Guide to Analyze Natural Resources in National Accounts

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GUIDE TO ANALYZE NATURAL RESOURCES IN NATIONAL ACCOUNTS AND APPENDIX SHOWING ILLUSTRATION FOR AUSTRALIA

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I. INTRODUCTION

1. **The *Guide to Analyze Natural Resources in the National Accounts* (*the Guide*) contains a set of Template Tables to show national accounts statistics on natural resources in a standard presentation that aid in the compilation of national accounts and in macroeconomic analysis of natural resources.** The natural resources covered are those that are extracted and sold by the mining industries, including oil and gas extraction. The types of transactions considered are those that fall within the scope of the core national accounts.[2]

2. **The Template Tables use the concepts recommended in the United Nations' *System of National Accounts 2008* (*SNA 2008*).** This facilitates comparisons of the natural resource industries with other parts of the economy and comparisons across economies. A supplementary treatment of the measurement of natural resources, including renewable resources, is provided by the *System of Environmental-Economic Accounting 2012–Central Framework* (*SEEA-CF*, United Nations and others, 2014).

3. **Economic activity associated with natural resources is significant for many economies.** The Fund expects that revenues from natural resources are, or could soon be, macro-critical for one-third of Fund member countries.[3] Nevertheless, the available data on natural resources to guide policymaking and assess economic performance have often been limited. As a step towards improving data availability in the area of Government Finance Statistics (GFS), the Fund has developed a *Template to Collect Data on Government Revenues from Natural Resources*[4] (or *GFS Template*) to guide the collection and presentation of existing data on government revenues and to facilitate future development of statistics on natural resources.[5]

4. ***The Guide* is a companion to the *Template to Collect Government Revenues from Natural Resources (GFS Template).*** A detailed discussion of the recording of transactions that provide income to the government is available in the *GFS Template*, allowing discussion of these transactions here to be more condensed. In addition, the definitions of the natural resource industry and products that are sold to downstream industries or final users are aligned with those of the *GFS Template*. On the other hand, a broader range of

[2] Guidance on environmental accounts for natural resources and other topics not covered here is found in the *System of Environmental-Economic Accounting 2012–Central Framework* (*SEEA-CF*, United Nations*, et al*., 2014).

[3] See *Fiscal Regimes for Extractive Industries: Design and Implementation,* http://www.imf.org/external/np/pp/eng/2012/081512.pdf, and *Macroeconomic Policy Frameworks for Resource Rich Developing Countries*, http://www.imf.org/external/np/pp/eng/2012/082412.pdf.

[4] Accessed at: http://www.imf.org/external/pubs/ft/gfs/manual/comp.htm).

[5] The Fund has also a model for Fiscal Analysis of Resource Industries (FARI) to project the fiscal impact of natural resource projects. See http://www.imf.org/external/np/fad/fari/index.htm.

methodological and analytical questions arise in the national accounts than in measuring government revenues, and these sometimes require answers that appear to differ from the approach taken in the *GFS Template.* For example, in measuring the output of the natural resource industries, the relevant products are not limited to goods that are sold to downstream industries (which are on the list of natural resource products in the *GFS Template*), because fixed assets for extracting natural resources, such as oil wells, must also be included.

5. **The management of natural resources is an important function of government, and statistics are needed to support analysis of macroeconomic impacts of natural resources.** For countries that rely heavily on natural resources, fluctuations in government revenues, exports, employment, and national income caused by changes in the output and prices of natural resources have major macroeconomic and fiscal implications. Sound policymaking when such issues are present requires accurate and complete coverage of relevant industries in the national accounts and analytical measures to assess the macroeconomic effects.

6. **The Managing Natural Resource Wealth-Topical Trust Fund (MNRW-TTF) has been established to assist countries develop the capacity to effectively manage their economy's natural resources.** *The Guide* is funded as a project under the MNRW-TTF, and builds upon the *GFS Template* by expanding coverage to the full suite of economic units and macroeconomic accounts specified by *SNA 2008*.

7. **The *Guide* is designed to meet multiple needs and purposes.** The statistics covered here can provide context for government revenues raised from the extractive industries presented in country reports of the Extractive Industries Transparency Initiative (EITI). *The Guide* is being field tested with a diverse range of stakeholders, including statistical compilers. Data are shown at a relatively high level of aggregation, but the structure can be expanded to include data with greater granularity to support specific user needs. In addition, the circumstances in a country may mean that some of the data elements presented below are unnecessary or impractical to provide.

8. ***The Guide* presents transactions and other items from the core national accounts related to the natural resources industries and the products they produce.** Measurement of depletion, values of natural assets and other aspects of the environmental economic accounts for natural resources based on the conceptual framework of the *SEEA-CF* is not covered here but is also important to have a full picture of natural resources and the economy. Types of economic statistics on natural resources that are beyond the scope of this guide are covered by *Statistics for Economies Based on Natural Resources,* a handbook produced by the Ulaanbaatar City Group, and by the *Energy Statistics Compiler's Manual* of the Oslo City Group.

9. **The main body of this guide comprises two sections.** The first of these sections defines the natural resource products and industries. The next section presents and explains

six Template Tables that guide compilation of national accounts for natural resources and provide analytical tools for understanding the macroeconomic impact of changes in natural resource output and prices.

II. Definition of Natural Resources and Natural Resource Products and Industries

10. **The *SNA 2008* (10.164) defines natural resources as non-produced, naturally occurring assets, where non-produced means that the assets are not created by a production process.** The SNA recognizes three types of non-produced, nonfinancial assets: natural resources; contracts, leases and licenses; and purchased goodwill and marketing assets. Natural resources can be divided into: (a) renewable resources, such as uncultivated forests and fish stocks; (b) land; and (c) non-renewable resources, which consist mainly of deposits of minerals that have an economic value.

11. **The *Guide* focuses on non-renewable natural resources and, for convenience, the term natural resources is used here to refer to non-renewable natural resources**. *The Guide* also focuses narrowly on the types of transactions covered by the national accounts. Environmental economic accounts for natural resources are not covered by the *Guide*.

A. Natural Resource Products

12. **Natural resource products may be extracted and sold with only minor processing, or they may undergo primary or secondary processing.** How far downstream to draw the boundary of natural resource products is open to debate, and the answer may depend on the specific circumstances in the economy and the purpose of the analysis. For example, refined petroleum products or metal ingots that are manufactured from natural resources extracted from within the national economic territory (locally sourced natural resources) are important to include in exports of natural resources products when analyzing balance of payments effects, even though they would not be included when analyzing other questions, such as the role of the extractive industries in the economy.

13. **As a general rule, manufactured products that have undergone secondary processing are not considered to be natural resource products**. On the other hand, a natural resource that has undergone the primary processing that is necessary for it to be sold for the first time, remains a natural resource product. Minerals and hydrocarbons that have undergone such primary processing usually generate the bulk of natural resources revenues for governments and are often a focus of international organizations. In particular, the EITI collects data on all material revenues received by governments from oil, gas, and mining enterprises. It includes all activities related to exploration, development, and production from mineral assets up to the point where the minerals extracted are in a marketable state without further processing.

14. **A list of the relevant natural resource products for this *Guide* is in Box 1.** The products are shown at the class level of Central Product Classification Version 2.1 (CPC 2.1).[6] Although this list provides a standard definition of the natural resource products, products that have undergone secondary processing may also be included if the available data at the enterprise level combine the extraction and secondary processing activities. For example, crude oil may be extracted and refined by establishments that belong to the same enterprise. In addition, natural resources subject to secondary processing before being exported should usually be included when analyzing exports of natural resource products.

15. **Fixed capital assets and services produced by the natural resource industries must also be considered in compiling national accounts.** These are shown in Box 2, and include structures used for exploration or extraction, such as wells and mine shafts, or for transport via pipeline. Services to transport via pipeline may also be treated as a natural resource product along with specialized support services for mining or petroleum extraction. Mineral exploration partly falls within the detailed description of product class 8621, support services for mining. However, to compile an estimate of intellectual property products that includes mineral exploration as recommended in *SNA 2008* (10.98), mineral exploration products must be separately identified. This can be accomplished by creating a more detailed level of aggregation within the CPC 2.1 subclass codes of class 8621 or by classifying all mineral exploration activities in CPC 2.1 subclass 83413, mineral exploration.

16. **Natural resource projects have four phases: exploration, development, extraction, and environmental remediation**. Most expenses during the exploration phase, including licensing and acquisition costs, surveys and appraisals, and drilling and test bores, are included in the fixed capital formation category of mineral exploration and evaluation (*SNA 2008,* 10.106). (Mineral exploration and evaluation is one of the intellectual property assets.) However, fixed assets that are produced in the development phase, such as oil wells or mine shafts, should be classified as structures, as they will be used for extraction purposes.

