be seen by inspecting the shares for wealthier economies in table 2.4. So for example, the USA, although a major agricultural exporter, has an estimated share of farmland in GDP of only 0.4%.

The indirect tax shares reported in table 2.4 are heavily dependent, not only on the tax structure in each region, but also on the source I/O table. In particular, some source tables have very poor coverage of indirect taxes, in which case this share in table 2.4 will be under-reported.

Bearing that in mind, it appears that Malaysia, Vietnam, China, and Rest of South Asia all have very high rates of indirect taxation. Having discussed the shares associated with labor, land, and indirect taxes, capital shares may be viewed as a residual, which is obviously subject to significant errors. The lowest share for capital arises in Germany (17.2%) and the highest is in Mexico and Rest of Andean Pact (57.5%).

Table 2.1 Expenditure on GDP (1995 US\$ million)

	Private consumption	Investment	Government consumption	Exports	Imports	Total
AUS	217818	74546	60890	64654	71273	346637
NZL	36855	11721	8358	18315	16583	58665
JPN	3072986	1453488	498254	502182	435255	5091655
KOR	243934	166815	47178	146104	152867	451163
IDN	119972	58341	16266	54502	49904	199178
MYS	43222	34125	10365	86933	78683	95963
PHL	54940	16675	8322	27133	36810	70259
SGP	33074	28116	7127	129801	130718	67399
THA	90272	71467	16276	71102	83226	165891
VNM	8696	5315	1486	7667	8410	14755
CHN	333361	246126	85295	214480	167261	712002
HKG	84500	41678	12315	75222	112349	101365
TWN	155138	60077	37673	132113	108746	276255
IND	219944	76794	33510	39382	40306	329325
LKA	9560	3228	1527	4402	5520	13197
RAS	70509	16310	11548	14753	21618	91502
CAN	339233	102232	108907	203778	179829	574322
USA	4924932	1202061	1130404	752337	883300	7126433
MEX	197701	39278	25706	87403	70798	279291
CAM	67776	15590	8248	40564	46822	85356
VEN	54992	11349	4592	19435	15971	74397
COL	52919	15322	8876	14430	16318	75228
RAP	59106	18452	8147	12884	16881	81709
ARG	203196	30771	23195	24040	24184	257018
BRA	454270	150497	117829	56153	65947	712801
CHL	41713	15642	5892	18600	18316	63531
URY	13214	2158	2278	3606	4205	17050
RSM	7453	2010	700	3830	6679	7313
GBR	704429	165842	235627	289987	309118	1086767
DEU	1376150	511808	473534	562473	554216	2369749
DNK	92607	27718	43320	63652	46678	180619
SWE	120153	34033	59895	91230	72981	232330
FIN	69032	18608	26925	47711	37376	124899
REU	2644257	806743	759911	1280966	1276464	4215413
EFT	255231	101206	74607	166213	146313	450945
CEA	199516	53573	48698	111968	118214	295541
FSU	285197	101801	94150	93588	78342	496396
TUR	115046	38964	16386	39432	40198	169630
RME	275785	113415	126387	155090	155190	515487
MAR	23067	7145	5014	8710	12432	31504
RNF	88583	29407	17853	39081	44848	130076
SAF	84054	25534	31465	30061	33201	137913
RSA	11140	2701	4400	12516	12193	18563
RSS	118175	25627	17157	40445	38164	163240
ROW	212338	34726	22753	31652	45875	255593
WOR	17886050	6069036	4359246	5890581	5890582	28314320

Table 2.2 Expenditure on GDP (per cent GDP)

