



Minerals industry tax survey 2017
Minerals Council of Australia

8 December 2017

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Dear James

2017 Minerals industry tax survey

Please find attached our report presenting and analysing the key findings of the 2015-16 industry tax data collection on behalf of the MCA.

The effective tax rate of minerals was 51%. That rate is only slightly below the highest recorded level in the history of this survey, with the moderation in the rate seemingly owing more to the temporary impact of asset sales and reductions in prior year tax losses rather than to any substantive improvement in business conditions for miners. The latter continued to place pressure on profitability.

We trust that this analysis proves useful to the MCA.

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

Yours sincerely,



Stephen Smith
Partner

Deloitte Access Economics

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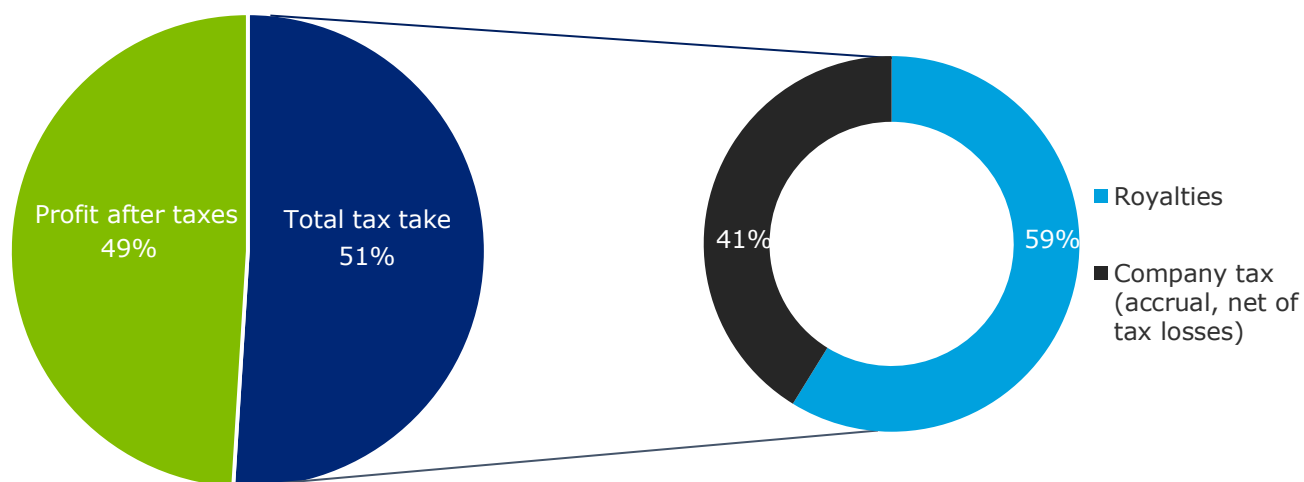
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Executive Summary

The MCA minerals industry tax survey finds that miners paid over half their profits in taxes in Financial Years 2015-16 (FY16). As shown in chart i below, royalties were the biggest component accounting for over half of total taxes.

Chart i: Total tax take ratio, FY16 (all minerals)¹



Source: MCA minerals tax survey, 2017

While prices for commodities reported in this report experienced a small uptick at end of FY16, operating conditions did not improve across the year as a whole. With the exception of gold, accounting profits remained under pressure in FY16, with a 26% fall year on year in iron ore, and with coal remaining in the red. While gold income fell marginally, accounting profit rose by 6% uptick due to reduced expenses.

While accounting profits were under pressure, taxable incomes were higher year on year in both coal and gold. It seems that FY16 saw a lift in non-core asset sales as miners rationalised operations and focussed on core activities as part of their ongoing cost cutting activities. Against this backdrop, and with a potential reduction in prior year tax losses playing a role as well, taxable income reconciliation items increased among all commodities.

With higher taxable incomes, miners' total taxes as a share of profits decreased three percentage points between FY15 and FY16.