[6] CPC version 2.1 was released in August 2015 and posted at: http://unstats.un.org/unsd/cr/registry/cpc-21.asp. The natural resource goods are as identified in the *GFS Template.*

Box 1. Natural Resource Products	
Class	**Description**
	Ores and Minerals
1101	Coal, not agglomerated
1103	Lignite, not agglomerated
1104	Lignite, agglomerated
1105	Peat
1201	Petroleum oils and oils obtained from bituminous minerals, crude
1202	Natural gas, liquefied or in the gaseous state
1203	Bituminous or oil shale and tar sands
1300	Uranium and thorium ores and concentrates
1410	Iron ores and concentrates, other than roasted iron pyrites
1421	Copper, ores and concentrates
1422	Nickel ores and concentrates
1423	Aluminum ores and concentrates
1424	Precious metal ores and concentrates
1429	Other non-ferrous metal ores and concentrates (other than uranium or thorium ores and concentrates)
1511	Slate
1512	Marble and other calcareous monumental or building stone
1513	Granite, sandstone and other monumental or building stone
1520	Gypsum, anhydrite, limestone flux, limestone, and other calcareous stone, of a kind used for the manufacture of lime or cement
1531	Natural sands
1532	Pebbles, gravel, broken or crushed stone, macadam; granules, chippings and powder of stone
1533	Bitumen and asphalt, natural asphaltites, and asphaltic rock
1540	Clays
1611	Natural calcium phosphates, natural aluminum calcium phosphates, and phosphatic chalk
1612	Unroasted iron pyrites
1619	Other chemical minerals
1620	Salt and pure sodium chloride; sea water
1631	Precious stones and semiprecious stones, unworked or simply sawn or roughly shaped
1632	Industrial diamonds, unworked or simply sawn, cleaved or bruted; pumice stone; emery; natural corundum, natural garnet and other natural abrasives
1633	Chalk and dolomite
1639	Other minerals n.e.c.
1720	Coal gas, water gas, producer gas and similar gases, other than petroleum gases and other gaseous hydrocarbons. Include: Coal gas, such as coal seam gas and other extracted gases.
	Metal Products
4131	Silver (including silver plated with gold or platinum), unwrought or in semi-manufactured forms, or in powder form. Include: unwrought or in powder form.
4132	Gold (including gold plated with platinum), unwrought or in semi-manufactured forms, or in powder form. Include: unwrought or in semi-manufactured forms, or in powder form, gold bars.
4133	Platinum, unwrought or in semi-manufactured forms, or in powder form. Include: unwrought or in powder form.
4134	Base metals or silver, clad with gold, not further worked than semi-manufactured. Include: only those products upstream from semi-manufactured.
4135	Base metals clad with silver, and base metals, silver or gold clad with platinum, not further worked than semi-manufactured. Include only those products downstream from semi-manufactured.
4141	Copper unwrought, copper mattes, cement copper. Include: Copper mattes; cement copper, unrefined copper.
4142	Nickel, unwrought; intermediate products of nickel metallurgy. Include: Nickel mattes.
4143	Aluminum unwrought; alumina. Include: alumina.
Source: United Nations Central Product Classification 2.1 (http://unstats.un.org/unsd/cr/registry/cpc-21.asp).	

17. In some cases, the classification system of CPC 2.1 groups a natural resource product together with one or more non-natural resource products, even at the subclass level. Some examples of this are found in product classes 1720 to 4143 of Box 1. Also, in Box 2, liquefaction of natural gas for transport purposes when done away from the well site is part of CPC 2.1 class 6799, "Other supporting transport services." To distinguish natural resources products, country-specific codes that are suitable for a resource-intensive economy can be created by adding extra digits to the CPC 2.1 subclass code.

Box 2. Fixed Assets and Services Produced by Natural Resource Industries	
Class or Subclass	**Description**
	Fixed asset and services products
54261	General construction services for mines
65131	Transport services via pipeline of petroleum and natural gas
6722	Bulk liquid or gas storage services
6799	Other supporting transport services (liquefaction of natural gas component)
7335	Licensing services for the right to use mineral exploration and evaluation
83413	Mineral exploration and evaluation
8621	Support services to mining
Source: United Nations Central Product Classification 2.1 (http://unstats.un.org/unsd/cr/registry/cpc-21.asp).	

B. Natural Resources Industries

18. The natural resource industries comprise the extractive industries defined in the *ISIC, revision 4 (ISIC 4)*,[7] together with other establishments whose primary activity is producing one of the products shown in Box 1 or Box 2. The extractive industries defined in section B of *ISIC 4* (Mining and Quarrying) are shown in Box 3, together with other natural resource industries identified in the *GFS Template*. In the cases of the *ISIC 4* industry group 242 and classes 4930 and 5221, only some of the detailed activities in the *ISIC 4* class fall within the natural resource industries. In particular, only the part of industry class 242 involving production of mattes of copper and nickel is included, only the part of class 4930 involving transport of gas, crude petroleum and other extracted minerals is included, and only the part of class 5221 involving liquefaction of natural gas for transport is included.[8] Nevertheless, as a practical solution, countries may choose to include or exclude all of the establishments in a given class depending on whether natural resource products account for half of the output of these establishments.

[7] International Standard Industrial Classification of All Economic Activities, Revision 4 (http://unstats.un.org/unsd/cr/registry/isic-4.asp)

[8] Liquefaction of gas at the well site is included in class 0910.

Box 3. *ISIC 4* Industries Engaged in Natural Resource Activities

Section	Group/Class	Description	Engages in Extractive Activity*	Related to Extractive Activity*
B		**Mining and quarrying**	Y	
	05	**Mining of coal and lignite**	Y	
	051	Mining of hard coal	Y	
	052	Mining of lignite	Y	
	06	**Extraction of crude petroleum and natural gas**	Y	
	061	Extraction of crude petroleum	Y	
	062	Extraction of natural gas	Y	
	07	**Mining of metal ores**	Y	
	071	Mining of iron ores	Y	
	072	Mining of non-ferrous metal ores	Y	
	08	**Other mining and quarrying**	Y	
	810	Quarrying of stone, sand and clay	Y	
	890	Mining and quarrying n.e.c.	Y	
	09	**Mining support service activities**	N	Y
	091	Support activities for petroleum and natural gas extraction	N	Y
	099	Support activities for other mining and quarrying	N	Y
C		**Manufacturing**		
	24	**Manufacture of basic metals**		
	242	Manufacture of basic precious and other non-ferrous metals	N	Y
H		**Transportation and storage**		
	4930	Transport via pipelines	N	Y
	5221	Service activities incidental to land transportation	Y	

*Y—Yes N—No
Source: International Standard Industrial Classification of All Economic Activities, Rev.4 (*ISIC*).

19. **In the *SNA 2008*, industries are composed of the establishments engaged in the same kind of economic activity**. Establishments that engage in more than one type of activity are classified based on their primary activity (but if the secondary activity is important, a second establishment may be created for statistical purposes). An establishment may belong to an enterprise that owns other establishments. When an enterprise has extractive industry establishments and establishments engaged in secondary processing of natural resources, such as an integrated oil company that extracts and refines petroleum, items that are reported at the enterprise level may have to be allocated to establishments. If this is impractical, the definition of the natural resource industry may be expanded to include the secondary processing activity so that entire enterprises can be included.

C. Processing and Transport of Imported Natural Resources

20. **Services for transport and processing of natural resources imported from another economic territory country are generally not included in the definition of a country's natural resources industries.** Processing and transport of natural resources have been included in general definition of natural resource industries because of their close links to extractive activities within a country, but when the natural resources come from other countries, this reason to include the transport and processing activities does not apply. Excluding the transport and processing services that facilitate sale of imported natural

resources from the definition of a country's natural resource industries is often appropriate. For example, a natural gas pipeline that transports imported gas that a country uses for final consumption would not be treated as part of that country's natural resource industries.

21. **Nevertheless, the circumstances and the purpose of the analysis may sometimes warrant inclusion of services to transport or process foreign-origin natural resources in a country's natural resource industries.** For example, if the provider of the transport services receives an economic ownership interest in the natural resource, their economic role resembles that of a partner in the natural resources extraction. This sort of arrangement might occur in the case of a pipeline that transports crude oil from another country across the economic territory for sale to third parties. A possible indicator of whether to include an oil pipeline in the natural resource industries may be whether income from the oil is shared between the non-resident extractor and the resident pipeline. Services to transport or process foreign-origin natural resources may also be included in a country's natural resource industries for practical reasons if the data do not allow these services to be separately distinguished from transport or processing of local-origin natural resources.

