MINERAL EXPLORATION IN AUSTRALIA

trends, economic impacts and policy issues*

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The trends, economic impacts and policy issues associated with the major downturn in mineral exploration activity in Australia since 1996-97 are examined in this study.

• **trends** — the recent exploration downturn in Australia is examined in an international and historical context.
• **economic impacts** — the economic implications of the recent exploration downturn in Australia are examined, with particular attention given to linkages between gold exploration, production and flow-on benefits to the national, state and territory economies.
• **policy issues** — policy measures that may facilitate future mineral exploration activity in Australia are examined, with particular attention paid to land access and taxation.

Trends

Mineral exploration expenditure is an investment in knowledge about the location, size and quality of mineral deposits. Discovery of mineral deposits is required before mining may proceed.

As a consequence of historical exploration activity, Australia is a major world producer of several mineral resources including bauxite, base metals (copper, lead and zinc), coal, gold, iron ore and nickel. However, exploration is an ongoing activity that is required for the continued discovery and extraction of mineral resources, and is particularly important for resources such as gold and base metals.

Mineral exploration activity in Australia demonstrates significant medium term or cyclical fluctuations. There were four distinct peaks in mineral exploration expenditure over the past three decades. The change in economic conditions that initiated each of these expansionary phases varied widely. Important drivers were the discovery of a newly prospective mineral provinces, actual and anticipated world commodity price increases, and the adoption of new technologies.

• **Nickel boom** — this peaked in 1970-71 and was associated with higher nickel prices and the discovery of a new type of nickel deposit in Western Australia that increased the prospectivity of the region.
• **Resources boom** — this broadly based event peaked in 1981-82 and was associated with increased commodity prices following the second oil shock in the late 1970s.
• **Gold boom** — this peaked in 1987-88 and was associated with the adoption since the early 1980s of a new gold ore processing technology that substantially lowered economic cutoff grades.
• **Boom in gold and other resources** — this peaked in 1996-97 and was associated with such factors as the introduction of 3D seismic
surveys in the early 1990s, several major gold and base metal discoveries that encouraged further exploration activity, and the adoption of a new nickel ore processing technology.

There is currently a substantial downturn in mineral exploration in Australia and overseas. Between 1996-97 and 2001-02, Australia’s mineral exploration expenditure (excluding petroleum, and in 2000-01 Australian dollars) declined by 49 per cent, to A$623 million, the lowest level since 1978-79. The downturn was largely the result of reduced spending on exploration for gold, base metals and nickel, although exploration expenditure has also declined in recent years for coal and uranium, diamonds and iron ore (figure A).

Based on survey data published by the Metals Economics Group, global nonferrous exploration expenditure declined markedly between 1997 and 2001 (a fall of 44 per cent in Australian dollars). During this period, Australia is estimated to have increased its share of global nonferrous exploration expenditure (from 13 per cent to 16 per cent).

International factors therefore clearly explain part of the recent downturn in exploration activity in Australia. Some major factors include the following:

- **Demand side impacts through the business cycle** — growth in OECD industrial production moderated in 1996 (2.5 per cent), 1998 (1.8 per cent) and declined markedly in 2001 (–2.6 per cent) as the latest economic downturn became relatively widespread. The decline in OECD industrial production in 1998 was mainly associated with the sharp downturn in Japan (–7.1 per cent) that followed the Asian economic downturn in 1997.

- **Official gold sales by major central banks since 1997** — assessments by gold market participants have also been influenced by a series of announcements in 1997, 1998 and 1999 that indicated a major change in the attitude and behavior of major central banks on official gold holdings.

- **The ‘merger wave’ among international minerals companies since 1997** — substantial mergers and acquisitions activity in the minerals sector since 1997 signals major industry restructuring that aims to increase industry profitability over the medium to longer term, and has resulted in a rationalisation of exploration budgets.

The rise and subsequent fall in domestic mineral exploration expenditure during the 1990s in Australia occurred against a background of substantial policy reform. Importantly, the Commonwealth government’s microeconomic reform process has progressed change in business taxation and industrial relations, increasing the economic efficiency of the Australian economy. Since the economic downturn in 1990-91 and 1991-92, macroeconomic policy settings have generally achieved a low inflation, low interest rate, strong economic growth environment.