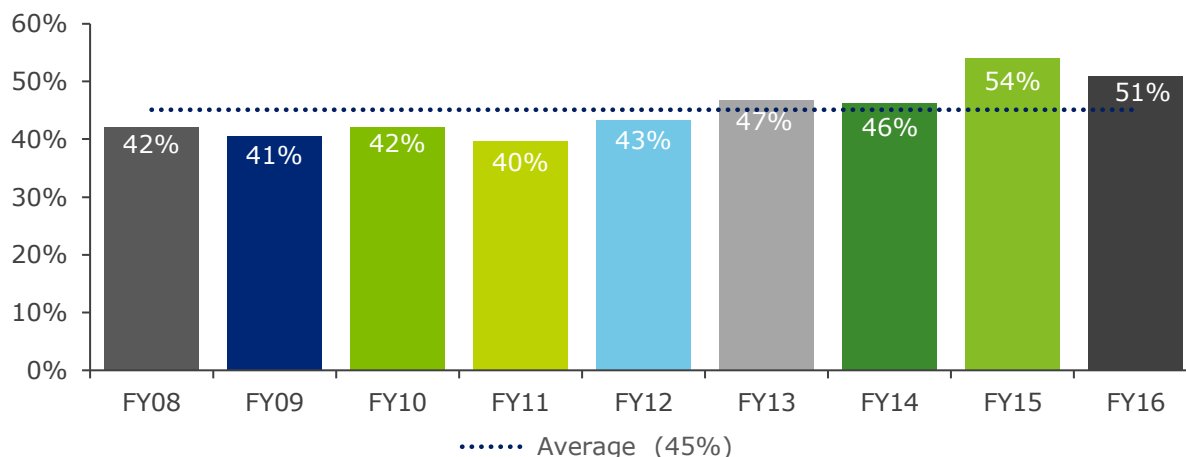
As shown in Chart ii below:

- the total tax ratio remains above its historical average of 45%
- moreover, the fall from 54% to 51% in FY16 didn't reflect improving underlying profitability, but merely reflected the asset sales and reduction in prior year tax losses that led to a lift in reconciliation items.

¹ Taxable income is calculated using the accrual accounting method. This accounts for revenue when it is earned and expenses goods and services when incurred.

For a sustained decrease in the ratio, operating conditions would need to improve – either via an increase in commodity prices and volumes, or a reduction in miners’ expenses.

Chart ii: Total tax take ratio FY08 to FY16 (all minerals)



Source: MCA minerals tax survey, 2017 and earlier years

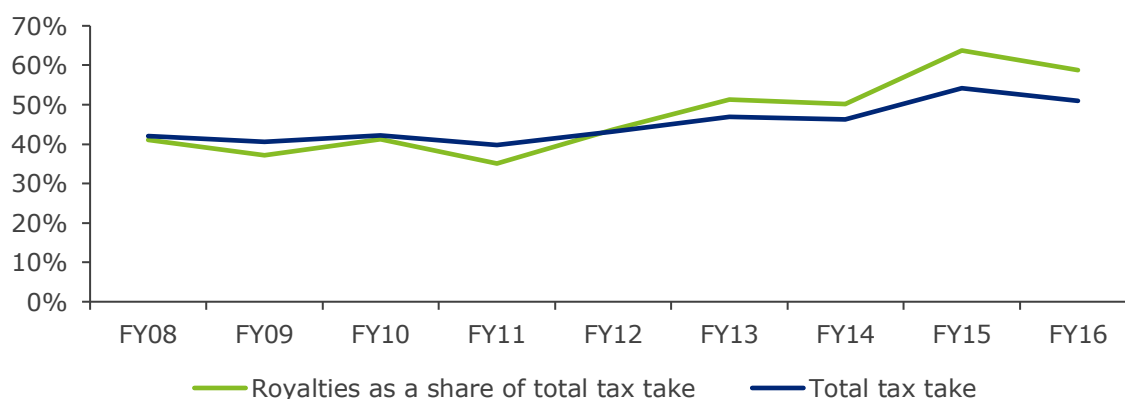
Note: Due to data revisions and sample changes estimates vary from year to year. Estimates for each year are taken from the most recent survey that provided data for that year.

As may be seen in Chart iii below, the royalty share of total tax has increased by 20 percentage points over ten years, and is presently over 50% of the total tax take. The slight drop between FY15 and FY16 is due to one-off increases in taxable income, stemming from asset sales and reductions in prior year tax losses, rather than underlying profitability.

There have been two key drivers of that trend: a lift in royalty rates, and an overall fall in commodity prices and hence in profitability. The latter has the effect of lifting royalties relative to company taxes, because royalties move with revenues, and company taxes move with profits.

In FY16 miners were paying approximately 1.4 times more in royalties than company taxes. Given company tax is directly linked to profits whereas royalties are not, this ratio is likely to remain in this range into the future unless underlying profitability improves significantly.

Chart iii: Royalty and company tax ratios, FY08 to FY16 (all minerals)



