CHAPTER 6

Economic Diversification and Sustainable Development of GCC Countries

Joerg Beutel

1 Introduction

For decades now, exports and imports of most countries have been growing more rapidly than domestic production. This is a strong indication that, besides foreign trade in final products, trade in intermediates is also becoming increasingly important. Globalisation in production is changing the way in which nations interact, and any analysis of diversification should therefore also encompass the worldwide exchange of intermediates in production. For this reason, an input-output approach, which accounts for the role of intermediates, is more appropriate for any analysis of diversification than a traditional approach based purely on macroeconomic data.

This chapter analyses economic diversification in the GCC using data from input-output tables to compare the performance of these economies with that of a 'reference case', Norway, which is considered as having successfully diversified its economy despite having a large oil resource

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base. It also assesses their relative progress on sustainable development using a new measure, adjusted net savings, which measures the 'true' rate of savings in an economy after accounting for investments in man-made and human capital, depletion of natural resources and damage from environmental pollution. This view of sustainable development requires that the nation passes on an *aggregate stock* of physical capital, human capital and natural capital to the next generation that is not smaller than the one that currently exists. This requires that the loss of depleting resources be offset by increasing the stock of physical and human capital.

The article concludes that GCC countries have (contrary to expectation) collectively performed relatively well on diversification, but their performance on sustainable development varies between countries.

The required information for sustainable development and diversification can be deducted from the national accounts in great detail. The main sources for analysis are monetary and physical supply and use tables, sector accounts, extended input-output tables and social accounting matrices.

2 Trends in Production and Foreign Trade

Since the foundation of the World Trade Organization (WTO) in 1995, trade boosted thanks to reduced barriers. Since then, exports and imports of most countries have been growing more rapidly than domestic production. Globalisation in production is changing the way in which nations interact, and any analysis of diversification should therefore also encompass the worldwide exchange of intermediates in production. This is the main reason why we promote an input-output approach for the analysis of diversification and sustainable development (Beutel 2012).

2.1 Exports and Imports

If exports and imports are growing faster than GDP, the shares of exports and imports in GDP are also increasing. Furthermore, if net exports grow faster than GDP, the purchasing power of the nation is increasing and imports also tend to grow faster than GDP. In Table 6.1, GDP and foreign

Table 6.1 GDP and foreign trade at current prices of the world's 10 largest economies

	USA	*China*	*Japan*	*Germany*	*United Kingdom*	*France*	*India*	*Italy*	*Brazil*	*Canada*	*G10*
	Gross domestic product (millions of US dollar)										
1995	7,664,060	736,870	5,449,118	2,591,447	1,335,286	1,609,794	358,024	1,170,824	778,053	604,014	22,297,488
2000	10,284,779	1,214,915	4,887,520	1,949,952	1,647,874	1,368,437	453,578	1,141,759	652,360	742,288	24,343 464
2005	13,093,726	2,308,800	4,755,410	2,861,339	2,520,709	2,203,624	812,059	1,852,616	891,634	1,169,393	32,469,311
2010	14,964,372	6,066,351	5,700,098	3,417,095	2,441,173	2,646,837	1,650,635	2,125,058	2,208,838	1,613,463	42,833,921
2015	18,120,714	11,226,185	4,379,869	3,375,611	2,885,570	2,433,562	2,132,755	1,832,347	1,803,650	1,552,808	49,743,071
2016	18,624,475	11,218,281	4,936,212	3,477,796	2,647,899	2,465,454	2,259,642	1,858,913	1,795,926	1,529,760	50,814,358
	Exports of goods and services (millions of US dollar)										
1995	812,813	140,675	488,884	570,285	335,955	360,689	40,196	289,773	57,122	218,079	3,314,471
2000	1,096,835	279,471	519,274	601,161	409,394	385,536	61,702	292,950	65,854	328,370	4,040,547
2005	1,308,901	773,092	666,349	1,079,882	622,240	581,070	160,991	456,701	135,919	430,280	6,215,425
2010	1,852,335	1,602,483	857,110	1,443,735	688,755	689,322	372,898	535,264	237,189	469,066	8,748,157
2015	2,264,916	2,431,269	773,034	1,582,312	790,107	722,100	425,341	548,573	232,476	490,372	10,260,500
2016	2,214,566	2,197,922	797,532	1,603,933	739,195	721,408	433,320	554,276	224,280	474,344	9,960,775
	Imports of goods and services (millions of US dollar)										
1995	902,571	128,718	420,001	558,153	332,299	335,901	44,596	246,757	73,196	199,279	3,241,470
2000	1,472,630	250,686	449,416	595,914	439,771	370,654	66,047	283,347	82,121	286,674	4,297,259
2005	2,030,086	648,505	594,571	935,107	686,991	590,200	184,026	458,748	105,596	384,903	6,618,733
2010	2,364,992	1,380,082	773,860	1,266,126	752,366	739,135	447,311	577,110	260,184	499,993	9,061,158
2015	2,788,958	2,045,768	791,424	1,312,470	839,561	758,772	474,641	494,893	253,714	527,476	10,287,680
2016	2,735,805	1,948,009	749,700	1,326,711	797,270	769,431	466,266	491,307	217,764	510,595	10,012,858

(*continued*)

Table 6.1 (continued)

	USA	*China*	*Japan*	*Germany*	*United Kingdom*	*France*	*India*	*Italy*	*Brazil*	*Canada*	*G10*
	Net exports of goods and services (millions of US dollar)										
1995	−89,758	11,957	68,883	12,132	3656	24,788	−4400	43,016	−16,075	18,801	73,000
2000	−375,795	28,785	69,858	5247	−30,377	14,882	−4345	9603	−16,267	41,696	−256,712
2005	−721,185	124,587	71,778	144,776	−64,751	−9130	−23,035	−2047	30,323	45,377	−403,309
2010	−512,657	222,401	83,250	177,609	−63,611	−49,813	−74,413	−41,846	−22,994	−30,927	−313,002
2015	−524,042	385,501	−18,391	269,843	−49,454	−36,672	−49,301	53,680	−21,238	−37,104	−27,180
2016	−521,239	249,914	47,832	277,223	−58,076	−48,024	−32,946	62,968	6515	−36,252	−52,083
	Share of exports in GDP (%)										
1995	10.6	19.1	9.0	22.0	25.2	22.4	11.2	24.7	7.3	36.1	14.9
2000	10.7	23.0	10.6	30.8	24.8	28.2	13.6	25.7	10.1	44.2	16.6
2005	10.0	33.5	14.0	37.7	24.7	26.4	19.8	24.7	15.2	36.8	19.1
2010	12.4	26.4	15.0	42.3	28.2	26.0	22.6	25.2	10.7	29.1	20.4
2015	12.5	21.7	17.6	46.9	27.4	29.7	19.9	29.9	12.9	31.6	20.6
2016	11.9	19.6	16.2	46.1	27.9	29.3	19.2	29.8	12.5	31.0	19.6
	Increase of share of exports in GDP (%)										
95–16	1.3	0.5	7.2	24.1	2.8	6.9	7.9	5.1	5.1	−5.1	4.7
	Share of imports in GDP (%)										
1995	11.8	17.5	7.7	21.5	24.9	20.9	12.5	21.1	9.4	33.0	14.5
2000	14.3	20.6	9.2	30.6	26.7	27.1	14.6	24.8	12.6	38.6	17.7
2005	15.5	28.1	12.5	32.7	27.3	26.8	22.7	24.8	11.8	32.9	20.4
2010	15.8	22.7	13.6	37.1	30.8	27.9	27.1	27.2	11.8	31.0	21.2
2015	15.4	18.2	18.1	38.9	29.1	31.2	22.3	27.0	14.1	34.0	20.7
2016	14.7	17.4	15.2	38.1	30.1	31.2	20.6	26.4	12.1	33.4	19.7
	Increase of share of imports in GDP (%)										
95–16	2.9	−0.1	7.5	16.6	5.2	10.3	8.2	5.4	2.7	0.4	5.2

Source: UNdata—National Accounts Estimates by Main Aggregates 1995–2016

trade are shown for the 10 largest economies of the world (G10) for the last two decades. The most striking examples of an increase in the share of exports in GDP between 1995 and 2016 are Germany (+24.1 per cent), India (+7.9 per cent), Japan (+7.2 per cent), France (+6.9 per cent), Italy (+ 5.1 per cent) and Brazil (+5.1 per cent).

Substantial increases in the share of imports in GDP during the period 1995–2016 are observed for Germany (+16.6 per cent), France (+10.3 percent), India (+8.2 per cent), Japan (+7.5 per cent) and Italy (+ 5.4 per cent). For the 10 largest economies combined (G10) the increase of the export share in GDP during the period 1995–2016 was +4.7 per cent and of the import share in GDP +5.2 per cent.

In Table 6.2, the same information on GDP, exports and imports was collected for the GCC countries. If net exports of a nation grow more rapidly than GDP, the purchasing power of the nation is increasing. In consequence, imports tend also to grow more than GDP. In the GCC countries, the share of exports in GDP increased by 12.9 per cent during the period 1995–2016, while the corresponding share of imports in GDP increased by 14.0 per cent. The most rapid increase of the export share was observed for the United Arab Emirates (UAE) (+57.9 per cent) and Oman (+14.0 per cent). Similar results were observed for the import share in GDP for UAE (+41.3 per cent) and Oman (+17.0 per cent).

2.2 Intermediate Consumption, Value Added and Output

The numbers in the table suggest that during the last 20 years, the globalisation of economic activities has caused increasing worldwide interdependencies in production, leading to the intermediate consumption of goods and services becoming a key element in the intensification of economic diversification. If the consumption of intermediate products is growing above its GDP growth rate, an economy is moving towards more complex participation in inter-industrial production.

For the future, the challenge for many countries is to become a successful member in the international chain of value added. As shown on Table 6.3, the share of intermediates in total output for G10 countries increased by 5.9 per cent in the period 1995–2011. As a consequence, the corresponding share of gross value added in output declined in the same period by 5.9 per cent. In other words, in this period, the production

Table 6.2 GDP and foreign trade at current prices of GCC countries

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*GCC*
	Gross domestic product (millions of US dollar)						
1995	6787	26,554	13,650	8041	143,152	66,603	264,786
2000	9063	37,718	19,450	17,548	189,515	105,701	378,994
2005	15,969	80,798	31,082	43,998	328,461	182,978	683,286
2010	25,713	115,416	58,641	123,627	528,207	289,787	1,141,392
2015	31,126	114,059	69,832	164,641	651,757	358,135	1,389,551
2016	32,179	110,346	63,171	152,452	639,617	348,744	1,346,509
	Exports of goods and services (millions of US dollar)						
1995	4798	14,234	4757	3613	53,450	30,591	111,442
2000	7176	21,301	10,474	11,964	82,259	53,889	187,063
2005	13,397	51,692	19,633	29,017	187,389	122,071	423,199
2010	17,880	76,952	38,500	78,069	261,831	225,275	698,507
2015	26,326	62,024	39,166	92,291	218,010	359,401	797,218
2016	23,782	55,530	30,845	72,397	195,169	362,069	739,793
	Imports of goods and services (millions of US dollar)						
1995	4122	11,409	4009	3526	39,659	24,663	87,388
2000	5132	11,371	5054	3966	46,926	36,003	108,452
2005	10,287	22,839	11,173	13,208	81,798	83,671	222,975
2010	13,097	35,034	24,166	29,717	174,203	184,221	460,439
2015	22,302	51,627	36,667	59,271	253,555	265,950	689,371
2016	21,088	51,922	29,301	63,475	194,169	273,274	633,230
	Net exports of goods and services (millions of US dollar)						
1995	675	2825	749	86	13,791	5928	24,054
2000	2044	9930	5420	7998	35,333	17,886	78,611
2005	3110	28,853	8460	15,809	105,592	38,400	200,224
2010	4783	41,918	14,333	48,352	87,628	41,054	238,069
2015	4024	10,397	2500	33,020	- 35,544	93,451	107,848
2016	2694	3608	1544	8922	1000	88,795	106,563
	Share of exports in GDP (%)						
1995	70.7	53.6	34.9	44.9	37.3	45.9	42.1
2000	79.2	56.5	53.9	68.2	43.4	51.0	49.4
2005	83.9	64.0	63.2	66.0	57.1	66.7	61.9
2010	69.5	66.7	65.7	63.1	49.6	77.7	61.2
2015	84.6	54.4	56.1	56.1	33.4	100.4	57.4
2016	73.9	50.3	48.8	47.5	30.5	103.8	54.9
	Increase of share of exports in GDP (%)						
95–16	3.2	−3.3	14.0	2.6	−6.8	57.9	12.9

Table 6.2 (continued)

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*GCC*
	Share of imports in GDP (%)						
1995	60.7	43.0	29.4	43.9	27.7	37.0	33.0
2000	56.6	30.1	26.0	22.6	24.8	34.1	28.6
2005	64.4	28.3	35.9	30.0	24.9	45.7	32.6
2010	50.9	30.4	41.2	24.0	33.0	63.6	40.3
2015	71.7	45.3	52.5	36.0	38.9	74.3	49.6
2016	65.5	47.1	46.4	41.6	30.4	78.4	47.0
	Increase of share of imports in GDP (%)						
95–16	4.8	4.1	17.0	−2.2	2.7	41.3	14.0

Source: UNdata—National Accounts Estimates by Main Aggregates 1995–2016

process of the 10 largest economies became more complex and more interdependent. It is worth noticing that the share of intermediates in total output in China increased by 6.7 per cent, while the share of intermediates in the USA slightly declined by −0.4 per cent.

