Deloitte Access Economics

Minerals industry tax survey 2014

Minerals Council of Australia

12 December 2014

Deloitte.

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James Sorahan
Director, Taxation
Minerals Council of Australia

12 December 2014

Dear James

2014 Minerals industry tax survey

Please find attached our report presenting and analysing the key findings of the 2014 industry tax data collection.

A combination of falling commodity prices and rising State royalty rates in recent years have had a significant impact on the profitability of companies participating in this survey, with the end result a considerable rise in the total tax take ratio to 47% in 2012-13, its highest level since the survey began.

We hope this analysis proves useful to the MCA.

Please do not hesitate to contact me should you have any queries.

Yours sincerely,

Chris Richardson
Director
Deloitte Access Economics Pty Ltd

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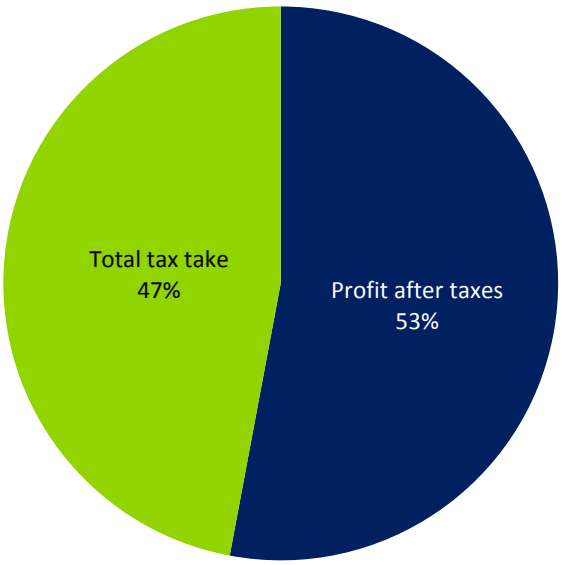
Executive Summary

The 2014 Minerals industry tax survey finds that in the most recent survey year (2012-13) the minerals sector paid nearly half of every dollar of profit as royalties and company tax to State and Federal Governments in Australia.

The total tax take ratio as calculated across all the surveyed miners was 47%.

The ratio refers only to company tax and royalties to allow ready comparison with survey results from previous years. It does not include other taxes, including the Minerals Resource Rent Tax (MRRT) and the carbon tax, which were also levied in 2012-13.

Chart i: Total tax take ratio, 2012-13 (all minerals)



Source: MCA minerals tax survey, 2014

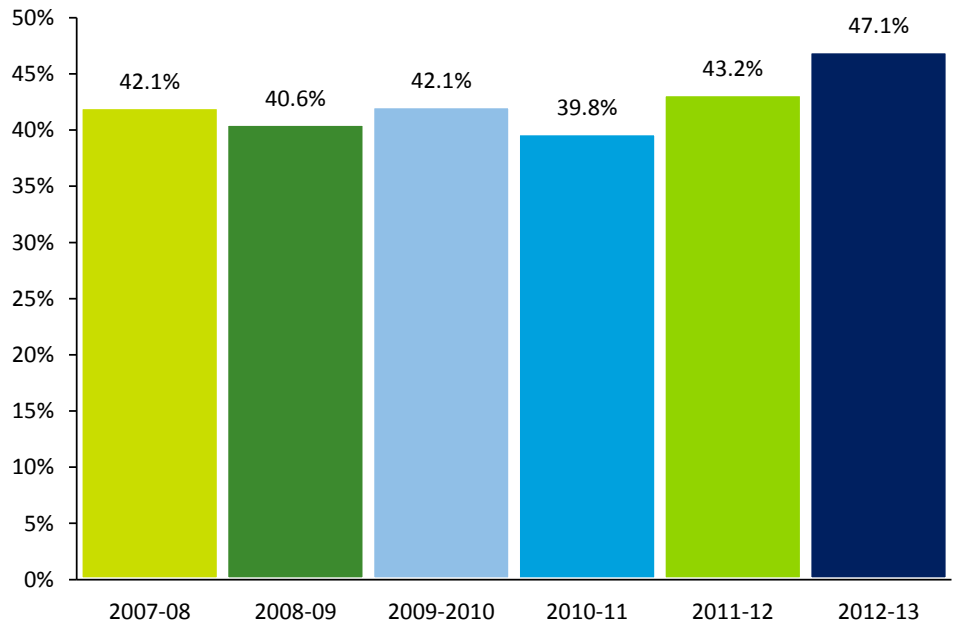
This is the third consecutive year in which the tax burden has increased on the sector, and the highest recorded level since the survey was inaugurated in 2011.

The total tax take ratio for the industry has averaged 42.5% based on six years of survey data from 2007-08 to 2012-13.

The survey also shows that the effective royalty ratio of 24.4% exceeded the company tax ratio for the first time since the survey began. The reason was simple – company tax is directly linked to profits (which fell sharply), whereas royalties are not.

Moreover, this trend is likely to have further to run. With commodity prices having fallen further since mid-2013, the tax ratio is expected to rise again in 2013-14 which will be assessed in next year's survey.

