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ISSUES IN MINERAL EXPLOITATION
IN PAPUA NEW GUINEA

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ISSUES IN MINERAL EXPLOITATION
IN PAPUA NEW GUINEA

by

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Introduction

The growth rate of the Papua New Guinean economy has been highly dependent on the growth rate of government expenditure (Gupta 1992). The latter has slowed down substantially in the post-colonial period, mainly as a result of the winding back of Australian budgetary aid as Papua New Guinea moves towards fiscal self-reliance. Australia has been phasing out its budgetary aid, and by 2000-2001 such fiscal support will be completely replaced by project/program aid. The phasing out of budgetary support has led to alternative ways of raising revenue, predominantly through resource projects and through new mining and petroleum projects, in particular.

The mining and petroleum projects in Papua New Guinea include the Bougainville, Porgera, Ok Tedi, Misima and Mt. Kare mines, Kutubu oil and the Hides gas projects. The new projects on the horizon include the Lihir, Tolukuma and Wapoli mines, and the Gobe oil fields. Those projects in the pipeline are the Nena, Hidden Valley, Wafi, Wild Dog, Tabar and Laloki mines. Furthermore, there are numerous exploration activities in mining, petroleum and gas projects throughout the country.

Raising revenue through mining and petroleum activities is also likely to help raise the savings ratio, provided government consumption expenditure is restrained. An increase in the savings ratio will help finance investment from internal sources, without the fear of ending up in a debt trap. A high savings/investment ratio is a necessary ingredient for sustained increase in the rate of growth of the Papua New Guinean economy. Although the efficiency with which such investment is used is of equal importance, this issue is not discussed here. It is merely mentioned that the efficiency of usage of capital in Papua New Guinea is low (Gupta, forthcoming).

The revenue flows to the Papua New Guinean Government and Papua New Guinean economy are dependent upon the cost structures employed by the mining companies during the exploration, construction, and operational phases of their projects. Because the mining companies' profitability is also dependent upon keeping such costs as low as possible, there should be a 'unity of purpose' between the government and the companies. On the other hand, there is likely to be a conflict between the government and companies on the share of equity holding, and the taxation regime that is in place.

There are also issues concerning the sequencing of the mines, particularly the relationship to the 'Dutch Disease' concept and that of the sharing of benefits between the national government, private partners, provincial governments, and landowners. There are also lessons from the past which are related to environmental concerns, and private partners who are carrying the government's equity-based share of its costs. These issues are explored further in the remaining sections of this paper, and policy suggestions are proposed at the end.

The impact of mining on the environment has been extensively discussed elsewhere (see Gupta 1992: Chapter X), therefore, it is discussed here only in the context of the landowners' demands for compensation and the building of tailings dams.

Finally, mining and mineral issues are daily features in the Papua New Guinean media and this is going to remain the case for the foreseeable future because of the importance of mining in the country. Thus, any publication in this area has to decide
2 Issues in Mineral Exploitation

when to let readers resort to the daily media and other contemporary sources for data updates. In our case, we felt that the end of August 1995 was the optimum date.

Changing Australian Aid Flows and the Bougainville Copper Agreement

In Papua New Guinea, as Australian budgetary aid has been reduced in the post-colonial period, the flow of revenue from the mining sector has been seen as the principal vehicle for maintaining government expenditure and services. Both Papua New Guinea and Australia have agreed that the level of Australian aid has been too high and should be reduced.

Australian budgetary aid increased rapidly between 1946 and 1967, at an average annual rate 16.4 percent. However, it declined to an average annual rate of six percent between 1966-1967 and 1973-1974, as Papua New Guinea moved towards independence. Table 1 shows the changes in aid flows at 1966-1967 (Australian) prices, for the period 1966-1967 to 1990-1991 (inclusive).

As Table 1 shows, in the period 1973-1974 to 1990-1991, real Australian aid flows to Papua New Guinea were reduced at an average annual rate of 4.45 percent per annum. In 1991, such flows were (in real terms) 41 percent of aid flows in 1973-74. Thus, Papua New Guinea had to 'find' A$71 million (at 1966-67 prices) over this period just to neutralise the revenue impact of the drop in Australian aid. The decline in real aid flows has continued since then, with budgetary aid declining more rapidly than total Australian aid. By 2000-2001, no Australian budgetary aid is planned, only A$300 million of project/program aid.

One way that the reduction in real Australian aid was offset was through the renegotiation of the first Bougainville Copper Agreement (BCA). The first mining agreement between Bougainville Copper Limited (BCL) and the colonial State of Papua New Guinea was signed in 1967. At that time, it was envisaged that Papua New Guinea would remain politically dependent for the foreseeable future. Consequently, the political risk of nationalisation of assets or renegotiation of the agreement must have been foreseen as minimal. Moreover, the terms and conditions of the agreement (under Clause 7) were such that no taxable income was expected for the first seven or eight years of commercial operations.

During the first eight years of commercial operations, the main sources of State revenue that were expected from the mine were from the 20 percent equity participation and the 1.25 percent royalties on the f.o.b. value of the copper concentrate which was sold. This was despite the State having committed A$26.7 million (20 percent of A$133.7 million) for equity, and A$45.9 million on infrastructure requirements, which mainly benefited the mine.

Against this, CRA contributed a net amount of A$56 million, for an equity of 53.6 percent, which was worth A$71.7 million (Mikesell 1975:89-90). In addition, Clause 23 on dispute settlement was favourable to CRA. Under this, out of three arbitrators, one each was to be appointed by the company and the State, and the third by the International Chamber of Commerce.
### Changing Australian Aid Flows and the BCA

Table 1: Real Australian Aid Flows to Papua New Guinea, 1966-67 to 1990-91

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount at 1966-67 Australian Prices (AS’000)</th>
<th>% Increase (+)</th>
<th>% Decrease (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966-67</td>
<td>84 321</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>1967-68</td>
<td>89 321</td>
<td>6.3</td>
<td>9.0</td>
</tr>
<tr>
<td>1968-69</td>
<td>106 260</td>
<td>11.7</td>
<td>2.0</td>
</tr>
<tr>
<td>1969-70</td>
<td>109 627</td>
<td>3.2</td>
<td>1.8</td>
</tr>
<tr>
<td>1970-71</td>
<td>111 549</td>
<td>0.3</td>
<td>1.1</td>
</tr>
<tr>
<td>1971-72</td>
<td>120 789</td>
<td>8.6</td>
<td>-18.3</td>
</tr>
<tr>
<td>1972-73</td>
<td>98 676</td>
<td>-18.3</td>
<td>11.1</td>
</tr>
<tr>
<td>1973-74</td>
<td>109 638</td>
<td>11.1</td>
<td>-6.1</td>
</tr>
<tr>
<td>1974-75</td>
<td>102 899</td>
<td>-6.1</td>
<td>-11.5</td>
</tr>
<tr>
<td>1975-76</td>
<td>91 054</td>
<td>-0.1</td>
<td>-9.8</td>
</tr>
<tr>
<td>1976-77</td>
<td>82 042</td>
<td>-9.8</td>
<td>-4.9</td>
</tr>
<tr>
<td>1977-78</td>
<td>78 008</td>
<td>-4.9</td>
<td>-6.5</td>
</tr>
<tr>
<td>1978-79</td>
<td>72 908</td>
<td>-6.5</td>
<td>-2.5</td>
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<tr>
<td>1979-80</td>
<td>71 074</td>
<td>-2.5</td>
<td>2.0</td>
</tr>
<tr>
<td>1980-81</td>
<td>72 495</td>
<td>2.0</td>
<td>-1.0</td>
</tr>
<tr>
<td>1981-82</td>
<td>71 770</td>
<td>-1.0</td>
<td>-5.0</td>
</tr>
<tr>
<td>1982-83</td>
<td>68 282</td>
<td>-5.0</td>
<td>-3.0</td>
</tr>
<tr>
<td>1983-84</td>
<td>64 773</td>
<td>-3.0</td>
<td>-15.0</td>
</tr>
<tr>
<td>1984-85</td>
<td>55 057</td>
<td>-15.0</td>
<td>-4.0</td>
</tr>
<tr>
<td>1985-86</td>
<td>52 855</td>
<td>-4.0</td>
<td>-1.0</td>
</tr>
<tr>
<td>1986-87</td>
<td>52 536</td>
<td>-1.0</td>
<td>-5.1</td>
</tr>
<tr>
<td>1987-88</td>
<td>49 710</td>
<td>-5.1</td>
<td>-4.45</td>
</tr>
</tbody>
</table>