	Private consumption	Investment	Government consumption	Exports	Imports	Total
AUS	62.8	21.5	17.6	18.7	20.6	100
NZL	62.8	20	14.2	31.2	28.3	100
JPN	60.4	28.5	9.8	9.9	8.5	100
KOR	54.1	37	10.5	32.4	33.9	100
IDN	60.2	29.3	8.2	27.4	25.1	100
MYS	45	35.6	10.8	90.6	82	100
PHL	78.2	23.7	11.8	38.6	52.4	100
SGP	49.1	41.7	10.6	192.6	193.9	100
THA	54.4	43.1	9.8	42.9	50.2	100
VNM	58.9	36	10.1	52	57	100
CHN	46.8	34.6	12	30.1	23.5	100
HKG	83.4	41.1	12.1	74.2	110.8	100
TWN	56.2	21.7	13.6	47.8	39.4	100
IND	66.8	23.3	10.2	12	12.2	100
LKA	72.4	24.5	11.6	33.4	41.8	100
RAS	77.1	17.8	12.6	16.1	23.6	100
CAN	59.1	17.8	19	35.5	31.3	100
USA	69.1	16.9	15.9	10.6	12.4	100
MEX	70.8	14.1	9.2	31.3	25.3	100
CAM	79.4	18.3	9.7	47.5	54.9	100
VEN	73.9	15.3	6.2	26.1	21.5	100
COL	70.3	20.4	11.8	19.2	21.7	100
RAP	72.3	22.6	10	15.8	20.7	100
ARG	79.1	12	9	9.4	9.4	100
BRA	63.7	21.1	16.5	7.9	9.3	100
CHL	65.7	24.6	9.3	29.3	28.8	100
URY	77.5	12.7	13.4	21.1	24.7	100
RSM	101.9	27.5	9.6	52.4	91.3	100
GBR	64.8	15.3	21.7	26.7	28.4	100
DEU	58.1	21.6	20	23.7	23.4	100
DNK	51.3	15.3	24	35.2	25.8	100
SWE	51.7	14.6	25.8	39.3	31.4	100
FIN	55.3	14.9	21.6	38.2	29.9	100
REU	62.7	19.1	18	30.4	30.3	100
EFT	56.6	22.4	16.5	36.9	32.4	100
CEA	67.5	18.1	16.5	37.9	40	100
FSU	57.5	20.5	19	18.9	15.8	100
TUR	67.8	23	9.7	23.2	23.7	100
RME	53.5	22	24.5	30.1	30.1	100
MAR	73.2	22.7	15.9	27.6	39.5	100
RNF	68.1	22.6	13.7	30	34.5	100
SAF	60.9	18.5	22.8	21.8	24.1	100
RSA	60	14.5	23.7	67.4	65.7	100
RSS	72.4	15.7	10.5	24.8	23.4	100
ROW	83.1	13.6	8.9	12.4	17.9	100
WOR	63.2	21.4	15.4	20.8	20.8	100

Table 2.3 Sources of GDP (1995 U\$S million)

	Unskilled labor	Skilled labor	Capital	Land	Natural resource	Other taxes	Total
AUS	112169	79938	122169	2517	4725	25119	346637
NZL	18289	9303	22386	398	484	7806	58665
JPN	1696100	1017510	1939618	21821	14473	402133	5091656
KOR	139744	52816	179783	19457	2182	57180	451163
IDN	68006	13219	93828	15762	6418	1945	199178
MYS	18683	5447	39602	3758	3041	25432	95963
PHL	18361	5754	28797	3936	1202	12208	70259
SGP	18001	9539	31474	279	48	8058	67399
THA	29396	9814	101864	7144	1356	16317	165891
VNM	5503	1184	3367	895	362	3445	14755
CHN	195863	42304	263971	32405	17909	159550	712002
HKG	26193	20265	53332	300	336	938	101365
TWN	91661	64699	89944	2842	900	26209	276255
IND	112931	25975	101398	34808	3773	50440	329325
LKA	4262	1223	4366	1211	128	2007	13197
RAS	27498	6558	24734	9034	1053	22626	91502
CAN	209554	83109	205188	1912	7421	67138	574322
USA	2514881	1704617	2303985	27087	36183	539680	7126434
MEX	56924	22244	160702	6759	6625	26036	279291
CAM	25719	8386	40434	3587	1117	6114	85356
VEN	19387	7506	37252	1248	4804	4200	74397
COL	23186	8490	32741	3077	1434	6301	75228
RAP	14528	6970	46759	2288	1528	9638	81709
ARG	93065	33958	117409	8369	1810	2406	257018
BRA	196677	92852	330855	9240	2545	80632	712801
CHL	14757	5807	32993	1245	745	7984	63531
URY	3728	1095	8708	497	39	2983	17050
RSM	1213	346	3204	201	60	2290	7313
GBR	422793	260083	348453	2696	7819	44924	1086767
DEU	1189477	670204	408246	6227	7205	88390	2369748
DNK	59226	40766	56688	825	794	22320	180619
SWE	73680	45861	80951	485	642	30712	232330
FIN	45774	23088	46692	547	498	8301	124899
REU	1354123	921058	1554088	12420	11512	362212	4215413
EFT	183202	120615	104462	2352	7020	33295	450945
CEA	131761	38247	106137	9359	4187	5849	295541
FSU	174291	79881	168015	3710	15553	54945	496396
TUR	41096	13905	94844	7993	905	10887	169630
RME	109196	55062	241894	2563	36562	70210	515487
MAR	11162	3095	10882	605	173	5586	31504
RNF	42003	12206	44289	1911	6559	23109	130076
SAF	51243	24742	47316	818	1040	12753	137913
RSA	5531	1398	6174	590	914	3956	18563
RSS	59386	12076	53032	4619	9203	24925	163240
ROW	80546	27805	105633	12326	3425	25857	255593
WOR	9790765	5691022	9898659	292122	236711	2405046	28314330