Chart ii: Total tax take ratio (all minerals)



Source: MCA minerals tax survey, 2014 and earlier years
Note: Due to data revisions and sample changes estimates vary from year to year. Estimates for each year are taken from the most recent survey that provided data for that year.

Economic and policy context

The significant growth in commodity prices experienced between 2003-04 and 2011-12 was driven by growing demand for raw materials from China, in particular coal and iron ore. Over time, global producers of resources have responded to the stronger price signals and increased supply. At the same time, demand growth from China itself has steadied as policymakers seek to rebalance growth and reduce excess credit.

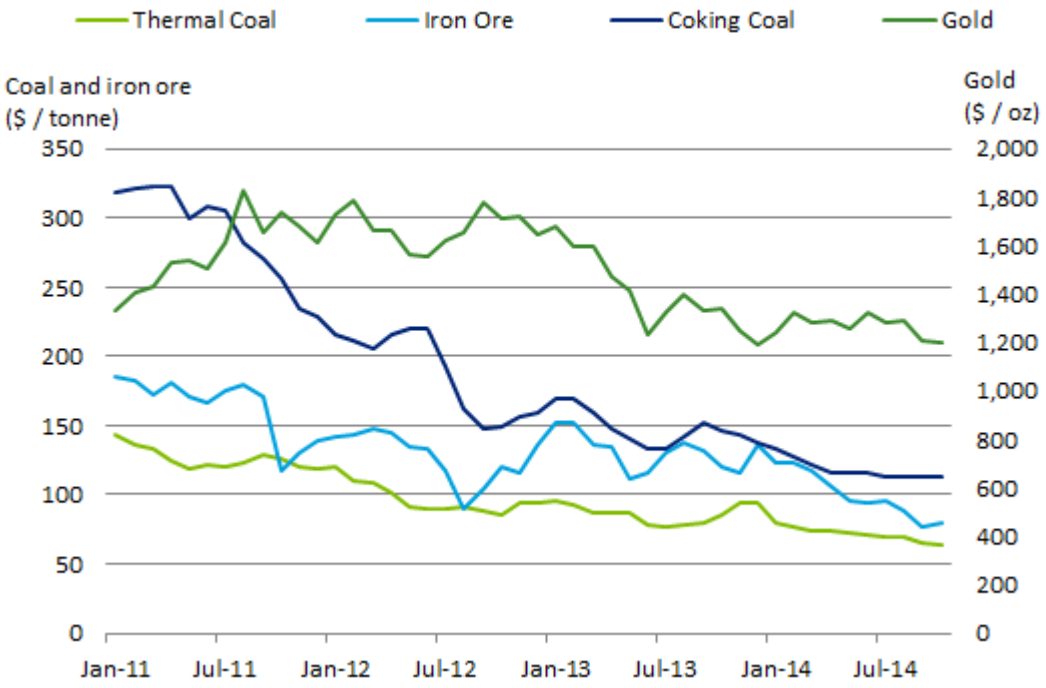
The result is that prices of key commodities covered by this survey fell considerably over the period covered (Chart iii). Specifically, between 2011-12 and 2012-13:

- The average spot price of thermal coal fell by 21%, and coking coal by 34%;
- The average spot price of iron ore fell by 16%; and
- The average spot price of gold fell by 5%.

The fall in commodity prices had the expected effect on miners' profitability. The total income of survey participants is estimated to have fallen by 12% between 2011-12 and 2012-13. (By way of benchmarking, the closest matching ABS data indicate a fall of 16%).

Yet while income fell, expenses continued to rise. The upshot was a dramatic fall in profitability – the accounting profits of surveyed companies fell by 57% between 2011-12 and 2012-13 (the closest matching ABS data indicate 52%), and taxable income fell by 35%.[1]

Chart iii: Commodity prices (at end of month), January 2011 – October 2014



Source: ANZ, CBA

Additionally, the 2012-13 results reflect increases in royalty rates by key mining state. In Particular:

- Western Australia raised the royalty rate on iron ore fines from 5.625% to 6.5% from July 1, 2012, with a further increase to 7.5% from July 1, 2013, thereby bringing royalty rates on iron ore fines up to the same royalty as charged on lump iron ore.
- Similarly, from 1 October 2012 Queensland increased the rate for coal royalties to 12.5% on the value per tonne between $100 and $150 and to 15% thereafter. The royalty rate for coal below $100 a tonne did not change.
- And, also announced in 2011, the NSW Government announced its intention to introduce a supplementary coal royalty. The supplementary royalty rate would be set by regulation and applied to all coal mining projects that pay MRRT instalments.

[1] The difference in accounting profit and taxable income arises due to reconciliation items, which are discussed in **Error! Reference source not found.**.

About the survey

The 2014 minerals industry tax survey is the fourth such data collection. It collected data relating to the 2011-12 and 2012-13 financial years.

In total, 24 companies participated in the 2014 survey, up from 22 in 2013. Of these, 11 had coal mining operations, five had iron ore mining operations, nine had gold mining operations and six had operations in respect of 'all other minerals' (predominately bauxite, copper, silver, lead, zinc and nickel).

It is estimated that this year's survey covers 84% of total mining income in the 2012-13 financial year. The main tax data collected relate to State and Territory royalties and to Commonwealth company income tax.