However, there are domestic economic circumstances that are likely to have adversely
affected the international competitiveness of domestic mineral exploration activity. Most notably, a large backlog in exploration and mining title applications has emerged in Australia, mainly since the High Court’s Wik decision in December 1996 that extended native title to pastoral lease land (figure B). In the first three quarters of 2000-01, exploration title applications in Australia comprised 5809 pending and 1003 granted, and mining title applications comprised 7488 pending and 329 granted.

In Australia, exploration is particularly important for gold and base metals where the level of economic demonstrated resources, relative to production, tends to be significantly lower than for other resources. With increased difficulties in accessing new areas for exploration in recent years, mainly associated with native title and environmental issues, industry and government research agencies have responded in two important ways:

• first, by increasing mineral exploration in production lease areas (from 11 per cent in the 1980s to 23 per cent in the 1990s); and
• second, by developing new technologies — for example, Falcon, TEMPEST and Glass Earth — to enable explorers to assess mineral prospectivity at greater depths than was previously feasible.

Despite the recent downturn, mineral exploration, production and processing activities continue to make a substantial contribution to the national, state, territory and regional economies. In 2001-02, Australian mining and mineral processing (including petroleum) accounted for:

• 9.0 per cent of gross domestic product;
• 4.3 per cent of total employment;
• 24.7 per cent of new capital expenditure; and
• A$43.7 billion in exports of minerals and metals (excludes petroleum, in current prices) or 29 per cent of Australia’s total exports of goods and services.

Excluding petroleum, the sector accounted for A$4.3 billion in total tax payments in 2000-01, comprising A$1.1 billion, A$2.8 billion and A$0.5 billion for resource based, direct and indirect taxes respectively.

If the current downturn in mineral exploration activity is sustained, however, Australia’s mineral production and exports will decline over the medium to longer term, with reduced economy-wide benefits sourced from this sector.

**Economic impacts**

**Gold exploration and production linkages**

Over the past two decades, exploration has resulted in discoveries that, together with technology adoption in mining and mineral processing, have supported growth in mineral production and exports, with commensurate flow-on benefits to the national, state, territory and many regional economies.

The lead–lag relationship between exploration and production in the gold industry is representative of the (longer term) relationships evident for other mineral commodities. As such, the
A recent analysis of the Australian gold industry aims to provide insights into the importance of exploration for the minerals industry more generally. Gold is an important commodity—for example, the value of gold exports of Australian origin is estimated to have been AU$3.9 billion in 2001-02. Gold also accounted for 52 per cent of Australia’s mineral exploration expenditure in 2001-02.

In recent years, the decline in gold exploration expenditure has been followed by a decline in gold production:

- Gold exploration expenditure fell by 59 per cent between 1996-97 and 2001-02; and
- Gold production increased by 6 per cent in 1996-97, but is estimated to have declined by 14 per cent between 1997-98 and 2001-02 (or 8 per cent between 1997-98 and 2002-03, based on ABARE forecasts, reflecting a temporary sharper drop in 2001-02).

An econometric model is used to estimate relationships between exploration, capital investment, and production for Australia’s gold industry over the period 1985-86 to 2000-01. These estimated historical relationships are applied to derive a set of outlook simulations to examine the impact of changes in exploration expenditure for gold production over the period 2002-03 to 2006-07. The simulation results indicate the importance of exploration expenditure to the future of the gold industry:

- If gold exploration expenditure is assumed to be constant, gold production falls further, by 2.0 per cent, between 2002-03 and 2006-07;
- If gold exploration expenditure falls by a further 20 per cent, gold production falls by 6.5 per cent between 2002-03 and 2006-07; and
- If gold exploration expenditure recovers by 20 per cent, gold production increases by 2.5 per cent between 2002-03 and 2006-07.

The simulation results also indicate that exploration will be a significant determinant of future capital investment in the gold industry.