For the GCC countries combined, the share of intermediates and gross value added in total output was more or less constant during the last 20 years (see Table 6.4). However, among individual countries, the performance has been mixed. While large increases of intermediates were reported for Bahrain (+10.6 per cent), Oman (+7.7 per cent), Kuwait (+5.4 per cent) and the UAE (+4.5 per cent), these were offset by the decline of intermediates in Saudi Arabia (−4.1 per cent).

3 Economic Diversification of the GCC Countries in International Comparison

The sustainable development of nations involves economic, social and environmental changes. Within this process, diversification and structural change of production and demand are closely related to many areas of the economy and society.

Table 6.3 Intermediates, value added and output of the world's ten largest economies

	USA	*China*	*Japan*	*Germany*	*France*	*Italy*	*United Kingdom*	*Brazil*	*India*	*Canada*	*G10*
	Intermediates at purchasers' prices (million US dollars)										
1995	5,710,633	1,153,865	4,457,767	2,005,032	1,298,807	1,094,780	1,096,869	604,655	343,683	466,288	18,232,377
2000	7,993,838	2,072,385	3,945,944	1,668,162	1,213,918	1,161,085	1,393,193	550,544	426,770	645,970	21,071,807
2005	10,421,164	4,365,839	4,051,216	2,593,739	1,901,837	1,936,759	1,938,854	878,865	921,350	1,002,072	29,339,760
2010	11,129,144	12,754,844	5,044,160	3,250,704	2,311,177	2,218,062	2,038,790	1,873,727	1,805,076	1,329,212	43,009,619
2015	13,270,599	15,605,704	3,905,847	3,058,368	2,085,240	1,825,720	2,335,764	1,552,677	2,124,098	1,287,691	48,728,413
	Gross value added at basic price (million US dollars)										
1995	6,759,151	708,115	5,287,733	2,280,483	1,404,508	1,019,575	1,051,892	654,215	335,020	553,449	20,054,141
2000	9,214,378	1,164,362	4,718,141	1,695,955	1,185,991	985,034	1,328,514	544,016	433,419	679,326	21,949,136
2005	12,660,441	2,192,815	4,769,184	2,589,273	1,972,448	1,670,923	2,274,762	756,995	781,680	1,088,760	29,068,685
2010	14,509,603	5,763,455	5,686,225	3,074,910	2,381,037	1,911,471	2,209,003	1,877,439	1,531,440	1,509,599	38,698,664
2015	17,550,250	7,117,538	4,343,472	3,039,094	2,182,051	1,647,215	2,585,059	1,549,670	1,914,110	1,455,566	42,360,316
	Output at basic prices (million US dollars)										
1995	12,469,784	1,861,980	9,745,500	4,285,514	2,703,315	2,114,355	2,148,760	1,258,870	678,703	1,019,737	38,286,518
2000	17,208,216	3,236,745	8,664,085	3,364,117	2,399,909	2,146,119	2,721,707	1,094,559	860,189	1,325,296	43,020,941
2005	23,081,605	6,558,654	8,820,399	5,183,011	3,874,285	3,607,682	4,213,615	1,635,859	1,611,770	2,090,832	58,408,447
2010	25,638,747	18,518,299	10,730,385	6,325,614	4,692,214	4,129,533	4,247,792	3,751,166	3,322,592	2,838,811	81,708,283
2015	30,820,849	22,723,243	8,249,319	6,097,462	4,267,291	3,472,935	4,920,823	3,102,346	3,643,666	2,743,257	91,088,731
	Shares of intermediates in total output (%)										
1995	45.8	62.0	45.7	46.8	48.0	51.8	51.0	48.0	50.6	45.7	47.6
2000	46.5	64.0	45.5	49.6	50.6	54.1	51.2	50.3	49.6	48.7	49.0
2005	45.1	66.6	45.9	50.0	49.1	53.7	46.0	53.7	57.2	47.9	50.2
2010	43.4	68.9	47.0	51.4	49.3	53.7	48.0	50.0	54.3	46.8	52.6
2015	43.1	68.7	47.3	50.2	48.9	52.6	47.5	50.0	58.3	46.9	53.5
2015–1995	−2.7	6.7	1.6	3.4	0.8	0.8	−3.6	2.0	7.7	1.2	5.9
	Shares of gross value added in total output (%)										
1995	54.2	38.0	54.3	53.2	52.0	48.2	49.0	52.0	49.4	54.3	52.4
2000	53.5	36.0	54.5	50.4	49.4	45.9	48.8	49.7	50.4	51.3	51.0
2005	54.9	33.4	54.1	50.0	50.9	46.3	54.0	46.3	48.5	52.1	49.8
2010	56.6	31.1	53.0	48.6	50.7	46.3	52.0	50.0	46.1	53.2	47.4
2015	56.9	31.3	52.7	49.8	51.1	47.4	52.5	50.0	52.5	53.1	46.5
2015–1995	2.7	−6.7	−1.6	−3.4	−0.8	−0.8	3.6	−2.0	3.2	−1.2	−5.9

Table 6.4 Intermediates, value added and output at current prices of GCC countries

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*GCC*
	Intermediates at purchasers' prices (million US dollar)						
1995	3737	11,878	5131	3332	79,090	38,371	141,539
2000	7101	16,019	7440	5351	99,219	64,268	199,398
2005	14,009	43,685	13,197	14,670	164,159	117,210	366,929
2010	24,374	79,339	29,639	55,329	262,678	194,448	645,807
2015	26,396	74,149	39,613	68,906	307,508	252,409	768,981
	Gross value added at basic prices (million US dollar)						
1995	6782	26,879	13,685	8311	139,225	65,744	260,626
2000	9063	39,015	19,326	18,052	184,162	104,337	373,955
2005	15,969	83,808	31,784	44,053	319,210	180,617	675,441
2010	25,442	131,065	59,876	124,080	512,817	289,880	1,143,160
2015	30,835	131,530	73,675	165,245	651,097	357,949	1,410,331
Output at basic prices (million US dollar)							
1995	10,519	38,757	18,816	11,643	218,315	104,114	402,165
2000	16,163	55,035	26,766	23,402	283,381	168,605	573,353
2005	29,978	127,493	44,981	58,723	483,369	297,827	1,042,370
2010	49,816	210,403	89,515	179,410	775,494	484,328	1,788,966
2015	57,231	205,679	113,288	234,151	958,604	610,358	2,179,312
	Share of intermediates in output (%)						
1995	35.5	30.6	27.3	28.6	36.2	36.9	35.2
2000	43.9	29.1	27.8	22.9	35.0	38.1	34.8
2005	46.7	34.3	29.3	25.0	34.0	39.4	35.2
2010	48.9	37.7	33.1	30.8	33.9	40.1	36.1
2015	46.1	36.1	35.0	29.4	32.1	41.4	35.3
	Increase in share of intermediates in output (%)						
95–15	10.6	5.4	7.7	0.8	−4.1	4.5	0.1
	Share of gross value added in output (%)						
1995	64.5	69.4	72.7	71.4	63.8	63.1	64.8
2000	56.1	70.9	72.2	77.1	65.0	61.9	65.2
2005	53.3	65.7	70.7	75.0	66.0	60.6	64.8
2010	51.1	62.3	66.9	69.2	66.1	59.9	63.9
2015	53.9	63.9	65.0	70.6	67.9	58.6	64.7
	Increase in share of gross value added in output (%)						
95–15	−10.6	−5.4	−7.7	−0.8	4.1	−4.5	−0.1

Source: UNdata—National Accounts Estimates by Main Aggregates 1995–2016; OECD

For income per capita to converge, countries must move towards more diversified and complex production structures incorporating more advanced technology and knowledge. Economic diversification means the diversification of exports and domestic production away from extreme dependence on a single dominant industry or a few natural-resource-based products, as well as towards increased complexity and quality of output.

In the following two tables, data on gross value added by industry and on GDP by type of expenditure are presented for the GCC countries in 2016 to discuss their different economic structure. In this comparison, Norway will act as the reference, as this country is highly developed in many ways, generating substantial oil and gas revenues and benefitting from a successful sovereign wealth fund. The Government Pension Fund Global, also known as Oil Fund, was established in 1990 to invest the surplus revenue of the Norwegian petroleum sector for the benefit of future generations. It has over US$1 trillion in assets, including 1.3 per cent of global stocks and shares, making it the world's largest sovereign wealth fund.

Table 6.5 reveals that the industry structure of the UAE is similar to that of Norway. It is also striking to observe that the industry structure of Iran is similar to the structure of the GCC countries combined, except for agriculture.

If we compare the industry structure of the individual GCC countries, we observe that their structure is quite diverse. The share of mining and utilities in gross value added is much higher in Kuwait than in Bahrain. Manufacturing in Kuwait has a very low share in gross value added, but in Bahrain this share is more than three times larger.

The oil and gas dependency of Kuwait and Oman was still high in 2016. The sector 'Mining and utilities' accounted for 51.4 per cent of gross value added in Kuwait, 42.6 per cent in Oman and 26.9 per cent in the GCC countries combined. The oil and gas dependency of Norway is considerably lower (19.0 per cent). And yet, if we compare Norway and the GCC in terms of the expenditure side of GDP, we observe a similar structure. But it is obvious that Norway is more developed concerning 'Other activities', which include private business services and government services.

Table 6.5 Value added by industries 2016 at current prices in international comparison

Year	*Bahrain*	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*GCC*	*Iran*	*Malaysia*	*Norway*	*Canada*
	Gross value added (million US dollar)										
Agriculture, forestry, fishing	107	550	883	279	17,301	2795	21,916	40,998	26,133	7916	24,252
Mining, utilities	4318	64,319	28,545	47,219	152,570	72,170	369,141	72,040	36,755	57,472	146,618
Manufacturing	5835	6679	6355	13,792	80,444	32,230	145,336	50,604	67,735	25,009	147,467
Construction	2544	2504	4158	18,105	42,571	35,652	105,535	21,398	13,114	22,503	114,853
Trade, restaurants, hotels	2262	5383	5339	17,124	73,637	53,157	156,903	54,679	53,123	30,016	177,325
Transport, communication	2402	6508	3270	7710	42,774	37,305	99,970	43,281	25,403	32,437	107,603
Other activities	14,422	39,146	18,491	55,014	230,764	115,435	473,273	137,031	70,611	127,898	716,476
Value added	31,892	125,091	67,042	159,243	640,061	348,744	1,372,073	420,030	292,874	303,251	1,434,594
	Shares in gross value added (%)										
Agriculture, forestry, fishing	0.3	0.4	1.3	0.2	2.7	0.8	1.6	9.8	8.9	2.6	1.7
Mining, utilities	13.5	51.4	42.6	29.7	23.8	20.7	26.9	17.2	12.5	19.0	10.2
Manufacturing	18.3	5.3	9.5	8.7	12.6	9.2	10.6	12.0	23.1	8.2	10.3
Construction	8.0	2.0	6.2	11.4	6.7	10.2	7.7	5.1	4.5	7.4	8.0
Trade, restaurants, hotels	7.1	4.3	8.0	10.8	11.5	15.2	11.4	13.0	18.1	9.9	12.4
Transport, communication	7.5	5.2	4.9	4.8	6.7	10.7	7.3	10.3	8.7	10.7	7.5
Other activities	45.2	31.3	27.6	34.5	36.1	33.1	34.5	32.6	24.1	42.2	49.9
Value added	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: UNdata—National Accounts Estimates of Main Aggregates

In Table 6.6, we present similar information for the expenditure side of GDP in 2016 for consumption, capital formation and foreign trade. Here, we observe significant differences between the GCC countries. The share of household consumption in GDP is similar in Norway (45.5 per cent), Bahrain (45.0 per cent), Kuwait (42.9 per cent) and Saudi Arabia (42.8 per cent). The share of government consumption is in the same range in Norway (24.3 per cent), Oman (28.2 per cent), Kuwait (27.7 per cent) and Saudi Arabia (25.8 per cent). By far the highest investment ratio is reported for Qatar (45.2 per cent) and for Oman (38.0 per cent). The shares of gross fixed capital formation in GDP in Norway (24.1 per cent) and in the GCC combined (23.6 per cent) are also similar.