Total tax take ratio

The total tax take ratio is calculated by

$$\frac{\textit{Royalties expenses + Company tax}}{\textit{Taxable income before royalties}}$$

The royalties component (royalties expenses as a share of taxable income before royalties) is referred to as the **royalties tax take ratio**.

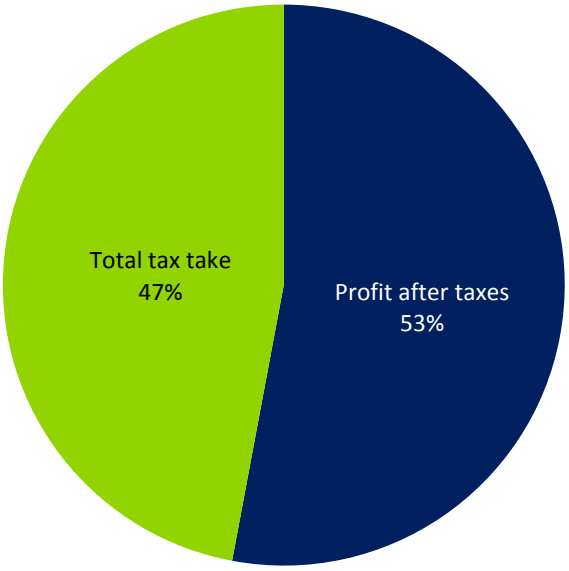
The denominator for the tax take ratio is the Australian Tax Office's measure of taxable income before deducting royalties. Since company accounts treat royalties as an expense and not a tax item, it is necessary to add royalties to taxable income in the denominator to avoid overestimating the tax ratio.

1 Key results

1.1 The total tax take

As Chart 1.1 shows, nearly half of every dollar of profit in the minerals sector is paid to Federal and State Governments as royalties and company taxes.

Chart 1.1: Total tax take ratio, 2012-13 (all minerals)



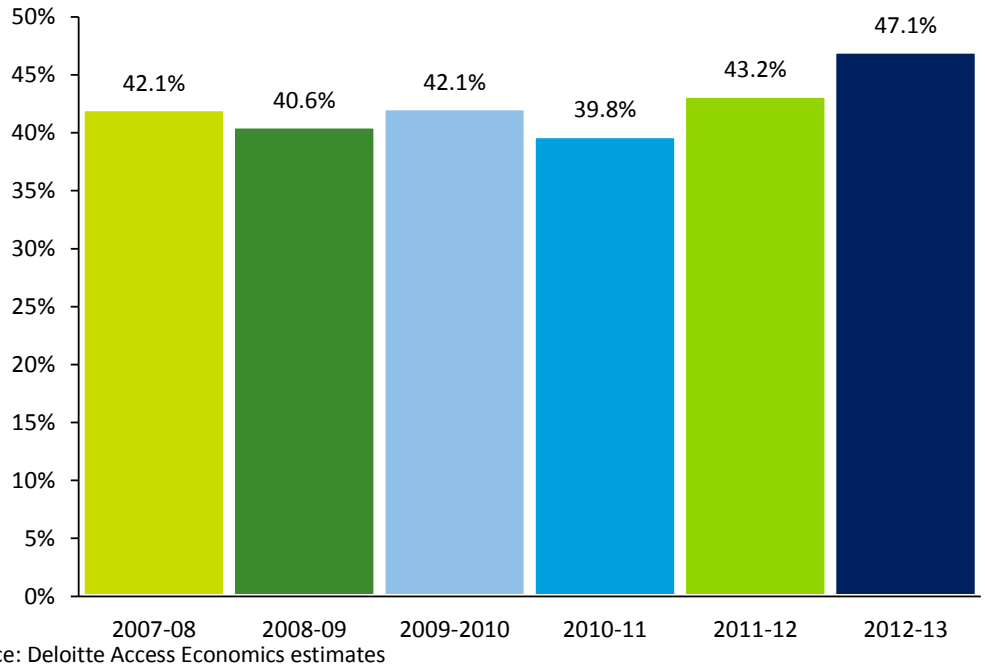
Source: Deloitte Access Economics estimates

The total tax take ratio[2] increased between 2011-12 and 2012-13 to its highest recorded level, marking the third consecutive year of increases. As seen in Chart 1.2 below, we estimate the total tax take rose from 43.2% of pre-tax taxable income in 2011-12 to 47.1% of pre-tax taxable income in 2012-13. (As discussed below data revisions between the 2013 and 2014 surveys caused the estimated ratio for 2011-12 to rise from 40.6% to 43.2%).

The strong rise in the total tax take is mostly attributable to falling commodity prices, which caused the corporate profit base (taxable income before royalties) to fall by some 35%.

[2] In this report, 'total' refers only to company tax and royalties. In 2012-13 minerals taxation also extended to other taxes, including the MRRT and carbon taxes, however these are not considered in this report.

