AUSTRALIAN MINERAL EXPLORATION: ANALYSIS AND IMPLICATIONS

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Australian mineral exploration is at a 20 year low in real terms. After doubling in line with global exploration activity during the 1990s exploration expenditure peaked in 1996/97 and fell sharply. The current decline differs from previous downturns in exploration that have occurred as part of the economic cycle as it is accompanied by major structural changes in the industry. Forces resulting in these changes are strongly inter-related and include cost cutting to stay competitive in the face of low (declining) commodity prices, demand for greater return on shareholder investment, consolidation in response to globalisation, intense competition for risk capital (particularly for junior companies) from new sources, loss of confidence in exploration as an economic activity following declining rates of discovery, and land access issues. These factors have changed and continue to change the face of the industry.

Australian mineral exploration expenditure 1991-2001

Australian Bureau of Statistics (ABS) quarterly survey data show that Australian mineral exploration expenditure approximately doubled in the early to mid-1990s, peaking in 1996/97 (Figure 1). Most of the increase was in gold, but there were also modest increases in expenditures on base metals, coal, iron ore and diamonds in this period. Exploration spending post the 1996/97 peak has fallen sharply (Figure 1) and in the 2000/2001 ABS survey was $683.3 million. This is down 40.5% on the 1996/97 peak but up slightly (1%) on 1999/2000, and is the first increase since 1996/97. In constant 2000-2001 dollars exploration is at a 20 year low (Figure 1).

In recent years, gold exploration has accounted for more than half of total mineral exploration expenditure in Australia. Gold exploration expenditure has halved since peaking in 1996/97 and fallen from about 63% to 54% of total Australian exploration expenditure (Table 1). Diamond and coal exploration expenditure has also halved, and base metal and uranium exploration is also down significantly on 1996/97 figures, whereas mineral sands exploration has nearly doubled (Table 1).

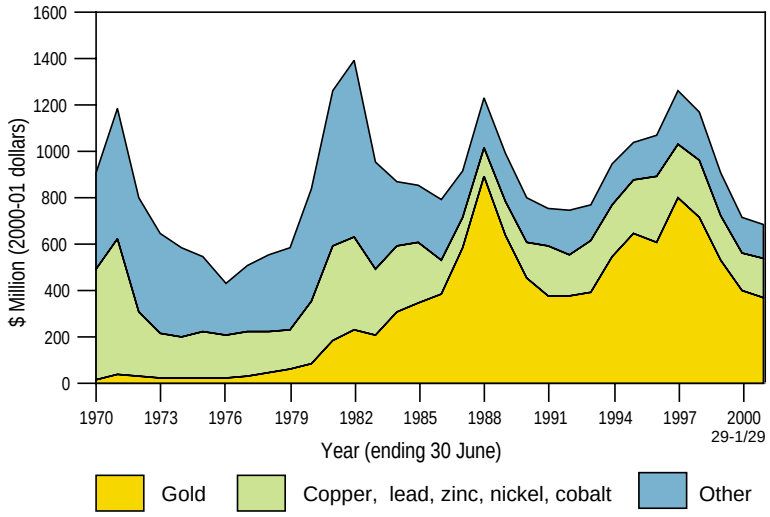

Figure 1. Australian mineral exploration expenditure in constant 2000-2001 Australian dollars (derived from ABS data).

Table 1. Percentage decline in Australian mineral exploration spending by commodity (source ABS, actual expenditure).

Commodity	1996-97 $ millions	2000-2001 $ millions	% change
Gold	728.3	370.2	-49.2%
Base metals	206.8	165.4	-19.9%
Coal	70.5	41.3	-41.4%
Diamonds	59.3	31.8	-46.3%
Mineral sands	13.9	23.6	+69.8%
Iron ore	25.8	23.4	-9.3%
Uranium	13.0	8.4	-35.4%
Others	31.0	19.3	-37.7%
TOTAL	1148.6	683.3	-40.5%

Global mineral exploration expenditure

The Metals Economics Group (MEG) annual surveys of exploration expenditure[1] indicate that Australian exploration spending over the past decade directly follows the global mineral exploration pattern, which also more than doubled from 1991 to 1997 peaking at $US 5.2 billion in 1997 before falling sharply to a low of $US 2.2 billion in 2001 (Figure 2). The reasons for the rise in exploration expenditure in the 1990s to levels well above the 50-year-average ratio of exploration expenditure to the value of metal production – 3.6% compared with the historic average of 2.4% (Doggett, 2000) – have been addressed elsewhere. A key factor was the ready access to capital, notably from North American mutual funds.