In the bottom part of Table 6.6, we relate the results on the expenditure side of GDP to the population. The highest GDP per capita is reported for Norway (70,617 Mio $/person), followed by the GCC countries Qatar (59.324 Mio $/person), UAE (37,622 Mio $/person) and Kuwait (27,229 Mio $/person). But what matters for the well-being of the people is less GDP per capita than final consumption per capita. In this respect, among the selected countries, the gold medal goes to Norway (32,140 Mio $/person), the silver medal to Canada (24,578 Mio $/person) and the bronze medal to Qatar (15,312 Mio $/person).

3.1 Product Concentration and Product Diversification

The most widely quoted product concentration and diversification indices are published by the United Nations Conference on Trade and Development (UNCTAD).

Figure 6.1 presents these indices for the GCC for the period 1995–2016. The product concentration index measures whether the exports and imports of the GCC are concentrated on a few products or distributed in a more homogeneous manner among a series of products. The diversification index indicates whether the structure of exports or imports by product differs in the GCC from the world pattern.

Both top two indices for GCC exports show a falling trend. The concentration index for exports indicates that today a broader range of products is exported than just oil and gas. The export diversification index shows that the divergence from the world pattern was significantly reduced.

The bottom two indices for imports are relatively stable. The concentration index shows that imports are rather homogenously distributed among many of products. The diversification index for imports shows very little divergence from the pattern of world trade (Box 6.1).

Table 6.6 GDP by type of expenditure 2016 at current prices in international comparison

Category	*Bahrain*	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*GCC*	*Iran*	*Malaysia*	*Norway*	*Canada*
	Million US dollar										
Final consumption expenditure	19,976	77,912	37,622	74,565	439,001	171,895	820,973	266,759	200,163	259,072	1,216,211
Household consumption expenditure	14,491	47,342	19,830	39,348	276,329	122,964	520,303	210,086	162,873	168,887	891,923
General government final consumption	5485	30,570	17,792	35,218	162,673	48,931	300,669	56,674	37,290	90,185	324,288
Gross capital formation	9509	28,826	24,005	68,965	199,616	88,053	418,973	151,864	77,412	108,793	349,801
Gross fixed capital formation	8328	28,826	24,005	68,965	161,290	82,459	373,872	86,164	76,437	89,342	351,798
Changes in inventories	1181	0	0	0	38,326	5594	45,102	65,700	974	19,450	- 1997
Net exports of goods and services	2694	3608	1544	8922	1000	88,795	106,563	6779	18,957	3204	- 36,252
Exports of goods and services	23,782	55,530	30,845	72,397	195,169	362,069	739,793	95,307	199,271	126,670	474,344
Imports of goods and services	21,088	51,922	29,301	63,475	194,169	273,274	633,230	88,528	180,315	123,466	510,595
Gross domestic product	32,179	110,346	63,171	152,452	639,617	348,744	1,346,509	425,403	296,531	371,069	1,529,760

(*continued*)

Table 6.6 (continued)

Category	*Bahrain*	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*GCC*	*Iran*	*Malaysia*	*Norway*	*Canada*
	Shares in GDP (%)										
Final consumption expenditure	62.1	70.6	59.6	48.9	68.6	49.3	61.0	62.7	67.5	69.8	79.5
Household consumption expenditure	45.0	42.9	31.4	25.8	42.8	35.3	38.6	49.4	54.9	45.5	58.3
General government final consumption	17.0	27.7	28.2	23.1	25.8	14.0	22.3	13.3	12.6	24.3	21.2
Gross capital formation	29.6	26.1	38.0	45.2	30.9	25.2	31.1	35.7	26.1	29.3	22.9
Gross fixed capital formation	25.9	26.1	38.0	45.2	26.0	23.6	27.8	20.3	25.8	24.1	23.0
Changes in inventories	3.7	0.0	0.0	0.0	4.9	1.6	3.3	15.4	0.3	5.2	−0.1
Net exports of goods and services	8.4	3.3	2.4	5.9	0.4	25.5	7.9	1.6	6.4	0.9	−2.4
Exports of goods and services	73.9	50.3	48.8	47.5	31.1	103.8	54.9	22.4	67.2	34.1	31.0
Imports of goods and services	65.5	47.1	46.4	41.6	30.7	78.4	47.0	20.8	60.8	33.3	33.4
Gross domestic product	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Population										
Memo: Population (millions)	1.4	4.1	4.4	2.6	32.3	9.3	54.0	80.3	31.2	5.3	36.3
GDP per capita ($/person)	22,579	27,229	14,277	59,324	19,817	37,622	24,927	5299	9508	70,617	42,154
Private consumption per capita ($/person)	10,168	11,682	4482	15,312	8562	13,265	9632	2617	5222	32,140	24,578

Source: UNdata—National Accounts Estimates of Main Aggregates

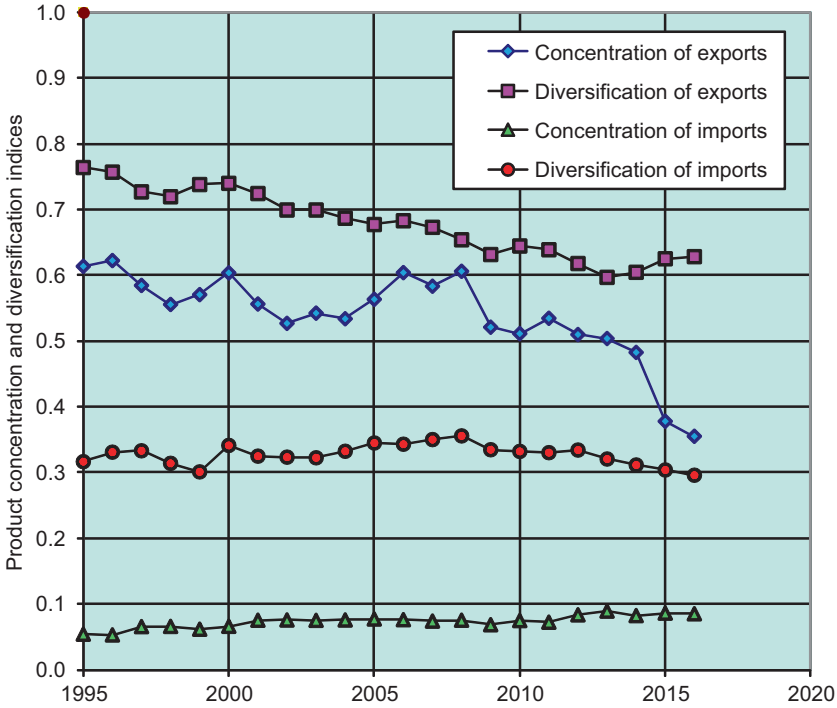

Fig. 6.1 Product concentration and diversification of exports and imports for GCC. (Source: UNCTADStat)

3.2 Economic Diversification of the Industrial Sector

The challenge is now to study the diversification of the industrial sector in the GCC countries. The key question is whether diversification has increased during the last 50 years.

The Herfindahl-Hirschman Index is the most widely used measure to evaluate market concentration and industry concentration of an economy. This time, the index is the sum of squared shares of the various industries in total gross value added. In the normalised form, the index varies from 0 to 1.

In the case of a low value, the economy has a large number of industries with similar shares in gross value added, indicating high diversity. If the

Box 6.1 Product Concentration and Diversification Indices of Exports and Imports

Concentration Index:

The concentration index, also named Herfindahl-Hirschman Index, is a measure of the degree of product concentration. The following normalised HHI is used in order to obtain values between 0 and 1:

$$H_j = \frac{\sqrt{\sum_{i=1}^{n}\left(\frac{x_{ij}}{X_j}\right)} - \sqrt{\frac{1}{n}}}{1 - \sqrt{1/n}}$$

Where,

Hj = country or country group index

xij = value of export for country j and product i

Xj = total exports of country j

$$X_j = \sum_{i=1}^{n} x_{ij}$$

and

n = number of products (SITC Revision 3 at 3-digit group level).

An index value closer to 1 indicates a country's exports or imports are highly concentrated on a few products. On the contrary, values closer to 0 reflect exports or imports are more homogeneously distributed among a series of products.

Diversification Index:

The diversification index is computed by measuring the absolute deviation of the trade structure of a country from world structure:

$$S_j = \frac{\sum_i \left| h_{ij} - h_i \right|}{2}$$

Where,

hij = share of product i in total exports or imports of country or country group j

hi = share of product i in total world exports or imports.

The diversification index takes values between 0 and 1. A value closer to 1 indicates greater divergence from the world pattern.

Source: UNCTAD Merchandise: Product concentration and diversification indices of exports and imports, annual, 1995–2016

index reaches 1, only one industry accounts for all gross value added, and a high concentration of economic activity is given. Thus, a decline in the index signifies less concentration in the dominant industry or greater diversification. If more concentration in the dominant sector is observed, the indicator will be higher.

Figure 6.2 plots the Herfindahl-Hirschman Index for all GCC countries (Bahrain, Qatar, Kuwait, Oman, Saudi Arabia and UAE). The calculation is based on the UN Statistics Division's long time series for value added by economic activity for the period 1970–2016, covering the following seven industries: (1) agriculture, hunting, forestry and fishing, (2) mining and utilities, (3) manufacturing, (4) construction, (5) wholesale, retail trade, restaurants and hotels, (6) transport, storage and communication and (7) other activities.

Starting from the first oil boom in 1974 and the second oil boom in 1978, the index steadily fell until 1998, indicating a successful process of diversification. However, at the end of the last century, the recovery of oil

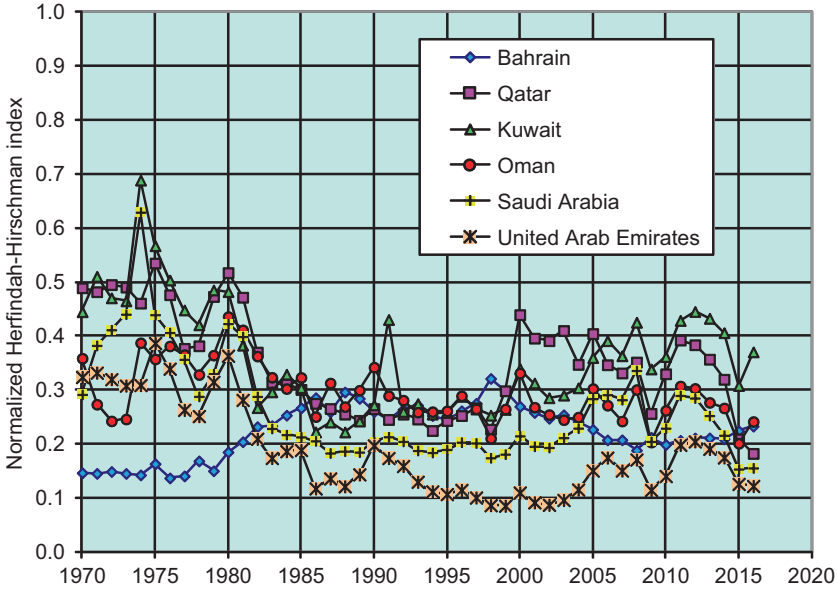

Fig. 6.2 Industry concentration index for the GCC countries. (Source: National Accounts Estimates of Main Aggregates—United Nations Statistics Division)

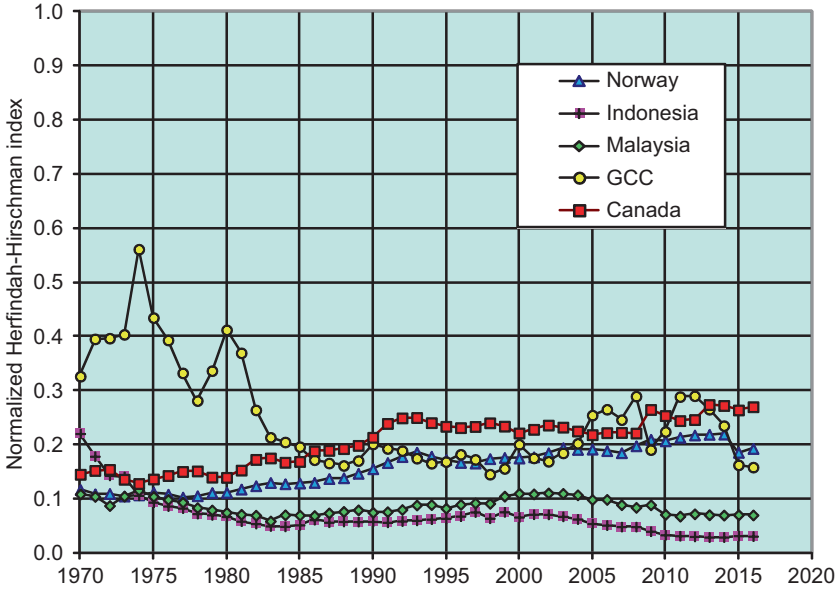

Fig. 6.3 Industry concentration index in international comparison. (Source: National Accounts Estimates of Main Aggregates—United Nations Statistics Division)

prices after a long period of relatively low prices seemingly provoked a reversal in the trend of industrial diversification in most GCC countries.