Source: MCA minerals tax survey, 2017

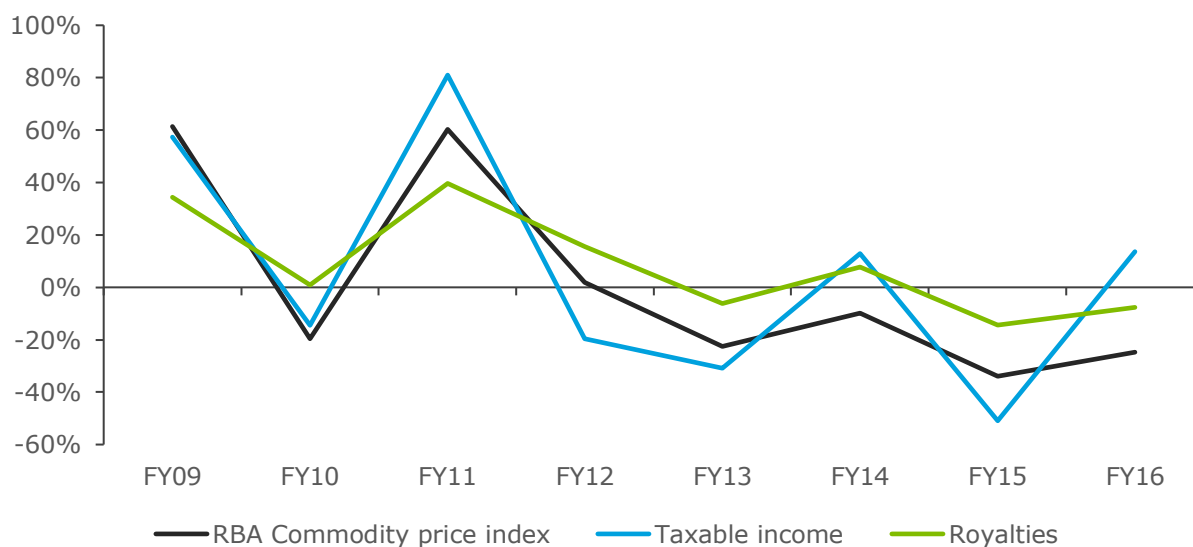
Chart iv below compares growth since FY09 (the first year available from the survey) in:

- the corporate profit base (taxable income)
- the Reserve Bank of Australia’s bulk commodity price index for non-rural commodities
- estimated royalty payments.

Although royalties move broadly in line with profitability, they are less responsive than movements in the commodity price index, contributing to relatively ‘sticky’ total tax ratios. Taxable income, which ultimately drives company tax, tends to fluctuate to a greater degree.

While the rates and directions of movement were an improvement on FY15, one off items lifted taxable income.

Chart iv: Minerals profits and world bulk commodity price



Source: MCA minerals tax survey, Reserve Bank of Australia

Although current commodity prices have seen somewhat of a turnaround (with spot iron ore prices close to US \$70 per tonne as this report was finalised), it may be a bit too optimistic to expect overall prices to change drastically in the near future.

Whether or not recent prices are sufficient to mark a turning point in the currently high tax ratio will be seen over time.

Deloitte Access Economics

1 Introduction and context

1.1 Background to the survey

The minerals tax survey is conducted on behalf of the Minerals Council of Australia, with the first survey being conducted in 2011. The survey provides insight into and analysis of the minerals industry's tax liabilities since 2007-08.

This year is the seventh such data collection. The survey is not intended to replicate other data sources, but rather to provide the MCA with its own independent and methodologically robust estimation of the minerals sector's tax burden.

The survey collects data for each of the three major commodity groups – coal, iron ore and gold mining – as well as for the total of Australian minerals operations.

1.2 Survey coverage

In previous years company level production data was provided to the MCA by AME Mineral Economics. This data was used to estimate the overall coverage of the survey in terms of percentage shares of total production. The AME Mineral Economics data was not available this year. As such, a combination of scaled AME data from 2016 and aggregate data from the Department of Industry, Innovation and Science was used to help to verify coverage.

Participation in the survey remained steady at 25 companies – the same number as 2016. There was a minor change in composition (with one company not participating, and another entering for the first time). The continued strong coverage of the survey gives Deloitte Access Economics a degree of confidence that the estimates presented herein are reflective of the prevailing conditions in the minerals sector as a whole.

The survey remains the most comprehensive analysis available of the minerals industry's tax contributions. Continued efforts will be made to ensure strong participation and coverage for future surveys.

Table 1.1: Estimated MCA survey coverage

Share of production		
	2016 survey	2017 survey
Coal*	70%	68%
Iron ore	78%	77%
Gold	74%	73%
All other minerals	54%	54%
Total	-	-

* in this year's survey coal mining is restricted to black coal

2 Industry tax survey results

2.1 Explanation of ratios

A key premise of this survey is that, in considering the tax burden, **it is best to focus on tax ratios rather than absolute tax dollars**. There are two key reasons for this:

- First, although there have been ups and downs, over time absolute tax dollars have grown due to the enormous growth in the demand for and price of industrial commodities; and
- Second, ratios abstract from the size of the sector and allow debate to focus on tax rates and the associated tax burden rather than absolute dollar values.

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

Two ratios are presented – a total tax take ratio and a royalty ratio:

$$\text{Total tax take} = \frac{\text{Royalties from Australian mining operations} + \text{company tax}}{\text{Taxable income (or loss)} + \text{royalties}}$$

$$\text{Royalty take} = \frac{\text{Royalties from Australian mining operations}}{\text{Taxable income (or loss)} + \text{royalties}}$$

Adjusting the profit base (denominator) to account for royalties

The ‘original’ denominator of this calculation is taxable income. However, royalties are also considered to be the functional equivalent of a tax for the purposes of this survey (see Appendix A). 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.

