

Mineral Exploration in the Northern Territory 2001 to 2012

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Biographical details of author

Dr Hugh Saddler has a first degree from Adelaide University and a PhD from Cambridge University. After some years as a Research Fellow at Sydney University and the ANU, he has worked primarily as a consultant for almost thirty years. His research interest throughout that period has been in energy policy and economics and related resource and environmental policy issues. He is the author of a book on Australian energy policy and large numbers of book chapters, academic papers and research papers in these fields. He is also a commentator on energy policy issues in print and electronic media. He is currently Principal Consultant – Energy Strategies with pitt&sherry, a national engineering and sustainability consulting company, and is also Adjunct Professor at the Fenner School of Environment and Society, and a Research Associate of the Centre for Climate Economics and Policy Associate, both at the ANU.

Executive summary

The five years up to the end of the 2011-12 financial year includes the onset of the global financial crisis. Its implications continue to reverberate. Many governments hold heavy debt. Confidence in parts of the world economy remains low. Asset values and economic activity have declined sharply across all nations as has the tolerance for risk. Banks, in particular, have become more risk averse, meaning that debt funding for investment has become more difficult.

The Chinese economy, however, has continued to grow strongly throughout this period and the demand for many of Australia's mineral commodities has remained strong. Prices for key metals have remained high, with only relatively minor and short-lived falls in 2009 and 2010, during the height of the GFC.

Trends in total world exploration expenditure over the last decade show very rapid growth in total exploration expenditure since 2002, with a temporary slow down following the onset of the global financial crisis, and an overall close relationship between exploration expenditure and metals prices.

Australia's exploration performance has been broadly comparable with that of other countries with the overall trend in expenditure being similar to the global trend. Expenditure in WA dominates Australian spend and in the last few years expenditure in Queensland has also grown rapidly.

Exploration in the NT is concentrated on a more limited range of minerals than Australia as a whole. The NT does not host commercial coal deposits and has only limited iron ore, Australia's two big export commodities.

Expenditure in the NT represents between 5% and 7% of the national total and this range has been maintained throughout the last decade. Significantly, unlike expenditure in all other states, exploration expenditure has grown steadily throughout the period.

Unlike most other states, in the NT there was very little slow down in the growth of exploration expenditure during the peak of the global financial crisis, suggesting that the NT is in fact a satisfactorily diverse and attractive location for mineral exploration. Significantly, exploration for new deposits has grown more rapidly in the NT than the rest of Australia. Comparing expenditure on exploration at existing deposits there are similar growth rates.

It is clear that the NT has performed at least as well as any other state in attracting investment in mineral exploration over the past decade. Over the past five years, including the period of falling mineral prices in the aftermath of the GFC, it has performed better than most other states. Over this period it has also performed better at attracting exploration for new mineral deposits.

Many of the companies exploring in the NT are smaller speculative Australian "juniors" that do not operate mines. Companies of this kind usually rely almost entirely on equity raisings to fund their activities. As such, their access to capital is likely to be more affected by mineral prices and less affected by difficulties accessing debt funding as a result of the GFC. The trends in expenditure up till now suggest that access to equity capital has been satisfactory, if not ideal.

Ultimately, the most important driver of the overall level of mineral exploration expenditure is the market price of each mineral commodity.

Introduction

This report examines the level of mineral exploration activity in the NT over the past twelve years, with particular reference to the past five years. The report is concerned with exploration for minerals other than oil and gas. In most relevant respects, the oil and gas industry is very different from the mining industry and different factors affect levels of exploration activity. Furthermore, in the NT, most exploration for oil and gas is undertaken offshore.

The five years up to the end of the 2011-12 financial year includes the initial onset of the global financial crisis, as well as the subsequent and still continuing aftermath. The report starts with a brief description of the global financial crisis and its effect on the availability of equity capital and loan funds. This is followed by a quantitative account of the level of mineral exploration in the NT and its relationship to activity in Australia as a whole and, in turn to world-wide mineral exploration activity. The relationship of levels of exploration activity to a number of relevant economic and other factors is examined and discussed. The discussion includes short description of the types of companies which dominate mineral exploration activity in the NT.

The measure of exploration activity used throughout this report is expenditure on mineral exploration activities as reported by the Australian Bureau of Statistics¹. All data presented is for financial years, and starts from 2000-01, except for some ABS data series which do not start until 2003-04.

The Global Financial Crisis

The Global Financial Crisis (GFC) describes a domino effect of asset write offs, instability and closures in the banking sector that swept around the world in the late 2000s. Realisation of losses severely eroded capital in many financial institutions, forcing them to the brink of bankruptcy. The credit ratings of many banks were severely downgraded and lending stalled, forcing a liquidity crisis in the broader global economy. Governments reacted with varying speed and effectiveness to restore liquidity and confidence in their damaged financial sector and prop up the payments system.