In Fig. 6.3, the Herfindal-Hirschman Index is presented for the GCC as an aggregate in comparison with selected reference countries. This figure clearly demonstrates that the GCC countries combined moved since 1995 in the concentration range of the reference countries Norway and Canada, while Malaysia and Iran manifested lower concentration.

4 New Assessment for GCC Countries with Input-Output Data

The best way of measuring the relationship between intermediate consumption, gross value added and final demand is through the use of input-output tables, which are derived from supply and use tables that are an integral part of National Accounts (Beutel 2017).

The input-output table is a matrix containing detailed information on the production of goods and services in an economy. It details the intermediate and final uses of domestic and imported goods and services, and also covers net taxes on products and the gross value added of industries.

The required inputs and corresponding cost structures of industries and final demand categories (consumption, investment, exports) can be studied in the columns of the table, while the sales or output structure for goods and services and components of value added (compensation of employees, net taxes on production, consumption of fixed capital, net operating surplus) can be derived from the rows.

Extended input-output tables comprise other useful information derived from satellite systems which are integrated into the national accounts. The additional data include information in matrix form on investment and capital in values, while matrices on employment, energy, emissions, natural resources, waste, sewage and water show the corresponding quantities.

The extended input-output table of Saudi Arabia for 2010 in Table 6.7 has the following seven extensions with information in values and quantities:

1. Gross fixed capital formation (million Saudi riyals)
2. Capital stock (million Saudi riyals)
3. Employment (1000 persons)
4. Energy use (1000 tons of oil equivalent)
5. Air emissions (1000 tons)
6. Global warming, acid deposition, tropospheric ozone formation (1000 tons)
7. Water use (million cubic metres)

The first part of the extended input-output table in rows 1–18 comprises the traditional input-output table. In rows 1–8, the use of domestic products in industries and final uses is shown. Imports and net taxes on products are presented in rows 10–11, followed by the various components of gross value added in rows 13–16. Detailed information on imported products is given in a separate import matrix below the input-output table in rows 19–27.

Environmentally extended input-output tables and models have become a powerful tool in supporting environmental and economic analyses and policies. They play an important role in providing the database for studying sustainable development and the impact of

Table 6.7 Extended input-output table with satellite systems for Saudi Arabia

		INDUSTRIES								FINAL USES					Output at basic prices
		Agriculture, forestry and fishing	Mining	Manufacturing	Electricity and water	Construction	Trade, transport, communication	Financial and business services	Public and other services	Private consumption	Government consumption	Gross fixed capital formation	Changes in inventories	Exports	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Input-output table (bn SR)															
1	Prod. of agriculture, forestry, fi	2	0	31		2	1	0	1	15	1		17	1	72
2	Products of mining	0	2	79	6	8	5	0	0	2	3		2	731	838
3	Products of manufacturing	5	3	28	4	35	24	7	22	113	0	146	40	91	519
4	Electricity and water	1	0	9	1	5	10	2	5	13	5		2	0	53
5	Construction work	2	1	13	2	16	11	5	18	13	0	149	1	2	231
6	Trade, transport and communi	7	4	64	4	30	67	9	31	127	5	58	22	47	475
7	Financial and business service	1	1	18	1	7	27	26	20	120	2		0	4	228
8	Public and other services	2	2	12	2	3	13	3	12	51	344		0	0	445
9	Domestic products at basic pri	18	14	255	20	106	158	52	110	453	360	353	85	876	2 860
10	Imported products	5	3	44	4	33	34	11	27	129	40	126	37	79	574
11	Taxes less subsidies on produ	0	0	1	0	1	0	0	1	4	0	4	1	2	15
12	Products at purchasers' prices	24	17	300	24	141	193	64	137	585	400	484	123	957	3 449
13	Compensation of employees	6	25	37	8	26	64	26	268						459
14	Other net taxes on production	- 4	1	1	0	1	3	1	0						4
15	Consumption of fixed capital														
16	Net operating surplus	46	795	182	21	64	214	137	39						1 498
17	Value added at basic prices	48	821	219	29	91	281	164	308						1 961
18	Input at basic prices	72	838	519	53	231	475	228	445						2 860
Input-output table of imports (bn SR)															
19	Prod. of agriculture, forestry, fi	0	0	8		0	0	0	0	4	0		5	0	19
20	Products of mining	0	0	1	0	0	0	0	0	0	0		0	6	7
21	Products of manufacturing	3	2	20	3	25	17	5	16	80	0	104	29	64	369
22	Electricity and water	0	0	0	0	0	0	0	0	0	0		0	0	0
23	Construction work	0	0	1	0	1	1	0	2	1	0	13	0	0	20
24	Trade, transport and communi	1	1	10	1	5	11	1	5	20	1	9	4	7	75
25	Financial and business service	0	0	3	0	1	4	4	3	18	0		0	1	34
26	Public and other services	0	0	1	0	0	2	0	1	6	39		0	0	50
27	Total	5	3	44	4	33	34	11	27	129	40	126	37	79	574
EXTENSIONS															
Gross fixed capital formation (bn SR)															
28	Buildings	2	3	13	7	5	18	87	130						264
29	Transport equipment	2	0	13	8	5	19	4	5						57
30	Machinery and other equipme	3	51	24	10	7	26	5	37						163
31	Total	7	54	49	26	17	64	95	172						484
Capital stock (bn SR)															
32	Buildings	47	99	126	57	64	221	1 227	1 272						3 114
33	Transport equipment	6	6	52	13	90	140	91	36						434
34	Machinery and other equipme	8	325	319	126	27	194	89	181						1 271
35	Total	61	430	498	197	181	556	1 408	1 489						4 819
Employment (1.000 persons)															
36	Saudi	93	91	148	70	91	562	207	2 693						3 955
37	Non-Saudi	199	13	509	27	1 006	1 679	221	1 225						4 880
38	Total	293	104	657	97	1 097	2 241	428	3 918						8 835
Energy (1.000 tons oil equivalent)															
39	Crude oil, NGL and feedstock		19	161 112	20 596								- 5 046	294 881	471 562
40	Oil products	2 736	7 792	27 393	14 156	192	25 563	37	122	10 840			2 774	63 134	154 739
41	Natural gas		15 138	21 193	30 161										66 492
42	Electricity	316	767	1 687	3 395	290	3 276	272	1 300	9 342					20 645
43	Total	3 052	23 716	211 385	68 309	482	28 838	309	1 422	20 182			- 2 272	358 015	713 438
Air emissions (1.000 tons)															
44	Carbon dioxide (CO2)	5 931	9 591	100 146	177 291	818	87 197	800	2 372	61 806					445 950
45	Methane (CH4)	1 903	51 110	575	336	2	519	2	5 637	227					60 310
46	Nitrous oxide (N2O)	2 613	927	2 426	197	1	29	0	25	32					6 250
47	Sulfur dioxide (SO2)	58	568	786	702	1	16	1	7	46					2 185
48	Ammonia (NH3)	33	7	23	2	10	21	10	19	0					126
49	Nitrogen oxides (NOx)	39	7	40	594	8	766	4	7	91					1 556
50	Carbon monoxide (CO)	33	29	163	35	28	1 454	5	27	396					2 170
51	Organic compounds (NMVOC	10	1 552	200	37	21	330	128	59	57					2 394
52	Hydroflurocarbons (HFC)	6	21	44	5	20	40	19	38	100					291
53	Sulfur hexafluoride (SF6)	0	0	0	0	0	0	0	0						0
54	Total	10 625	63 811	104 403	179 200	907	90 371	971	8 191	62 753					521 232
Global warming, acid deposition and tropospheric ozone formation (1.000 tons)															
55	Greenhouse gases 1)	855 913	1 370 291	864 363	245 552	1 032	106 942	975	128 473	76 419					3 649 960
56	Acid deposition 2)	85	573	814	1 118	7	552	4	11	109					3 274
57	Tropospheric ozone 3)	1 984	52 697	979	1 003	58	3 069	140	5 730	770					66 430
Water use (Mio. cubic meter)															
58	Desalinated water	50	58	108	104	1	281	97	207	378					1 284
59	Renewable groundwater	2 260	16	31	30	0	68	23	50	90					2 568
60	Non-renewable groundwater	15 298	54	100	97	1	205	70	150	273					16 247
61	Total	17 608	128	239	231	3	553	189	407	742					20 099

Saudi Arabia 2010 = Values = Quantities

(*continued*)

Table 6.7 (continued)

Source: Central Department of Statistics and Information (CDSI), Ministry of Economy and Planning (MOEP), Ministry of Water and Electricity (MOWE), International Energy Agency (IEA), World Bank (WB), World Input-Output Database (WIOD), European Commission (EDGAR), own estimates

Notes: (1) Carbon dioxide (CO_2 = 1), methane (CH_4 = 21) and nitrous oxide (N_2O = 310) were transformed with the documented factors to greenhouse gases in CO_2-equivalents; (2) sulphur dioxide (SO_2 = 1) and nitrogen oxides (NO_x = 0.7) were transformed with the documented factors to acid depositions in SO_2-equivalents; (3) substances causing tropospheric ozone formation: carbon monoxide (CO), non-methane volatile organic compounds (NMVOC), methane (CH_4), nitrogen oxides (NO_x)

environmental policies. If, for example, input-output tables are extended to include environmental information, a solid foundation for environmental policy analysis is provided. Life cycle analysis of products and their impact on the environment and sustainable use of natural resources are two prominent applications. The United Nations recently published the *Handbook on Supply, Use and Input-Output Tables with Extensions and Applications* (United Nations 2018, p. 518) in which the compilation of physical supply and use tables and extended input-output tables is promoted (Box 6.2). I was a member of the Editorial Board and heavily engaged in drafting the new *Handbook* for the national accounts.

4.1 Traditional Input-Output Indicators for GCC Countries

Only a few GCC countries compile and publish supply, use and input-output tables for their national accounts. At the time of writing, national tables were available only for Saudi Arabia and Kuwait.

A comparison of input-output data of Saudi Arabia and Norway reveals that the shares of intermediate consumption of products and gross value added in total output did not change much in both countries between 2005 and 2011. However, the shares of intermediates in total output were significantly lower in Saudi Arabia than in Norway (31 vs. 46 per cent of output), as were the shares of imported intermediates (5 vs. 10 per cent).

The first part of Table 6.8 is devoted to the analysis of direct input coefficients, while in the second part of the table the cumulative input coefficients are explored. The input coefficients reflect the direct input requirements of products for a specific industry, while the cumulative input coefficients represent the direct and indirect input requirements of

Box 6.2 UN Handbook of Supply, Use and Input-Output Tables

The United Nations Statistics Division (UNSD) announced in May 2018 that the final draft of the *Handbook on Supply, Use and Input-Output Tables with Extensions and Applications* is now available on the website of UNSD at:

https://unstats.un.org/unsd/nationalaccount/docs/SUT_IOT_HB_wc.pdf

From the preface of the UN Handbook:

The Handbook on Supply, Use and Input-Output Tables with Extensions and Applications has been prepared as part of a series of handbooks on national accounting in support of the implementation of the System of National Accounts 2008 (2008 SNA). The objective of this Handbook is to provide a step-by-step guidance for the compilation of Supply and Use Tables (SUTs) and Input-Output Tables (IOTs) and an overview of the possible extensions of SUTs and IOTs which increase their analytical usefulness.

Supply and use tables and the institutional sector accounts constitute the core of the national accounts.

The Institutional Sector Accounts provide detailed information on institutions (Non-financial corporations, Financial corporations, General Government, Households, Non-profit institutions serving households) in the production, the income and the capital account.

Supply and use tables show the relationship between input and output of industries in great detail including the components of value added, intermediate use of products in industries and final demand of products.

Supply and use tables are transformed into symmetric input-output tables on the basis of analytical assumption on technology and sales structure. Input-output models are often used to study the impact of exogenous changes of final demand or primary inputs on the rest of the economy. Input-output tables also provide the database for different macroeconomic models.