Chart 1.2: Total tax take ratio (all minerals)



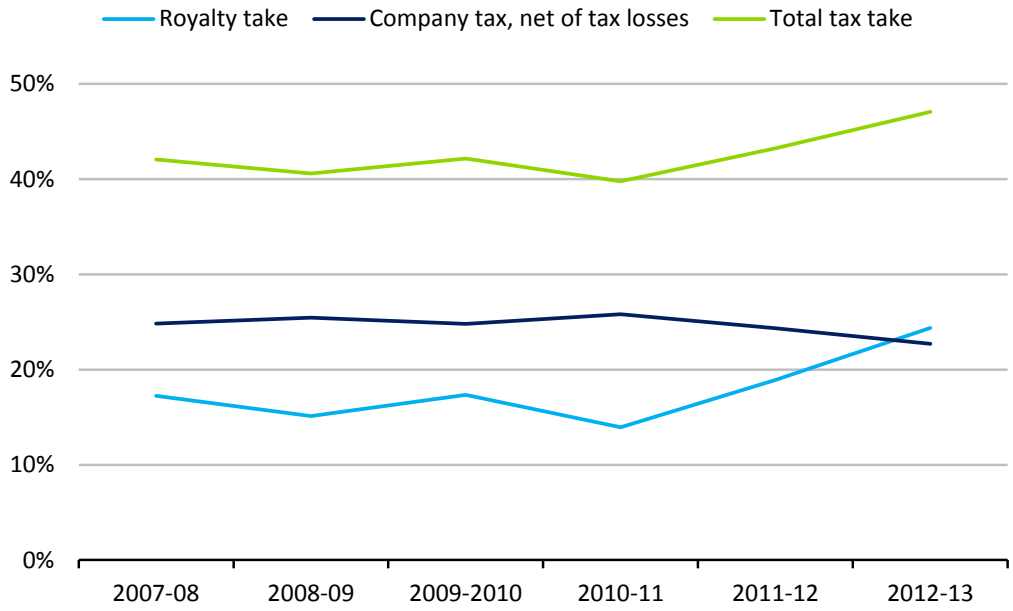
Source: Deloitte Access Economics estimates

Note: Due to data revisions and sample changes estimates vary from year to year. Estimates for each year are taken from the most recent survey that provided data for that year.

As shown in Chart 1.3, lower commodity prices mean the effective royalty ratio exceeded the company tax ratio for the first time since the survey began. The reason was simple – company tax is directly linked to profits (which fell), whereas royalties are not.[3]

[3] Royalties used to be linked to output, but are now more likely to be a share of revenue. Company tax, by contrast, is a share of profits. As revenues are less cyclical than profits, royalties tend to form a higher share of profits when the latter are weak and a lower share of profits when the latter are strong.

Chart 1.3: Comparison of tax ratios over time (all minerals)



Source: Deloitte Access Economics estimates

Adjusting the profit base (denominator) to account for royalties

The 'original' denominator is taxable income. However, royalties are also considered to be the functional equivalent of a tax for the purposes of this survey. Royalties, which ordinarily are expensed in a company's accounts, are therefore added back to the denominator in order to calculate the tax ratios used in this survey. Failure to do this would mean that royalties are compared to a base from which they have already been deducted, leading to an overestimate of tax ratios.

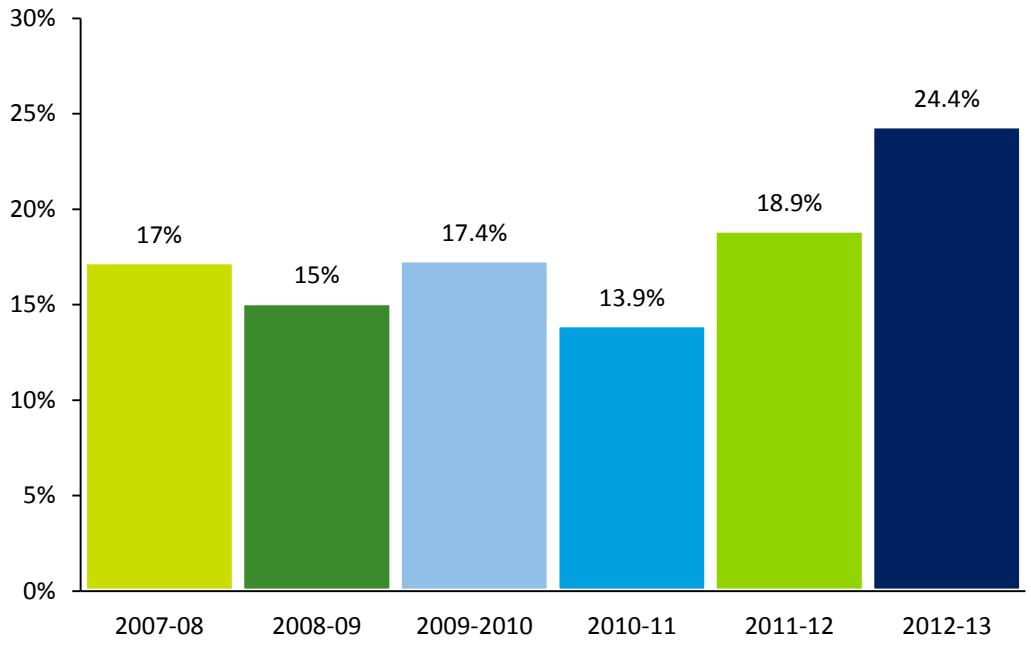
The adjusted denominator is what we call *pre-tax taxable income.* Thus the ratios presented throughout this report express taxes (being company tax, royalties, and the sum of the two) as a percentage of *pre-tax taxable income*. The resulting company tax ratio is less than 30% solely on account of adjusting the profit base to include royalties. This should not be interpreted as an effective tax rate – it is merely company tax as a share of taxable income *and* royalties.