The key events leading up to and contributing to the crisis included rapid growth in residential property prices in the US and many European countries, followed by significant declines in the 2006-07 period. This triggered increased loan defaults, a reduction in the value of securitized sub-prime mortgage debt, and bankruptcy of an increasing number of mortgage lenders. In July 2007 Bear Stearns, one of the largest investment banks in the US announced that two of its hedge funds would file for bankruptcy. It was followed by the revelation by a host of other major financial institutions in the US and Europe of substantial holdings of sub-prime mortgage debt. Central banks around the world acted to inject extra liquidity into credit markets, but this did little to slow the spreading crisis. On 15 September 2008, Lehmann Brothers, a major global investment bank, filed for bankruptcy. It was the largest bankruptcy in US history, and investors recognised that the government would not necessarily prop up major banks. Confidence in the credit worthiness of institutions and the banking system continued to decline.

Over the following couple of years the US and other governments made substantial injections of liquidity into the financial system and introduced stimulatory fiscal policies, with the aim of

¹ Cat. No. 8412.0 - *Mineral and Petroleum Exploration, Australia*

stimulating their economies and pushing down interest rates, but success has been limited. Many European countries faced, and continue to face, severe financial crises.

The implications of the financial crisis continue to reverberate, with many governments now holding heavy debt and confidence in some parts of the world economy remaining low. The crisis has seen asset values and economic activity decline sharply across all nations, and the tolerance for risk in many quarters has declined. In particular, banks, including Australian banks, have become more risk averse, meaning that, all else being equal, debt funding for investment has become more difficult.

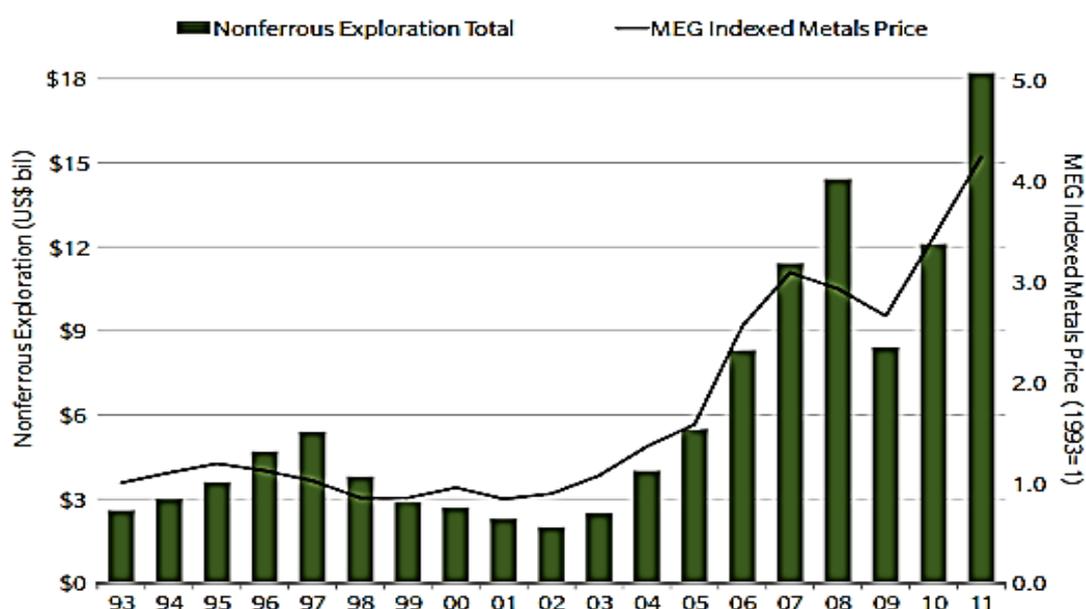
However, from the perspective of the mining industry, the Chinese economy has continued to grow strongly throughout this period, albeit not quite as fast as in preceding years. This has meant that demand for many of Australia’s mineral commodities has remained strong and, as will be seen below, prices for key metals have remained high, with only relatively minor and short-lived falls in 2009 and 2010, during the height of the GFC.

Australia and the world

The Metals Economics Group, an international mineral industry consulting organisation based in Canada, produces an annual report entitled *World Exploration Trends*, which contains data on expenditure on exploration for all major metal ores except iron ore. The graphic below, copied from the 2011 annual report, shows the trend in total world exploration expenditure over the past two decades, and its relationship to an index of metals prices compiled by the Metals Economics Group. This clearly shows:

- the very rapid growth in total exploration expenditure since 2002,
- the temporary slow down following the onset of the global financial crisis, and
- the overall close relationship between exploration expenditure and metals prices.

Figure 1: Estimated Global Nonferrous Exploration Budget Totals, 1993-2011



© Metals Economics Group, 2012
Source: Corporate Exploration Strategies

Successive issues of the annual report also show that the Australian share of the world total exploration expenditure has varied between about 12% and 15% over this period, and in 2011 was 13%.

By comparison, during this period the Canadian share of total expenditure has remained fairly constant at between 18% and 19%, while the share of Latin American countries, as a group, is reported as increasing from around 21% to 25%. On a global scale, one of the most important factors affecting the attractiveness of a particular country for mineral exploration is the country's exchange rate. This will affect both the cost of exploration activity, and any subsequent mine construction and operation, and also the price received within the country for the mineral products. Between 2006 and 2012 the exchange rate of the A\$ against the US\$ increased from about 0.75 to about 1.05 US\$/A\$². The Canadian dollar also appreciated against the US but by the lesser amount of about 0.83 to 1.00³. The currencies of key Latin American countries also appreciated against the US dollar: the Chilean peso, for example from about 0.017 to 0.021⁴ and the Brazilian real from about 0.45 to 0.50⁵.