III. Template Tables for Natural Resources in the National Accounts

A. General Considerations

22. **The Template Tables are designed to be consistent with the conceptual framework of the *SNA 2008*.** This framework treats the payments received by owners of natural resources for providing the right to extract those resources as rent. Treating these payments as rent makes them distributions of income, not purchases of services (or taxes, in the case of payments to the government that owns the resources). Another feature of the *SNA 2008* framework is the absence of a deduction for depletion in measuring the income of owners of natural resources. In contrast, payments for the use of produced assets, which include "rentals," are classified as purchases of services, and a deduction for consumption of fixed capital is made when calculating the net income of the asset owner. An alternative treatment of depletion of natural resource reserves as a subtraction from income may be presented in an environmental satellite account, as discussed in the *SEEA-CF*.

23. **In the SNA framework, taxes on products levied on the output of an industry are not viewed as paid by the industry, but rather by the buyer.** This makes the treatment of taxes on products produced by natural resource industries more complicated here than in the *GFS Template*. In the *GFS Template*, those taxes are included in government revenues from natural resources under the headings of general taxes on goods and services (GFS code 1141), excises (GFS code 1142) or taxes on exports (GFS code 1152). Here the taxes that are not in the national accounts definition of the taxes paid by the natural resource industries are shown as a memo item in the addendum section of the relevant template.

24. **The Template Tables are designed to be general enough to allow any relevant transaction to be included.** Countries will often not fill out a template table in its entirety. In many countries, only a subset of the items shown will be relevant.

25. **If an enterprise has establishments in multiple industries, the data on the income of the enterprise may be impossible to allocate to individual establishments.** This is a problem because, for purposes of analyzing production of natural resource products, the output of each establishment should be assigned to the appropriate industry. It will likely be necessary to include all the establishments of the enterprise, even those that do not produce natural resource products, when analyzing income from natural resources. Income flows are important to track, but doing so may require the acceptance of a broader definition of the natural resource industries to cover entire enterprises in cases where the enterprise's other activities, such as secondary processing, are combined with its natural resources activity. The template for tracing the flows of the income generated by natural resources therefore covers the entire enterprise if the main activities of the enterprise fall within the natural resources industries. For example, an integrated oil company that extracts and refines petroleum would be included.

B. Template on the Importance of Natural Resource Industries in GDP

26. **Template Table 1 shows output, value added, taxes on products, and subsidies on products for the natural resources industries.** Totals of value added, taxes on products and subsidies on products are also shown for the economy as a whole. Output is measured at basic prices, and value added is calculated using basic prices to value output. Basic prices exclude taxes on products and include subsidies on products. Taxes on products of the natural resources industries excluding VAT that is deductible to the purchaser are shown to the right of value added. The last row combines all resident units and includes VAT. The sum across the last row of value added, taxes on products, and subsidies on products (a negative number) equals GDP. For reference, a numerical illustration of this table for Australia in 2012-13 is shown in the appendix.

27. **The standard measure of the output of an industry in national accounts is the sum of the output of every establishment in the industry, but this sum double counts output that is used by another establishment in the same industry to produce its own output.** Including only the output that is final an industry in the measure of an industry's consolidated output avoids this double counting. For example, the output of the mining support services industry is excluded from the consolidated output of natural resource industries as a group because this output is consumed by mining industries. Consolidated output for the economy as a whole equals GDP less net taxes on products plus imports. Estimation of annual supply and use tables is encouraged, and these tables allow consolidated (or "unduplicated") measures of the output of each natural resource industry, and of all natural resource industries as a group, to be compiled. Although the consolidated measure of

output is preferred for Table 1, the standard output measure is acceptable if estimation of consolidated output is impossible.

28. **Taxes on products levied on the output of the natural resources industries may represent a significant source of government revenue.** These taxes are based on the quantity or value of the products produced or sold, and consist of: nondeductible VAT, if any (GFS code 1141 in the IMF's *Government Finance Statistics Manual 2014*); excises (GFS code 1142); profits of fiscal monopolies (GFS code 1143); taxes on the use of goods, including pollution taxes (GFS code 1145), and other taxes on goods and services (GFS code 1146), if calculated based on production or sales; and taxes on exports (GFS code 1152). In national accounts, taxes on products are considered to be paid by the buyer of the products, not the seller. Yet, regardless of who is viewed as paying them, the taxes on products sold by the natural resource industries are part of government revenues from natural resources, and are included as such in the *GFS Template* and the EITI reports.

29. **Subsidies on products are likely to involve products used directly by consumers, and natural resource products defined in Box 1 are generally purchased by other industries, not consumers.** To show subsidies on refined petroleum products, such as gasoline or diesel fuel, the petroleum refining industry may be added to the set of natural resource industries defined in Box 2. In countries where subsidies on refined petroleum products are important, adding this industry would be appropriate.

30. **The proportion of an economy's value added at basic prices that comes from each industry is a standard way to analyze the relative significance of natural resources industries**. Nevertheless, national accounts aggregates are frequently shown as a proportion of GDP, rather than as a proportion of the total value added of all industries. Assume, as is normally the case, that taxes on products exceed subsidies on products. Then GDP will be larger than value added of all industries. Taxes on products less subsidies on products must be added to value added of all industries to obtain GDP because GDP is measured at purchasers' prices, which includes taxes on products net of subsidies on products, while the featured measure of value added is based on output at basic prices.

31. **Although purchasers' prices are not recommended for valuing the output of specific industries, producers' prices differ from purchasers' prices only in the treatment of VAT, and they can be used for an alternative measure of value added (*SNA 2008, 6.78*)**. The next to last column of Template Table 1 adds taxes on products other than VAT and subtracts subsidies on products to derive an alternative measure of relative significance of the natural resources industries. For example, if oil is sold for export at the world market price and is subject to excise or export taxes, in the next to last column of Table 1, the oil is valued at the same price that is used to measure exports in the expenditure approach to calculating GDP.

32. **The final column of Template Table 1 shows the importance of the natural resource industries in GDP as measured by ratios of value added at producers' prices to GDP**. The residual that is not assigned to any industry comprises VAT if producers' prices are used, and for purposes of finding shares of GDP, the similarity between producers' prices and the purchasers' price underlying the expenditure approach to GDP is conceptually appealing. Note, however, that the significance of the natural resources industries can also be measured using value added at basic prices. For example, the basic price approach is advantageous if an industry receives large amounts of subsidies on products, especially if value added is negative when subsidies on products are not included. While a negative number is meaningful—GDP would have been larger had the inputs used by the subsidized industry been deployed elsewhere—the price including the subsidies may give a meaningful measure of the industry's significance to the economy.

33. **Countries where natural resources are extracted may also import natural resources for processing or domestic uses**. Establishments included in natural resources industries that process or service natural resources extracted by resident establishments to enable them to be sold, may also process or service imported natural resources. In the national accounts, value added is recorded for each economic activity that takes place within a country's economic territory. For the purposes of measuring the significance of a country's natural resources industries, it is often appropriate to exclude the value added associated with processing or servicing foreign-origin natural resources. If the value added from processing and servicing foreign-origin natural resources cannot be estimated directly from the available source data, ratios based on relevant flows should be applied to allocate output and intermediate consumption so that only the activity relevant to natural resources extracted by resident establishments is recorded in Template Table 1.

34. Some of the output of the natural resource industries, particularly the support services for mining industry, is used for fixed capital formation. (For example, drilling for oil and geophysical or seismic surveys are typically done by contractors included the support services for mining industries.) However, imported goods and services are also used for fixed capital formation. Aggregate amounts of fixed capital formation are important indicators, and are reported in table 2, as discussed below.

Template Table 1. Importance of the Natural Resource Industries in GDP

ISIC code[a]	Description	Consolidated Output	Value Added (VA)	Taxes on Products[b]	Subsidies on Products	VA plus taxes less subsidies, or GDP[c]	*Percent of GDP*
0500	Mining of coal and lignite						
0600	Extraction of crude petroleum and natural gas						
0700	Mining of metal ores						
0800	Other mining and quarrying						
0900	Mining support service activities						
2420[d]	Manufacture of basic precious and other non-ferrous metals, components involving initial processed of extracted minerals						
4930[d]	Transport via pipeline of natural resource products						
5221[d]	Service activities incidental to land transportation, LNG liquefaction component						
	Natural Resource Industries						
	All Industries in the Economy						***100***

a. *International Standard Industrial Classification of All Economic Activities, Rev.4 (ISIC).*
b. Taxes on products of the natural resource industries omit VAT that is deductible to the purchaser. Total payments of VAT are included in the total for all resident units of taxes on products.
c. Total for all resident units equals GDP.
d. Only the relevant parts of the *ISIC* code are included.

C. Disposition of the Income Generated by the Natural Resources Industries

35. **An accounting for the disposition of the income generated by the natural resource industries is presented in Template Table 2.** Data on uses of income must be collected at the enterprise level rather than at the establishment level, so all of the income from domestic operations of resident enterprises that engage in a natural resource activity is included. The difference between the output of the establishments that belong to the natural resource industries and the overall output of the enterprises is shown on line 3 of the table. It may also be possible to separately identify the value added of the establishments producing natural resource products, which would allow a decomposition of the value added shown on line 8. An explanatory note on the reason for the discrepancy between the value added of the establishments in Template Table 1 and the value added data of the enterprises in Template Table 2 may accompany Template Table 2 if necessary. A numerical illustration of this table for Australia in 2012-13 is shown in the appendix.