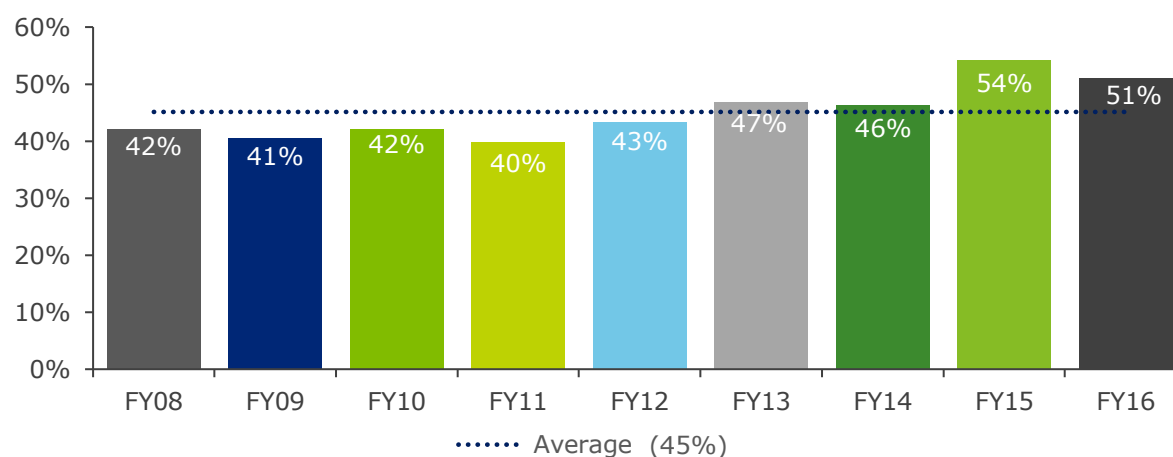
2.2 Key results

Last year's survey told a bleak story with an increasing overall tax ratio, low commodity prices and lower profits.

This year's survey shows a small improvement, with commodity prices more resilient and taxable incomes slightly higher on the back of large reconciliation item entries. However, accounting profits remained under pressure demonstrating that the operating conditions in the industry as a whole remain challenging. Across the sector:

- accounting profits fell by an estimated 47% year on year (YoY) – most notably from a decrease in total sales income (using the proxy of 'all other income' in the survey)
- low commodity prices put pressure on major companies to sell off previous acquisitions. Consistent with this there was a sharp increase in reconciliation items of 277%
- while production figures remained stable, taxable incomes increased by 14% (noting though that this figure is an aggregate estimate, and as such does not explicitly consider commodity specific differences). Indeed, this was as a result of the sharp increase in reconciliation items, stemming from asset sales and reductions in prior year tax losses, rather than improved operational performance.

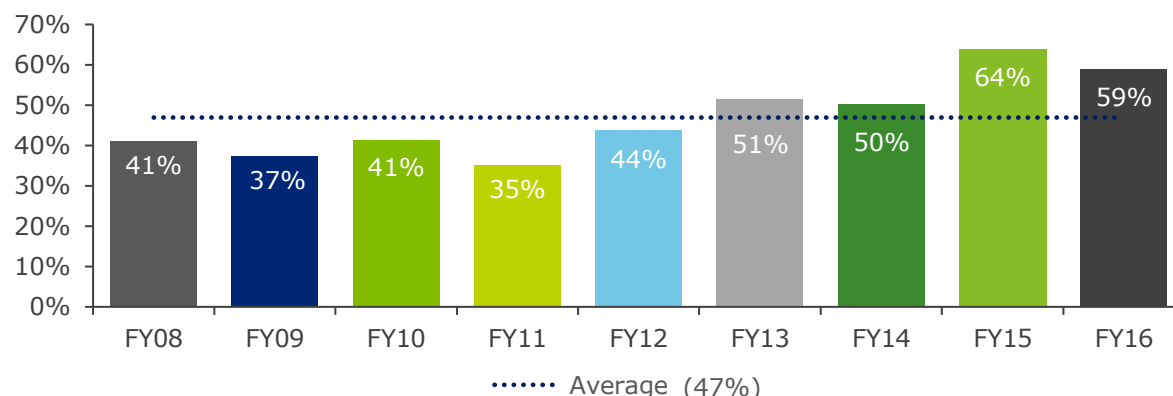
Chart 2.1: Total tax take ratio for total Australian minerals sector



Source: 2017 MCA tax survey. Note 2012-13 ratio for gold unable to be calculated due to negative values

Chart 2.2 below shows royalty's share of the total tax take. During periods of low or negative profitability, royalties tend towards 100% of tax paid. Periods of stronger operational performance reduce this weighting.