**Note:** Between 1991 and 1994 real Australian aid declined by three percent per annum, with budgetary aid declining by five percent per annum. From 1994-1995, Australian budgetary aid is being rapidly wound back and replaced by project/program aid. By 2000-2001, there will be no budgetary aid. Instead, AS$100 million of project/program aid is planned. The priority sectors for this aid are (road) infrastructure, (primary) education, (rural) health, and law and order. In addition, renewable resources in the non-mining and non-forestry sectors, as well as the private sector, will be a focus of Australian project/program aid.

**Sources:**
2. Statistics for 1983-1984 and 1988-1989 are calculated from AIDAB’s submission to the Joint Committee on Foreign Affairs, Defence and Trade Inquiry into Australia’s Relations with Papua New Guinea (August 1989: Table 2).
3. Statistics for the latest years are calculated from Australian Government Budget Paper No. 4 (1991: Table 3).

Such arrangements created almost a perpetual state of suspicion against CRA, which was never eroded (despite the technical efficiency of its operations in BCL, the contributions of its Mine Training College to the supply of technical manpower, and direct and indirect contributions to the North Solomons economy). CRA has been seen as a company which was likely to short-change the Papua New Guinean people and its economy. The faction led by John Momis has been particularly distrustful of the company. This was clearly evident in Momis’s Bougainville Initiative Fund letter (4 May 1987) to the Managing Director of BCL, Paul Quodling, in which the former accused the company of transfer pricing K60 million every year (Quodling 1991).
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In the context of the 1967 Bougainville Copper Agreement such suspicions were heightened when BCL, having started production in April 1972, made record profits in the subsequent two and a half years to recover its initial investment. When Papua New Guinea obtained self-government in December 1973, the Bougainvillean Members of Parliament, led by John Moms, drove the Solomons government to seek renegotiations with the company in 1974. Papua New Guinean sentiment, especially on Bougainville Island where the mine is located, was strongly against the company and it was just as well that the latter did not invoke Clause 23. With production having commenced and the company making record profits, and with independence to be attained in 1975 under a constituent assembly approved home-grown Constitution, the company was in a weak bargaining position. Even before renegotiations began, changes had been made to personal income tax and a Dividend Withholding Tax (DWT) of 15 percent was introduced. Consequently, the revenue flows from BCL had been raised in the process.

The 1974 renegotiated Bougainville Copper Agreement heralded several other changes. It reduced the tax holiday period from three years to 21 months, and BCL was subjected, as from the beginning of 1974, to a higher company tax rate of 33.33 percent, up from the previous 25 percent. The accelerated depreciation was scrapped. In addition, the concept of the hybrid Resource Rent Tax (RRT) was brought in for the first time in the form of an Additional Profits Tax (APT) of 70 percent (less company tax). The Additional Profits Tax was to become payable as from 1 January 1974 in any year in which BCL income, after ordinary tax, exceeded a 15 percent return on a notional capital base.

Initially, the expected life of the mine was 26 years, but through the introduction of more advanced technology (reflected in its technical efficiency) the company had expected to extend the life of the mine by another five to eight years. However, it was forced to close in May 1989 as a result of the insurgent activities of the Bougainville Revolutionary Army (BRA).

The reasons underlying the Bougainville crisis are complex (Gupta 1991). At the heart of the crisis was the conflict over the distribution of the mine's surpluses. With the signing of the Mirigini Charter at Waigani on 25 November 1994, and subsequently with the formation of the Bougainville Transitional (Interim) Government, which will also be a constituent assembly, the crisis after six years seems close to resolution. However, it is unclear if the mine will reopen in the foreseeable future, because the top leadership of the BRA has so far not joined such a transitional government.

Moreover, even if the BRA decides to come out of hiding (which is problematic, given the possible danger to the lives of its leaders, not from the Papua New Guinean Defence Force, but from some of the Bougainvillean who have suffered during the rule of the BRA), the BCL mine may not come back into the operation. CRA has estimated that it would cost between A$400 million to A$600 million to restart the mine as much of the infrastructure has been damaged, mostly through disuse, by the Bougainville conflict. Even if it does recommence operation, it will be as a new mine, and this is far from a reality. The reason why it may not come into being is that the landowners are likely to be divided on whether or not there should be a mine at all and if there is one, whether or not CRA should be the lead manager and operator. The net benefits, because of higher costs involved in developing such a mine, are likely to be considerably fewer than would have been the case if BCL had not been forced to close in the first place.
The Sharing of the Mining Benefits

Even before the May 1989 closure of the mine, the Bougainville Initiative Fund letter, from John Momis to Paul Quodling, had brought to the fore the issue of the perceived unequal sharing of the surpluses between the national government, the private partners, the provincial government, and the landowners. As to what should be the share of each of the parties remains a difficult issue. Nevertheless, what will become clear is that the share of benefits likely to go to the landowners is being steadily lifted, following the Bougainville crisis.

The major beneficiary in terms of cash benefits has been the Papua New Guinean Government, and therefore, the rentiers of the national bureaucracy and politicians. However, the benefits to the North Solomons Provincial Government and Panguna landowners were much larger than those suggested by the cash values given in Table 2. Retained value (total increase in disposable income less net remittances out of the province/country) for 1980 gave a much higher share to North Solomons Province — 20 percent (against 3.7 percent direct cash benefits) (Quodling 1991:Table 6).

Table 2: Direct Cash Benefits of Bougainville Copper Limited

<table>
<thead>
<tr>
<th>Beneficiary</th>
<th>Share (K millions)</th>
<th>% Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNG Central Government</td>
<td>1.078</td>
<td>61.4</td>
</tr>
<tr>
<td>North Solomons Provincial Government</td>
<td>75</td>
<td>4.3</td>
</tr>
<tr>
<td>Panguna Landowners</td>
<td>24</td>
<td>1.4</td>
</tr>
<tr>
<td>Others (Others)</td>
<td>577</td>
<td>32.9</td>
</tr>
</tbody>
</table>

Source: P. Quodling, 1991: Table 4.