A social accounting matrix (SAM) comprises all information of the supply and use tables and the institutional sector accounts in one matrix. The SAM is often used as the database of Computable General Equilibrium Model (CGE).

Box 6.2 (continued)

The UN Handbook promotes the compilation of physical supply and use tables and extended input-output tables as an integral part of the national accounts. The additional tables offer new opportunities for the analysis of economic diversification and sustainable development models.

products at all stages of production. The cumulative input coefficients are often used to identify the backward linkages of an industry.

In its simplest form, the strength of the backward linkage of an industry is given by the column sum of the direct input coefficients. A more useful and comprehensive measure is provided by the column sum of the Leontief Inverse, which reflects the direct and indirect effects on other industries.

Backward linkages are input-oriented. The industry 'Construction' requires inputs from many other industries and therefore will have strong backward linkages. Forward linkages are output-oriented. The industry 'Electricity' supplies electricity to all other industries, and therefore, this industry is expected to have strong forward linkages (many clients) but weak backward linkages (few inputs).

The column totals of the direct input coefficients and the Leontief Inverse input coefficients reflect the intensity of backward linkages. The row totals of the direct output coefficients and the Ghosh inverse output coefficients show the intensity of forward linkages.

In Table 6.8, the cumulative input coefficients per industry are reported for domestic products (column 2) and total (domestic and imported) products (column 4). The sum of cumulative input coefficients was divided by the number of industries, as the input-output tables comprise a different number of industries in successive years. While the input coefficients for domestic products allow a high degree of substitution between domestic and imported products, the input coefficients for total products reflect technical requirements.

On average, Saudi Arabia reached 95 per cent of the Leontief Inverse for domestic products of Norway. In other words, it can be said that by 2011, Saudi Arabia has reached an international level of industrial

Table 6.8 Input-output data of Saudi Arabia and Norway

	Number of industries	*Intermediate consumption of domestic products at basic prices*	*Intermediate consumption of imported products at basic prices*	*Intermediate consumption of products at basic prices*	*Taxes less subsidies on products*	*Intermediate consumption of products at purchasers' prices*	*Gross value added at basic prices*	*Output at basic prices*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
	Saudi Arabia (Mio Saudi riyal)							
2005	59	444,900	99,327	544,227	3342	547,569	1,172,399	1,719,968
2010	59	728,715	168,027	896,742	2830	899,572	1,960,873	2860 445
2011	59	931,300	191,442	1,122,743	4062	1,126,805	2,493,366	3,620,170
	Norway (Mio Norwegian krona)							
2005	59	1,079,314	310,162	1,389,476	44,267	1,433,743	1,731,949	3,165,692
2010	65	1,468,471	448,813	1,917,284	63,684	1,980,968	2260 620	4,241,588
2011	65	1,579,262	481,601	2,060,863	66,761	2,127,624	2,455,726	4,583,350
	Saudi Arabia (input coefficients %)							
2005	59	25.9	5.8	31.6	0.2	31.8	68.2	100.0
2010	59	25.5	5.9	31.3	0.1	31.4	68.6	100.0
2011	59	25.7	5.3	31.0	0.1	31.1	68.9	100.0
	Norway (input coefficients %)							
2005	59	34.1	9.8	43.9	1.4	45.3	54.7	100.0
2010	65	34.6	10.6	45.2	1.5	46.7	53.3	100.0
2011	65	34.5	10.5	45.0	1.5	46.4	53.6	100.0

	Saudi Arabia (sum of cumulative input coefficients/number of industries)							
2005	59	1.5363	–	2.0067	–	–	–	–
2010	59	1.4965	–	1.7733	–	–	–	–
2011	59	1.5225	–	1.8118	–	–	–	–
	Norway (sum of cumulative input coefficients/number of industries)							
2005	59	1.6195	–	2.0902	–	–	–	–
2010	65	1.6004	–	2.0807	–	–	–	–
2011	65	1.6130	–	2.1135	–	–	–	–
	Diversity index 'backward linkages' for Saudi Arabia (% of reference country Norway)							
2005	–	94.9	–	96.0	–	–	–	–
2010	–	93.5	–	85.2	–	–	–	–
2011	–	94.4	–	85.7	–	–	–	–

Source: Statistics Norway, CDSI Saudi Arabia, author estimates

diversification. If imported intermediate inputs are included, the level of diversification appears to have reached 86 per cent of that of Norway.

In Table 6.9, a similar comparison was made for the input-output data of Kuwait and Norway. Kuwait has a long history of compiling input-output data. We used the national input-output tables of Kuwait for 2005, 2010 and 2013. We refrained from using input-output tables which were compiled for the Global Trade Analysis Project (Green 2011) as these tables have been generated in a mechanical process with only a few sources. The results for 2005–2013 show a clear trend for the use of domestic intermediates in Kuwait. In 2013, Kuwait, with 32.8 per cent of output, has almost reached the level of Norway (35.2 per cent). However, the share of imported intermediate inputs (5.5 per cent) is much lower than the share in Norway (11.1 per cent). The share of gross value added in output of Kuwait (64.8 per cent) is about 10 per cent higher than in Norway (54.6 per cent), indicating the potential for more diversification.

The backward linkages for domestic inputs in Kuwait reached 95.8 per cent that of Norway. They even exceeded the level of Norway (108.8 per cent) if imported inputs are included. Thus, in Kuwait, the potential to induce more diversification should not be based on a general policy of promoting more import substitution but rather on a specific policy of encouraging more imports of intermediates.

4.2 Primary Diversity Measure

Economic diversity has often been promoted as a means to achieve the economic goals of stability and growth. Empirical studies have been able to relate higher levels of diversity to both economic stability and overall levels of economic activity. Diversity measures, as used in these studies, have tended to be narrowly defined, usually emphasising the distribution of employment across industries. Such measures are unsatisfactory, because they do not capture inter-industrial linkages.

An alternative approach to measuring diversity, based on the technical coefficients matrix of an input-output model, was developed by Wagner and Deller (1998) who show that higher levels of diversification within the theoretical construct of input-output are associated with higher levels of stability. Ahmed Al-Kawaz (2008) has successfully implemented this

Table 6.9 Input-output data of Kuwait and Norway

	Number of industries	*Intermediate consumption of domestic products at basic prices*	*Intermediate consumption of imported products at basic prices*	*Intermediate consumption of products at basic prices*	*Taxes less subsidies on products*	*Intermediate consumption of products at purchasers' prices*	*Gross value added at basic prices*	*Output at basic prices*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
	Kuwait (Mio Kuwaiti dinar)							
2005	80	10,716	1450	12,166	−752	11,414	23,900	35,314
2010	44	20,584	2536	23,120	−1429	21,691	36,182	57,873
2013	50	25,776	4518	30,294	−1398	28,896	53,162	82,058
	Norway (Mio Norwegian krona)							
2005	59	1,079,314	310,162	1,389,476	44,267	1,433,743	1,731,949	3,165,692
2010	59	1,468,471	448,813	1,917,284	63,684	1,980,968	2260 620	4,241,588
2013	59	1,655,109	558,949	2,214,058	75,509	2,289,567	2,749,018	5,038,585
	Kuwait (input coefficients %)							
2005	80	30.3	4.1	34.5	−2.1	32.3	67.7	100.0
2010	44	35.6	4.4	39.9	−2.5	37.5	62.5	100.0
2013	50	31.4	5.5	36.9	−1.7	35.2	64.8	100.0
	Norway (input coefficients %)							
2005	59	34.1	9.8	43.9	1.4	45.3	54.7	100.0
2010	59	34.6	10.6	45.2	1.5	46.7	53.3	100.0
2013	59	32.8	11.1	43.9	1.5	45.4	54.6	100.0
	Kuwait (sum of cumulative input coefficients/number of industries)							
2005	80	1.3990	–	2.2638	–	–	–	–
2010	44	1.5783	–	2.2671	–	–	–	–
2013	50	1.5007	–	2.2412	–	–	–	–

(*continued*)

Table 6.9 (continued)

	Number of industries	*Intermediate consumption of domestic products at basic prices*	*Intermediate consumption of imported products at basic prices*	*Intermediate consumption of products at basic prices*	*Taxes less subsidies on products*	*Intermediate consumption of products at purchasers' prices*	*Gross value added at basic prices*	*Output at basic prices*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
	Norway (sum of cumulative input coefficients/number of industries)							
2005	59	1.6195	–	2.0902	–	–	–	–
2010	65	1.6004	–	2.0807	–	–	–	–
2013	65	1.5667	–	2.0591	–	–	–	–
	Diversity index 'backward linkages' for Kuwait (% of reference country Norway)							
2005	–	86.4	–	108.3	–	–	–	–
2010	–	98.6	–	109.0	–	–	–	–
2013	–	95.8	–	108.8	–	–	–	–

Source: Statistics Norway, CSB Kuwait, author estimates

approach for Kuwait using input-output data for Kuwait and Norway for 2000.

The primary diversity measure of Wagner and Deller puts special emphasis on inter-industry relations and provides the best way to evaluate the diversification of economies. The index is a multiplicative combination of three components:

- The relative size of an economy (SI)—number of indigenous industries
- The density of the economy (DEN)—number of non-zero elements in the Leontief Matrix, indicating the diversity of transactions
- The condition number of the Leontief Matrix (CN)—indicator of inter-industry linkages

The Primary Diversity Measure (PDM) is defined as the simple multiplicative combination of these three characteristics, PDM = SI * DEN * CN.

The relative size of the economy is defined as $SI = N/N_r$, where N is the number of indigenous industries identified in the nation, and N_r is the number of indigenous industries in the reference country. This measure implies the larger the economy as compared to the base economy, the better. The larger the regional economy, in terms of the number of industries contained within the economy, the greater the ability of the economy to absorb shocks. This is a measure of relative size, but does not contain any information on inter-industry linkages.

The density of the (I - A) matrix is defined as DEN = non-zero/N * N where non-zero is the number of transactions (non-zero elements) in the Leontief Matrix, and N is again the number of indigenous industries. The greater the number of non-zero elements contained in the table, the greater the degree of possible inter-industry linkages. This measure does not capture the relative magnitudes of the elements, nor does it capture the positions of these elements within the Leontief Matrix.

The third component measures the degree of inter-industry linkages. The condition number of the Leontief Matrix defines a scalar reflecting the inter-industry linkages.

The condition number is a measure of linear independence. Most commonly, it is used to test for the uniqueness of a solution to a set of linear equations. By definition, an identity matrix, of any size, has a condition

number equal to one. Any divergence from an identity matrix will cause the condition number to increase. In terms of regional economics, divergence from the identity matrix in terms of the (I - A) matrix implies more purchases from indigenous industries or a greater degree of inter-industry linkages. Thus, the higher the condition number, the more diverse the economy.

Common diversification measures focus on value added of industries and exports and imports of products. The main shortcoming of the traditional measures is the non-consideration of inter-industry nature of economic activities. Input-output indicators for diversification comprise detailed information on supply and demand. They cover intermediate consumption of domestic and imported products, value added by industry and final uses of products (consumption, investment, exports). The Primary Diversity Index puts special emphasis on inter-industry relations. In our opinion, this indicator is the best choice to evaluate the diversification of economies (Box 6.3).

Box 6.3 Input-Output-Based Primary Diversity Index

An alternative approach to measuring diversity based on the technical coefficients matrix of an input-output model was developed by Wagner and Deller and applied to the 50 US states. Empirical results suggest that higher levels of diversification are associated with higher levels of stability.

Ahmed Al-Kawaz implemented this approach also for Kuwait.

The diversity measure of Wagner and Deller is a multiplicative combination of three components:

Relative size of an economy (SI)—Number of indigenous industries

Density of the economy (DEN)—Number of non-zero elements in the Leontief Matrix indicating the diversity of transactions

The condition number of the Leontief Matrix (CN)—Scalar measure of the inter-industry linkages with the economy as captured in the Leontief matrix

The Primary Diversity Measure (PDM_i) for a country (i) is defined as the simple multiplicative combination of these three characteristics $PDM_i = SI_i * DEN_i * CN_i$.

The relative size of the economy is defined as $S_i = N_i / N_r$, where N is the number of indigenous industries in country (i) and N_r is the number of indigenous industries in the reference country.

Box 6.3 (continued)

The density of the economy is defined as DEN_i = non-zero$_i$ / N_i * N_i, where non-zero is the number of transactions in the Leontief Matrix (I-A), and N_i is again the number of indigenous industries in country (i).