Hence, while the appreciation of the Australian dollar against the US dollar is greater than that experienced by the other countries, they also saw appreciable appreciation of their currencies. The implication is that the growth in actual exploration effort — metres drilled, for example — is likely to be somewhat less than the growth in expenditure measured in US dollars, as shown in the graphic. The other implication is that, when the greater appreciation of the Australian dollar is taken into account, Australia's performance has been broadly comparable with that of other countries.

Total Australian expenditure

Figures 1 and 2 show total annual private, i.e. non-government, expenditure (in \$ of the day) on exploration for minerals other than oil and gas, by state/territory. It can be seen, firstly, that in Australia as a whole, and in most individual states, the overall trend in expenditure has been similar to the global trend, as shown in the graphic above. Secondly, throughout the period, expenditure in WA has dominated and in the last few years expenditure in Queensland has also grown rapidly. Expenditure in the NT has been a small fraction of the national total, but significantly, unlike expenditure in all other states, has grown steadily throughout the period. That is to say, in the NT, unlike most other states, there was very little slow down in the growth of exploration expenditure during the peak of the global financial crisis. Expenditure in the NT has been between 5% and 7% of the national total throughout the period since 2000-01.

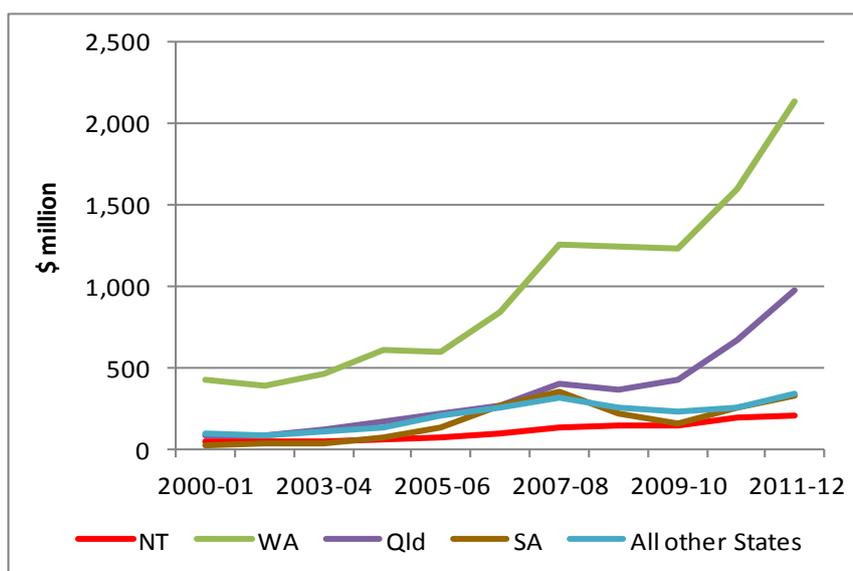
² <http://www.exfin.com/historical-forex-aud>

³ <http://www.forecast-chart.com/exchange-canadian-dollar.html>

⁴ <http://www.tradingeconomics.com/chile/currency>

⁵ <http://www.tradingeconomics.com/brazil/currency>

Figure 1: Expenditure on exploration for minerals other than oil and gas



In rough terms, the levels of exploration activity shown in Figure 1 reflect the respective levels of mining activity. A convenient measure of the value of mining activity is total factor income from the mining industry, as reported by the ABS. Values of total factor income from mining, at current prices, in each state in 2011-12 are shown in Table 1⁶. It should be noted that in these statistics mining includes production of oil and gas. This will increase Victorian income by a significant amount, but not greatly affect relativities for any other state. All else being equal, states with a high level of current mining activity are likely to have more exploration expenditure associated with existing mines, proving up and delineating extensions to existing resources. This is likely to account in part for the higher level of exploration in WA and Queensland in particular.

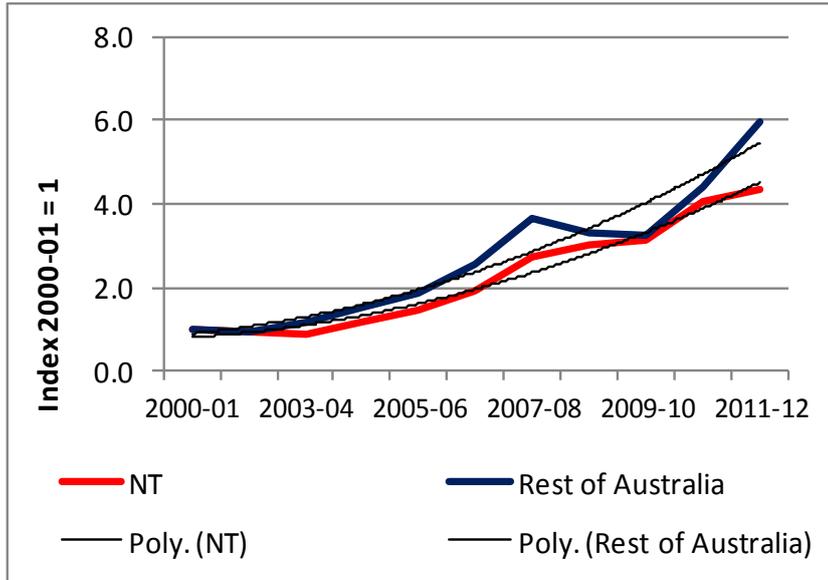
Table 1: Mining industry (including oil and gas) total factor income at current prices, 2011-12

State	\$ billion
NSW	14.3
Victoria	7.3
Queensland	29.4
SA	3.9
WA	82.1
Tasmania	0.4
NT	3.6

The relative performance of the NT is seen more clearly in Figure 2, which shows the increase in expenditure since 2000-01 in index number terms. Over this period as a whole, there is no significant difference between the NT and the rest of Australia. The graph includes a fitted quadratic equation trend line for each of the two data series.