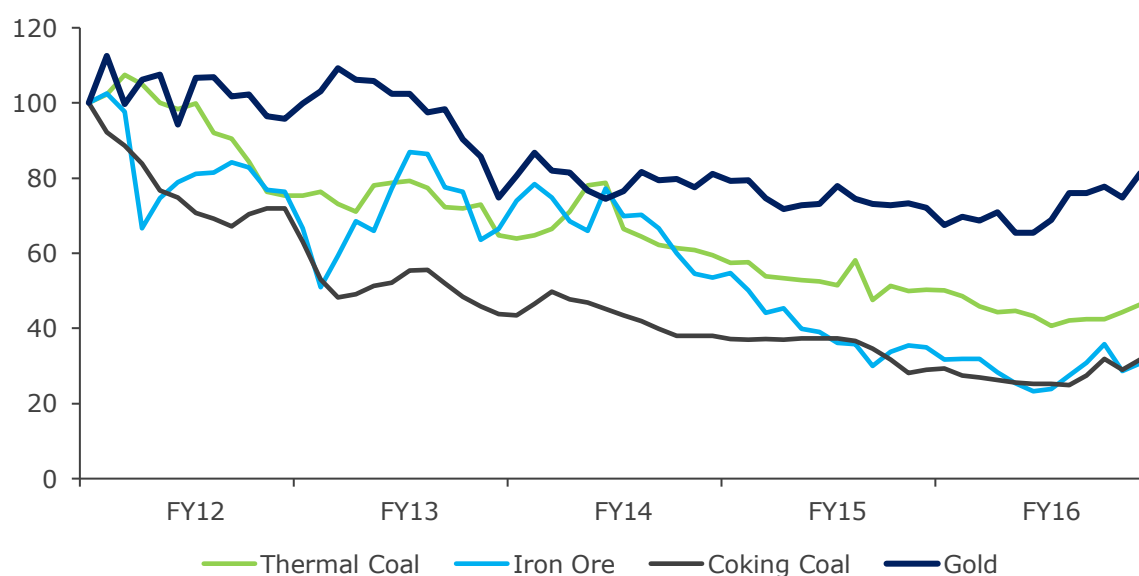
Chart 2.2: Royalty's share of total tax take for total Australian minerals sector



Source: 2017 MCA tax survey

Examining underlying movements in commodity prices, Chart 2.3 below highlights the small recovery in prices in FY16, following several years of falls. Iron ore and coking coal have experienced the greatest falls, with spot price reductions of over 50% compared with FY12 levels. The reductions in commodity prices, and corresponding pressure on operational performance among many miners, are an important component in the increase of royalties as a proportion of total tax take.

Chart 2.3: Indexed changes in commodity prices (at end of month), July 11 – June 16