36. **The main headings of Template Table 2 are intended for all users of the *Guide*, while the lines showing the composition of the main headings are optional.** (The main headings are: output, intermediate consumption, value added, compensation of employees, other taxes less subsidies on production, gross operating surplus, property income, current transfers, gross saving, gross capital formation, and net lending/borrowing.) The lines showing the detailed composition of each of the main headings are provided both to serve as

a reference on the items that should be included in at least some countries and to enable countries to provide as much detail as possible on the disposition of the income generated by their natural resources enterprises. These lines need not be filled out if source data are not readily available or the amounts involved are small. However, all users should report rent paid to owners of natural resources.

37. The top line of Template Table 2 shows the revenue received from sales of output plus the value of output used for capital formation. Taxes on products that are paid by buyers of the goods and services produced by natural resource enterprises are excluded here and shown instead in the addendum section. In other words, basic prices are used to value output. Note also that enterprises that produce natural resources products may have additional establishments that produce other kinds of goods and services as secondary or downstream outputs. The other products are included in the income from production of the natural resource enterprises.

38. **The part of the income from output that is used to purchase intermediate inputs is shown next.** Taxes on products, including import duties on items directly imported by the enterprise, are included in the prices paid for intermediate inputs. Taxes on the products purchased by the enterprises excluding VAT that is deductible or reimbursable are reported as a memo item in the addendum section of the table. Fees paid to government are treated as purchases of intermediate inputs if they entitle the payer to receive a service or cover the costs of government services used by the industry.

39. **The income arising from the value added by economic production equals the difference between output and intermediate consumption**. A portion of this income is used for compensation of employees, and another part of it is used for payment of taxes on production other than taxes on products. Other taxes on production include property taxes, business and professional licenses, licenses required for exploration or extraction, pollution taxes, and other taxes.

40. **Gross operating surplus is the amount of value added that remains after expenses for compensation of employees and other taxes less subsidies on production.** Gross operating surplus plus gross receipts of property income is the amount that is available for distribution as property income to investors and to owners of natural resources. The payments to investors consist of dividends and interest. If the government has a stake in enterprises engaged in natural resource activities within the country's economic territory, including state owned enterprises (SOEs), the dividends payable to the government may also be shown as an "of which" item.

41. **Direct foreign investment often plays an important role in the natural resource industries.** In the case of direct foreign investment, retained earnings of local corporations that are owned by multinational corporations (or other non-resident economic units) are treated as if they had been distributed and then reinvested by the non-resident owner. They

are therefore shown below dividends in the table as a kind of imputed distribution of property income.

42. **Payments of property income to the owners of natural resources are known as rent**. All users of the template should report rent payments of natural resource enterprises. Rent includes royalties, bonuses and license charges payable by natural resource enterprises. If the government is not the only recipient of royalty and license payments, the rent received by government may be shown separately in the table as an "of which" item.

43. **The government may also receive rent payments from foreign-owned or private natural resource enterprises as production entitlements or production sharing.** These enterprises may meet their production sharing obligations by making payments or transferring output to a state owned enterprise (SOE). In this case, the value of the payments and output that the SOE is entitled to receive should be rerouted through the general government sector. Rerouting means that government is recorded as receiving rent equal to the value of the production transferred to the SOE, and paying a current transfer to the SOE.

44. **Current transfers, which include taxes on income or capital gains, are another use of the gross operating surplus of natural resource enterprises**. Fines, forfeitures and penalties paid by natural resource enterprises are included in the line for "other current transfers." If SOEs are entitled to production sharing, the amounts received by the SOE are shown as current transfers made by the government from the rent that it has received in connection with production sharing. Note that a transfer received by an enterprise would be recorded as negative number in Template Table 2 because the table shows net payments *from* enterprises.

45. **Gross saving is the amount that remains after property income is distributed and income taxes and other current transfers are paid.** For natural resource enterprises, gross saving is, conceptually, equal to retained corporate earnings after tax but before charges for depreciation and depletion. Consumption of fixed capital, which is a charge for depreciation of fixed assets as calculated in national accounts, is subtracted from gross saving to obtain net saving, and also subtracted from gross fixed capital formation to obtain net fixed capital formation.

46. **Gross saving that is not used for capital transfers may be invested in produced assets, non-produced non-financial assets, or financial assets.** Net acquisitions of produced assets used in production are known as "gross fixed capital formation," where "gross," in this case, means gross of consumption of fixed capital. Net acquisitions of inventories include natural resource products produced but not yet sold, and work-in-progress. Some kinds of fixed capital assets used by extractive industries, such as major offshore oil and gas platforms and liquefied natural gas (LNG) plants, take more than one year to construct. To measure capital formation on an accrual basis, work-in-progress assets should be recorded for fixed assets that take more than one accounting period to construct, and

recording of work-in-progress is especially critical for assets that take more than a year to construct.

47. **The *SNA 2008* (17.316) allows payments for long-lived licenses to extract mineral reserves to be treated as acquisitions of non-produced, non-financial assets rather than as rent.** If this optional treatment is chosen for long-lived licenses, investment in such assets should be shown as one of the uses of gross saving, and excluded from rent.

48. **Net acquisition of financial assets less net incurrence of financial liabilities is known as net lending (+)/net borrowing (-)**. Net lending/net borrowing is estimated as the residual that remains after accounting for the uses of gross saving for capital formation, net payments of capital transfers, and net acquisitions of non-produced, non-financial assets.

49. **Government revenue from the taxes, rent and fees for services paid by the natural resource enterprises or buyers of their output is shown in the addendum to Template Table 2**. The total of the fees for services, other taxes on production, dividends, rent, and current transfers shown above is reported on the first line of the addendum. The second line of the addendum shows the taxes on products net of subsidies on products paid by natural resources enterprises on purchases of intermediate inputs and fixed assets. These taxes on products include import duties paid by natural resource enterprises, but they do not include VAT that is deductible or reimbursable.

50. **Total government revenues from natural resources include taxes on products that are paid by the buyers of the output of natural resource enterprises.** The third line of the addendum shows taxes on products net of subsidies on products on the output of natural resource enterprises. These taxes are recorded in the *GFS Template* as taxes on goods and services (*GFSM 2014* code 114) and are included in government revenues from natural resources in the reports of the EITI. They include excise taxes, export taxes, profits of fiscal monopolies, and VAT. Finally, for purposes of comparison, total government revenues from all sources are shown below total government revenues from natural resources.

51. **The next addendum section shows exports of natural resource products**. Locally produced natural resources subject to secondary processing before being exported should also be included, and their inclusion should be noted. Total exports of all goods and services are shown below exports of natural resources products for comparison purposes.

52. **Last, the addendum shows depletion of natural resource reserves.** Depletion is reported here rather than in the main part of the table because it is not a charge against income in national accounts and because it is not part of the core national accounts. Estimates of depletion may be reported by the extractive enterprises, or estimated by the national accountant. For comparison purposes, the last two lines of the addendum show the total value of reserves, and the total value of all assets of natural resource enterprises.

Template Table 2. Disposition of the Income of Natural Resource Enterprises

Line	Description	Value	Proportion of GDP
		(local currency)	(Percent)
1	**Output**		
2	Natural resource products		
3	Other products		
4	**Intermediate consumption at purchasers' prices**		
5	From domestic units, excluded government		
6	Fees and other purchases of government services		
7	Imported		
8	**Value added at basic prices**		
9	**Compensation of employees**		
10	Resident		
11	Non-resident		
12	**Other taxes less subsidies on production**		
13	**Gross operating surplus**		
14	**Property income, payments net of receipts**		
15	Interest		
16	Dividends		
17	Of which, to government		
18	Reinvested earnings on direct foreign investment		
19	Rent (royalties, bonuses, licenses, and production entitlements)		
20	Of which, to government		
21	**Current transfers, net**		
22	Taxes on income and other current taxes		
23	Net transfers from state owned enterprises		
24	Other current transfers		
25	**Gross Saving**		
26	**Gross capital formation**		
27	Gross fixed capital formation		
28	Consumption of fixed capital		
29	Net fixed capital formation		
30	Change in inventories		
31	**Capital transfers (paid less received)**		
32	**Acquisitions less disposals of non-produced, non-financial assets**		
33	**Net Lending**		
	Addendum:		
	Government revenue from payments by the natural resource enterprises[a]		
	Taxes less subsidies on products purchased by natural resource enterprises[b]		
	Taxes on products sold by natural resource enterprises, less subsidies		
	Total government revenue related to natural resources		
	Memo: Total government revenue from all sources		
	Exports of natural resource products (in local currency)[c]		
	Memo: Total exports		
	Depletion of reserves		
	Value of reserves (local currency)		
	Total assets (local currency)		

Sum of lines 6, 12, 17, 20, 22, 23, and applicable portions of 32.
Deductible or reimbursable VA is excluded.
Re-exports are excluded. If downstream products made from local natural resources are included, their presence should be noted.