⁶ Australian Bureau of Statistics, 2012. *Australian National Accounts: State accounts 2011-12*. Cat. No. 5220.0.

Figure 2: Expenditure on exploration for minerals other than oil and gas: Index numbers



Expenditure by mineral sought

Figure 3 and 4 show annual expenditure on mineral exploration, classified by the mineral being sought, for the NT and for the whole of Australia respectively. Exploration in the NT is concentrated on a more limited range of minerals than in Australia as a whole, and data availability is also constrained by commercial confidentiality requirements applied to official statistics when there are a small number of separate businesses in a sector or activity. All else being equal, the generally smaller size of the mineral exploration enterprise in the NT might be expected to make the level of annual expenditure change more rapidly year on year. In fact, this is not observed, suggesting that the NT is in fact a satisfactorily diverse and attractive location for mineral exploration.

Figure 3: Annual expenditure on mineral exploration, by type of mineral, NT

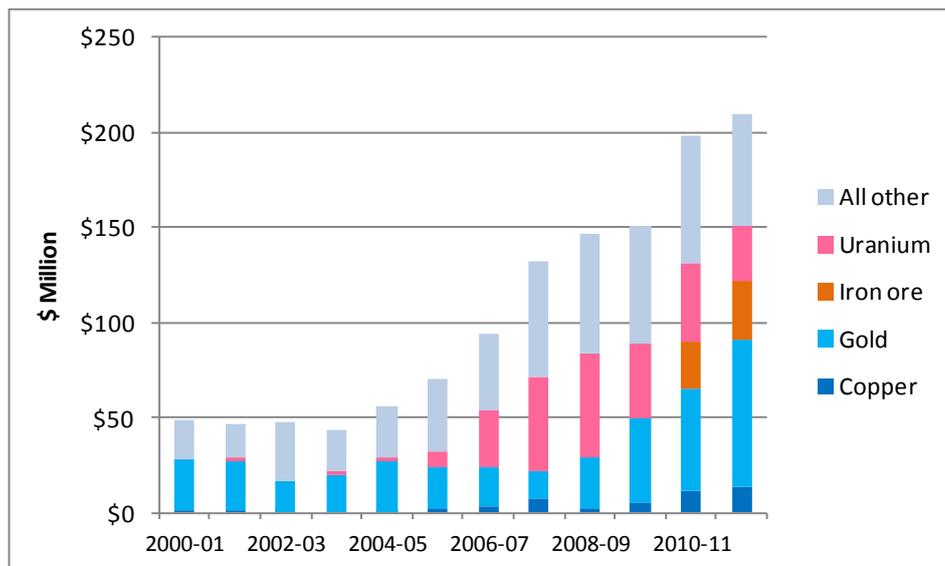
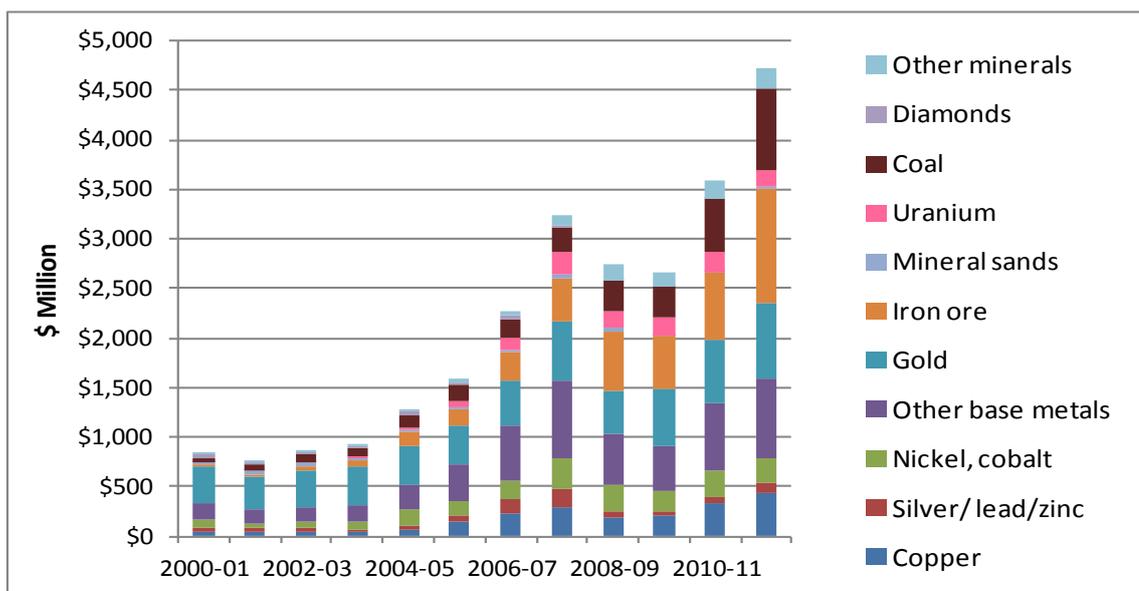