For Papua New Guinea, excluding North Solomons Province, Quodling estimates a 57 percent share, with the balance of 23 percent going to overseas interests (ibid.). Consequently, the benefits to North Solomons Province were quite substantial. In 1980, the retained value for the province was placed at K42.3 million. In the post-1981 period, the North Solomons Provincial Government increased its revenue base through sales taxes and land taxes. The total revenue tended to grow at 15 percent per annum, mainly because of an expansion in business activities associated with the mine. The relative social indicators for North Solomons Province were clearly indicative of the positive impact of the mine, because it had the lowest infant mortality rate, the longest life expectancy, and the highest per capita cash cropping income in Papua New Guinea, before the current crisis. However, it is apparent from experiences in the province, and subsequently in the Ok Tedi area that, after a sharp lift in these social indicators and economic benefits in the initial years, such improvements taper off in later years, and therefore the expectations of landowners, having been heightened by the mine developments, are far from satisfied. Experience also shows that the cumulative effect of tailings disposal into the river systems is such that opposition to the mine on environmental grounds heightens substantially after ten to 15 years of production.
Consequently, despite the payment of K21 million in compensation to the landowners, the CRA management was unable to convince the landowners who were directly impacted through the adverse effect of the loss of land and through the overburden and tailings disposal into the Jaba River, that the benefits exceeded the costs. There was a failure on the part of both the management and the bureaucratic and political apparatus at the national level to forestall the developments which led to the closure of the mine. The revised 1974 BCL Agreement called for a review every seven years. However, the national government did not review the agreement in 1981, and would not have considered changes in 1988 if there had not been pressure from the landowners and the North Solomons Provincial Government. Needless to say, the revised package offered by the national government and BCL was seen to be too little too late by the radicals led by Francis Ona, who demanded a massive K10 billion compensation from BCL, as well as secession.

The CRA management was not adequately aware of developments among the landowners, nor their changing leadership patterns, in order to counter the moves and involve the national government at an early enough stage and so prevent the takeover of the island by the Bougainville Revolutionary Army. There was inadequate involvement of prominent Papua New Guineans in the company's senior management structures. Although the management ran the BCL mine highly efficiently and the company was a good corporate citizen, as was reflected in its Mine Training College (whose output substantially exceeded BCL's own requirements), good residential facilities, and construction (in 1987-1988) of a pipeline to convey the tailings into the sea, CRA failed to shake off its image of a corporation determined to transfer as much surplus from the mine as possible, not only through legal, but also through dubious means.

The closure of the BCL mine represented a substantial loss of revenue to the national government, CRA and the international investors. The inability of CRA, to pick up and monitor developments among the landowners and subsequently convey to the national government the impending dangers to the mine in time for the national government to act effectively represented a weakness in company management. The latter's lack of resolve to place experienced Papua New Guineans in senior management positions and to present the company's points of view through them (a process that it belatedly began with the appointment of Messrs Moramoro and Tioti to management positions in the 1990s) reflected a poor management strategy. The withdrawal by CRA from Bougainville in May 1989 and Mt. Kare in March 1993 has given the impression in Papua New Guinea Government circles that CRA has a lack of commitment to Papua New Guinea - - at the slightest signs of danger, CRA will pull out from active mining in Papua New Guinea. CRA's inability to project BCL as a 'Papua New Guinean company rather than a subsidiary of a large foreign-based multinational', left it open to attacks from neo-Marxists, and without adequate defence from other Papua New Guinean nationals, despite the fact that there were substantial benefits to the Papua New Guinea Government and the economy from BCL's operations.

Similarly, improved social indicators — more than doubling of the life span over the last ten years and a substantial improvement in literacy rates — also show the positive benefits from OTML's mining activity in the Ok Tedi region. These benefits have to be weighed against the negative environmental impact of the Ok Tedi mine. Again, as occurred in Bougainville, the benefits from the Ok Tedi mine to the landowner groups living down the Fly/Ok Tedi River have begun to taper off, while opposition on environmental grounds has heightened in the mid-1990s.
The Sharing of the Mining Benefits

There are large compensation demands for damages against BHP, the lead manager, and a demand for the construction of a tailings dam. OTML management is totally opposed to the latter for two reasons:

- the tailings dam would have to be very large and engineering constraints could add considerably to construction and environmental costs. The government has agreed "to commission an independent and impartial organisation to study the feasibility of constructing a tailings dam at the Ok Tedi mine", [Post-Courier, 10 August 1995, p.2]; and
- it would make the mine totally unviable. To date, the government has received no return on its equity of 20 percent (although there were dividends for its preference shares, which the government sold for K30 million in early 1995). Moreover, it will not receive any dividends for the foreseeable future, if the costs of the tailings dam are added. The company has agreed to a compensation package of K110 million proposed by the government to the landowners over the life of the mine, and the government increased its equity to 30 percent and therefore would share in the added costs. However, it is unclear how this additional equity is being paid for. If it is carried at commercial rates, then the cost to the government is likely to exceed its opportunity cost of capital, which is a concern surrounding government equity in any mining or petroleum venture. Latest developments are that BHP is being seen to be instrumental in proposing the ratifying legislation, to go before Parliament, to make it illegal for the landowners to continue with their compensation court battle against BHP and to make effective the compensation package (The Saturday Independent, 8 August 1995, p.2). The cost, therefore, to the government is far exceeding the benefits from the mine.

In the context of the emerging crisis over BCL's distribution of mining surpluses, initiatives from the department of Mining and Petroleum and the pressure from the Enga Provincial Government, the Namaliu government established somewhat changed arrangements, which increased the surpluses going directly to the provincial government and the landowners. This followed the recommendations of the National Premiers' Council’s Mining and Petroleum Committee report (September 1988). This report proposed a substantial increase in royalty payments (to 2.5 percent plus 20 percent of income tax revenue or 30 percent of income tax payments) to the provincial governments in the provinces where the projects were located, with payment (including retrospective payments) to apply from the beginning of the construction period. As expected, the Premiers wanted a substantial transfer of surpluses to the provincial government(s), from the national government and the private partners.

As discussed earlier, there were substantial benefits to the North Solomons economy from the BCL operations. The losses were confined to the landowners — certainly the landowners suffered from significant non-economic costs in addition to the economic ones. However, the Bougainville crisis also demonstrated that unless compensation payments are converted into effective capitalist ventures, they create a rentier mentality, where escalating rent demands, particularly during boom periods, become an unending saga. It is in the mining companies' interest to provide for and employ managerial talent to advise landowners on how to manage the surpluses being transferred to them and how to set up and operate sustainable capitalist ventures; that is, providing the knowledge and impetus to convert rentiers into capitalists. Unless this is
done, the changes to the distribution of surpluses, from the national government to the provincial governments and the landowners and even the new initiatives of trust accounts for future generations of landowners (in mining areas), may turn out to be a negative step, even though other changes are likely to ensure greater stability for mining operations. The policy changes from 1988 have improved the share of surpluses going to the landowners, and clearly show that the power to make or break the mining operations lies with the landowners.

A revised mining policy was announced by the Namalian government at the end of 1988. Under this policy, negotiations are conducted through the concept of the Tripartite Development Forum; that is, the national government, the particular provincial government, and the landowners in the respective project area conclude parallel agreements, setting out the mutual rights and obligations of each party. These arrangements complement the contract between the developer and the national government under which the developer proceeds with the project, and should give a greater degree of stability to mining operations. Following the introduction of the 1988 revised policy, the transfer of surpluses from the national government to the provincial governments and landowners occurred through three changes:

- There has been an increase in the royalties paid to the landowners. The split is 80:20 (previously 95:5) between the provincial government and the landowners, respectively;
- A special support grant of one percent of the f.o.b. value of sales is being made available to the provincial government; and
- In the case of non-petroleum mining, up to ten percent (from the State's share) of equity is made available to the landowners and provincial governments on a 50:50 basis. Payment terms are for up to half of the equity (2.5 percent each) to be acquired at cost, but 'carried' by the State and paid out of future dividends. The balance can be acquired after three years, but at market value and through cash payment. In the case of petroleum projects, up to 4.4 percent of the State's share is being made available to the landowners and provincial governments, and once again, a 50:50 basis applies.