D. Labor in the Natural Resource Industries

53. **Natural resources industries are generally labor intensive, and thus may play a significant role in the labor market.** Template Table 3 allows employment and compensation of employees in the natural resources industries to be compared with figures for the whole economy. The right column of the table derives average hourly compensation of employees based on hours worked for the natural resources industries, and provides comparable figures for all other activities and the economy as a whole.

54. **Hours worked is the preferred measure of labor input for purposes of comparing compensation generosity over time and across industries, or countries when expressed in a common currency.** Hours is also the preferred measure of labor inputs for purposes of calculating productivity growth from the change in value added per hour. Use of hours worked as the labor input concept instead of employment improves comparability because average hours worked can vary over time, across industries and countries. (Of course, the comparisons may still be affected by differences in occupational mix and human capital from education, training or experience.) Average hours worked may be available from a household survey. Where this information is not available, full time equivalent (FTE) employment or number of employees may be used – although multiple job holders may not handled consistently by these approaches.[9]

55. **To analyze labor productivity growth over time, value added is expressed in volume terms and divided by hours.** Value added per hour at current prices can be used to compare the natural resource industries to all other industries at a point in time.

Template Table 3. Labor in the Natural Resource Industries

	Employment	Compensation of Employees	Hours Worked[a]	Compensation of Employees per hour worked
	(simple count)	(local currency)		(local currency)
Natural Resource Industries[b]				
All other industries				
All Industries				

If actual hours worked are not estimated, full-time equivalent (FTE) employment or unadjusted employment may be used.
If the natural industries are defined differently from the set of natural resource enterprises covered by Table 2, the compensation of employees for the natural resource industry may differs from the corresponding number in Table 2. If this occurs, the effect of the difference in definitions should be noted.

[9] For example, consider one person working two jobs, one in the natural resource industry and the education industry. This individual will report as one employed person (i.e., employment) in the labor force survey classified to the predominant industry, but they will be recorded as two jobs in the employer survey.

E. Contributions of Natural Resource Industries to GDP Volume and Price Change

56. **The contribution of the natural resource industries to the volume change in GDP is an important analytical tool for measuring the effect of natural resources on a country's economic performance.** The general approach to calculating contributions to growth of these (and other) industries is shown in Template Table 4. The difference between the current year and the preceding year in the value added is calculated in column (3). In column (4) this level difference is divided by the GDP of the year t–1, and expressed as a percentage. (Another way to calculate an industry's contribution to GDP growth, which gives the same result, is to multiply its initial share of GDP as shown in Template Table 1 by the growth rate of its value added at constant prices.)

57. **Some countries calculate volume measures in a constant price framework, with updates of the base year at intervals of more than a year. In the constant price volume, both the current year and the preceding year are measured using the prices of a third base year**. The calculation of contributions to volume change in the constant price framework can be also derived from Template Table 4. The difference in value added between the current year and the preceding year (measured at constant prices of the base year) is divided by GDP of the preceding year (measured at prices of the base year) and then expressed as a percentage to calculate the contribution to volume change from the natural resource industry.

58. **If the contributions to change in GDP are calculated from value added at producers' prices (as is done in the last two columns of Template Table 1), the contribution of unallocated taxes on products in the next-to-last row of Template Table 4 will consist of VAT, while if basic prices are used, all taxes on products less subsidies on products will be included in the next-to-last row**. These definitions ensure that the contributions to change shown in the final column add up to the aggregate change in GDP. Producers' prices have the advantage of corresponding more closely to the prices used to calculate GDP based on final expenditures, while basic prices have the advantage of being the standard way that value added is measured in the production approach. Using basic prices may also prevent value added from being negative in cases of heavily subsidized products.

59. **Note that estimates of taxes or subsidies on products in volume (constant price) terms should always be calculated using volume extrapolation.** The volume of the tax or subsidy on a product must change in the same proportion as the volume of the product itself (*SNA 2008*, 14.148-152). The volume movement for the underlying product must first be determined (by either price deflation or quantity extrapolation applied to output, imports, or consumption), and then movement of the tax or subsidy on the product is calculated from the product's volume change. By way of example, an excise tax levied on natural gas should move in proportion to the volume of natural gas output. The approach of deflating taxes or subsidies on products directly by a price index such as a CPI or PPI should be avoided.

60. **Some countries use a chained index framework in which the prices used to calculate the volume change are updated annually.** With annual chaining, the prices of the preceding year are used to measure the volume of GDP in the current year. In this case, the value added of the natural resource industry in the preceding year is subtracted from the its value added in the current year measured at the prices of the preceding year. The difference in levels with prices held constant is then divided by the GDP of the preceding year to obtain the contribution to the volume change in GDP.

61. **Contributions of prices of natural resource industry outputs and intermediate inputs to the change in the GDP deflator may be calculated using an analogous approach to the one used for volume change contributions, as shown in Template Table 5**. However, the interpretation of such price change contributions is not straightforward because they show only the direct effects. Other things being equal, a change in the price of the output that is sold by a natural resource industry to a resident establishment in another industry will have offsetting effects on the two industries, but only the direct effect on the seller will be reflected in the price change contribution.

62. **The deflators for the outputs and intermediate consumption of the natural resource industries should always use appropriate individual prices for each product.** Assuming that the changes in input and output prices are the same may yield highly distorted results. This is especially likely in the case of the natural resource industries, where the prices often change rapidly. For example a sharp fall in the price of oil will not be reflected in a sharp fall on the intermediate uses, at least not in the short term.

Template Table 4. Contributions of Natural Resource Industries to GDP Volume Change

Industry or Industry Group	Value Added in Year t-1, at Prices of the Base Year[a]	Value Added in Year t, at prices of the Base Year[a]	Difference in Levels	Contribution to Percentage Change in GDP
	(1)	**(2)**	**(3) = (2) – (1)**	**(3) / GDP**
Mining of coal and lignite				
Extraction of crude petroleum and natural gas				
Mining of metal ores				
Other mining and quarrying				
Mining support service activities				
Transport and processing of crude natural resource commodities				
Natural resource industries				
All other industries				
Either **VAT** or **Taxes on products and imports less subsidies**[b]				
Gross Domestic Product				

a. Under an annual chaining approach, prices of year t-1 would be used in lieu of prices from a fixed base year.
b. If value added is measured at producers' prices, the unallocated residual will come from VAT, while if basic prices are used the residual will contain all taxes on products and imports less subsidies on products.

Template Table 5. Contributions of Prices Paid and Received by the Natural Resource Industries to the Change in the GDP Price Index since the Base Year

Industry or Industry Group	Value Added in Year t, at prices of the Base Year[a]	Value Added in Year t, at current prices	Difference in Levels	Contribution to Percent Change in GDP Deflator
	(1)	(2)	(3) = (2) – (1)	(3) / GDP
Mining of coal and lignite				
Extraction of crude petroleum and natural gas				
Mining of metal ores				
Other mining and quarrying				
Mining support service activities				
Transport and processing of crude natural resource commodities				
Natural resource industries				
All other industries[b]				
Gross Domestic Product				

Under an annual chaining approach, prices of year t-1 would be used in lieu of prices from a fixed base year
Includes net taxes on products.

F. Terms of Trade Effects

63. **Export and import prices have direct effects on GDP in current prices and on real income.** On the other hand, in concept, export and import prices have no direct affect on GDP in volume terms, because the definition of volume change excludes direct effects of price changes. Changes in export prices relative to import prices are known as changes in the terms of trade. An improvement in the terms of trade raises export revenues relative to import costs and makes it possible to increase consumption while maintaining the same trade balance.

64. **The high price volatility that is characteristic of natural resources means that terms of trade effects are particularly important for economies with large exports of natural resource products.** The terms of trade index is calculated as the ratio of the export price index to the import price index. This index provides a single summary statistic for the effects of changes in prices of internationally traded goods and services. In addition, the influence of natural resource products on the terms of trade can be shown by calculating export and import price indexes with and without natural resource products. Because changes in petroleum prices tend to be passed through to refined petroleum product prices, exports and imports of refined petroleum products should be included in the sensitivity analysis along with the natural resource products defined in Box 1. These indexes are shown in Template Table 6. A numerical illustration for Australia is also shown in the appendix.