Figure 4: Annual expenditure on mineral exploration, by type of mineral, Australia



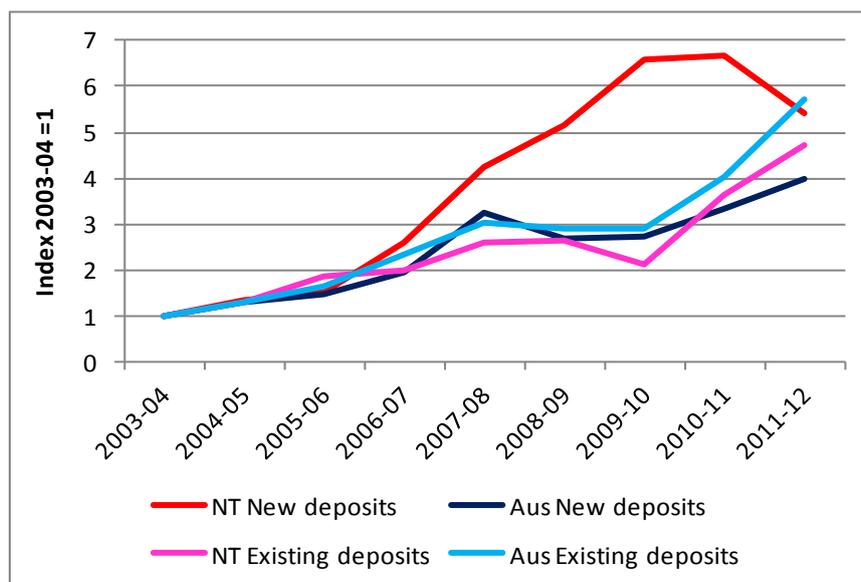
Expenditure by type of deposit

The ABS data classify mineral exploration expenditure according to whether the exploration is seeking a new mineral deposit or is associated with an existing mineral deposit (development or extension exploration, sometimes termed “brownfield”). This data series starts from 2003-04. The data are presented in three separate ways, each comparing the NT with Australia as a whole.

Figure 5 shows expenditure for new deposits and at existing deposits for the NT and the whole of Australia, as index numbers starting from 2003-04. Significantly, it is clear that exploration for new deposits has grown more rapidly in the NT than in the rest of Australia, whereas there is little difference in growth rates of expenditure on exploration at existing deposits. Since exploration for new deposits is, in general, a higher risk activity than exploration to extend existing deposits, the difference between the NT and the rest of Australia could be interpreted as an indicator of the attractiveness of the NT for mineral exploration. Three other factors might also be contributing to the difference.

- Specifically, a number of states prohibit exploration for uranium, which the NT does not and, moreover, the NT is particularly prospective for uranium.
- More generally, the mix of other minerals for which the NT is particularly prospective may be those which have experienced stronger growth in price and demand; mineral price trends are examined in the next Section of this report.
- States with more existing mines are likely, all else being equal, to have more exploration at existing deposits.

Figure 5: Trends in mineral exploration expenditure for new and at existing deposits



The nature of the companies undertaking mineral exploration in the NT may also be a factor. The overview of NT exploration and mining activity in 2011⁷ identifies over fifty separate companies which undertook some exploration in the NT during the year. Four of these were major companies; two of these (Xstrata and Newmont) currently operate major mines in the NT and the level of activity undertaken by the other two was, as reported, very low. There is one further company which is included in PwC’s list of “mid-tier 50” mining companies⁸. Some of the remaining roughly fifty companies are from other countries, such as Canada and India, but most are, by implication, smaller speculative Australian companies (“juniors”), which do not currently operate mines in Australia. Companies of this kind usually rely almost entirely on equity raisings to fund their activities. As such, their access to capital is likely to be more affected by mineral prices and less affected by difficulties accessing debt funding as a result of the GFC. The trends in expenditure up till now suggest that access to equity capital has been satisfactory, if not ideal. That said, it is widely reported that smaller companies are finding it difficult to raise capital, and there can be no certainty that exploration expenditure will continue the steady growth seen up till now, either in the NT or elsewhere in Australia or, for that matter, the world.

Figure 6 shows NT exploration expenditure as a share of total Australian expenditure for each of the two categories of exploration. It can be seen that for most of the period NT expenditure has been between about 4% and 7% of total Australian expenditure for both existing and new deposits. However, during the period 2008-09 to 2010-11, NT expenditure on exploration of new deposits was a higher share of the total. This was the period, in the aftermath of the global financial crisis, when total Australian expenditure on exploration for new deposits fell in absolute terms, whereas in the NT it kept increasing, as Figure 5 shows.

This is also seen in Figure 7, which shows exploration expenditure for new deposits as a share of total exploration expenditure in the NT and in Australia as a whole.