1.2 The take from royalties

The take from royalties reached its highest level of 24.4% in 2012-13, as shown in Chart 1.4. The survey results indicate that the effective royalty rate nearly doubled between 2010-11 and 2012-13, a clear indication of the less-cyclical nature of State based royalties.

This trend is likely to continue with Western Australia's iron ore royalty rate having increased further on 1 July 2013, and with additional falls in commodity prices.

Chart 1.4: Royalty tax take ratio (all minerals)



Source: Deloitte Access Economics estimates

Note: Due to data revisions and sample changes estimates vary from year to year. Estimates for each year are taken from the most recent survey that provided data for that year.

1.3 Changes since last year's survey

As noted earlier, results for 2011-12 have been revised between the 2013 and 2014 surveys. Three factors explain the variation in 2011-12 data as between this year's survey and last year's survey.

- First, some companies that participated in the 2013 survey did not participate in this year's survey.
- Second, a number of companies that report on a calendar year basis were unable to provide 2011-12 results in the 2013 survey, and some companies provided preliminary 2011-12 data last year, which were revised this year. All companies provided both years' worth of data for this year's survey, meaning the effect of data revisions should not be as great in the 2015 survey.

- Third, the 2014 survey saw a number of companies participate for the first time, providing both 2011-12 and 2012-13 data in doing so.

Table 1.1 breaks down the differences in 2011-12 results from last year's and this year's survey into the three sources of change described above. The table shows that the effect of data revisions was by far the dominant driver of re-estimated 2011-12 results. This shows that the changes in the sample did not have a significant effect on the ratios ultimately presented.

The effect of data revisions was quite significant, with the final tax take ratio for 2011-12 being revised upward from 40.6% to 43.2%.

Table 1.1: Changes for 2011-12 between 2013 and 2014 surveys (all minerals)

	Change in key calculation items			
	Drop outs	Data revisions	Newcomers	Total change
Royalties	-0.4%	11.5%	1.0%	12.0%
Company tax	0.0%	-14.9%	0.6%	-14.3%
Total tax take	-0.1%	-5.1%	0.8%	-4.5%
Taxable income before royalties	0.0%	-11.0%	0.7%	-10.3%
	2011-12 tax ratios			
	Last year's estimate	After drop outs	After data revisions	Final estimate
Royalty tax take	15.11%	15.05%	18.85%	18.90%
Company tax take	25.47%	25.48%	24.35%	24.33%
Total tax take	40.58%	40.54%	43.19%	43.23%

Source: Deloitte Access Economics estimates.

Appendix A: Survey background

Background to the survey

In late 2010, the Minerals Council of Australia (MCA) recognised the importance of industry analysis and reporting of tax data for the purpose of current and future tax debates. An industry data collection was instigated, with the aim of generating tax ratios that are timely and transparent.

Deloitte Access Economics was engaged by the MCA to assist with conducting the survey. The first survey was undertaken in mid-2011. The survey collected financial information in relation to the direct resource taxes paid to Australian governments on account of the local mining operations of minerals companies. Results were publicly released in September 2011.

The current survey is the fourth tax data collection. It updates and extends on surveys from previous years:

- The 2011 survey collected data in relation to the tax years of 2007-08, 2008-09 and 2009-10.
- The second survey (the 2012 survey) collected data in relation to the tax years of 2009-10 and 2010-11. Respondents were asked to check and, if necessary, update 2009-10 values, as well as provide 2010-11 values.
- Similarly, the third survey (2013 survey or "last year's survey") collected data in relation to 2010-11 and 2011-12. Respondents were asked to check and, if necessary, update their data in relation to 2010-2011, as well as provide 2012 values.
- This year's survey, the fourth in the series, (2014 survey) collects data in relation to 2011-12 and 2012-13. Respondents were asked to check and, if necessary, update their data in relation to 2011-12, as well as provide 2012-13 values.

The focus of the survey is on the minerals sector (excluding oil and gas) and on mining operations (extraction) in particular – distinguishing between the main commodity groups of: coal mining, iron ore mining, gold mining and other metals mining.[4] Furthermore, this information is required only in relation to mining in Australia.

The main data being collected relate to resource royalties and company tax, with the other financial data requested providing the basis for calculating a pre-tax "profit" figure against which to compare resource tax payments.

All the financial information collected is derived from a company's annual tax return – being information generally accessible (and dissectible) by a company's tax group. While the requisite information is readily available at the company level, completing the survey requires such information to be allocated across the key commodities/activities and across locations.

[4] Mining can also involve the extraction of non-metallic minerals. This category was excluded from the survey on the grounds that it is not a significant category for resource taxation purposes.

The focus of the survey is on mining operations (extraction). Fundamentally, this excludes the refining or smelting of minerals or ores (other than preliminary smelting of gold), or the manufacturing (processing) of products of mineral origin such as coke or cement. These excluded activities are in the nature of manufacturing, not mining.