The provincial governments and landowners have decided to acquire equity in the highly profitable Porgera Joint Venture and Kutubu Joint Venture, but not the marginal Ok Tedi and Misima mines. These developments will increase the advantages and income to Enga and Southern Highlands Provinces and particularly to the landowners in the Porgera development areas in these provinces.

There may be an argument that, with their heavier populations, these provinces will be better able to use such surpluses. However, it is already apparent that the Porgerans do not wish to share the benefits with the rest of the Engans. They wish to have a separate province of their own. Intraprovincial inequalities tend to increase and this will worsen as the willingness to share the surpluses with other communities in the province continues to be eroded. This could lead to an increase in social problems out of jealousy and massive compensation claims like the Ok Tedi and Porgera town river cases in an attempt to benefit from the project developments.

From 1 January 1992, in order to increase the spin-off benefits of mining activities, a Tax Credit Scheme (TCS) was introduced. Under the TCS:
'Mining and petroleum companies are allowed to fund and carry out approved capital infrastructure development projects on behalf of the national government. The cost to the company of such a project in a year of income is taken as payment of tax by that company in that year' (The National, 29 May 1995, p.36).

The allowable tax credit between 1992 and 1995 was 0.75 percent of a taxpayer's assessable income or the amount of a taxpayer's liability for the year of income. This will be raised to two percent from 1 January 1996.

In 1995, another review of mining policy, again recognising the power of the landowners to make or break a mining project, has led to proposals which will further strengthen the position of the landowners with respect to equity. Under these proposals, the landowners are expected to be given five percent free equity, to be paid for by all shareholders (including the national government) on a pro rata basis. In addition, the royalty payments, which go to the provincial governments and landowners, are expected to increase to two percent from the current 1.25 percent.

Small to Medium-Sized Mines

It is recognised that a private developer's returns are likely to be lower, and that there is increasing potential for the development of small to medium-sized mines that will bring benefits to areas which do not have the potential to benefit from the larger mines. Accordingly, the Taxation Act is being amended to encourage the development of such mines. In order to encourage the development of small and medium-sized mines, the 1995 review is proposing exploration incentives and a reduction in company tax for such projects. The company tax rate for these mines is to be reduced to 25 percent (which is the normal company tax rate) compared to 35 percent for the larger mines. As with the larger mines, the Tax Credit Scheme and Special Support Grants of one percent of the f.o.b. value of production from the mine apply to the small and medium-sized mines. In 1995, there were three such mines approved and mining leases granted to:

- Dome Resources NL to bring into operation the Tolukuma Gold Mine in the highly undeveloped Goilala area of Central Province;
- Union Mining and Maclip NL to bring into operation the Wapoli Gold Mine in Milne Bay Province; and
- Placer Pacific to extend the Misima Gold Mine to incorporate the Ewatinona ore deposit.

The Flow of Revenue from the Bougainville and Ok Tedi Mines

As a consequence of the changes in the tax regime in the 1970s, the Papua New Guinean Government's share of net earnings (before tax) from the BCL mine rose from 16.4 percent in 1973 to more than 50 percent between 1979 and 1988 (see Table 3). There were years in which the government's share rose to approximately 70 percent. The Papua New Guinean Government also received revenue through customs duties and employees' income taxes.
Table 3: Sources of Government Revenue Generated by BCL, 1972-1989 (K millions)

<table>
<thead>
<tr>
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<tbody>
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<td>63.2</td>
<td>15.7</td>
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<td>13.7</td>
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<td>14.7</td>
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<td>Sub-Total(^b)</td>
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<td>86.7</td>
<td>74.1</td>
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<td>Total(^c)</td>
<td>5.8</td>
<td>31.9</td>
<td>93.8</td>
<td>31.9</td>
<td>30.2</td>
<td>27.7</td>
<td>46.4</td>
<td>125.2</td>
<td>91.4</td>
<td>39.5</td>
<td>38.1</td>
<td>72.4</td>
<td>36.5</td>
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<td>67.7</td>
<td>116.0</td>
<td>145.1</td>
<td>4(^7)</td>
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<td>61.6</td>
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<td>70.0</td>
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<td>122.7</td>
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<td>101.5</td>
<td>28.8</td>
<td>47.1</td>
<td>75.5</td>
<td>145.2</td>
<td>201.8</td>
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<td>Central Government's Share ((^d))</td>
<td>12.6</td>
<td>16.4</td>
<td>47.9</td>
<td>43.1</td>
<td>436.6</td>
<td>48.6</td>
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<td>60.0</td>
<td>56.4</td>
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<td>BCL's Contribution to Total Government</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Revenue ((^e))</td>
<td>6.2</td>
<td>21.4</td>
<td>52.8</td>
<td>4.4</td>
<td>16.8</td>
<td>17.0</td>
<td>24.3</td>
<td>44.1</td>
<td>29.7</td>
<td>11.2</td>
<td>10.3</td>
<td>17.6</td>
<td>7.8</td>
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<td>12.5</td>
<td>17.7</td>
<td>29.9</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Notes:  
\(^a\) Tax revenue was attributed to the year in which the relevant income was earned.  
\(^b\) Includes Additional Profits Tax.  
\(^c\) Total of the sum of Corporate Income Tax, Dividend Withholding Tax, and Dividends.  
\(^d\) Consists of Sub-total, Royalties, Customs Duties, and Employees' Income Tax.  
\(^e\) Total (as in Note \(^d\)) as a percentage of Total Government Internal Revenue.  

Source: Calculated from statistics supplied by BCL, after adjustment with the government's official statistics.
Revenue from the Bougainville and Ok Tedi Mines

Nevertheless, BCL’s contribution to the government’s internal revenue peaked in 1974 when the combination of high profits and a renegotiated tax regime gave the government more than half its internal revenue from the BCL mine in 1974 (see Table 3). In the ensuing period, the share of internal revenue from the BCL mine has been lower than this.

Even in nominal terms, the internal revenue generated from BCL’s mining operations rarely exceeded that of 1974 — the exceptions being 1979, 1987 and 1988. Therefore, in real terms, it was set to fall in the subsequent period.

As a consequence, the Papua New Guinean Government was forced to restrain its expenditure in the face of declining real flows from two important sources — Australian aid and the BCL mine. Such restraint was reinforced on Papua New Guinea in the aftermath of its recourse to commercial loans in the early 1980s, mainly to finance its 20 percent share of the Ok Tedi mine.

Papua New Guinea had to raise some K320 million to finance its share of the Ok Tedi project. This imposed an interest rate burden of between K20 to K25 million on the government, with no offsetting dividends. Therefore, it is not surprising that the national government was forced to cut its expenditures during the 1982 and 1983 fiscal years. These cutbacks also reflected the need to wind back some of the unsustainable increases in expenditure of the 1979-81 period, and to deal with the problems arising from the collapse of the terms of trade during the 1980-84 period.