65. **Price indexes for the expenditure components of GDP can be used to measure the effects of international trade prices on real income.** The combined consumption and

capital formation components of the expenditure approach are known as gross domestic final expenditure. Deflating GDP by the price index for gross domestic final expenditure yields real gross domestic income. Real gross domestic income is a measure of the purchasing power of the income generated by domestic production.

66. **The difference in growth rates between real gross domestic income and GDP volume is measured by the change in the ratio of the implicit deflator for GDP to the implicit deflator for gross domestic final expenditure.** This ratio, scaled to equal 100 in the base year, is shown in the addendum section of the table. This index is also known as the trading gains index. The effect of natural resource prices on the trading gains index is analyzed by calculating a version of the GDP deflator that excludes exports and imports of natural resources.

67. **Similarly, gross national income (GNI) may be deflated by the price index for gross final domestic expenditure to obtain a measure of real national income.** Differences in growth rates between real gross domestic or national income and GDP or GNI in volume terms show of the effect of changes on international trade prices on real income.

Template Table 6. Effect of Natural Resources on the Terms of Trade

		20xx (reference year)	Year t-1	Year t
A: Index numbers (20xx = 100)				
1	Export price index	100		
2	Import price index	100		
3	Terms of trade index ((1) / (2))	100		
4	Export price index excluding natural resources and associated products	100		
5	Import price index excluding natural resources and associated products	100		
6	Terms of Trade index excluding natural resources and associated products ((4) / (5))	100		
	Addendum:	100		
7	Implicit deflator for GDP	100		
8	Implicit deflator for gross final domestic expenditures	100		
9	Effect of export and import prices on real gross domestic income[a] ((7) / (8))	100		
10	Implicit deflator for GDP excluding exports and imports of natural resources and associated products	100		
11	Effect of export and import prices on real gross domestic income excluding natural resources and associated products ((10) / (8))	100		
B: Percent change since preceding year				
12	Export price index			
13	Import price index			
14	Terms of trade index (≈ (12) – (13))			
15	Export price index excluding natural resources and associated products			
16	Import price index excluding natural resources and associated products			
17	Terms of Trade index excluding natural resources and associated products (≈ (15) – (16))			
	Addendum:			
18	Implicit deflator for GDP			
19	Implicit deflator for gross final domestic expenditures			
20	Effect of export and import prices on real gross domestic income[a] (≈ (18) – (19))			
21	Implicit deflator for GDP excluding exports and imports of natural resources and associated products			
22	Effect of export and import prices on real gross domestic income excluding natural resources and associated products ((≈ (21) – (19))			

Also known as the "trading gains index."

APPENDIX: EXAMPLE OF TEMPLATE TABLES FOR AUSTRALIA

Scope: We will define the natural resources sector as including all units classified in the Mining Division (Division B) and the Basic Nonferrous Metal Manufacturing industry within the Primary Metal and Metal Product Manufacturing Subdivision (Subdivision 21) of ANZSIC 2006.[10] Although Liquefaction of Natural Gas appears in the master template table as a part of the ISIC industry *service activities incidental to land transportation* (ISIC 5221), in the case of Australia this activity is entirely included in the output of the oil and gas industry. For simplicity, we exclude *Transport via pipeline of natural resource products* (part of ISIC 4930). This activity is relatively unimportant in Australia, with output equal to about 0.6 percent of the consolidated output of the natural resources sector as we have defined it for Australia. Also, for simplicity we do not exclude the portion of basic nonferrous metal manufacturing industry that processes recycled metals (primarily aluminum). In principle, however, it should be excluded.

A. Template table 1

The data for 2012-13 (12 months ending June 30, 2013**)** for the mining industry from the Use Table published by the ABS are shown on the first three rows of Box 1-A. The last column of the box, the entries sums up the entire natural resources sector.

Box A-1: Natural Resource Sector Value Added and Consolidated Output, Australia 2012
(millions of Australian dollars)

	Coal mining	Oil and gas extraction	Metal ore mining	Non-metallic mining and quarrying	Exploration and Mining Support Services	Basic Non-ferrous Metal Manu-facturing	Total, Natural Resources Industries
Gross value added	**18982**	**28485**	**57276**	**2441**	**9835**	**2557**	**119576**
Output	**46596**	**42558**	**103837**	**4512**	**16765**	**40677**	**254945**
Uses of own output	**1842**	**430**	**271**	**6**	**25**	**2819**	NA
Uses of all natural resource output	5948	1108	6495	385	194	26728	**40857**
Consolidated output	**44754**	**42128**	**103566**	**4506**	**16740**	**37858**	**214088**

Source: 5209.0.55.001 - Australian National Accounts: Input-Output Tables, 2012-13, Table 5, and authors' calculations.

[10] The Australian Bureau of Statistics (ABS) defines natural resources as all units classified to the Mining Division (Division B) and the Primary Metal and Metal Product Manufacturing Subdivision (Subdivision 21) as defined by Australia and New Zealand Standard Industrial Classification (ANZSIC) 2006.

Template Table 1: Importance of Natural Resource Industries in the Economy
Australia, 12 Months Ending June 20, 2013
(millions of Australian dollars)

ISIC code[a]	Description	Consolidated Output[b]	Value Added (VA)	Taxes on Products less Subsidies[c]	VA plus taxes less subsidies (GDP)	*Percent of GDP*
500	Mining of coal and lignite	44,754	18,982		18,982	1.2
600	Extraction of crude petroleum and natural gas	42,128	28,485	1,255	29,740	2.0
700	Mining of metal ores	103,703	57,276		57,276	3.8
800	Other mining and quarrying	4,506	2,441		2,441	0.2
900	Mining support services	16,740	9,835		9,835	0.6
2420	Manufacture of basic non-ferrous metals	37,858	2,557		2,557	0.2
	Natural Resource Industries	214,088	119,576		120,831	**7.9**
	All Industries	**1,589,748**	**1,423,473**	**97,471**	**1,520,944**[d]	***100***

a. *International Standard Industrial Classification of All Economic Activities, Rev.4 (ISIC)*.

b. Excludes intermediate inputs produced within the aggregate in question. When all industries are combined, equals total gross value added plus imported intermediate inputs.

c. For individual industries, taxes on products of the natural resource industries omit VAT that is deductible to the purchaser, but VAT is *included* when all industries are combined.

d. Equals GDP in the row for all industries combined.

Source: 5209.0.55.001 - Australian National Accounts: Input-Output Tables, 2012-13, Tables 5 and 38, and authors' calculations

B. Template table 2

Scope: All resident enterprises active in natural resource extraction.
Data sources: For illustrative purposes we have pulled together data from tables in the national accounts, the Annual Establishment Survey and the government finance statistics (GFS) sources. Estimates of dividends, and of reinvested earnings of foreign affiliates and income taxes are based on assumptions about the share of the published total for private nonfinancial corporations attributable to natural resource enterprises. The share is based on published values for interest and gross operating surplus. Net acquisitions of nonproduced assets are unknown, but because they are undoubtedly small compared to gross fixed capital formation, they are assumed to be zero.

Template Table 2. Disposition of the Income of Natural Resource Enterprises
Australia, 12 Months Ending June 20, 2013
(millions of Australian dollars)

Description	Transactions ($m)	Source
Output at basic prices	**267,990**	National Accounts, GFS Template
Natural Resources	239,009	
Secondary Production	28,981	
Intermediate consumption at purchasers' prices	**145,990**	
From Domestic Units	124,488	
o.w. Fees and other purchases of government services	616	
Imported	21,502	
Value added at basic prices	**122,000**	
Compensation of employees	**34,955**	
Resident	34,839	
Nonresident	116	
Other taxes on production less subsidies on production	**1,667**	
Gross operating surplus	**85,378**	
Property income, payments net of receipts	**28,197**	
Interest	5,260	Annual Establishment Survey
Dividends	*9,313*	0.2 or 0.3×National Accounts Private Nonfinancial Corps. (PNFCs)
Reinvested earnings on direct foreign investment	*2,917*	
Property income of insurance policyholders	*–130*	
Rent on natural resources	10,707	National Accounts
o.w to government	10,581	GFS Template
Current transfers, payments net of receipts	***15,464***	
Taxes on income and other current taxes	*13,729*	0.3×National Accounts PNFCs
Other current transfers	*1,735*	
Gross Saving	**41,717**	
Gross capital formation	**118,382**	
Gross Fixed Capital Formation	117,092	National Accounts, Annual Establishment Survey
Change in Inventories	1290	Mining Operations, table 3
Capital Transfers	0	Assumed to be zero
Acquisitions less disposals of non-produced, nonfinancial assets	0	Assumed to be zero
Net Lending	**–76,665**	
Memorandum Items:		
Consumption of fixed capital	33,942	National Accounts, Annual Establishment

		Survey
Net fixed capital formation	83,150	
Employment in natural resource industries	342,667	Full Time Equivalent employees derived from Labour Force Survey and reported in National Accounts memorandum items
Employment in all industries	8,807,066	
Compensation of Employees / employee for natural resource industries ($)	102,009	
Compensation of Employees paid by all resident industries	733,633	
Compensation of Employees / employee paid by all resident industries ($)	83,300	
Government revenue from taxes, rents and fees paid by natural resource enterprises	26,593	Sum of fees, other taxes on production, rent, and income taxes

The dollar amounts in Template Table 2 are compared to GDP and to output in the table below. Output of natural resource products and secondary products was 17.6 percent of GDP in 2012-13. About half of the money received for these products was used to buy domestically sourced intermediate inputs, about 13 percent of it was used to compensate employees, about 10 percent of it was paid to governments as taxes, fees or rents, and 15.6 percent of it was saved. Spending on gross fixed capital formation was very high, amounting to 7.7 percent of GDP and 43.7 percent of output. The large gap between saving and gross capital formation was covered by net borrowing (which in this case is defined to include net issuance of equity shares) amounting to 5 percent of GDP or 28.6 percent of output. If reinvested earnings on foreign direct investment were treated as saving rather than as net borrowing, saving would be 16.7 percent of output and net borrowing would be 27.5 percent of output.