The companies surveyed were also asked to exclude from the mining data they reported:

- all oil and gas activities, on the grounds that the MCA's focus is on minerals rather than petroleum products;
- all offshore activities, on the grounds that the focus of the data collection is on taxes paid to Australian governments which, by their nature, do not reflect mining activities undertaken outside Australia;
- any exploration activity or other mining support activity, on the grounds that resource rents by their nature arise on account of extraction of minerals or ores rather than any preceding exploration activity or any downstream or support activities; and
- any non-mining activities.

The companies surveyed were asked to report data in relation to their mining operations for each State and/or Territory in which they operated.

The confidentiality undertaking signed by both the MCA and Deloitte Access Economics for the assurance of companies surveyed means that the survey data collected at an individual company level cannot be disclosed under any circumstances. Survey data have been analysed solely in aggregate form.

Calculating tax take ratios

The aim of the tax data collection is not to derive population estimates of total amounts (as is the purpose of 'official' mining industry data published by the ABS). Rather, the aim is to derive **ratios** that convey an insight into the tax liabilities incurred in respect of Australian mining operations.

A key premise of this approach is that in considering the tax burden **it is best to focus on tax rates rather than absolute tax dollars**:

- Although there have been ups and downs, over time absolute dollars have grown due to the enormous growth in the demand for and price of industrial commodities.
- Ratios provide a more accurate measure of the tax burden. Ratios abstract from the size of the sector and allow debate to focus on tax rates and the associated tax burden.

Hence, the survey data are used primarily to calculate "tax take" ratios broadly comparable with those published by the Government from time to time.

Choice of denominator for the tax take ratio

Rather than comparing taxes paid with "resource rents" (which are unobservable), the analysis from this report instead compares dollar levels of tax collection with a more transparent and widely-accepted measure of corporate profits, namely the corporate tax base – the ATO's measure of taxable income.

Specifically, it uses taxable income *plus* royalty expenses. The 'original' denominator is taxable income. However, royalties are also considered a tax for the purposes of this survey. Royalties, which ordinarily are expensed in a company's accounts, are therefore added back to the denominator in order to calculate the ratios used in this survey. Failure to do this would mean that royalties are compared to a base from which they have already been deducted, leading to an overestimate of tax ratios.

Note that taxable income is not the same as accounting profit. Thus it is necessary to reconcile accounting profit or loss to taxable income or loss through the addition and subtraction of certain items:.

- 'A*ddition* items' tend to increase taxable income relative to accounting profits. Examples of 'addition items' include franking credits, net capital gains, and expenses that are recorded in a company's accounts but are not deductable for tax purposes.
- *'Subtraction items'* tend to reduce taxable income relative to accounting profits. A prime example of a 'subtraction item' is prior year tax losses, which while not recorded on a company's financial statements, can be used to offset current year tax liabilities. Other examples include capital works deductions, small business and general business tax breaks, and non-taxable income.

The distinction between accounting profits and taxable income highlights the broader distinction between items which are 'tax' concepts and items which are 'accounting' concepts. Since the purpose of this survey is to collect tax data, the correct comparator for ratio purposes is the 'tax' concept of profits – i.e. taxable income, or the corporate tax base – and not the 'accounting' concept of profits.

While the two should generally move in line with each other over the long term, occasionally cyclical factors will mean that the two may not shift in parallel, and as such ratios using accounting profits and not taxable income could potentially misstate the true tax burden of the sector.

Choice of numerator for the tax take ratio

The survey collects data for each of the following tax payment variables:

- Royalty expenses within Australia , as reported in the annual company tax return; this amount generally involves an accrual/payable amount.
- Australian gross company tax payable, being 30% of 'taxable income'; this amount generally involves an accrual/payable amount. This is the figure used for company tax in the tax take ratios.
- Australian company tax *actually paid* during year; this amount reflects both cash payments made during a year, and any rebates/tax offsets and tax credits, and so can differ in any one year.

With regard to the second dot point above, note that the gross tax payable figure used in calculation of the tax ratios is not 30% of positive taxable income, but 30% of aggregate taxable income, and therefore is net of current year tax losses. Although current year tax losses have the effect of reducing *actual* tax payments in future periods, in accrual terms, their effect is to reduce the tax liability *with respect to the current period*.

With regard to the third dot point, on account of various rebates, tax offsets and credits, as well as potential timing effects, the amount of tax actually paid in any one year may differ substantially from gross company tax payable. This series can be highly volatile, and the effects of timing differences mean it cannot be ascertained for certain which period actual tax payments relate to.

For this reason the company tax figure that is used in the numerator for the tax ratios published in this report is gross company tax payable, not company tax actually paid.

Rather than just focussing on royalties and other resource-specific taxes, the reporting of the survey's findings is based on the premise that the mining tax take should be measured as the combined impact of all taxes, including company tax.

The main fiscal instruments used to collect resource revenues in the minerals sector are State and Territory royalties and Commonwealth company income tax.