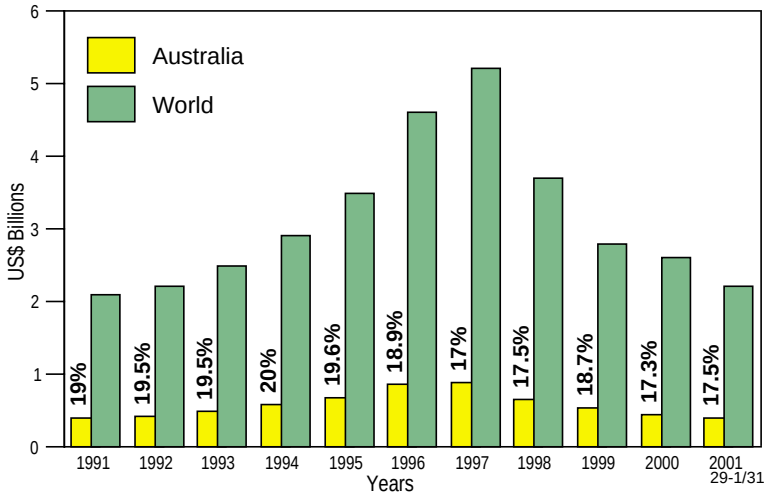

Figure 2. Global mineral exploration budgets for the period 1991-2001 as estimated by the Metals Economics Group annual survey of mineral exploration and mining companies.

Most of the growth in global exploration expenditure in the period 1991-97 was directed into gold exploration in Latin America (notably Peru, Argentina, and Chile) and to a much lesser extent Africa and South East Asia/Pacific at the expense of Canada, Australia and the USA which had historically attracted 50-60% of global exploration. Exploration in emerging

[1] Note: the MEG data are estimates of planned expenditure on exploration for non-ferrous metals for the year based on a survey of exploration and mining companies worldwide. The 2001 survey covered 679 companies with exploration budgets of $US 100,000 or more. MEG estimates that this represents about 90% of total exploration spending. The MEG survey results are not directly comparable with the ABS quarterly survey of actual exploration expenditure.

mining countries was encouraged by adoption of more favourable mining and foreign investment laws, a welcoming attitude to exploration and mining by foreign companies, and the opportunities presented by prospective geology that had not been subjected to modern exploration.

MEG data indicates that, since 1997, mineral exploration expenditure has fallen in virtually all countries but spending cuts have been most heavily felt in the Southeast Asia/Pacific region, Africa, and the USA (Table 1). Australia's exploration spending has fallen broadly in line with but slightly more than the overall fall in global spending for that period (Table 1). Canada experienced the smallest decline.

Table 2. Percentage change in mineral exploration budgets 1997-2001 based on the MEG annual survey.

Country/Region	Change (%) 1997-2001
Southeast Asia/Pacific	- 73.2
Africa	- 62.9
USA	-61.1
Australia	- 60.0
Latin America	- 56.3
Rest of World	- 48.6
Canada	- 38.8
Total	**- 57.7**

The MEG surveys indicate that Australia's share of global exploration spending has fallen from around 20% in the early to mid 1990s to 17.5% in 2001 (Figure 2). Australia continued to attract more exploration expenditure than any other country (Figure 3).

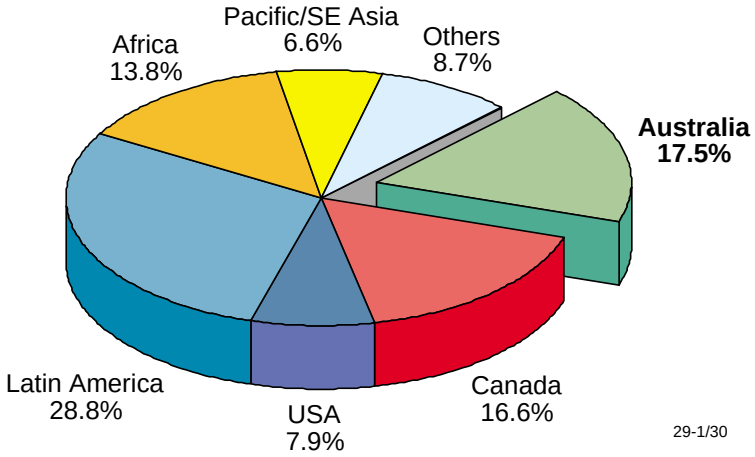

Figure 3. Distribution of world mineral exploration budgets in 2001 as reported by the Metals Economics Group.

Factors contributing to the current decline in Australian mineral exploration

There are a number of reasons for the major decline in exploration spending after the 1997 peak. Some are global, whereas others are either of a more local nature or else have been more acutely felt in Australia. They include:

- low returns on investment and low profitability of the mining sector;

- industry consolidation in response to globalisation;
- static or declining rates of discovery despite rising expenditure and loss of confidence in the exploration process as a cost-effective means of achieving acceptable company growth;
- land access problems;
- intense competition for capital from the 'new economy' sectors;
- low metal prices, especially the fall in the gold price after 1996;
- loss of confidence in exploration by the finance market, especially in North America, after the Bre-X scam, and
- the consequent drying up of risk capital for junior companies that have historically comprised an important part of the exploration industry.