Source: ANZ, CBA

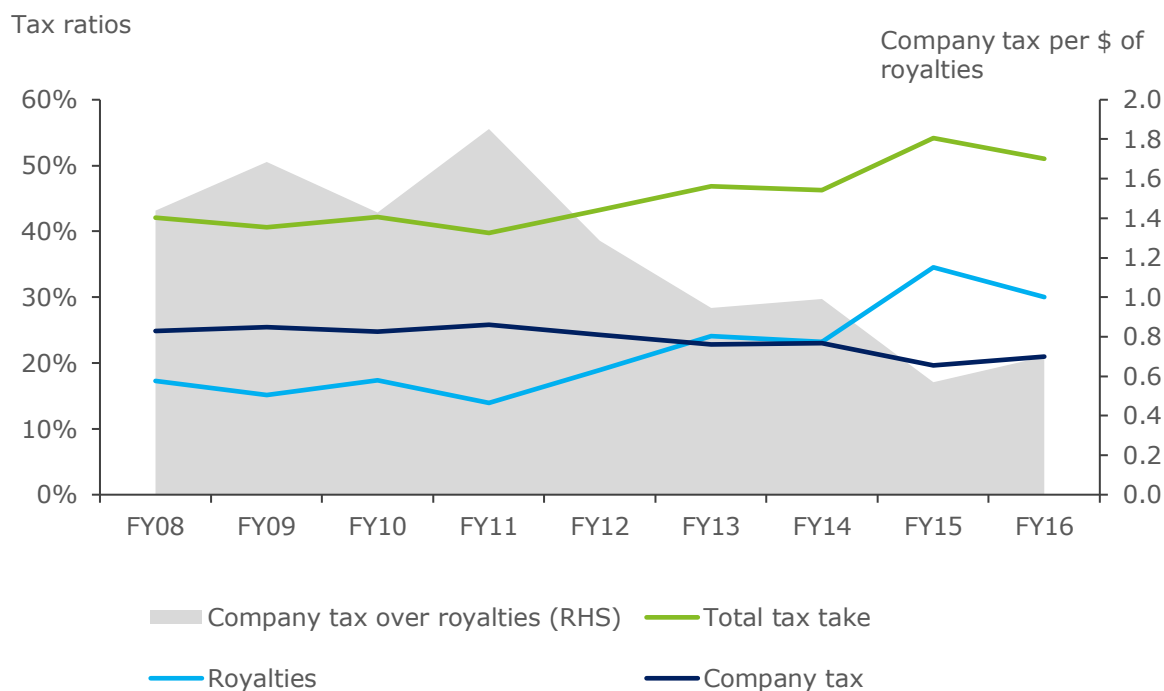
2.3 Trends

As illustrated in Chart 2.4 below, last year's survey saw the lowest share of company tax and, correspondingly, the highest share of royalties paid.

Since FY15, these ratios have improved marginally, with the royalty and company tax rates moving towards each other and total tax take decreasing. However, these improvements are reflective of increases in reconciliation items rather than underlying profitability, and the current trend remains negative.

It is worth noting the company tax ratio is less than 30% solely on account of royalties being included in the denominator and is not an indication of effective tax rates being lower than the corporate tax rate.

Chart 2.4: Comparison of tax ratios over time (all minerals)



Source: 2017 MCA tax survey

Chart 2.5 below shows the annual growth in the total tax ratio on the right axis and annual growth in taxable income and RBA commodity price index on the left axis.

It is clear that a countercyclical trend in total tax take exists – that is, when times are good and profits increase, the tax ratio falls, and vice versa. Between FY15 and FY16 commodity prices improved slightly, and following a range of factors (the key driver being buoyant demand) these further strengthened throughout FY17.

Chart 2.5: Growth in total tax take versus growth in commodity prices and taxable income



Source: 2017 MCA tax survey, Reserve Bank of Australia

2.4 What drives the tax ratios?

The table below summarises the change in key numbers behind the tax ratio between FY15 and FY16.

Table 2.1: Change in key numbers, FY15 to FY16

Total Australian minerals sector	
Total income	-11%
Total expenses	-5%
Accounting profit	-47%
Taxable income	14%
Royalties	-8%
Company tax	14%

Source: 2017 MCA tax survey

2.4.2 Total income (commodity prices)

Following a difficult year in FY15, with commodity prices plummeting, prices in FY16 improved. This marked the first time in five years that all commodity prices reported consistently increased.

Table 2.2: Change in spot commodity prices

% change on year earlier	Iron ore	Coking coal	Gold
Jul-12	-33%	-37%	na
Jul-13	11%	-31%	-22%
Jul-14	-18%	-15%	6%
Jul-15	-42%	-21%	-12%
Jul-15	-42%	-21%	-12%
Jul-16	9%	6%	23%

Source: CBA

Yet although commodity prices increased, income levels did not. Iron ore and gold prices increased by 9% and 23%, whereas income levels fell. Coal prices increased by 6%, however income remained flat. Of course, it is worth noting that spot prices are an imperfect predictor of overall minerals income. Commodities are sold in bulk forward contracts with only some portion being sold on spot markets, while changes in volumes shipped are also part of the equation here.

As illustrated in Table 2.3 below, with the exception of iron ore, income and expense items did not change by a significant amount. Rather, the sharp increases in taxable income levels were driven by changes in reconciliation items. Reconciliation items include net capital gains (among other categories) and broadly speaking, overall low commodity prices and high debt saw a number of major miners shore up their balance sheets with non-core asset sales.² It is also possible that there was a reduction in prior year tax losses that moderate reconciliation items. Reconciliation items are further described in section 2.4.4 below.

Iron ore saw income and expenses levels fall while production levels (and spot prices) increased. The lower income levels potentially reflected the lagged impact of earlier weakness in spot prices), with lower expense levels reflective of industry wide cost cutting.

Table 2.3: Change in income, expenses and reconciliation items, FY15 to FY16

	% change FY15 to FY16
All other expenses	-5%
All other income	-11%
Addition items subtotal less subtraction items subtotal	277%

Source: 2017 MCA tax survey

2.4.3 Total expenses

Industry-wide, total expenses fell by 5% between FY15 and FY16. This stands in contrast to last year's survey, which showed a 7% increase in overall expenses between FY14 and FY15.

Royalty expenses remained relatively flat across the two periods, with the greatest expense reductions coming from lower interest payments. This is consistent with debt being paid down on miners' balance sheets following the aforementioned asset sales in the sector.

Despite reductions in expenses, accounting profits fell on the back of larger reductions in income.

² This survey does not separate out the elements of reconciliation items. In our judgement, the key swing variable year-to-year in reconciliation items usually lies in asset sales and changes in the availability of prior year tax losses.