Total tax take ratio

The tax take ratio is calculated here by:

$$\frac{\textit{Royalties expenses + Company tax}}{\textit{Taxable income before royalties}}$$

The total tax take ratio is separated into its royalties and company tax components throughout this report. The royalties component (royalties expenses as a share of taxable income before royalties) is also referred to as the **royalties tax take ratio**.

In total, 24 companies participated in the 2014 survey, up from 22 in 2013. Of these, 11 had coal mining operations, 5 had iron ore mining operations, 9 had gold mining operations and 6 had operations in respect of 'all other minerals' (predominately copper, silver, lead, zinc and nickel).

As with the previous years' surveys, data provided by the Resource Information Unit (RIU) enabled us to assess the survey's overall coverage, in terms of tonnes of overall mineral production. This is summarised in Table A.1.

Table A.1: Estimated survey coverage

	Surveys received		Share of production	
	2014 survey	*2013 survey*	*2014 survey*	*2013 survey*
Coal	11	10	68%	73%
Iron ore	5	5	80%	80%
Gold	9	6	77%	74%
All other minerals	6	7	56%	84%

Source: Resource Information Unit; Deloitte Access Economics estimates

The potential for errors

Over the years of its operation to date, the tax data collection survey has an established (and effective) procedure for ensuring that all companies' returns are as accurate as they can be. That said, some degree of error is inevitable in any survey.

This section discusses the potential for both sampling and non-sampling errors to occur, as well as the procedures in place to minimise the scope for such errors.

Sampling error

1. Companies providing data on different reporting periods

The methodology set out in Appendix B ensures that the data being reported relate only the specific financial years in question, and hence relate only to market conditions that prevailed in the specific financial years under examination.

Each year, the survey asks companies to provide data in respect of their two most recent financial years – that is, the current survey sought data in relation to 2012 and 2013 (either calendar year or the equivalent financial year). For companies that reported on a calendar year basis, their returns were converted to a consistent financial year basis using the procedure detailed in Appendix B.

By definition, it is virtually impossible to ever truly assess the accuracy of the financial year estimates – put simply, a company which reports on a calendar year basis is unlikely to provide data on a financial year basis, meaning we are unlikely to ever know the 'true' financial year values for those companies.

An alternative would be to seek data in relation only to a specific reporting period. Preliminary consultations with some companies when the survey commenced in 2010 indicated that the larger companies would likely be able to convert their own data to a consistent reporting period.

However, there are two issues with this:

- First, Deloitte Access Economics would effectively lose control (and knowledge) over the methodology employed by individual companies in converting their data. In our judgement, it is better to apply a consistent (and transparent) methodology for all companies, such that the methodology ultimately employed, and as set out in Appendix B, is a matter of public record.
- Second, we would likely sacrifice some sample size, since not all companies would be able (or willing) to convert their data to a consistent reporting period.

We estimate that companies who report on a calendar year basis represent roughly half of the total sales revenue of the survey sample, meaning that roughly half of the companies' sales data were converted into their financial year equivalents.

Also, one company provided data for the year ending 31 March. Given that this reporting period is really only one quarter 'out' on either side of the desired reporting period (i.e. year ending 30 June), it was decided not to adjust this company's data, on the grounds that any attempt at adjusting that data risked creating more errors than it attempted to solve.

We remain confident in the soundness of our estimation methodology, and the fact that changes in the sample of companies surveyed has not, over time, generated significant increases or decreases in the ultimate ratios presented, gives us further empirical confidence that the survey results are accurate.

Non-sampling error

1. Non-sampling error by respondents

Inaccuracies in reporting by survey respondents can give rise to non-sampling errors. In particular, the survey very deliberately asks companies to exclude from any data they provide amounts that relate to non-mining activities, oil and gas activities, exploration or mining support activities, offshore activities, and the share of any joint venture amounts attributable to other companies.

To the extent that some amounts relating to the above items may inadvertently have been included in survey responses, some degree of non-sampling error is possible. That said, being in its fourth year, we are confident that respondents are fully aware of the specific requirements of the current survey.

A more likely source of non-sampling error from respondents lies in the requirement that data be separated into specific commodity groups (coal, iron ore, gold and all other minerals) that may not explicitly correspond with companies' internal reporting procedures. It should also be noted that in some cases amounts relating to gold may also include small amounts of other minerals – such as copper or silver – where such minerals are effectively a by-product of gold production.

Where companies indicated that their commodity level data breakdowns may be a cause for some concern, or where companies were unable to allocate some financial items across commodities or States, follow up correspondence with the relevant companies was conducted until a satisfactory conclusion was found.

More broadly, to minimise non-sampling error by respondents, considerable effort was allocated to manual 'checking' by Deloitte Access Economics of each company's survey return. This involved comparing reported data with published total where appropriate, as well as conducting a series of 'sense checks' on the data (for example, ensuring that returns were internally consistent). Any issues identified were followed up with individual companies.

2. Non-sampling error by Deloitte Access Economics

Where necessary, manual adjustments were made to survey returns to ensure consistency with totals or where the respondent (or Deloitte Access Economics) had concerns with the accuracy of a particular component of the survey. All such adjustments were discussed both internally and with the relevant company so as to ensure the appropriateness of the adjustment employed, and a record was kept of all adjustments made.