Low industry profitability

The minerals industry has suffered from low rates of return for many years, largely because of the continued decline in metal prices, which have shown a long-term average decline of around 2-4% per annum in real terms. Profitability has been maintained by increased mining efficiency resulting in declining costs of production and increased production volumes (Doggett, 2000). In recent years rates of return have been below the cost of capital resulting in loss of shareholder wealth (Cusack, 2001). These poor rates of return for mining have fallen well short of that offered by other market sectors and the threshold demanded by shareholders and fund managers. This, when combined with the growth in other market sectors, has seen the combined market capitalisation of the mining sector decline to about 1% of the total world market capital. However, the 2001 MCA Mineral Industry Survey Report showed a substantial improvement with net profit returns on average shareholder's funds for 2001 of 13.9% compared with a ten year average of 6.9%.

Declining discovery rates

Despite significant growth in Australia's economic demonstrated resources for most commodities and the discovery and development of major new deposits (e.g. Century, Cannington, Cadia, etc), globally, discovery rates of new deposits, especially of giant or world-class deposits, have at best remained flat or have fallen, in spite of rising exploration expenditure (Haynes, 2000; Parry, 2001). Global exploration expenditure levels and average ore discovery costs in the 1990s were three times that of the 1950s (Parry, 2001) with the ratio of exploration expenditure to the gross value of production in the 1990s 3.6% compared with 1.1% in the 1950s (Doggett, 2000). This poses a particular challenge for exploration today where the focus is increasingly on world-class deposits – the top 10% of deposits on a contained metal basis – since these can profoundly affect metal supply and cash flow. Such deposits are, by definition, rare, commonly found early in the exploration of a mineral province as they represent the largest mineral system (e.g. Kalgoorlie, Broken Hill), and typically contain the bulk of the mineral endowment of the province.

Industry consolidation

Consolidation, through mergers and acquisitions, continues to impact adversely on exploration expenditures. There has been a major loss of mid-sized to major Australian mining companies that historically have had significant Australian exploration budgets (over $10 million). The merged companies have reduced their exploration effort. Simultaneously, larger Australian companies have, in line with their global counterparts, cut their exploration budgets. There has been entry of new mining companies, notably from South Africa and Canada, but to date their focus has largely been on the acquisition of existing mining operations and they have not replaced the former commitments to exploration. However, this may change as the availability of high quality, advanced projects dries up. Majors are increasingly conducting much of their exploration through strategic alliances and joint ventures with junior exploration companies. A positive impact of the rationalisation has been the disposal of some non-core assets by majors to juniors that has created new opportunities and, in some cases, cash flow for the junior to support exploration (Brook and Alexander, 2001).

Impact of low metal prices

The long-term decline in metal prices has been a major contributor to the low rates of return from mining. The present consolidation will yield more control over production and, to some extent, prices. Gold exploration has been especially impacted by metal prices. The modest increase in gold prices in the early 1990's saw a period of strong growth in global gold exploration, rising in 1997 to about 65% of total exploration expenditure worldwide. This was about 6% of the value of gold production, well above the long term average for most metals (Doggett, 2000). Since 1997 expenditure on gold exploration has fallen by 71% globally (MEG data) and by nearly 50% (58% in $US terms) in Australia (Table 1). A declining proportion is being spent on grassroots exploration. The decline in gold exploration coincides with the start of substantial sales of gold by the central banks of many countries and the move by the markets to treat gold as a commodity rather than a store of wealth. The decline in both gold and total exploration effort both in Australia and globally closely matches, but is offset by one year from, the decline in the gold price since 1996. The pattern shown by gold exploration expenditure is consistent with the fact that, historically, mineral exploration expenditures have tracked metal prices with a 1-2 year lag. A rebound in exploration levels is, therefore, strongly contingent on a rise in metal prices, but the extent of any rebound in Australia will ultimately depend on the interaction of price and a range of others factors, including those discussed below.

Risk and land access

The globalisation of mineral exploration in the 1990s saw an increase in the number of Australian companies engaging in exploration outside Australia. The MCA annual mineral industry surveys of Australian companies indicate that overseas exploration increased significantly from 12% of budgets in the early 1990s to a peak of about 46% in 1998/99 before declining in 2000/2001 to around 26%. Land access difficulties following the Native Title Act and the High Court's Wik decision in 1996 were cited as a major factor influencing decisions to explore offshore.