2.4.4 Taxable income (and adjustment items)

The corporate profit base (that is, taxable income) is obviously a primary driver of the underlying tax ratios. As noted above, taxable income generally shows a countercyclical relationship with the tax ratios – higher taxable income means a lower denominator and thus a lower tax ratio, and vice versa.

Broadly speaking, the same income and expense aggregates that affect accounting profit will equally affect taxable income. Yet taxable income is not the same as accounting profit, so it is necessary to reconcile accounting profit or loss to taxable income or loss through the addition and subtraction of certain items:

- *'Addition 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 deductible 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, 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. As the purpose of this survey is to collect tax data, the correct comparator for ratio purposes is the *'tax'* concept of profits – that is, 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 longer 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 trends in the underlying tax burden of the sector.

As illustrated in Table 2.3, the total increase in reconciliation items across the Australian minerals sector was 277% between FY15 and FY16.

Company tax increased between FY15 and FY16, both in absolute terms and as a percentage, while the royalty take decreased (again in absolute and percentage terms). The increase in company tax is consistent with an increase in taxable incomes on the back of higher reconciliation items.

2.4.5 Royalties

Royalties are essentially levied on minerals companies' gross income, not their profits. That generates the countercyclical relationship between royalties and the corporate profit base (and hence overall tax take ratios) over the past few years. From an overall industry perspective, while the accounting profit fell by 47% between FY15 and FY16, royalty payments fell by only 8%.

As noted above, a further comment can be made regarding the fact that all companies, even those making a loss, are obliged to pay royalties. As profits fall, the tax take ratio tends toward infinity, and royalties contribute a larger share of miners' overall tax contribution. And, of course, when profits become a loss, royalties themselves make up 100% of companies' tax contributions.

2.5 Changes from last year's survey

This year's survey collected data for FY15 and FY16. As with previous years, there is an overlap between the data provided for years FY15 and that provided this year. Analysis of the difference

provides us with an understanding of the overall veracity (and stability) of the underlying tax ratios.

Two factors explain the variation in FY15 data between this year's survey and last year's survey:

- first, one company that participated in the 2016 survey did not participate in the 2017 survey
- second, some FY15 data were revised between this year's and last year's survey. This is especially the case for companies that report on a calendar year basis (that is, CY 2015 and CY 2016), as the CY 2015 data provided in last year's survey were often preliminary.

Table 2.4 breaks down the differences in FY15 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 the dominant driver of the re-estimated FY15 results. The combined effect of drop-outs and data revisions was notable for royalties, company tax and taxable income before royalties.

However, the change on total tax was negligible, coming in at less than a third of a percentage point.

It should be noted that the newcomer in this year's survey did not provide data for FY15, only FY16. As a result, the 'Newcomers' section in the table below remains at 0.00%.

Table 2.4: Changes for FY15 between 2016 and 2017 surveys (all minerals)

Change in key calculation items				
	Data revisions	Drop-outs	Newcomers	Total change
Royalties	6.42%	-0.14%	0.00%	6.27%
Company tax	5.62%	1.60%	0.00%	7.30%
Total tax take	0.22%	-0.50%	0.00%	-0.28%
Taxable income before royalties	5.89%	0.99%	0.00%	6.94%

2014-15 tax ratios				
	Last year's estimate	Data revisions	Drop outs	Newcomers
Royalty tax take	34.76%	35.26%	33.63%	34.76%
Company tax take	19.57%	19.31%	20.17%	19.57%
Total tax take	54.33%	54.55%	53.83%	54.33%

Source: 2017 MCA tax survey

Appendix A: Are royalties taxes?

In the minerals tax debate of 2010 the charts released by the Treasury included royalties in with resource and other taxes in considering the minerals sector's total contribution to the coffers of the public sector. Accordingly, Treasury referred to "Resource taxes (such as royalties, PRRT, crude oil excise and the RSPT)"³ in putting together its figures.

Yet some commentators have argued that royalties are not a tax, and so should not be included in ratios aimed at assessing the tax liabilities of the minerals sector.⁴

So how many angels are dancing on the head of that particular pin? The debate over whether or not to classify royalties as a tax, a charge, a levy, or something else, is of little consequence. As the IMF puts it:

*"From the perspective of the investor, of course, it makes little difference whether a payment is called a royalty or a tax: the economic impact is the same. In terms of policy design too whether one thinks of a royalty as akin to a user fee or as an explicit tax, the determination of its proper level and time path reduces to the same question."*⁵

As the IMF also notes, what actually matters is the extent to which royalties share similar characteristics to taxes.

The primary purpose of royalties is to allow the community a return on the use of its raw mineral deposits. In that context to argue that royalties are not a tax is also to argue that the PRRT, MRRT, or the originally proposed RSPT, are not taxes either – despite all of them having 'tax' in their names.