BCL’s contribution to the Papua New Guinean exchequer has been quite substantial. In 1988, it represented 20 percent of the Papua New Guinean Government’s internal revenue. The annual flows into consolidated revenue during the 1975-1990 period averaged K57 million per annum from the Mineral Resources Stabilisation Fund (MRSF) (see Table 4). This revenue was exclusively from BCL’s operations. There has been no contribution from the Ok Tedi mine into the MRSF, from the commencement of production in 1984 up until the present.

Whereas the net flows of revenue from BCL to the government have been quite substantial, the net flows from the Ok Tedi project have been negative. The latter situation is the result of high interest costs on initial investment, without the benefits of any dividends (or taxes) to date.

OTML did not pay any dividends until 1990 and then only small amounts on the government’s preference shares in 1991 and 1992. The Papua New Guinean Government’s 20 percent shareholding in the Ok Tedi project turned out to be expensive for the State, not only in monetary terms, but also because it was forced to compromise on its pollution control policy. The lesson from its financial involvement in the Ok Tedi project is clearly that the government should minimise its equity participation in marginal mines and maximise it in the more profitable ones.

Establishment and construction costs are usually expected to be quite high in remote and inaccessible sites and where the natural environment is inhospitable. Thus, such mines are likely to be much riskier ventures. The ability of OTML’s management to liaise and work successfully with the national government and provincial government in such a hostile environment shows that they are 'in tune' with the socio-political
environment of Papua New Guinea. Having senior Papua New Guineans such as Kipling Utari in the upper echelons of OTML’s management team has helped the mining company considerably.

Table 4: Operations of the Mineral Resources Stabilisation Fund, 1975-1995 (average per annum (K millions))

<table>
<thead>
<tr>
<th>Period</th>
<th>Receipts</th>
<th>Payments*</th>
<th>Balance at End of Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972-89</td>
<td>43.6</td>
<td>n.r.</td>
<td>—</td>
</tr>
<tr>
<td>1975-90</td>
<td>n.r.</td>
<td>48.0</td>
<td>90.7</td>
</tr>
<tr>
<td>1980-85</td>
<td>48.7</td>
<td>43.5</td>
<td>47.6</td>
</tr>
<tr>
<td>1986</td>
<td>30.3</td>
<td>14.0</td>
<td>75.3</td>
</tr>
<tr>
<td>1987</td>
<td>45.3</td>
<td>60.5</td>
<td>65.2</td>
</tr>
<tr>
<td>1988</td>
<td>87.0</td>
<td>57.1</td>
<td>99.9</td>
</tr>
<tr>
<td>1989</td>
<td>110.9</td>
<td>84.7</td>
<td>134.9</td>
</tr>
<tr>
<td>1990</td>
<td>0.0</td>
<td>50.0</td>
<td>90.6</td>
</tr>
<tr>
<td>1991</td>
<td>5.8</td>
<td>0.0</td>
<td>103.9</td>
</tr>
<tr>
<td>1992</td>
<td>82.7</td>
<td>88.0</td>
<td>98.6</td>
</tr>
<tr>
<td>1993</td>
<td>273.7</td>
<td>251.3</td>
<td>121.0</td>
</tr>
<tr>
<td>1994</td>
<td>281.1</td>
<td>213.2</td>
<td>188.9</td>
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<tr>
<td>1995a</td>
<td>223.7</td>
<td>170.0</td>
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<tr>
<td>1996b</td>
<td>279.3</td>
<td>195.5</td>
<td>326.4</td>
</tr>
<tr>
<td>1997b</td>
<td>242.5</td>
<td>171.8</td>
<td>400.1</td>
</tr>
<tr>
<td>1998b</td>
<td>185.2</td>
<td>129.7</td>
<td>455.6</td>
</tr>
</tbody>
</table>

Notes: *Payments to Central Government’s consolidated revenue.
  n.r. = not recorded
  a Estimated
  b Projected

Source: Estimated by the authors from data supplied by BCL and the Department of Finance and Planning.

The closure of the BCL mine because of the militant activities of the Bougainville Revolutionary Army in May 1989 led to substantial revenue losses and increased expenditure outlays, particularly on defence and law and order activities, for the Papua New Guinean Government. The magnitude of the impact of these developments on the Papua New Guinean Government’s budget may have been in the order of K200 million annually at 1989 prices.

The BCL experience shows the clear need for mining companies and the national government to collaborate on all future developments, so that appropriate action can be taken to avoid similar crises. However, later actions by the government and BHP on the Ok Tedi issue to introduce a Bill to divert the case against them by the landowners could lead to more problems. The only option available is for the developers, governments and landowners to play an open, honest and fair game; that is, to have transparent processes.
The New Mines

In an attempt to offset revenue losses resulting from the Bougainville crisis, the government encouraged the companies involved in other potential mining ventures in the country to move towards a more rapid phase of construction and production. The previous concern expressed in the economic literature with the danger of too much mining production coming on stream simultaneously, thus creating the Dutch Disease problem (squeeze on the other tradeables), was seen to be irrelevant in the context of a deteriorating budgetary situation and the developing crisis in the tree crop sector, where low prices had led to the draining of the stabilisation funds and substantial erosion of income. The Papua New Guinean Government needed additional sources of revenue not only to cover the shortfall caused by the closure of the BCL mine, but also to shore up the tree crop sector, and increase outlays on education and health. Increased access to Papua New Guinea’s forests was facilitated for foreign logging companies, and the rate of harvesting of commercial forest resources exploded during the early 1990s.

The initial impact of enhanced mining activity was always going to have a negative effect on government revenue because the government had to borrow funds to pay for its share of construction (and exploration) costs in the three mines in which it had decided to take up equity holdings. Consequently, the government’s interest component (on debt) in its budget rose markedly. In 1990, the government’s actual interest payments exceeded K116 million — approximately nine percent of total government expenditure with interest payments to commercial banks and financial institutions based outside Papua New Guinea amounting to K32 million (Bank of Papua New Guinea 1991).

There was a capital outlay of K50 million for the government’s 20 percent shareholding in the Misima gold and silver mine. Both Placer Pacific Ltd., which has 80 percent equity, and the government expected a low rate of return on their investment. Placer Pacific most likely became involved in the Misima project to establish its credentials as a good corporate citizen, while the government did so to improve the economy of a less developed province and area. However, long-term benefits to the province and area are likely to be limited. Nevertheless, two landowner groups from Misima and a Papua New Guinean catering company began a joint venture to provide catering and camp services at the mine site. The skills and management experience gained from this venture are likely to be used to develop tourism, hospitality, and fish processing enterprises (Post-Courier, 22 March 1995, p.20). Fishing activity has also been stimulated through the Tax Credit Scheme for the Misima mine and involves village fishermen in the export of their catches (Post-Courier, 19 April 1995, p.22). This is one activity which is likely to be continued, even after the mine ceases operation. Furthermore, trust accounts have also been drawn up for future generations where 20 percent of royalties would be held out of the 30 percent held by landowners (The National, 12 August 1995, pp.8, 23). The Misima mine has turned out to be far more profitable than predicted, and has been paying company tax and dividends since 1993. This success reflects the difficulty of predicting future outcomes for any mining venture, from initial observations.

Papua New Guinea is a relatively important mining country and is likely to become even more important in the future. In 1994, Papua New Guinea was ranked eighth in world gold production and is expected to become the sixth largest producer in the 1990s (Islands Business, May 1995, p.20). It is also the twelfth largest copper exporter in the world (ibid.).
Despite the high costs, exploration activity was extensive in the late 1980s and early 1990s (see Table 5 and Figure 1). However, it was affected by a number of developments. One was the Mt. Kare dispute, which forced CRA to pull out in March 1993, while other more serious developments relate to the Porgera Joint Venture.