Template Table 2. Disposition of the Income of Natural Resource Enterprises
Australia, 12 Months Ending June 20, 2013
(Percent of GDP)

Description	Percent of GDP	Percent of Output
Output at basic prices	**17.6**	**100**
Natural Resources	15.7	89.2
Secondary Production	1.9	10.8
Intermediate consumption at purchasers' prices	**9.6**	**54.5**
From Domestic Units	8.2	46.5
o.w. Fees and other purchases of government services	0.0	0.2
Imported	1.4	8.0
Value added at basic prices	**8.0**	**45.5**
Compensation of employees	**2.3**	**13.0**
Resident	2.3	13.0
Nonresident	0.0	0.0
Other taxes on production less subsidies on production	**0.1**	**0.6**
Gross operating surplus	**5.6**	**31.9**
Property income, payments net of receipts	**1.9**	**10.5**
Interest	0.3	2.0
Dividends	0.6	3.5
Reinvested earnings on direct foreign investment	0.2	1.1
Property income of insurance policyholders	-0.01	-0.05
Rent on natural resources	0.7	4.0
o.w to government	0.7	3.9
Current transfers, payments net of receipts	**1.0**	**5.8**
Taxes on income and other current taxes	0.9	5.1
Other current transfers	0.1	0.6
Gross Saving	**2.7**	**15.6**
Gross capital formation	**7.8**	**44.2**
Gross Fixed Capital Formation	7.7	43.7
Change in Inventories	0.1	0.5
Capital Transfers	**0.0**	0.0
Acquisitions less disposals of non-produced, nonfinancial assets	**0.0**	0.0
Net Lending	**-5.0**	**-28.6**
Addendum:		
Government revenue from payments by natural resource enterprises	**1.7**	**9.9**

C. Template Table 6

Natural resource-rich economies are heavily affected by variation in the prices of the commodities that they export. These effects are measured by the terms of trade index and by the difference between the change in real gross domestic income and the volume change in GDP. Real gross domestic income is calculated by deflating the gross income generated by production as measured by GDP by an index of the prices of the things that the residents are buying, as measured by gross domestic final expenditures (which comprise the components of GDP as measured by final expenditures other than exports and imports). Thus the effects of export and import prices on real income is measured by an index that compares the GDP deflator with an index of the prices of gross domestic final expenditures. This index is known as the trading gains index.

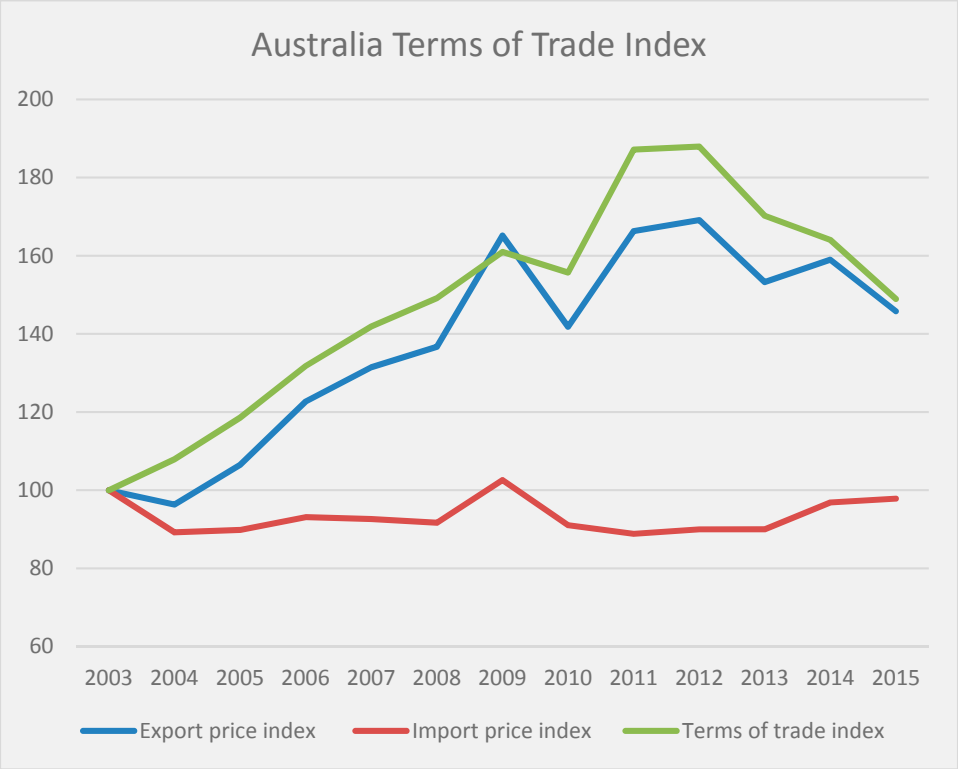
Template Table 6 shows the terms of trade index for Australia. To isolate the effects of natural resource prices, Template Table 6 has alternative measures based on special export and import price indexes that omit natural resources. We were not able to calculate these indexes using published information for Australia, but it can be presumed that natural resources account for the large increases and decreases in export prices for this economy, and hence for most of the movement in the terms of trade.

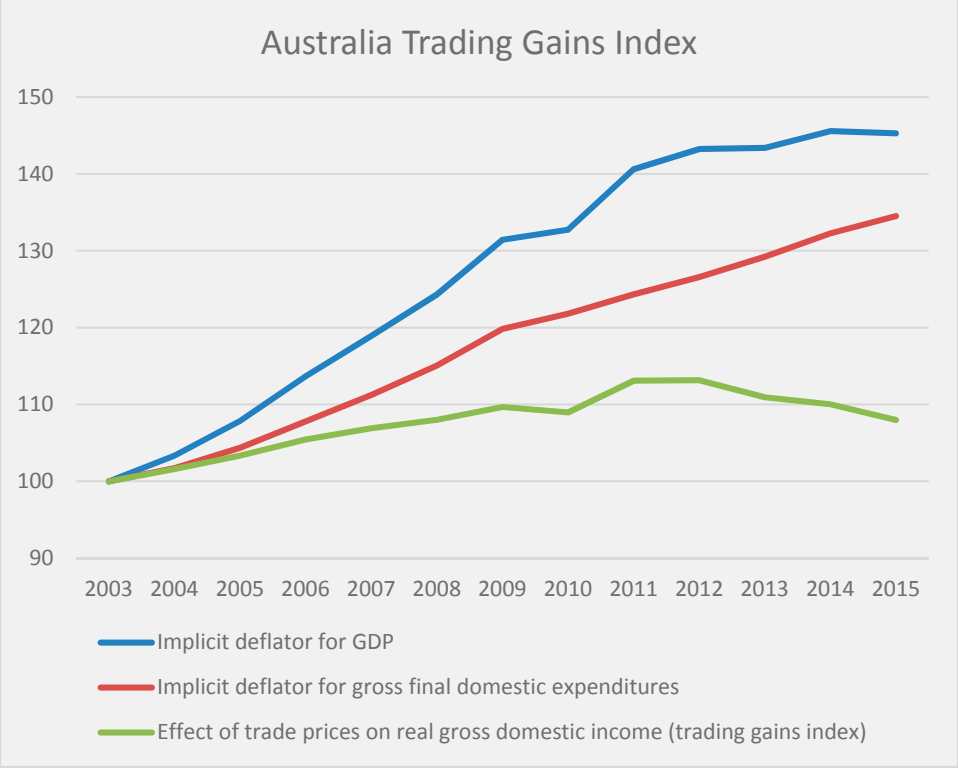
Between 2003 and 2009, rising export prices gave Australia a 61 percent improvement in its terms of trade, adding nearly 10 percent to its real gross domestic income. Also, in 2011, a combination of falling import prices (linked to recessionary conditions in many of the world's economies) and a rebound in export prices led to a 20.2 percent annual improvement in the terms of trade and contributed 3.8 percentage points to the growth of real income.