**Policy issues**

Exploration investment decisions are influenced by a range of geological, economic, and policy factors. Private explorers assess the expected profitability of investing in mineral exploration taking into account the risks associated with this activity.

Reduced costs and uncertainties associated with land access arrangements, particularly native title, and changes in the taxation treatment of exploration costs to achieve full exploration loss offset have the potential to increase exploration activity by affecting the private explorer’s risk adjusted assessment of the profitability of mineral exploration.

**Land access issues**

Land access is an issue for the mining industry because mineral explorers and producers need access to land to continue to operate. There are often competing interests, requiring some system for determining the socially optimal combination of uses. When property rights to a particular use

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**Macroeconomic impacts of a change in mineral production**

The macroeconomic impacts of an expansion or contraction in mineral production have been quantified using the MONASH-MRF model of the national, state, and territory economies.

For example, a 10 per cent increase in mineral production would, over the longer term, result in a 0.2 per cent rise in national output (compared with its baseline level). This may imply significant impacts in aggregate terms—0.2 per cent of national output in 2000-01, for example, is AU$1.3 billion.

The macroeconomic impacts vary widely between different jurisdictions, reflecting the relative economic importance of minerals in the state or territory economy. A 10 per cent increase in mineral production has the largest impacts in Western Australia (a rise of 3.6 per cent in gross state product), the Northern Territory (3.0 per cent), Queensland (1.9 per cent) and Tasmania (1.1 per cent).

From the outlook simulations for Australia’s gold industry, a fall in gold production of 6.5 per cent or 2.0 per cent by 2006-07 corresponds to a fall in national output of less than 1 per cent (compared with its baseline level and using the MONASH–MRF simulation results).
of the land can be assigned, a market based system for determining the optimal combination of uses is generally best. When property rights cannot be assigned, administrative processes and procedures are required.

Native title issues

Native title legislation, and the native title regime more broadly, assigns property rights to native title parties. This permits native title parties to negotiate agreements with mining companies that involve the receipt of economic benefits in return for (the temporary impairment of) cultural and social rights. This can be viewed as a market for ‘future act agreements’ — that is, agreements that cover future acts on land that is or may be subject to native title. The important objective of policy is to enable this market to work as efficiently as possible.

Since enactment of the Native Title Act in 1994, applications for minerals tenements must be subject to the native title process as well as the mining act process that prevails in each state or territory. A substantial rise in the backlog of applications for minerals tenements occurred because applications were not submitted to the native title process or stalled awaiting the start of substantive negotiations during this period. Many uncertainties have now been resolved and most parties appear to have decided to engage in good faith in the process. All jurisdictions are now submitting applications to the native title process.

A high priority in this process is the development of effective expedited procedures with standardised terms and conditions that will obviate the need for Aboriginal groups to lodge objections. Realistically, even with an effective negotiating framework agreement in place, agreements will take time until relationships are developed and a suitable body of precedent established.

The backlog suggests that the current ‘marketplace’ in which mining companies and native title parties negotiate future act agreements does not operate efficiently. Key requirements for a more efficient marketplace are:

- decision making processes that enable counterparties to identify and then physically transact with each other; and
- an effective contracting technology, including mechanisms for monitoring the implementation of agreements over time.

Intermediaries are likely to be important in delivering these requirements. Properly resourced native title representative bodies of good standing should facilitate the process of negotiating agreements and monitoring their implementation over time.

Smaller exploration companies appear to be at a disadvantage in the market for future act agreements because:

- the fixed costs of negotiation bear more heavily on smaller companies;
- there is a perception that native title parties can strike better deals with larger companies; and
- larger companies are more likely to employ resources dedicated to native title matters.

This suggests that a more efficient market for future act agreements is particularly important for smaller companies.

Environmental and heritage issues

In contrast to native title, it is difficult to assign property rights to environmental and heritage uses of the land, and therefore it is not possible to rely on market mechanisms to determine the socially optimal level of environmental and heritage uses.

The important objective of policy is to design administrative processes that replicate as closely as possible the outcomes that would be achieved in a functioning market. This requires measures of environmental and heritage use values that can be used to make genuine tradeoffs between alternative uses, that can be clearly signaled to market participants such as mining companies and that can change over time in response to changing social and economic imperatives.