The policy with respect to the Porgera mine has been poorly thought through and has involved the continuous shifting of the goal posts. The behaviour of the Papua New Guinean Government with respect to its equity stake in mining ventures has been 'consistently reactionary', with equity decisions being based on reactions to immediate past experiences (Jackson 1994: 22). For example, the highly successful BCL mine led the government into taking a larger equity stake in the Ok Tedi project than the BCL venture, which was not warranted because of the high risk nature of the project. However, the poor outcome from the Ok Tedi project led to a lower government equity stake than that warranted by the highly profitable nature of the Porgera mine. The high risk nature of the Ok Tedi mine was reflected in Kennecott's decision to pull out in disagreement over taxation and other terms and conditions. The company obviously thought the mine was marginal.

The highly profitable nature of the Porgera mine was evident from the successful float of Placer Pacific shares, in which the majority of the top Papua New Guinean bureaucrats and politicians participated. In this context, it was poor policy for the government to take up only ten percent equity in a profitable mine. However, having made the initial mistake of taking only ten percent equity, in November 1992, the government made another error. It changed the playing field by forcing renegotiations for an increased shareholding in the Porgera Joint Venture. When the government announced its intention to increase its stakeholding to 30 percent, there was a sharp fall in the share prices of the three private partners — Placer Pacific Ltd., Renison Goldfields Consolidated Ltd., and Highlands Gold Ltd., an MIM subsidiary (Callick 1993:19; Jackson 1994). Consequently, this raised the costs of capital for the private partners as well as the Papua New Guinean Government. A compromise was necessitated, but because of increased sovereign risk due to fiscal irresponsibility of the 1990–94 period and such forced renegotiations, the government has ended up being the real loser.

Each of the three partners relinquished five percent of their shareholding, allowing the Papua New Guinean Government to assume an equity of 25 percent. The private partners were each left with 25 percent equity. The government was required to pay K138.75 million of its share of the total net cash flows from the mine in order to pay for its newly acquired equity. The tax arrangements have been altered to improve the total net cash flows from the mine. The three private partners have acted as good corporate citizens, accepting that a new stable arrangement would improve their position in the eyes of the stock market and establish future good will with the Papua New Guinean Government. The share prices of the private partners recovered in late June 1993 after this agreement.

At the time of writing, the government had not introduced the enabling legislation for it to take up its additional equity in the Porgera project and it is probable that the government will not take it up (J. Giheno, Minister for Mines and Petroleum, as reported in the Post-Courier, 23 March 1995, p.32). It is evident that the benefit to the government from having its additional share 'carried at the commercial rate of prime rate plus five percent' is not large. Having its additional stake carried is not the best way of financing added equity. However, considering the fiscal bind in which Papua New Guinea finds itself, as a result of poor fiscal policies during the 1990-94...
period, the alternative of being able to raise a loan at an attractive rate of LIBOR plus one percent is not a possibility. In fact, obtaining an attractive commercial loan has become a problem in the mid-1990s. Furthermore, the Porgera mine expansion plan is expected to cost about K90 million and is set for completion in 1996 as further exploration showed signs of proven deposits (The National, 4 August 1995, p.56).

Table 5: Mineral Exploration Expenditure, 1987-1994

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Expenditure (Kina)</th>
<th>Advance Project Expenditure (Kina)</th>
<th>Grass Roots Expenditure (Kina)</th>
<th>Projects Classified As Advanced</th>
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<tr>
<td>1987</td>
<td>49 952 893</td>
<td>25 956 483</td>
<td>23 996 410</td>
<td>454, 485, 677, 497, 215</td>
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<td>1988</td>
<td>68 747 563</td>
<td>41 239 877</td>
<td>27 507 686</td>
<td>454, 485, 677, 497, 580, 216</td>
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<td>1989</td>
<td>64 310 636</td>
<td>40 214 231</td>
<td>24 096 405</td>
<td>454, 485, 677, 497, 580</td>
</tr>
<tr>
<td>1990</td>
<td>56 500 644</td>
<td>36 496 490</td>
<td>19 804 154</td>
<td>440, 455, 485, 677, 497, 580</td>
</tr>
<tr>
<td>1991</td>
<td>50 730 072</td>
<td>33 901 533</td>
<td>16 828 539</td>
<td>440, 485, 677, 497</td>
</tr>
<tr>
<td>1992</td>
<td>38 831 932</td>
<td>26 936 061</td>
<td>11 894 871</td>
<td>440, 455, 485, 677, 497</td>
</tr>
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<td>1993</td>
<td>40 544 161</td>
<td>31 968 301</td>
<td>8 575 860</td>
<td>440, 455, 485, 677, 497, 580, 58, 216</td>
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<td>1994</td>
<td>44 577 151</td>
<td>27 023 774</td>
<td>17 498 377</td>
<td>440, 485, 580, 58, 216</td>
</tr>
</tbody>
</table>

Source: Mining Division, Department of Mining and Petroleum.

The Porgera River Alluvial Miners’ Association (based in the lower Porgera area) has asked for the construction of a tailings dam for two reasons. First, there is the environmental damage to people, plants and animals from the discharged tailings from the Porgera mine. Second, the added sediment has already buried alluvial gold and thus is adversely affecting these miners’ livelihoods.

In regard to the Kutubu oil project, the Papua New Guinean Government opted for a 22.5 percent production share. Although this share has been carried by the private partners, the interest cost to the Papua New Guinean Government for this arrangement is substantially higher than it would have been, if the government had obtained alternative finance.

In 1990 and 1991, before the fiscal crisis and the increased sovereign risk arising from the Porgera renegotiations engulfed Papua New Guinea, the government could have borrowed at LIBOR plus one percent. The difference between this rate and the commercial rate (prime rate plus five percent) at which the government’s equity was being carried amounted to approximately six percent. Such an arrangement would have saved the government at least K180 million, if it had refinanced in late 1990 or early 1991. In fact, the government anticipated saving K45 million by refinancing a reduced amount of its ‘carried debt to the private partners’ in 1994 (Iangalo 1994:11). Given the fiscal crisis, Papua New Guinea was not able to refinance in 1994 and 1995. However, it is clear that having the private partners carry the government’s debt was not the best option in 1990-1991. Improving the capability of both the Mineral Resources Development Company and the Department of Mining and Petroleum, to ensure that such mistakes are not repeated, would help. Analytical input and recommendations from a suitable research organisation, such as the National Research Institute, would be invaluable in these situations.
The Porgera share issue clearly points to the unity of opposites in mining ventures between the government and its private partners. All parties lose from a dispute, as the cost of capital is increased to them by global capital, as risk becomes greater.

**New Large Projects on the Horizon**

The mining and petroleum ventures on the horizon are the Lihir gold mine, and the South East Gobe and Gobe oilfields. The South East Gobe-Gobe oilfields are being managed by Chevron Niugini and are expected to come into production in 1997. At the time of writing details were not available. Furthermore, petroleum exploration has increased significantly (*The National*, 4 August 1995, p.56). However, the possible increase in oil production in Papua New Guinea makes the issues of downstream processing and construction of oil refineries important ones.