Table 2.4 Sources of GDP (per cent GDP)

	Unskilled labor	Skilled labor	Capital	Land	Natural resource	Other taxes	Total
AUS	32.4	23.1	35.2	0.7	1.4	7.2	100
NZL	31.2	15.9	38.2	0.7	0.8	13.3	100
JPN	33.3	20	38.1	0.4	0.3	7.9	100
KOR	31	11.7	39.8	4.3	0.5	12.7	100
IDN	34.1	6.6	47.1	7.9	3.2	1	100
MYS	19.5	5.7	41.3	3.9	3.2	26.5	100
PHL	26.1	8.2	41	5.6	1.7	17.4	100
SGP	26.7	14.2	46.7	0.4	0.1	12	100
THA	17.7	5.9	61.4	4.3	0.8	9.8	100
VNM	37.3	8	22.8	6.1	2.5	23.3	100
CHN	27.5	5.9	37.1	4.6	2.5	22.4	100
HKG	25.8	20	52.6	0.3	0.3	0.9	100
TWN	33.2	23.4	32.6	1	0.3	9.5	100
IND	34.3	7.9	30.8	10.6	1.1	15.3	100
LKA	32.3	9.3	33.1	9.2	1	15.2	100
RAS	30.1	7.2	27	9.9	1.2	24.7	100
CAN	36.5	14.5	35.7	0.3	1.3	11.7	100
USA	35.3	23.9	32.3	0.4	0.5	7.6	100
MEX	20.4	8	57.5	2.4	2.4	9.3	100
CAM	30.1	9.8	47.4	4.2	1.3	7.2	100
VEN	26.1	10.1	50.1	1.7	6.5	5.6	100
COL	30.8	11.3	43.5	4.1	1.9	8.4	100
RAP	17.8	8.5	57.2	2.8	1.9	11.8	100
ARG	36.2	13.2	45.7	3.3	0.7	0.9	100
BRA	27.6	13	46.4	1.3	0.4	11.3	100
CHL	23.2	9.1	51.9	2	1.2	12.6	100
URY	21.9	6.4	51.1	2.9	0.2	17.5	100
RSM	16.6	4.7	43.8	2.8	0.8	31.3	100
GBR	38.9	23.9	32.1	0.2	0.7	4.1	100
DEU	50.2	28.3	17.2	0.3	0.3	3.7	100
DNK	32.8	22.6	31.4	0.5	0.4	12.4	100
SWE	31.7	19.7	34.8	0.2	0.3	13.2	100
FIN	36.6	18.5	37.4	0.4	0.4	6.6	100
REU	32.1	21.8	36.9	0.3	0.3	8.6	100
EFT	40.6	26.7	23.2	0.5	1.6	7.4	100
CEA	44.6	12.9	35.9	3.2	1.4	2	100
FSU	35.1	16.1	33.8	0.7	3.1	11.1	100
TUR	24.2	8.2	55.9	4.7	0.5	6.4	100
RME	21.2	10.7	46.9	0.5	7.1	13.6	100
MAR	35.4	9.8	34.5	1.9	0.6	17.7	100
RNF	32.3	9.4	34	1.5	5	17.8	100
SAF	37.2	17.9	34.3	0.6	0.8	9.2	100
RSA	29.8	7.5	33.3	3.2	4.9	21.3	100
RSS	36.4	7.4	32.5	2.8	5.6	15.3	100
ROW	31.5	10.9	41.3	4.8	1.3	10.1	100
WOR	34.6	20.1	35	1	0.8	8.5	10