⁷ Scrimgeour, I.R., 2012. *Mineral exploration and mining overview 2011*. Northern Territory Geological survey.

⁸ PwC, 2012. *Aussie Mine 2012: staying the course*. <http://www.pwc.com.au/industry/energy-utilities-mining/assets/Aussie-Mine-Nov12.pdf>.

Figure 6: NT share of total Australian expenditure on mineral exploration

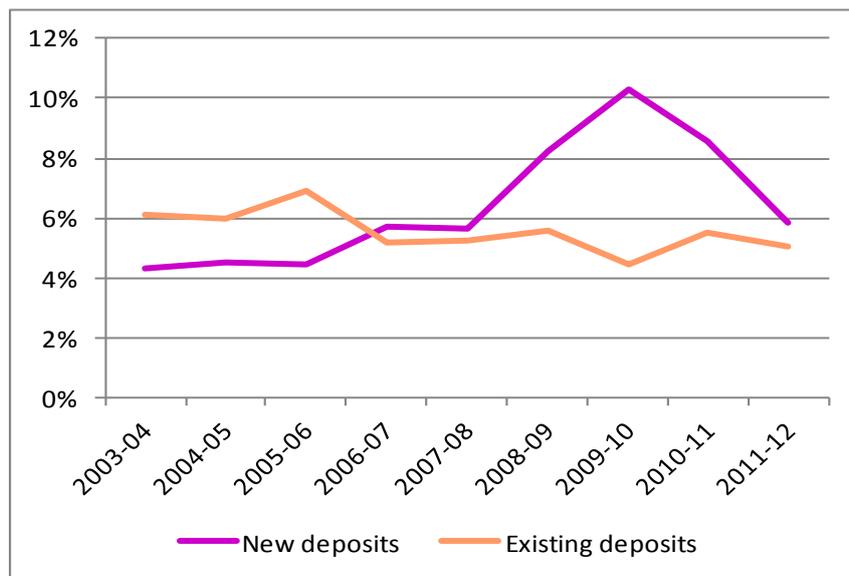
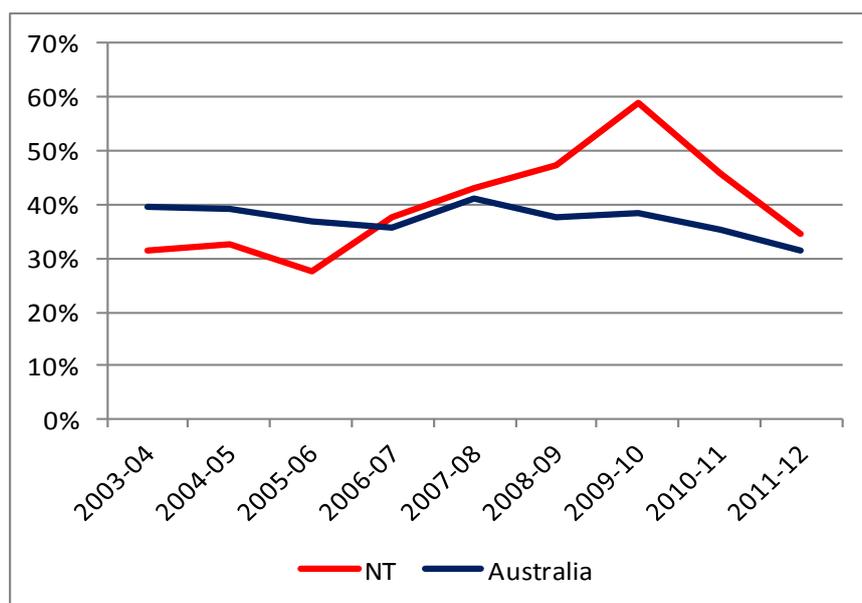


Figure 7: Expenditure on exploration for new deposits as a share of total exploration expenditure, NT and Australia



The relationship between mineral price and exploration expenditure

The most important driver of the overall level of mineral exploration expenditure is the market price of each mineral commodity. As explained earlier, recent years have seen considerable volatility in world market prices for many mineral commodities. In this section, the relationship between exploration expenditure for particular minerals and the prices producers received for those minerals is examined. The analysis is confined to those minerals which account for a significant proportion of NT exploration expenditure over the whole period analysed. These are gold, copper and uranium, as shown in Figure 3 above. The special case of iron ore is discussed below. All prices are averaged unit price received by mineral producers, in A\$. Price data were obtained from *Australian*