The 1993 and 1994 budgets which were formulated at the end of 1992 were predicted on the assumption that the Lihir project would commence construction in 1994. However, the landowners were able to hold out for better terms for themselves, and construction did not eventuate. There were also the issues of the size of government equity and the participation of the Malaysian Mining Company. The lead manager, RTZ, is the largest mining company in the world. In early 1994, the Minister for Mining and Petroleum, John Kaputin, wanted to put future mining developments on hold until the mining policy review was complete, but the Minister for Finance, Masket Langalio, was keen to proceed because of the impending foreign exchange and cash flow problems.

Lihir's landowners, after a great deal of bargaining, finally agreed to a 15 percent share in the mine, with another five percent possible with the float. Other shareholders in the Lihir Joint Venture are RTZ (40%); Niugini Mining, a subsidiary of Battle Mountain Mining Ltd. and the only large mining company registered in Papua New Guinea (30%); and the Papua New Guinean Government (15%). The Australian Government committed itself to insuring sovereign risk at US$250 million, after delaying such insurance to ensure adoption of Papua New Guinea's structural adjustment package proposed by the IMF and the World Bank (*The National*, 12 July 1995, p.24). Such insurance has allowed interest rates to drop from 14 percent to ten percent on the US$300 million syndicated loan from the Union Bank of Switzerland for the construction phase in 1995. The balance of the money (approximately US$450 million) is expected to come from the float of Lihir Gold Limited public company shares to be listed on the Australian, London, and United States stock exchanges in October 1995. Approximately US$150 million has already been spent, taking the total cost of exploration and construction to US$850 million (approximately K1.1 billion at mid-1995 exchange rate) (*The National*, 18 May 1995, p.36).

The Australian Government pressured the Papua New Guinean Government to agree to the onerous terms and conditions imposed by the World Bank. As discussed earlier, this shows that if the fiscal policy is poorly managed, the sovereign risk increases, the costs of projects tend to rise, and the benefits to Papua New Guinea are reduced. The expected life of the open pit mine is 14.7 years, followed by 21.3 years of processing the stockpile. Estimates reveal that there are at least 42 million ounces of gold awaiting extraction. Production costs are expected to be approximately US$230 an ounce (1994 prices), thus making it a profitable mine worth taking out a shareholding in (*Islands Business*, May 1995, p.23). On the other hand, there are remote risks of a volcanic eruption, which would destroy the project. Learning from the experience of
BCL and OTML, the tailings from the processing plant are to be disposed of in a deep marine site as occurs at the Misima mine (Post-Courier, March 1995, p.28).

**Lowering Costs and Increasing Benefits to Papua New Guinea**

Given the rich mineral potential that Papua New Guinea has, the Papua New Guinea Chamber of Mines and Petroleum should ensure that long-term costs to the industry are reduced. Apart from reducing political uncertainty and risk, and working towards a stable mining environment (which will lower the cost of capital), it is important that the mining companies, contribute more equitably towards the education and training of nationals, specifically in areas where highly-paid expatriates are currently needed. A mine training college could be established at one of the mine sites, linked up with Unitech, and funded by contributions from the mining companies, with the curriculum negotiated between Unitech and the Papua New Guinea Chamber of Mines and Petroleum.

The employment of qualified Papua New Guinean nationals will lower exploration, construction, and operating costs. It will also improve the bottom line for the companies, and reduce the suspicion and distrust with which some of them are currently viewed.

High transport charges add to the costs of exploration, construction, and operations. The companies involved in areas of high-potential, high-density activity should provide resources for the construction and maintenance of roads in these areas. This will engender goodwill, lower transport costs for the companies, and can be provided without excessive cost through the Tax Credit Scheme.

Although individual companies may have no interest in improving and maintaining Papua New Guinea's infrastructure, given potential mining prospects, Papua New Guinea's economic prospects and the profitability of the mining sector are intertwined, dependent on the stability of Papua New Guinea's political system. The healthier and more stable the Papua New Guinean economy, the less likely is the risk and uncertainty, from a political perspective, of renegotiating the more successful projects.

**Fly-In Fly-out Issue**

This issue concerns the construction of residential buildings, facilities, and a township to cater for the work force and the surrounding population versus reliance on fly-in fly-out (FIFO) arrangements. FIFO arrangements apply to Porgera and the expatriate populations in Kutubu and Misima. FIFO means that the mining employees commute into the workplace from outside the mine site. The main issue here deals with FIFO arrangements for employees residing outside Papua New Guinea, in Cairns or the United States of America. The multiplier effect, given such an arrangement, is weak in Papua New Guinea, but is strong in Cairns and the United States. Cairns, for example, has expanded at the expense of Lae and other urban centres in Papua New Guinea. This issue is contextualized by the law and order problem which discourages families from staying in Papua New Guinea. Another factor is the added cost of building a township around the mine site.

The Bougainville experience shows that a township can create disharmony between the landowners and the immigrants who come and settle in the township. This can be a
major factor in the increase in dissatisfaction with the existence of a mine, and may lead to disruption and possible closure of the mine's operations.

Another issue is that most mining activity takes place in isolated or remote areas of the country. This invariably leads to wasted infrastructure and investment after the mine closes unless the government is in a position to step in and maintain the infrastructure and economic activity. However, the latter is unlikely. Also, the construction costs in such isolated areas are high, and consequently will adversely affect profitability and government revenues from the mine. However, it may be worthwhile relocating the families of the workers in Port Moresby, Lae, or other urban centres, where schooling and other amenities are available and people are cosmopolitan and tolerant of other communities. A small township, which may be viable in the long term even after a mine has closed, may also be a worthwhile and added option.

Refrineries

'Refinery in Papua New Guinea would not be viable unless it exported petroleum products', reported Abby Yadi (Post-Courier, 5 April 1995, p.27), quoting promoters of the Motukea refinery project in Port Moresby. The refinery, which is being developed by PNG Oil Refinery Pty. Ltd. — a consortium of Australian, American, and Papua New Guinean companies — is expected to cost US$220 million to develop. As an export-oriented project with a capacity of 40,000 barrels per day, which is in excess of Papua New Guinea’s anticipated local demand of 16,000 barrels per day, it will be a worthwhile project. The developers are expected to make profits by saving on transport costs from Papua New Guinea to major oil refineries in the region, especially Brisbane and Singapore. Value is added, without penalising the Papua New Guinean consumers, if no protection is afforded. The Motukea refinery had guaranteed import parity prices for Papua New Guinean consumers before the government agreed to the building of a second refinery (backed by Galveston-Houston in a joint venture with Kikori Oil Investment Pty. Ltd. and with a 15 percent equity for Kuripare Pty. Ltd., representing the local landowners of the Kikori area) at Kopi in Gulf Province.

The decision to build a second refinery was made in spite of opposition from the Department of Commerce and Industry. This project is being managed by the Papua New Guinea Oil Refining Company Pty. Ltd. Unfortunately, the government had agreed to retain the current formula used to price the petroleum products under the price control arrangements set in 1983. The agreement also allowed for the import of petroleum products by the distributers if the Kipoli Oil Refinery failed to supply at the price set by the current formula. The domestic price would therefore be subject to the world crude oil prices and the exchange rate (Post-Courier, 28 June 1995, p.19).