A number of reputable commentators – including the Henry Review itself, ABARE, Ross Garnaut, Henry Ergas, Ben Smith and others – have all discussed the current royalties regime. Yet none of those contributors to the debate have countenanced the view that royalties do not form part of miners' total tax contributions.

Just like other taxes that affect miners, royalties are levied to ensure the community gets a slice of minerals companies' revenue. And, just like other taxes, royalties themselves can be useful policy levers. In particular, royalties can help ensure the extraction of that resource occurs at an optimal rate (a point also made by the IMF in 2010).

To suggest that royalties are not a tax is to overlook the many similarities that royalties share with other taxes.

³ See http://www.aph.gov.au/~media/Estimates/Live/economics_ctte/estimates/bud_1011/Treasury/answers/BET6.ashx.

⁴ See for example this article in the *Sydney Morning Herald* in response to the latest MCA tax survey: <http://www.smh.com.au/business/a-taxing-tale-of-two-peak-bodies-20150101-12gcty.html>.

⁵ Phillip Daniel, Michael Keen and Charles McPherson, IMF (2010), *The taxation of petroleum and minerals: principles, problems and practice*, <https://www.imf.org/external/np/seminars/eng/2010/tax/090910.htm>.

Appendix B: 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 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 seventh tax data collection. It updates and extends on surveys from previous years, with data now available stretching back to 2007-08 (respondents in the first survey were asked to provide three years' worth of data; respondents in all other surveys are asked to provide the most recent two years' worth of data).

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.⁶ Furthermore, this information is required only in relation to the mining of minerals 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.

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 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;

⁶ 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.

- 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' minerals 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 minerals 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 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 ratios

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 as noted in Appendix A, 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:

- '*Addition 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 deductible 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 – that is, 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 ratios

The survey collects data for each of the following tax payment variables, which enable calculation of tax take ratios:

- 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 minerals 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 mainly State and Territory royalties and Commonwealth company income tax.

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

Companies providing data on different reporting periods

The methodology set out in Appendix C ensures that the data being reported relate only to 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 2014 and 2015 (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 C.

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 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 C, 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 and another for the year ending 31 July. Given that March reporting period is really only one quarter ‘out’ on either side of the desired reporting period (that is, 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. The same applied to the company with the July reporting period.

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

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 seventh 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.

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 C). 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 C: 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.

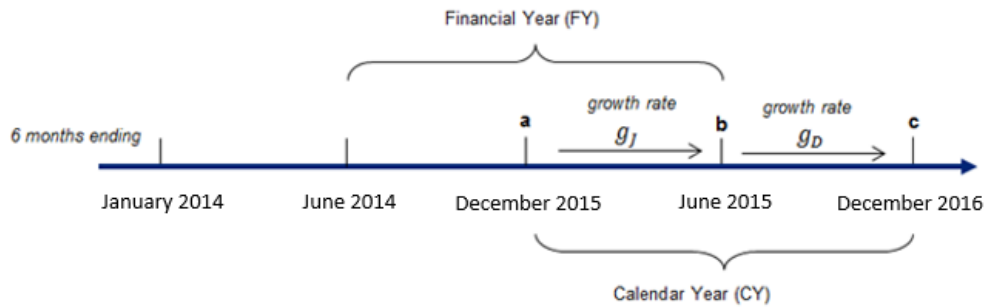
As an alternative, for a company providing calendar year financial information (CY), the arithmetic mean (or mid-point) of each pair of consecutive CY values could be used to approximate the associated amount for the financial year ending 30 June (FY). For example, for the series in the table below, the arithmetic mean of the 2015 CY and 2016 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 2016 in this example being 751 compared with the arithmetic mean of the 2015 CY and 2016 CY values of 925).

	2015	2015	2016	2016
Irregular growth series	Jan-Jun	Jul-Dec	Jan-Jun	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 – the average of 1,070 and 779) would provide a reasonable approximation of the FY value. But in an industry as volatile as the minerals 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 calendar year comprises the sum of two six 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 six 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,

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

Re-arranging,

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

Now, turning to the six month period a ,

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

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:

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

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

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 Department of Industry 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 minerals sector, we are confident that in normal circumstances, this is a superior methodology than the alternatives (that is, using a simple average or simply not converting data to a consistent reporting period).

Where companies' taxable income has switched from positive to negative over a given period however, the adjustment factor described above can yield results which are contrary to expectations. Where this occurs, a simple average of the relevant calendar years often produces a more sensible result. Judgement is applied in all such instances to ensure the resulting financial year estimate is the best possible.

Limitation of our work

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Deloitte.

Access Economics

Contact us

Deloitte Access Economics

ACN: 149 633 116
8 Brindabella Circuit
Brindabella Business Park
Canberra Airport ACT 2609
Tel: +61 2 6263 7000
Fax: +61 2 6263 7004

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