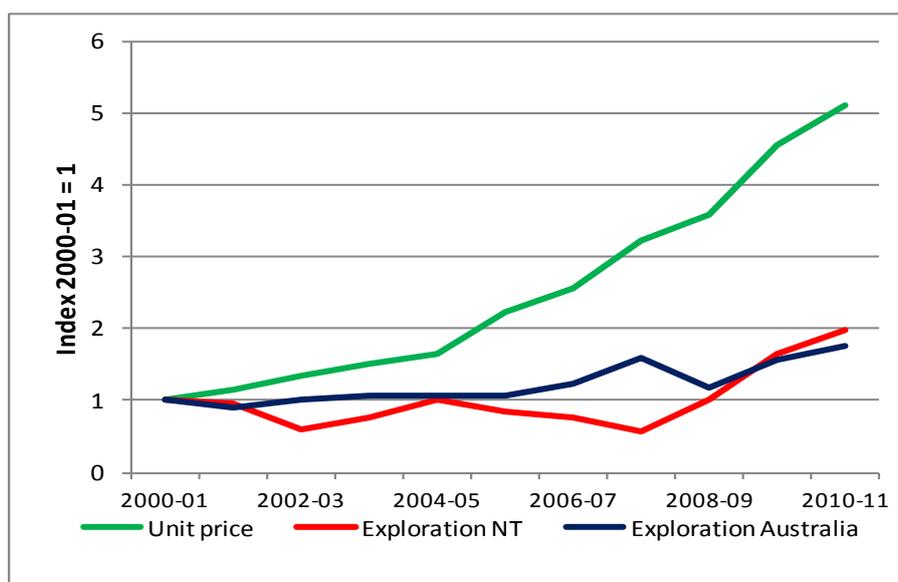
Commodity Statistics, produced by ABARES up to 2009-10⁹, and from *Resources and Energy Statistics*, produced by the Bureau of Resource and Energy Economics (BREE) for the two most recent years¹⁰.

Figures 8 and 9 show that for both gold and copper large increases in prices have been associated with large increases in exploration expenditure. In the case of gold, the price increased fivefold over the analysis period and exploration expenditure almost doubled, though it should be noted that most of the latter increase has occurred in the last few years. In the case of copper, the price has increased by a factor of 3 and exploration expenditure by a factor of almost 10, though it should be noted that this increase was from a low base in 2000-01. For both minerals, there is no significant difference in the exploration expenditures trends between the NT and the whole of Australia.

Figure 10 shows trends in exploration for uranium. In this case, the increase in expenditure from the extremely low levels during the first few years of the analysis period is so large that, for clarity of presentation, the uranium price trend is shown in absolute, rather than index number terms. Again, however, the response of exploration expenditure to the price increase is effectively the same in the NT as in the whole of Australia.

Expenditure on exploration for iron ore in the NT was quite large in the last two years of the analysis period, reaching 15% of total mineral exploration expenditure in 2011-12. No data are available from the ABS for years prior to 2010-11. This does not mean that expenditure was actually zero, but is a restriction on publication, imposed for reasons of commercial confidentiality, when the number of separate respondents in a category is three or fewer. Figure 13 shows the trend in price and total Australian exploration expenditure in trend terms. The overwhelming majority of expenditure on exploration for iron ore was in WA – 89% in 2011-12. A further 7% was in SA and the NT accounted for 3%. This limited information is consistent with the NT achieving a share of national exploration commensurate with its performance across mineral exploration as a whole, and with the fact that both WA and, to a lesser extent, SA have more and larger operating iron ore mines than the NT.

Figure 8: Relationship between expenditure on exploration for gold and the gold price



⁹http://www.daff.gov.au/abares/publications_remote_content/publication_series/australian_commodity_statistics

¹⁰<http://www.bree.gov.au/publications/res.html>

Figure 9: Relationship between expenditure on exploration for copper and the copper price

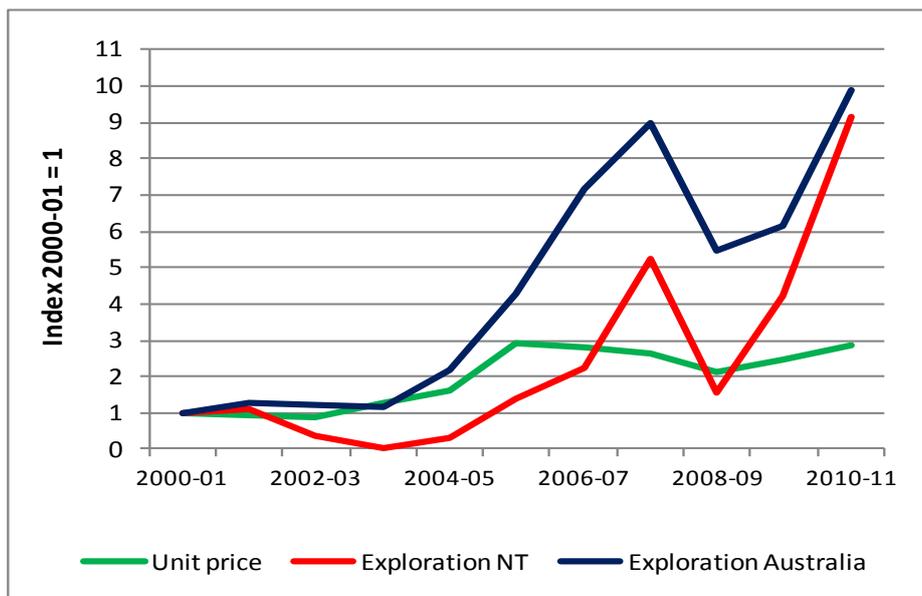


Figure 10: Relationship between expenditure on exploration for uranium and the uranium price