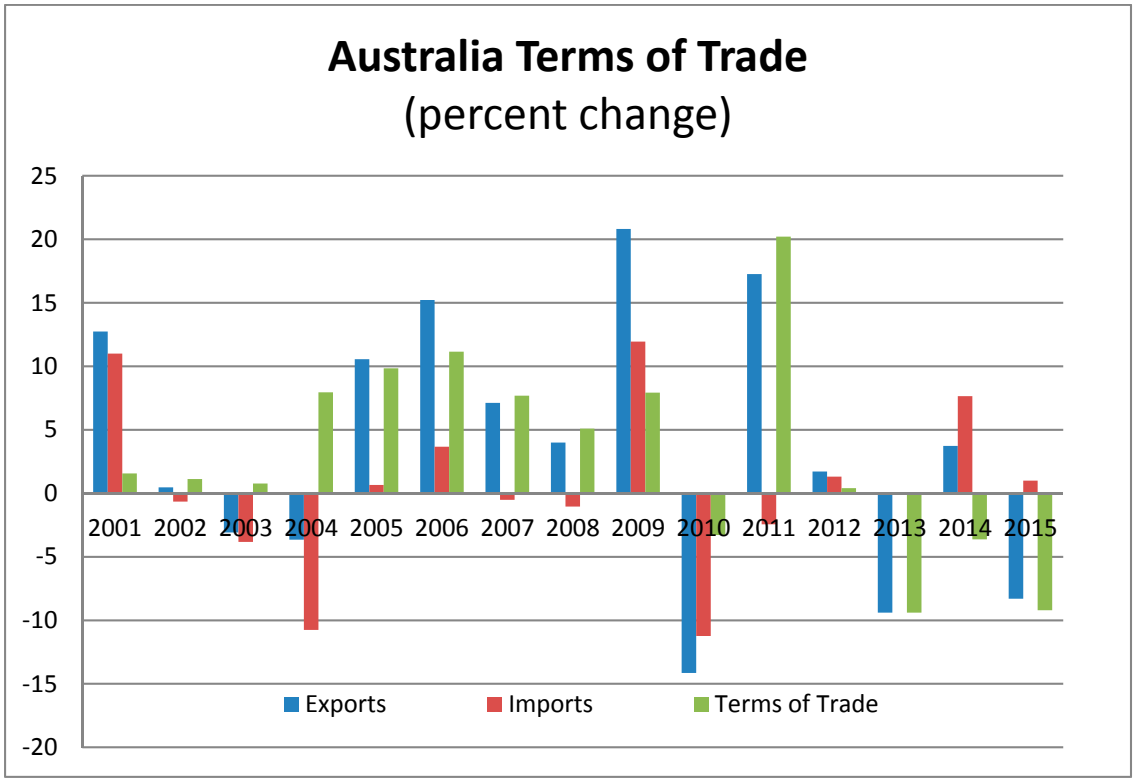
Starting in 2013, Australia's fortunes reversed. Three consecutive years of deteriorating terms of trade subtracted a cumulative 4.6 percentage points between 2012 and 2015 from Australia's real gross domestic income. These changes are depicted in the charts that follow the table.

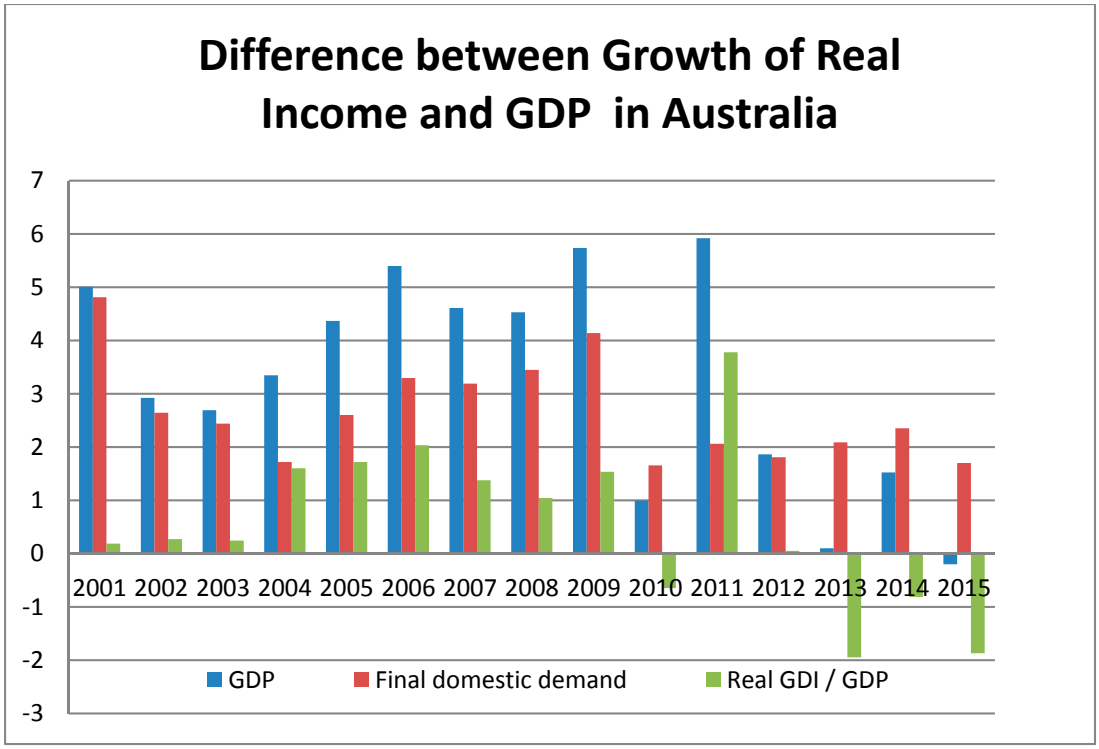
Template Table 6. Terms of Trade
Australia, 12 Months Ending June 20, 2013

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Export price index	100	96.3	106.5	122.7	131.5	136.7	165.2	141.8	166.3	169.2	153.3	159.0	145.8
Import price index	100	89.2	89.8	93.1	92.6	91.7	102.6	91.1	88.9	90.0	90.0	96.9	97.9
Terms of trade index	**100**	**108.0**	**118.6**	**131.8**	**141.9**	**149.2**	**161.0**	**155.7**	**187.2**	**187.9**	**170.3**	**164.1**	**149.0**
GDP deflator	100	103.3	107.9	113.7	118.9	124.3	131.4	132.8	140.6	143.2	143.4	145.6	145.3
Gross domestic final expenditures price index	100	101.7	104.4	107.8	111.2	115.1	119.8	121.8	124.3	126.6	129.2	132.3	134.5
Effect of trade prices on Real gross domestic income	**100**	**101.6**	**103.3**	**105.5**	**106.9**	**108.0**	**109.7**	**109.0**	**113.1**	**113.1**	**110.9**	**110.0**	**108.0**
Percentage change since previous year:													
Export price index	-3.1	-3.7	10.6	15.2	7.1	4.0	20.8	-14.1	17.3	1.7	-9.4	3.7	-8.3
Import price index	-3.8	-10.8	0.7	3.7	-0.5	-1.0	11.9	-11.2	-2.4	1.3	0.0	7.6	1.0
Terms of trade index	**0.8**	**8.0**	**9.8**	**11.1**	**7.7**	**5.1**	**7.9**	**-3.3**	**20.2**	**0.4**	**-9.4**	**-3.6**	**-9.2**
GDP deflator	2.7	3.3	4.4	5.4	4.6	4.5	5.7	1.0	5.9	1.9	0.1	1.5	-0.2
Gross domestic final expenditures price index	2.4	1.7	2.6	3.3	3.2	3.4	4.1	1.7	2.1	1.8	2.1	2.4	1.7
Effect of trade prices on Real gross domestic income	**0.2**	**1.6**	**1.7**	**2.0**	**1.4**	**1.0**	**1.5**	**-0.6**	**3.8**	**0.1**	**-1.9**	**-0.8**	**-1.9**


Australia Terms of Trade Index
200
180
160
140
120
100
80
60
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Export price index
Import price index
Terms of trade index


Australia Trading Gains Index
150
140
130
120
110
100
90
2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Implicit deflator for GDP
Implicit deflator for gross final domestic expenditures
Effect of trade prices on real gross domestic income (trading gains index)


Australia Terms of Trade
(percent change)
25
20
15
10
5
0
-5
-10
-15
-20
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
Exports
Imports
Terms of Trade


Difference between Growth of Real Income and GDP in Australia
7
6
5
4
3
2
1
0
-1
-2
-3
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015
GDP
Final domestic demand
Real GDI / GDP