The third component measures the degree of inter-industry linkages. The condition number of the Leontief matrix defines a scalar reflecting the inter-industry linkages. The condition number is defined as

$CN_i = \|(I - A)\| \|(I - A)^{-1}\| = \delta_l (I - A) / \delta_s (I - A)$ where

$\|(I - A)\|$ is the 2-norm of the (I - A) matrix,

$\|(I - A)^{-1}\|$ is the 2-norm of the $(I - A)^{-1}$ (the Leontief inverse matrix),

$\delta_l(I - A)$ is the largest singular value of the (I-A) matrix, and

$\delta_s(I - A)$ is the smallest singular value of the (I - A) matrix, respectively.

The Primary Diversity Index is defined as $PDI = PDM_i/PDM_r$.

i = Country i

r = Reference country r

Sources:

John E. Wagner and Steven C. Deller (1998): *Measuring the Effects of Economic Diversity on Growth and Stability, in: Land Economics*, Vol. 74, No. 4. pp. 541–556; Ahmed Al-Kawaz (2008): Economic Diversification: The Case of Kuwait with Reference to Oil Producing Countries, in *Journal of Economic Cooperation*, 29, 3, pp. 23–48.

The results of the input-output-based diversity index for Saudi Arabia compared to Norway are presented in Table 6.10.

We used the input-output tables of the OECD (2018) for this analysis. All input-output tables of the database show 34 industries. In Norway and Saudi Arabia, only 33 indigenous industries were reported. This is why the size (SI) in Table 6.13 is always reported with 1.0 for all years. The number of non-zero elements in the table of Saudi Arabia was somewhat smaller than in Norway. This is why the density (DEN) of Saudi Arabia is a bit lower. The condition number (CN) reflects inter-industry linkages: in all years, it is lower in Saudi Arabia than in Norway, but the difference is not strikingly high. Consequently, the Primary Diversity Index of Saudi Arabia was lower than that of Norway for all years, but the distance has

Table 6.10 Input-output diversity index

		1995	*2000*	*2005*	*2010*	*2011*
		Norway				
Number of indigenous industries	N	33	33	33	33	33
Size	SI	1.0000	1.0000	1.0000	1.0000	1.0000
Number of non-zero elements	Non-zero	1090	1089	1090	1090	1090
Number of elements	N*N	1156	1156	1156	1156	1156
Density	DEN	0.9429	0.9420	0.9429	0.9429	0.9429
Condition number	CN	3.4960	3.7054	3.6340	3.9076	4.0122
Primary Diversity Measure	PDM	3.2964	3.4906	3.4265	3.6845	3.7832
		Saudi Arabia				
Number of indigenous industries	N	33	33	33	33	33
Size	SI	1.0000	1.0000	1.0000	1.0000	1.0000
Number of non-zero elements	Non-zero	1052	1053	1066	1077	1077
Number of elements	N*N	1156	1156	1156	1156	1156
Density	DEN	0.910	0.911	0.922	0.932	0.932
Condition number C	CN	3.2999	3.0747	3.3256	3.5792	3.9049
Primary Diversity Measure	PDM	3.0030	2.8008	3.0666	3.3346	3.6380
Diversity index	PDM/ PDM	0.9110	0.8024	0.8950	0.9051	0.9616

Source: OECD Input-Output Tables

shrunk. In 1995, Saudi Arabia was at 91.1 per cent of the corresponding level of Norway, but by 2011, it had increased to 96.2 per cent. Therefore, by 2011, Saudi Arabia almost reached the diversity level of Norway. This is a considerable achievement of the Saudi development policy.

5 Sustainable Development of Nations: Adjusted Net National Income and Savings

Since a long time, the World Bank is engaged in measuring sustainable development of nations (World Bank 2001). Given the exhaustible nature of oil resources, the long-term strategy for economic sustainability of the oil-producing countries must be to transform the non-renewable natural capital into other forms of capital like machinery, buildings and human capital, and so increase the gross national income per capita (Beutel et al. 2013). In the World Bank's World Development Indicators (World Bank 2018), we find two prominent indicators for sustainable economic development:

- Adjusted net national income, which is gross national income (GNI) minus consumption of fixed capital and natural resources depletion.
- Adjusted net savings, which are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide and particulate emissions damage.

5.1 Adjusted Net National Income

Adjusted net national income is calculated by subtracting consumption of fixed capital and the depletion of natural resources from gross national income (GNI). Consumption of fixed capital reflects the decline of man-made capital (buildings, machinery, transport equipment), while the depletion of natural resources measures the decline in non-renewable natural resources through extraction.

Gross domestic product (GDP)

\+ Net income from abroad
= Gross national income (GNI)
– Consumption of fixed capital
= Net national income (NNI)
– Natural resources depletion
= Adjusted net national income

Where:

Gross domestic product at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.

Net income from abroad includes the net labour income and net property and entrepreneurial income components of the SNA.

Gross national income (GNI) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.

Consumption of fixed capital represents the replacement value of capital used up in the process of production.

Net national income is gross national income (GNI) less consumption of fixed capital.

Natural resource depletion is the ratio of the value of the stock of natural resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil and natural gas. The World Bank provides valuable information for 10 minerals, 4 energy sources and the net forest depletion.

Adjusted net national income is GNI minus consumption of fixed capital and natural resources depletion.

5.2 Adjusted Net Saving

Adjusted net saving is a national accounting aggregate designed to measure the net change in assets in a national balance sheet that includes natural and human capital. The gross stock of natural capital, produced capital and human capital is growing if the adjusted net savings of a nation are positive.

There is an intrinsic link between change in the wealth of a nation and the sustainability of a development path. If genuine (adjusted) savings are negative at any point in time, then welfare in the future will be less than current welfare. Therefore, adjusted net saving can be regarded as a sustainability indicator.

Specifically, the World Bank's definition of adjusted net savings is as follows:

Gross national savings
Consumption of fixed capital
= Net savings
+ Education expenditure
– Energy depletion
– Mineral depletion
– Net forest depletion
– Carbon dioxide emissions damage
– Particulate emissions damage
= Adjusted net savings (genuine savings)

Where:

Net national savings are equal to gross national savings less the value of consumption of fixed capital.

Education expenditure refers to the current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment.

Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil and natural gas.

Mineral depletion is the ratio of the value of the stock of mineral resources to the remaining reserve lifetime (capped at 25 years). It covers tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite and phosphate.

Net forest depletion is calculated as the product of unit resource rents and the excess of wood harvest over natural growth.

Carbon dioxide damage is estimated to be $20 per ton of carbon (the unit damage in 1995 US dollars) times the number of tons of carbon emitted.

Particulate emissions damage is the damage due to exposure of a country's population to ambient concentrations of particulates measuring less than 2.5 microns in diameter (PM2.5), ambient ozone pollution and

indoor concentrations of PM2.5 in households cooking with solid fuels. Damages are calculated as foregone labour income due to premature death. Estimates of health impacts from the Global Burden of Disease Study 2015 are for 1990, 1995, 2000.

5.3 Test for Sustainable Development

An economy is sustainable if it saves more than the depreciation on its man-made and natural capital. In Table 6.11, an assessment has been made for all GCC countries and Norway.

The highest adjusted national income per capita (78.515 $/person) and adjusted net national saving per capita (22.363 $/person) were achieved in Norway. Among GCC countries, Qatar had the highest adjusted national income per capita (67.443 $/person), followed by UAE (38.670 $/person) and Kuwait (37,781 $/person). Qatar had also the highest adjusted net national saving per capita (34.570 $/person) followed by Kuwait (13.421 $/person).

Among the GCC countries, only Oman (−1.052 $/person) recorded negative adjusted savings, and its combined capital stock of man-made capital and natural capital declined in 2014. This is well in line with the lowest level of the adjusted net national income per capita (10,556 $/person). The net income from abroad was negative throughout the years.

Tables 6.12–6.17 contain complete information on a country by country basis, showing the evolution of sustainable development of the six GCC countries for the 20 years 1995–2015.

Earlier in the text in Table 6.5, it was reported that Bahrain had in 2016 the lowest oil dependency (13.5% of gross value added) and Kuwait (51.4% of gross value added) the highest oil dependency among the GCC countries. The test for sustainable development of Bahrain in Table 6.12 reveals that the adjusted net national income and the adjusted net saving are low compared to other GCC countries. In 2014, final consumption expenditure is high (68.2% of GNI) and education expenditure is low (2.9% of GNI), both resulting in a low adjusted savings ratio (10.3% of GNI).

The prospects for Kuwait in Table 6.13 are brighter. Despite substantial allocations for the depletion of natural resources, the savings ratios throughout the period 2000–2014 are impressive. The positive performance of the savings ratio is certainly supported by relatively low

Table 6.11 Test for sustainable development of GCC countries in 2014

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*Norway*
	Million US $ at current prices						
Gross domestic product	33,388	162,632	81,034	206,225	756,350	403,198	499,339
+ Net income from abroad	−5664	15,641	−4346	−9301	13,553	659	18,349
= Gross national income (GNI)	27,724	178,272	76,688	196,924	769,903	403,857	517,687
− Consumption of fixed capital	−1750	−12,340	−10,904	−28,642	−67,161	−29,013	−82,454
= Net national income	25,973	165,932	65,785	168,282	702,742	374,844	435,233
− Natural resources depletion	−2343	−23,026	−23,975	−8145	−98,603	−24,075	−31,885
= Adjusted net national income	23,630	142,906	41,810	160,138	604,139	350,768	403,348
Net national income	25,973	165,932	65,785	168,282	702,742	374,844	435,233
+ Net transfers	−2364	−20,674	−10,301	−17,514	−38,734	–	−8693
− Final consumption	−18,904	−76,005	−38,351	−64,441	−439,737	−278,449	−314,257
= Net national savings	4705	69,253	17,133	86,327	224,272	–	112,282
+ Education expenditure	807	5658	3537	4986	55,359	–	35,186
− Energy depletion	−2343	−23,025	−23,968	−8144	−98,452	−24,075	−31,848
− Mineral depletion	0	0	−5	0	−151	0	−36
− Net forest depletion	0	−1	−2	0	0	0	0
− Carbon dioxide damage	−280	−1013	−778	−1003	−6116	−2182	−505
− Particulate emission damage	−24	−111	0	0	0	0	−195
= Adjusted net national saving	2865	50,763	−4083	82,165	174,911	–	114,884
	Population (Mio Persons)						
Population	1.336	3.782	3.961	2.374	30.777	9.071	5.137
	US $ per person						
Gross domestic product	24,983	42,996	20,458	86,853	24,575	44,450	97,200
+ Net income from abroad	−4238	4135	−1097	−3917	440	73	3572
= Gross national income (GNI)	20,745	47,131	19,361	82,936	25,016	44,522	100,772
− Consumption of fixed capital	−1310	−3262	−2753	−12,063	−2182	−3198	−16,050

(*continued*)

Table 6.11 (continued)

	Bahrain	*Kuwait*	*Oman*	*Qatar*	*Saudi Arabia*	*United Arab Emirates*	*Norway*
= Net national income	19,435	43,869	16,608	70,873	22,834	41,324	84,721
– Natural resources depletion	−1753	−6088	−6053	−3430	−3204	−2654	−6207
= Adjusted net national income	17,682	37,781	10,556	67,443	19,630	38,670	78,515
Net national income	19,435	43,869	16,608	70,873	22,834	41,324	84,721
+ Net transfers	−1769	−5466	−2601	−7376	−1259	–	−1692
– Final consumption	−14,145	−20,094	−9682	−27,140	−14,288	−30,697	−61,173
= Net national savings	3521	18,309	4325	36,357	7287	–	21,857
+ Education expenditure	604	1496	893	2100	1799	–	6849
– Energy depletion	−1753	−6087	−6051	−3430	−3199	−2654	−6200
– Mineral depletion	0	0	−1	0	−5	0	−7
– Net forest depletion	0	0	0	0	0	0	0
– Carbon dioxide damage	−210	−268	−197	−422	−199	−241	−98
– Particulate emission damage	−18	−29	0	0	0	0	−38
= Adjusted net national saving	2144	13,421	−1031	34,604	5683	–	22,363