Deloitte Access Economics maintains internally documented procedures for all of the 'standard' estimation methodology in relation to this survey (such as the standard reporting period conversion discussed in Appendix B). Any and all adjustments made during the 'data checking' phase were recorded so that they can be reviewed in future surveys as necessary. A first step in the 'data checking' phase is to review the notes made last year in relation to any manual adjustments.

Appendix B: Estimating a standard reporting period

Companies participating in the survey differ in the reporting periods used for their financial data. As the annual period covered by official economic and financial statistics in Australia generally relates to the 12 months ending 30 June, for the sake of comparison it is most convenient if all data are converted on a standardised basis reflecting trading conditions in the 12 months ending 30 June.

One option is simply to aggregate data from both types of reporting periods. In this case, however, the estimates would reflect trading conditions prevailing in periods outside the 12 months ending 30 June in the relevant year.

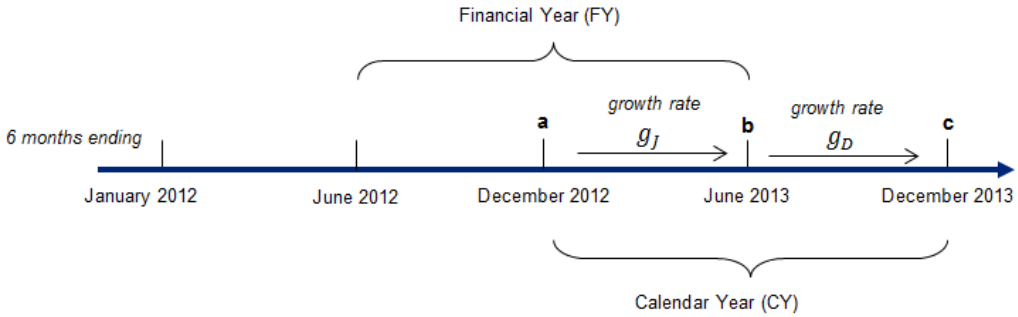
As an alternative, for a company providing calendar year financial information (CY), the arithmetic mean (or mid-point) of each pair of consecutive CY values could be used to approximate the associated amount for the financial year ending 30 June (FY). For example, for the series in the table below, the arithmetic mean of the 2011 CY and 2012 CY values (1,070 and 779 respectively) is 925. However, it is evident that this approach has limited merit as it can result in a FY estimate that is quite different to the actual value (with the observed FY value for the year ending 30 June 2012 in this example being 751 compared with the arithmetic mean of the 2011 CY and 2012 CY values of 925).

irregular growth series	**2011 Jan-Jun**	**2011 Jul-Dec**	**2012 Jan-Jun**	**2012 Jul-Dec**
series	597	473	278	501
half-yearly growth rates			-41%	80%
12 months ending 30 June (FY)			751	
12 months ending 31 December		1,070		779

If the half yearly growth rates for the relevant series were similar, then taking the arithmetic mean (in the table above, 925) would provide a reasonable approximation of the FY value. But in an industry as volatile as the mining sector, the observed half yearly growth rates are rarely consistent, meaning the arithmetic mean is a less reliable guide than otherwise.

As an alternative, Deloitte Access Economics has derived a formula which takes into account differing half yearly growth rates and will, where the requisite growth rates are known, provide the correct FY value.

We begin by noting that the calender year comprises the sum of two 6-month periods, *b* and *c*, while the financial year is made up of periods *a* and *b* (see the figure below).



The known growth rates between each of these 6-month periods (g_J and g_D) allow us to trace-back the calendar year data to arrive at a financial year estimate. First we start with,

$$\begin{aligned} CY &= b + c \\ &= b + (1 + g_D)b \\ &= b\big(1 + (1 + g_D)\big) \end{aligned}$$

Re-arranging,

$$b = \frac{CY}{1 + (1 + g_D)}$$

Now, turning to the 6-month period *a*,

$$\begin{aligned} a &= \frac{b}{1 + g_J} \\ &= \frac{CY}{(1 + g_J)\big(1 + (1 + g_D)\big)} \end{aligned}$$

Now it is possible to combine these results to express the financial year in terms of the calendar year value and the two half-yearly growth rates:

$$FY = a + b$$

$$= \frac{CY}{(1 + g_J)\big(1 + (1 + g_D)\big)} + \frac{CY}{1 + (1 + g_D)}$$

$$FY = CY\left(\frac{1 + (1 + g_J)}{(1 + g_J)(1 + (1 + g_D))}\right)$$

Of course, in estimating FY values for individual companies, the requisite half yearly growth rates are rarely known. As an alternative, we use the observed half yearly growth rate in either the company's volume or value of production, or, where such data are not available, the implied half yearly growth rates from BREE data.

The resulting estimates are then subject to a comprehensive internal 'sense check' to ensure the calculation has provided a reasonable figure. While not perfect, given the volatility in half yearly growth rates observed in the mining sector, we are confident that this is a superior methodology than the alternatives (i.e. using a simple average or simply not converting data to a consistent reporting period).

Limitation of our work

General use restriction

This report is prepared solely for the internal use of the Minerals Council Australia. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose of estimating taxation ratios for companies participating in the survey. You should not refer to or use our name or the advice for any other purpose.

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