Taxation treatment of exploration expenditure

There are at least two significant distortions in the current taxation treatment of exploration costs in Australia — most importantly:

- native title costs that are incurred in mineral exploration are not clearly and unambiguously...
immediately deductible for company income tax purposes; and

• junior exploration companies are not able to use tax credits unless, and until, they begin to earn revenue and/or merge with, or are acquired by, another minerals company.

The lack of full exploration loss offset in the industry increases industry costs and reduces mineral exploration activity. Native title costs are an unavoidable expense and, as a consequence, should be deductible together with other exploration costs.

Exploration companies with insufficient taxable income to immediately use tax credits are most likely to be juniors. The role of junior explorers in Australia, and related policy options, are discussed briefly below.

**Junior explorers in Australia**

Geoscience Australia estimates that, since the 1960s, junior exploration companies have accounted for around 60 per cent of total discoveries, rediscoveries and renewals for gold, base metals and nickel.

Information on market capitalisation, exploration expenditure and net profit for 105 junior mineral explorers in 1999-2000 was obtained from the Minnet database. Junior explorers are defined as companies that are engaged primarily in exploration and that have a market capitalisation of less than A$200 million.

The correlation between net profit and exploration expenditure is close to zero (figure C). Of these 105 junior explorers:

• 87 companies (83 per cent of the total) recorded exploration expenditure of less than A$2 million in 1999-2000; and

• 93 companies (89 per cent of the total) recorded net loss positions at an average of A$2.1 million in 1999-2000 — the net loss of 77 of these companies was less than A$0.3 million.

The aggregate market capitalisation for this group of 105 junior explorers is A$1.8 billion. Total exploration expenditure in 1999-2000 was A$113 million, accounting for 17 per cent of Australian mineral exploration expenditure in that year.

The aggregate net loss of the 93 companies was A$196 million, with these companies accounting for exploration expenditure of A$100 million.

**Policy options for non-taxpaying junior explorers**

Under current taxation arrangements, mineral exploration expenditure is deductible against income earned in the same financial year by the company. For junior exploration companies that do not have adequate revenue in a given year, exploration tax credits may be carried forward in nominal terms by the company that incurred the expenditures. The tax credit is used when revenue is earned by the junior exploration company, or when the company merges with or is acquired by another company.

The main issue is that the present value of the accumulated tax credits is lower than the value of an immediate tax deduction. As a consequence, industry exploration costs are higher than would otherwise be the case and the level of mineral exploration activity lower. There are two important points that justify considering some policy response to allow immediate deductibility:

• first, on behalf of the community, government is responsible for the efficient management of the discovery, development and production of Australia’s mineral resources; and

• second, junior explorers are highly efficient at certain types of exploration activity (with the majors increasingly targeting the discovery of world class ore deposits).
Three policy options considered briefly in this study that would enable non-taxpaying junior explorers immediate access to tax credits are:

- refundable tax credits;
- limited trade in tax credits; and
- flow-through shares.

A refundable tax offset (similar to the current arrangement for franked dividends) or limited trade in tax credits (similar to the approach in the Northern Territory in the context of the treatment of exploration expenditure for mineral royalty purposes) would enable junior exploration companies to gain immediate access to those tax deductions.

In the absence of refundable tax credits or trading rights in tax credits, a system of flow-through shares with a tax deduction at the company tax rate (currently 30 per cent) would provide investors in non-taxpaying junior exploration companies with immediate deductibility of those costs.

A system of flow-through shares whereby investors are able to claim a 100 per cent deduction for exploration expenditure, potentially at a marginal tax rate above the company tax rate, would only be justified in the presence of sufficient positive externalities in private mineral exploration activity.

A refundable tax offset is likely to be the lowest administrative cost way of providing non-taxpaying junior explorers with immediate deductibility of costs.

ABARE is currently undertaking further research on issues relating to land access, the taxation treatment of exploration costs in Australia and access to venture capital by junior explorers.