Source: The World Bank—World Development Indicators, March 2018

Table 6.12 Test for sustainable development of Bahrain

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	Million US $ at current prices								
Gross domestic product	5849	9063	15,969	25,713	28,777	30,749	32,540	33,388	31,126
+ Net income from abroad	−59	−224	−413	−2373	−3384	−3837	−3926	−5664	−1736
= Gross national income (GNI)	5790	8839	15,555	23,340	25,393	26,912	28,614	27,724	29,390
− Consumption of fixed capital	−588	−834	−1023	−1457	−1658	−1585	−1659	−1750	−1871
= Net national income	5203	8005	33	21,883	23,735	25,327	26,955	25,973	27,519
− Natural resources depletion	−171	−320	−772	−994	−1789	−2213	−2347	−2343	−1332
= Adjusted net national income	5032	7685	13,761	20,889	21,946	23,114	24,608	23,630	26,187
Net national income	5203	8005	14,533	21,883	23,735	25,327	26,955	25,973	27,519
+ Net transfers	−379	−990	−1223	−1642	−2050	−2074	−2166	−2364	–
− Final consumption	−4321	−5517	−8590	−13,914	−15,229	−16,435	−18,327	−18,904	−19,519
= Net national savings	502	1498	4720	6328	6456	6817	6462	4705	–
+ Education expenditure	208	351	467	638	706	783	822	807	752
− Energy depletion	−171	−320	−772	−994	−1788	−2212	−2347	−2343	−1332
− Mineral depletion	0	0	0	0	0	0	0	0	0
− Net forest depletion	0	0	0	0	0	0	0	0	0
− Carbon dioxide damage	−95	−127	−156	−219	−227	−242	−262	−280	–
− Particulate emission damage	−14	−17	−18	−21	−24	−24	−25	−24	−22
= Adjusted net national saving	431	1386	4241	5732	5122	5121	4651	2865	–

(*continued*)

Table 6.12 (continued)

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	% of gross national income (GNI)								
Gross domestic product	101.0	102.5	102.7	110.2	113.3	114.3	113.7	120.4	105.9
+ Net income from abroad	−1.0	−2.5	−2.7	−10.2	−13.3	−14.3	−13.7	−20.4	−5.9
= Gross national income (GNI)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
− Consumption of fixed capital	−10.2	−9.4	−6.6	−6.2	−6.5	−5.9	−5.8	−6.3	−6.4
= Net national income	89.8	90.6	93.4	93.8	93.5	94.1	94.2	93.7	93.6
− Natural resources depletion	−2.9	−3.6	−5.0	−4.3	−7.0	−8.2	−8.2	−8.5	−4.5
= Adjusted net national income	86.9	86.9	88.5	89.5	86.4	85.9	86.0	85.2	89.1
Net national income	89.8	90.6	93.4	93.8	93.5	94.1	94.2	93.7	93.6
+ Net transfers	−6.5	−11.2	−7.9	−7.0	−8.1	−7.7	−7.6	−8.5	–
− Final consumption	−74.6	−62.4	−55.2	−59.6	−60.0	−61.1	−64.0	−68.2	−66.4
= Net national savings	8.7	16.9	30.3	27.1	25.4	25.3	22.6	17.0	–
+ Education expenditure	3.6	4.0	3.0	2.7	2.8	2.9	2.9	2.9	2.6
− Energy depletion	−2.9	−3.6	−5.0	−4.3	−7.0	−8.2	−8.2	−8.5	−4.5
− Mineral depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Net forest depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Carbon dioxide damage	−1.6	−1.4	−1.0	−0.9	−0.9	−0.9	−0.9	−1.0	–
− Particulate emission damage	−0.2	−0.2	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1
= Adjusted net national saving	7.4	15.7	27.3	24.6	20.2	19.0	16.3	10.3	–

Source: The World Bank—World Development Indicators, March 2018

Table 6.13 Test for sustainable development of Kuwait

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	Million US $ at current prices								
Gross domestic product	27,192	37,712	80,798	115,419	154,028	174,070	174,161	162,632	114,567
+ Net income from abroad	4883	6698	7182	8462	9180	12,697	13,254	15,641	12,692
= Gross national income (GNI)	32,074	44,410	87,979	123,881	163,208	186,767	187,416	178,272	127,259
− Consumption of fixed capital	−2440	−2774	−5483	−8741	−9776	−10,532	−10,582	−12,340	−9428
= Net national income	29,635	41,636	82,497	115,140	153,432	176,235	176,834	165,932	117,831
− Natural resources depletion	−1700	−3321	−10,466	−11,950	−22,863	−28,625	−26,399	−23,026	−12,215
= Adjusted net national income	27,935	38,315	72,030	103,189	130,569	147,609	150,436	142,906	105,616
Net national income	29,635	41,636	82,497	115,140	153,432	176,235	176,834	165,932	117,831
+ Net transfers	−1465	−1956	−3421	−12,258	−14,376	−16,714	−19,107	−20,674	−16,522
− Final consumption	−20,355	−23,761	−38,671	−53,119	−60,276	−67,387	−72,333	−76,005	−75,318
= Net national savings	7814	15,919	40,405	49,763	78,781	92,133	85,394	69,253	25,991
+ Education expenditure	1656	2304	3537	3952	5206	5958	5979	5658	4111
− energy depletion	−1700	−3321	−10,466	−11,950	−22,863	−28,625	−26,398	−23,025	−12,214
− Mineral depletion	0	0	0	0	0	0	0	0	0
− Net forest depletion	0	0	0	0	0	0	0	−1	−1
− Carbon dioxide damage	−324	−365	−580	−854	−882	−968	−1004	−1013	–
− Particulate emission damage	−25	−41	−74	−109	−173	−183	−182	−166	−111
= Adjusted net national saving	7421	14,495	32,821	40,802	60,069	68,315	63,788	50,707	–

(*continued*)

Table 6.13 (continued)

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	% of gross national income (GNI)								
Gross domestic product	84.8	84.9	91.8	93.2	94.4	93.2	92.9	91.2	90.0
+ Net income from abroad	15.2	15.1	8.2	6.8	5.6	6.8	7.1	8.8	10.0
= Gross national income (GNI)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
− Consumption of fixed capital	−7.6	−6.2	−6.2	−7.1	−6.0	−5.6	−5.6	−6.9	−7.4
= Net national income	92.4	93.8	93.8	92.9	94.0	94.4	94.4	93.1	92.6
− Natural resources depletion	−5.3	−7.5	−11.9	−9.6	−14.0	−15.3	−14.1	−12.9	−9.6
= Adjusted net national income	87.1	86.3	81.9	83.3	80.0	79.0	80.3	80.2	83.0
Net national income	92.4	93.8	93.8	92.9	94.0	94.4	94.4	93.1	92.6
+ Net transfers	−4.6	−4.4	−3.9	−9.9	−8.8	−8.9	−10.2	−11.6	–
− Final consumption	−63.5	−53.5	−44.0	−42.9	−36.9	−36.1	−38.6	−42.6	−59.2
= Net national savings	24.4	35.8	45.9	40.2	48.3	49.3	45.6	38.8	–
+ Education expenditure	5.2	5.2	4.0	3.2	3.2	3.2	3.2	3.2	3.2
− Energy depletion	−5.3	−7.5	−11.9	−9.6	−14.0	−15.3	−14.1	−12.9	−9.6
− Mineral depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Net forest depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Carbon dioxide damage	−1.0	−0.8	−0.7	−0.7	−0.5	−0.5	−0.5	−0.6	–
− Particulate emission damage	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1
= Adjusted net national saving	23.1	32.6	37.3	32.9	36.8	36.6	34.0	28.4	–

Source: The World Bank—World Development Indicators, March 2018

Table 6.14 Test for sustainable development of Oman

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	Million US $ at current prices								
Gross domestic product	13,803	19,507	31,082	58,642	67,937	76,690	78,939	81,034	69,832
+ Net income from abroad	−397	−753	−1199	−3581	−4138	−4463	−3235	−4346	−2315
= Gross national income (GNI)	13,406	18,754	29,883	55,060	63,799	72,227	75,703	76,688	67,517
− Consumption of fixed capital	−1508	−1846	−3110	−6568	−7199	−7709	−8678	−10,904	−10,504
= Net national income	11,898	16,909	26,773	48,492	56,601	64,517	67,025	65,785	57,013
− Natural resources depletion	−2767	−6149	−9707	−16,106	−24,557	−26,440	−26,770	−23,975	−12,277
= Adjusted net national income	9131	10,759	17,066	32,386	32,044	38,078	40,255	41,810	44,735
Net national income	11,898	16,909	26,773	48,492	56,601	64,517	67,025	65,785	57,013
+ Net transfers	−1469	−1451	−2257	−5704	−7215	−8087	−9104	−10,301	−10,991
− Final consumption	−10,565	−11,089	−15,962	−29,403	−31,584	−31,904	−34,550	−38,351	−38,771
= Net national savings	−136	4368	8553	13,386	17,802	24,526	23,371	17,133	7250
+ Education expenditure	429	696	974	2559	2959	3338	3492	3537	3114
− Energy depletion	−2766	−6149	−9706	−16,098	−24,548	−26,432	−26,764	−23,968	−12,272
− Mineral depletion	−1	0	0	−6	−7	−6	−5	−5	−4
− Net forest depletion	0	0	0	−1	−1	−1	−1	−2	−2
− Carbon dioxide damage	−94	−149	−242	−529	−629	−692	−738	−778	–
− Particulate emission damage	−28	−27	−40	−57	−72	−79	−85	−85	−68
= Adjusted net national saving	−2596	−1261	−461	−747	−4497	654	−730	−4168	–

(*continued*)

Table 6.14 (continued)

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	% of gross national income (GNI)								
Gross domestic product	103.0	104.0	104.0	106.5	106.5	106.2	104.3	105.7	103.4
+ Net income from abroad	−3.0	−4.0	−4.0	−6.5	−6.5	−6.2	−4.3	−5.7	−3.4
= Gross national income (GNI)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
− Consumption of fixed capital	−11.2	−9.8	−10.4	−11.9	−11.3	−10.7	−11.5	−14.2	−15.6
= Net national income	88.8	90.2	89.6	88.1	88.7	89.3	88.5	85.8	84.4
− Natural resources depletion	−20.6	−32.8	−32.5	−29.3	−38.5	−36.6	−35.4	−31.3	−18.2
= Adjusted net national income	68.1	57.4	57.1	58.8	50.2	52.7	53.2	54.5	66.3
Net national income	88.8	90.2	89.6	88.1	88.7	89.3	88.5	85.8	84.4
+ Net transfers	−11.0	−7.7	−7.6	−10.4	−11.3	−11.2	−12.0	−13.4	−16.3
− Final consumption	−78.8	−59.1	−53.4	−53.4	−49.5	−44.2	−45.6	−50.0	−57.4
= Net national savings	−1.0	23.3	28.6	24.3	27.9	34.0	30.9	22.3	10.7
+ Education expenditure	3.2	3.7	3.3	4.6	4.6	4.6	4.6	4.6	4.6
− Energy depletion	−20.6	−32.8	−32.5	−29.2	−38.5	−36.6	−35.4	−31.3	−18.2
− Mineral depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Net forest depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Carbon dioxide damage	−0.7	−0.8	−0.8	−1.0	−1.0	−1.0	−1.0	−1.0	–
− Particulate emission damage	−0.2	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1
= Adjusted net national saving	−19.4	−6.7	−1.5	−1.4	−7.0	0.9	−1.0	−5.4	–

Source: The World Bank—World Development Indicators, March 2018

Table 6.15 Test for sustainable development of Qatar

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	Million US $ at current prices								
Gross domestic product	8138	17,760	44,530	125,122	167,775	186,834	198,728	206,225	164,641
+ Net income from abroad	237	–	−5716	−12,944	−13,271	−12,125	−10,364	−9301	−3565
= Gross national income (GNI)	8375	–	38,815	112,179	154,504	174,709	188,364	196,924	161,076
– Consumption of fixed capital	−1048	−2008	−3862	−17,396	−22,925	−25,547	−27,238	−28,642	−22,990
= Net national income	7327	–	34,952	94,783	131,579	149,162	161,126	168,282	138,087
– Natural resources depletion	−1031	–	−3382	−5477	−8718	−9280	−9524	−8145	−4035
= Adjusted net national income	6296	–	31,571	89,306	122,860	139,881	151,602	160,138	134,051
Net national income	7327	–	34,952	94,783	131,579	149,162	161,126	168,282	138,087
+ Net transfers	–	–	–	–	−12,651	−14,058	−14,732	−17,514	−15,704
– Final consumption	−5201	−6197	−13,478	−37,729	−41,022	−47,936	−57,869	−64,441	−68,723
= Net national savings	–	–	–	–	77,907	87,168	88,524	86,327	53,660
+ Education expenditure	175	–	768	2293	3346	3997	4539	4986	4078
– Energy depletion	−1031	−1827	−3381	−5477	−8718	−9280	−9524	−8144	−4035
– Mineral depletion	0	0	0	0	0	0	0	0	0
– Net forest depletion	0	–	0	0	0	0	0	0	0
– Carbon dioxide damage	−182	−237	−421	−707	−813	−877	−941	−1003	–
– Particulate emission damage	−17	−20	−47	−57	−72	−77	−82	−82	−64
= Adjusted net national saving	–	–	–	–	71,650	80,931	82,517	82,083	–