The collapse in global exploration spending since the 1997 peak has most adversely impacted on those countries and regions that are seen as having higher country risk[2]. Country risks are canvassed in surveys such as the AIG World Investment Risk Survey of Australian mining company exploration managers and the Fraser Institute Annual Survey. The fall in global exploration post-1997 has seen exploration capital preferentially flow to those countries that rank favourably in such risk surveys. Australia, along with the major mining countries in the Americas – Canada, Chile, USA, and to a lesser extent Peru, Mexico, and Argentina, – has consistently ranked in the top group of favoured countries for mineral investment. Australia continues to receive an adverse ranking in both surveys in the categories of land access and land claims reflecting the impact of Native Title on granting of exploration permits. The MCA Minerals Industry Survey Report 2001 noted the rising expenditure on native title and related issues. Despite these impediments, Australia remains one of, if not the, most favourable countries for mineral exploration and mine development.

Access to capital

There has been a dramatic fall in mining-related capital raising and the number of new floats since 1997 in all the major centres for mining finance. For example, new mining equity raising on the Toronto Stock Exchange fell from over $C6.5 billion in 1996 to a mere $C500 million in 2000 (Bogden, 2001). This has severely impacted on exploration by junior companies, in particular, as equity raising is the prime form of capital raising of junior companies. The

[2] Country risks include political, economic, and social stability as well as the administrative and legal policies and the regulatory environment of the country. Risk categories include sovereign risk, land access, environmental compliance requirements, bureaucracy (red tape), social risk, infrastructure, civil unrest, natural disasters, and labour relations.

dramatic decline in the activity of junior companies since 1997 coincides with the collapse in their ability to raise finance. In 2000 junior companies raised $A120 million in 19 new resource listings on the ASX (Brook and Alexander, 2001). Some Australian juniors listed on the Alternative Investment Market (AIM) of the London Stock Exchange which raised £43 million ($A123 million) in 53 floats (Bogden, 2001). In the year 2001 14 new resource floats on the ASX have raised $84 million, with a number deferred or pending, and a small number of others have listed on the AIM.

The mergers and acquisitions together with the decline in the capacity of junior mineral exploration companies to raise capital has seen the number of exploration and mining companies that are currently active in Australia fall by over 50%, based on indicators such as the Australian Gold Council (AGC) Explorers Index and the number of companies in the ABS quarterly exploration surveys. The capitalisation of resource stocks as a percentage of the ASX has fallen over 10 years from 37% to 14%, and the Australian gold sector has declined in value from around 7% of the ASX All Ordinaries Index in 1994 to about 1% today. The market capitalisation of the AGC Explorers Index has halved from 1997 to present. Associated with this has been a major reduction in the level of institutional investment in small companies, especially gold companies (Brook and Alexander, 2001). Difficulties in capital raising by the exploration sector have lead to calls for the introduction of tax incentives including a tax credit similar to the 'flow-through shares' scheme that operates in Canada.

Implications and outlook

Levels of mineral exploration expenditure have historically fluctuated in line with the economic cycle. This raises several questions:
"Is the present downturn any different from previous downturns?";
"Does it matter that mineral exploration in Australia is at a 20 year low in real terms?" and:
"What is the future outlook for the industry?".

The evidence above indicates that the present downturn in Australian exploration differs from previous downturns as it is accompanied by significant structural change in the industry, notably: consolidation as a consequence of globalisation; unprecedented competition for capital; land access issues; a change in gold's former strategic position as store of wealth; and a loss of confidence in exploration as a profitable economic activity. All these factors will tend to counteract the positive impact of a rise in metal prices.

Is the present level of exploration activity a cause for concern? Exploration is the 'lifeblood' of the industry, being necessary to ensure the discovery of new deposits to replace those that are mined out. Key issues are: what level of exploration activity, especially grassroots activity, is required to sustain the industry, and will funding be forthcoming? The continuing consolidation of the industry is creating a new generation of global miners supplemented by a small number of junior producers, and a pool of junior explorers that are increasingly reliant on the majors for funds through strategic alliances and joint ventures. Grassroots exploration continues to decline, notwithstanding recent escalated activity in the Musgrave and Mt Woods regions following encouraging drill intersections. In an environment of reduced levels of local financial backing and where decisions on exploration spending in Australia are increasingly being made offshore Australia needs to actively compete to ensure that it continues to attract its share of the global exploration 'cake' and to maximise the effort in under-explored areas.

Quantitative assessments suggest that the global demand for metals in the next 50 years will be strong, possibly even exceeding total mineral production to date (Lambert, 2001). A recent presentation to the Prime Minister's Science, Engineering and Innovation Council (PMSEIC, 2001) highlighted the importance of the mining sector to the Australian economy past and present, and the potential for further discoveries under cover. The report also emphasised the importance of innovation in exploration and the opportunities presented by new exploration

technologies. These factors, and those raised by Lambert (2001), suggest that the mining will continue to be a major part of the Australian economy in the years ahead. But the mining industry will be very different to that of the 1990s.

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