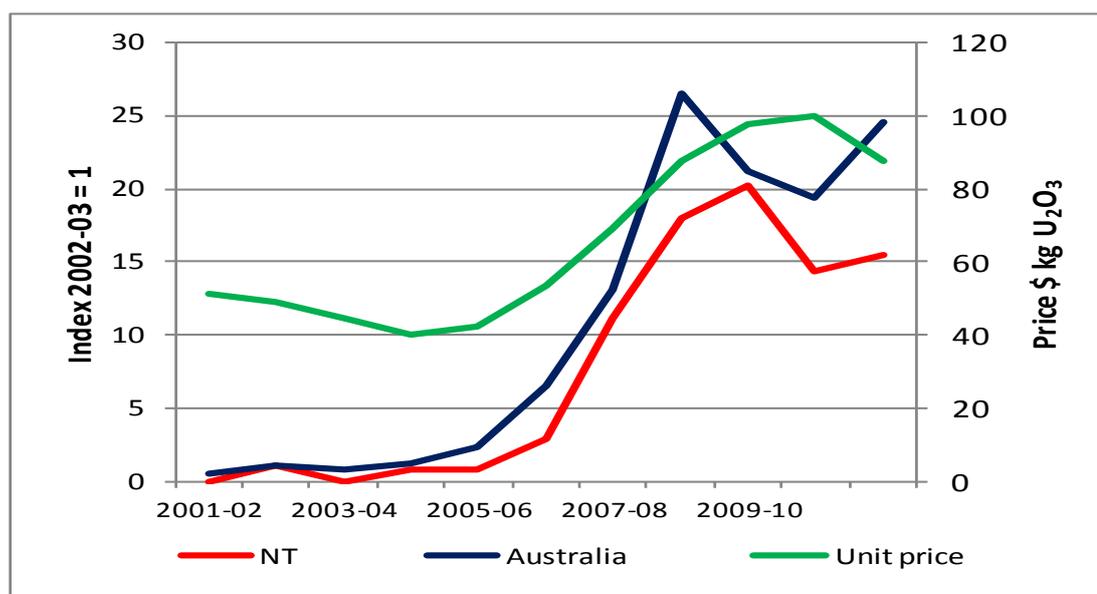
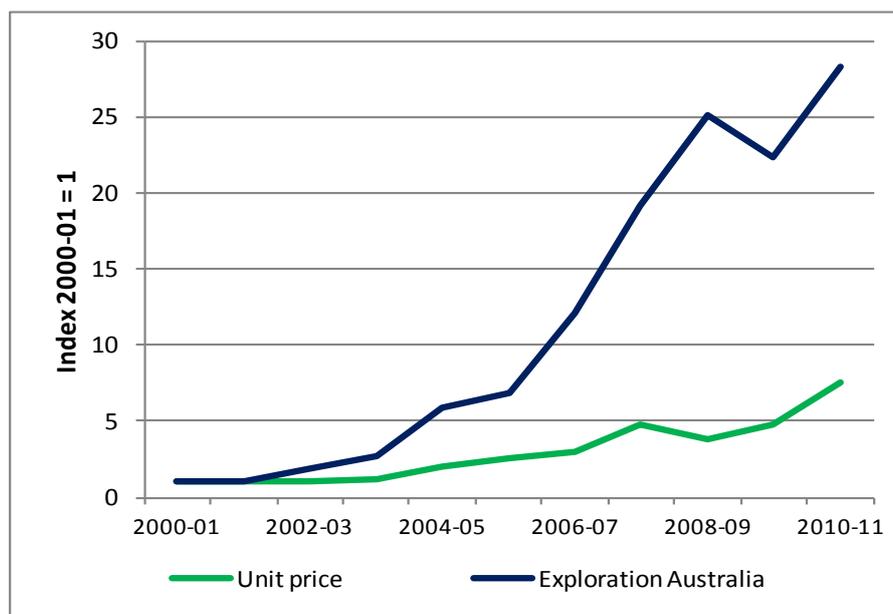


Figure 11: Relationship between expenditure on exploration for iron ore and the iron ore price



Conclusion

The analysis presented in this report has examined the level of expenditure on mineral exploration in Australia over the period from 2000-01 to 2011-12 inclusive, with particular emphasis on the last five years. Total national expenditure on mineral expenditure, expressed in dollars of the day, grew by a factor of six over this period. Throughout the period, half or more of total exploration expenditure was in WA. The NT had a relatively modest share of total national expenditure, of between 5% and 7%, which was maintained throughout the period.

Most significantly, mineral exploration expenditure in Australia as a whole and in most individual states fell in 2008-09 and again in 2009-10, following the onset of the global financial crisis. However, it continued to rise in Queensland and the NT.

Differences between states are inevitable because of differences in prospectivity for the various mineral resources and also differences in movements in prices for the individual minerals. For example, lack of major coal resources accessible to ports means that the NT cannot expect to see a surge in exploration expenditure for coal, as seen in Queensland in the last couple of years. Similarly, lacking the enormous iron ore resource of WA, the NT could not be expected to experience the enormous boom in exploration for iron ore seen in WA.

Having regard to such considerations, it is clear that the NT has performed at least as well as any other state in attracting investment in mineral exploration over the past decade or so. Over the past five years, including the period of falling mineral prices in the aftermath of the GFC, it has performed better than most other states. Over this period it has also performed better at attracting exploration for new mineral deposits (greenfields exploration).

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