(*continued*)

Table 6.15 (continued)

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	% of gross national income (GNI)								
Gross domestic product	97.2	–	114.7	111.5	108.6	106.9	105.5	104.7	102.2
+ Net income from abroad	2.8	–	−14.7	−11.5	−8.6	−6.9	−5.5	−4.7	−2.2
= Gross national income (GNI)	100.0	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0
− Consumption of fixed capital	−12.5	–	−10.0	−15.5	−14.8	−14.6	−14.5	−14.5	−14.3
= Net national income	87.5	–	90.0	84.5	85.2	85.4	85.5	85.5	85.7
− Natural resources depletion	−12.3	–	−8.7	−4.9	−5.6	−5.3	−5.1	−4.1	−2.5
= Adjusted net national income	75.2	–	81.3	79.6	79.5	80.1	80.5	81.3	83.2
Net national income	87.5	–	90.0	84.5	85.2	85.4	85.5	85.5	85.7
+ Net transfers	–	–	–	–	−8.2	−8.0	−7.8	−8.9	−9.7
− Final consumption	−62.1	–	−34.7	–	−26.6	−27.4	−30.7	−32.7	−42.7
= Net national savings	–	–	–	–	50.4	49.9	47.0	43.8	33.3
+ Education expenditure	2.1	–	2.0	2.0	2.2	2.3	2.4	2.5	2.5
− Energy depletion	−12.3	–	−8.7	−4.9	−5.6	−5.3	−5.1	−4.1	−2.5
− Mineral depletion	0.0	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Net forest depletion	0.0	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Carbon dioxide damage	−2.2	–	−1.1	−0.6	−0.5	−0.5	−0.5	−0.5	–
− Particulate emission damage	−0.2	–	−0.1	−0.1	0.0	0.0	0.0	0.0	0.0
= Adjusted net national saving	–	–	–	–	46.4	46.3	43.8	41.7	–

Source: The World Bank—World Development Indicators, March 2018

Table 6.16 Test for sustainable development of Saudi Arabia

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	Million US $ at current prices								
Gross domestic product	143,343	189,515	328,460	528,207	671,239	735,975	746,647	756,350	651,757
+ Net income from abroad	2191	892	2715	7044	9684	9695	10,969	13,553	19,006
= Gross national income (GNI)	145,534	190,407	331,174	535,251	680,923	745,670	757,616	769,903	670,763
– Consumption of fixed capital	–15,423	–16,430	–27,218	–44,410	–48,555	–54,449	–64,048	–67,161	–61,024
= Net national income	130,111	173,977	303,957	490,842	632,368	691,221	693,567	702,742	609,739
– Natural resources depletion	–10,208	–22,540	–56,660	–69,682	–106,930	–114,896	–106,585	–98,603	–50,602
= Adjusted net national income	119,904	151,438	247,297	421,160	525,438	576,325	586,982	604,139	559,137
Net national income	130,111	173,977	303,957	490,842	632,368	691,221	693,567	702,742	609,739
+ Net transfers	–16,694	–15,490	–14,778	–27,921	–29,386	–30,438	–35,869	–38,734	–44,707
– Final consumption	–100,455	–117,573	–156,602	–277,224	–311,953	–356,422	–391,268	–439,737	–457,473
= Net national savings	12,963	40,914	132,577	185,697	291,029	304,360	266,430	224,272	107,559
+ Education expenditure	7844	13,576	24,025	38,364	48,808	53,533	54,464	55,359	47,549
– Energy depletion	–10,207	–22,539	–56,658	–69,577	–106,781	–114,608	–106,367	–98,452	–50,462
– Mineral depletion	–1	–1	–2	–105	–149	–288	–218	–151	–140
– Net forest depletion	0	0	0	0	0	0	0	0	0
– Carbon dioxide damage	–1396	–2022	–3223	–5010	–5043	–5467	–5756	–6116	–
– Particulate emission damage	–358	–468	–515	–801	–889	–1029	–1141	–1141	–977
= Adjusted net national saving	8845	29,461	96,203	148,568	226,975	236,502	207,411	173,770	–

(*continued*)

Table 6.16 (continued)

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	% of gross national income (GNI)								
Gross domestic product	98.5	99.5	99.2	98.7	98.6	98.7	98.6	98.2	97.2
+ Net income from abroad	1.5	0.5	0.8	1.3	1.4	1.3	1.4	1.8	2.8
= Gross national income (GNI)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
− Consumption of fixed capital	−10.6	−8.6	−8.2	−8.3	−7.1	−7.3	−8.5	−8.7	−9.1
= Net national income	89.4	91.4	91.8	91.7	92.9	92.7	91.5	91.3	90.9
− Natural resources depletion	−7.0	−11.8	−17.1	−13.0	−15.7	−15.4	−14.1	−12.8	−7.5
= Adjusted net national income	82.4	79.5	74.7	78.7	77.2	77.3	77.5	78.5	83.4
Net national income	89.4	91.4	91.8	91.7	92.9	92.7	91.5	91.3	90.9
+ Net transfers	−11.5	−8.1	−4.5	−5.2	−4.3	−4.1	−4.7	−5.0	–
− Final consumption	−69.0	−61.7	−47.3	−51.8	−45.8	−47.8	−51.6	−57.1	−68.2
= Net national savings	8.9	21.5	40.0	34.7	42.7	40.8	35.2	29.1	–
+ Education expenditure	5.4	7.1	7.3	7.2	7.2	7.2	7.2	7.2	7.1
− Energy depletion	−7.0	−11.8	−17.1	−13.0	−15.7	−15.4	−14.0	−12.8	−7.5
− Mineral depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Net forest depletion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
− Carbon dioxide damage	−1.0	−1.1	−1.0	−0.9	−0.7	−0.7	−0.8	−0.8	–
− Particulate emission damage	−0.2	−0.2	−0.2	−0.1	−0.1	−0.1	−0.2	−0.1	−0.1
= Adjusted net national saving	6.1	15.5	29.0	27.8	33.3	31.7	27.4	22.6	–

Source: The World Bank—World Development Indicators, March 2018

Table 6.17 Test for sustainable development of United Arab Emirates

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	Million US $ at current prices								
Gross domestic product	65,744	104,337	180,617	289,880	350,908	374,818	390,427	403,198	357,949
+ Net income from abroad	–	–	2886	−100	110	297	1579	659	1743
= Gross national income (GNI)	–	–	183,503	289,781	351,018	375,115	392,007	403,857	359,692
– Consumption of fixed capital	−7963	−7725	−19,463	−21,449	−22,681	−25,262	−26,363	−29,013	−30,462
= Net national income	–	–	164,040	268,332	328,337	349,854	365,643	374,844	329,230
– Natural resources depletion	–	–	−8512	−13,719	−21,316	−24,609	−25,906	−24,075	−11,851
= Adjusted net national income	–	–	155,529	254,612	307,022	325,245	339,738	350,768	317,379
Net national income	–	–	164,040	268,332	328,337	349,854	365,643	374,844	329,230
+ Net transfers	–	–	–	–	–	–	–	–	–
– Final consumption	–	–	−115,984	−215,229	−240,373	−236,083	−254,816	−278,449	−253,189
= Net national savings	–	–	–	–	–	–	–	–	–
+ Education expenditure	–	–	–	–	–	–	–	–	–
– Energy depletion	−1841	−4097	−8512	−13,719	−21,316	−24,609	−25,906	−24,075	−11,851
– Mineral depletion	0	0	0	0	0	0	0	0	0
– Net forest depletion	–	–	0	0	0	0	0	0	0
– Carbon dioxide damage	−417	−767	−941	−1575	−1730	−1902	−2035	−2182	–
– Particulate emission damage	−213	−294	−411	−687	−926	−944	−966	−1019	−984
= Adjusted net national saving	–	–	–	–	–	–	–	–	–

(*continued*)

Table 6.17 (continued)

	1995	*2000*	*2005*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
	% of gross national income (GNI)								
Gross domestic product	–	–	98.4	100.0	100.0	99.9	99.6	99.8	99.5
+ Net income from abroad	–	–	1.6	0.0	0.0	0.1	0.4	0.2	0.5
= Gross national income (GNI)	–	–	100.0	100.0	100.0	100.0	100.0	100.0	100.0
– Consumption of fixed capital	–	–	−10.6	−7.4	−6.5	−6.7	−6.7	−7.2	−8.5
= Net national income	–	–	89.4	92.6	93.5	93.3	93.3	92.8	91.5
– Natural resources depletion	–	–	−4.6	−4.7	−6.1	−6.6	−6.6	−6.0	−3.3
= Adjusted net national income	–	–	84.8	87.9	87.5	86.7	86.7	86.9	88.2
Net national income	–	–	89.4	92.6	93.5	93.3	93.3	92.8	91.5
+ Net transfers	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0
– Final consumption	–	–	−63.2	−74.3	−68.5	−62.9	−65.0	−68.9	−70.4
= Net national savings	–	–	–	–	–	–	–	–	–
+ Education expenditure	–	–	–	–	–	–	–	–	–
– Energy depletion	–	–	−4.6	−4.7	−6.1	−6.6	−6.6	−6.0	−3.3
– Mineral depletion	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0
– Net forest depletion	–	–	0.0	0.0	0.0	0.0	0.0	0.0	0.0
– Carbon dioxide damage	–	–	−0.5	−0.5	−0.5	−0.5	−0.5	−0.5	–
– Particulate emission damage	–	–	−0.2	−0.2	−0.3	−0.3	−0.2	−0.3	−0.3
= Adjusted net national saving	–	–	–	–	–	–	–	–	–

Source: The World Bank—World Development Indicators, March 2018

consumption ratios in recent years. Due to substantial net income from abroad, GNI is larger than GDP throughout the whole period.

Is Oman the problem-child of the GCC at present? Oman is the only GCC country for which the test for sustainable development failed. The adjusted net savings ratio in the last row of Table 6.14 is negative throughout the period due to heavy allocation for energy depletion and negative income from abroad. As a consequence, it must be expected that the combined capital stock of man-made capital and natural capital declined.

The test for sustainable development of Qatar in Table 6.15 shows favourable results. In 2014, the share of adjusted net savings in GNI is 41.7% despite negative income from abroad. The allocations for natural resources depletion are relatively modest and the share of consumption in GNI very low.

In Table 6.16, the test of sustainable development is applied to Saudi Arabia. Saudi Arabia has significant net incomes from abroad, low allocations for consumption of fixed capital, moderate allocation for natural resource depletion and the highest allocations for education expenditures of the GCC countries. Since 2005, adjusted net savings are in the range of 20–30 per cent of GNI. This level is an achievement as it even exceeded the corresponding level of Norway.

Table 6.17 includes the test for sustainable development of the United Arab Emirates. Unfortunately, no information is available on net transfers and education expenditure. Therefore, no estimate on net savings and net adjusted savings is available. However, the information on energy depletion allows assessing the adjusted net national income. The reported shares of energy depletion in GNI are low compared to other GCC countries.

In 2006, the World Bank published the *Little Green Data Book 2006* (World Bank 2006). In this assessment, energy depletion is equal to the product of unit resource rents and the physical quantities of energy extracted. It should be noted that a recent change in methodology in the new time series of the World Bank's World Development Indicators now estimates energy depletion as the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years), covering coal, crude oil and natural gas. The new results for 2005 are quite different from the previous ones in the *Little Green Data Book 2006* for the GCC countries. The significant revision of the methodology to estimate the depletion of natural resources brought about a sudden, and debatable, improvement in the estimate of adjusted savings for the GCC.

6 Conclusion

This article has argued that, perhaps contrary to established opinion, the economic diversification of GCC countries is well underway. In many ways, the GCC countries are approaching the diversification levels of the reference country Norway. The test for sustainable development of GCC countries for the period 1995–2015 showed positive results for most years. In 2014, Qatar and Kuwait achieved high rates of adjusted net national saving per person; Qatar even surpassed the level of Norway. Bahrain and Saudi Arabia realised small positive rates. Oman was the only GCC country for which the test yielded a negative result. During the last 20 years (1995–2015), Bahrain, Kuwait, Qatar and Saudi Arabia had positive rates of adjusted net saving throughout the whole period, whereas for Oman the rate was only positive in 2012.

A full implementation of the input-output approach will only be possible if supply and use tables become available for all GCC countries, which are comparable, have the same number of products and industries and use the same classification of the System of National Accounts 2008—SNA 2008 (United Nations 2009). At the moment, only selected input-output tables are available for Kuwait and Saudi Arabia. The National Statistical Offices of the GCC countries should be encouraged to compile annual supply and use tables as an integral part of their national accounts, which are in line with the SNA 2008.

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