Oil is a critical input in transport and other production processes and by lifting the price of oil unnecessarily, merely to satisfy one group of producers, Papua New Guinea is likely to raise its already high cost of production. Approval of projects on a competitive and commercial basis is a must for Papua New Guinea. In addition, the taxation regime on downstream processing, at a Company Tax of 25 percent, is considerably lower than that for unprocessed oil or gas. The oil refining policy must be consistent with government policies and the movement towards lower tariffs, which are being pursued in light of APEC and the requirements of international trade (that are being put in place by the World Trade Organisation (WTO), following the successful completion of the Uruguay Round of GATT negotiations).
Similarly, the government should extend this downstream processing principle to the mining sector. At present, there is only one metal refining operation, the Metals Refining Operation Pty. Ltd. (MRO), which is based in Port Moresby. MRO processes about 45 percent of the gold from Porgera, and all of the gold from Tolukuma and the alluvials. Only about 40 percent of locally produced gold is being locally refined. Given the steady gold/silver production over the past ten years and the shift towards small to medium-scale mines, and the international recognition gained so far by MRO, an expansion of the metal refining industry is an ideal worth pursuing in Papua New Guinea.

The Liquified Natural Gas Policy

During exploration for petroleum, large volumes of gas reserves have been identified. Unfortunately, Papua New Guinea does not have a large enough domestic market to make extensive development possible. However, the Porgera Joint Venture has a backward linkage to the Hides gas field and there is the prospect of other linkages to provide energy to similar projects. Ultimately, the exploitation of gas is dependent upon Papua New Guinea exporting its natural gas as liquified natural gas to countries in the Asia-Pacific region.

Papua New Guinea is currently in the exploration/appraisal stage for potential liquified natural gas, although reserves have been identified in the Hides/Karius and Kutubu areas of Southern Highlands Province. Demand and supply projections for the Asia-Pacific region show that demand is likely to exceed current capacity after the year 2000 which will open a window in the market. As competition for market shares is likely to be intense, government-to-government bilateral agreements could be pursued by Papua New Guinea with the other countries in this region. However, Papua New Guinea does not have to rush into production and supply, as technology is likely to improve (thus reducing the cost of construction and production), training is likely to be lifted (thus increasing the benefits to Papua New Guinean nationals), and Papua New Guinea's bargaining position will improve with constrained supply in the region.

The new policy initiatives, as put forward in the draft government statement on liquified natural gas, are in line with those prevailing in the petroleum sector with regard to equity (government to have 22.5 percent), royalty (1.25 percent), and the same tax regime. The tax regime prevailing in the petroleum sector applies to the development of the oilfield/gasfield, pipeline transportation (upstream processing), and downstream processing, which includes liquefaction and transportation to the end market. The upstream segments are being taxed under the Petroleum Income Tax Act (50 percent plus an additional profit tax of 50 percent if the rate of return exceeds 27 percent), while the downstream segments are being taxed under the General Industrial Tax regime (currently 25 percent).

Similarly, the basic rate of import duties of 16.62 percent applies to the upstream gas sector, while the downstream processing is likely to be exempted from import duties by the Commissioner General of the Internal Revenue Commission. This means that the tax regime is tilted heavily in favour of downstream processing of petroleum and gas in Papua New Guinea, which will hopefully promote backward and forward linkages and industrialisation in the country.
The Dutch Disease and Savings Ratio Issues

Pressure on the exploration companies is to be maintained, by allowing them to retain non-commercial discoveries for an initial period of three years, renewable subject to satisfactory performance for a maximum of 15 years.

Papua New Guinea has a different petroleum/gas sector tax regime than other countries in the Asia-Pacific region. Without the database to convert these different tax regimes into equivalent tax rates, it is difficult to assess whether Papua New Guinea's regime is more (or less) attractive. Obviously, where the risk is greater, the tax regime has to be more attractive. For example, Papua New Guinea would be perceived as being riskier than Australia, but less so than China; that is, Papua New Guinea's taxation regime is transparent and predictable, while China's is not. Moreover, Papua New Guinea's legal jurisdiction is familiar to all Western mining companies. Consequently, Papua New Guinea remains attractive to mining companies, not only because of its geology (and the prospective mineral and petroleum riches), but also because of its legal and political systems. The changing of the playing field with respect to the Porgera project caused considerable investor concern. Therefore, it is important to establish a consistent tax regime and equity policy as well as a responsible fiscal policy in order to reduce sovereign risk.

The Dutch Disease and Savings Ratio Issues

The Dutch Disease was so named following the squeeze on output, employment, and profits in the tradables sector (excluding the minerals or gas sector in this case), which resulted from the discovery and exploitation of gas deposits in Holland. Since then, it has spread to Britain following the discovery and exploitation of the North Sea oil deposits. The implications of the exploitation and export of large mineral deposits in Australia were similarly seen by Gregory (1976), where the Dutch Disease is known as the 'Gregory Effect'. Gregory argued that the rapid growth of mineral exports and the resulting rapid improvement in the balance of payments would squeeze both the agricultural and manufacturing sectors by increasing Australian cost levels more rapidly, relative to its trading partners.

This would be equivalent to doubling the tariff for the rural (traditional agriculture) exporting sector, and equivalent to reducing to zero tariff plus the introduction of an import subsidy, for the import-competing manufacturing sector. As Corden (1981) pointed out, the tradables are squeezed by a combination of the nominal appreciation of the domestic currency and continuous increase in nominal wages of the country, which has suddenly begun exporting large quantities of minerals. Any increases in the prices of minerals will have the same effect as the exploitation of a new mine. This sequence operates through two effects (Corden and Neary 1982):

- the resource movement effect; and
- the spending effect.

The resource movement effect influences the economy by raising the marginal products; that is, the demand of the mobile factors employed in the new tradable boom sector (in Papua New Guinea, oil, gold and copper), and so draws resources out of other sectors, giving rise to various adjustments in the rest of the economy. As these resources have always been imported into Papua New Guinea for mineral exploitation, such an impact on Papua New Guinea has been limited. Nevertheless, it means that the benefits in terms of employment and income which would normally accrue to Papua New Guinean nationals and Papua New Guinea's economy have also been limited.
Issues in Mineral Exploitation

Such developments and the strong confined nature of mining activities have exposed mining companies to a greater degree of suspicion and distrust in Papua New Guinea than in the more industrial countries. Greater commitment of resources by the mining companies to the education and training of manpower required for exploration, construction and operating activities would improve the spread effect of mining exploitation in Papua New Guinea. This would give rise to higher incomes, more savings, and better investments by Papua New Guinean nationals. The mining sector would then impart a dynamic impetus to the rest of the Papua New Guinean economy — something which has been missing to date.

In this context, it is important that the internal efficiency of Papua New Guinea’s education sector is improved. Papua New Guinea receives a very limited return from its investment in education because it has adopted developed country standards for its educational institutions. At its current stage of development, Papua New Guinea needs to adopt much larger class sizes, double (or triple) shifts in the educational institutions, continuous use of the capital stock of educational institutions over the full year rather than only for eight to nine months, and use of more functional and less expensive schooling facilities. If such internal efficiency improvements were adopted, then universal primary schooling would be an attainable goal within the next five to ten years. Six-day schooling and extended homework programs would improve the quality of mathematical skills and the confidence that Papua New Guineans must have in their skills. As already proposed, there is also a need for the Papua New Guinea Chamber of Mines and Petroleum to convince the mining companies to fund the establishment of a mining college to service their appropriate needs.

Because of the confined nature of the country’s mining projects, the major impact of the boom has been through the spending effect. Fortunately, the government has been able to minimise this effect by spreading the expenditure more smoothly through the setting up of the Mineral Resources Stabilisation Fund (MRSF) and drawing down the fund into consolidated revenue in a sustainable and planned manner. The Bougainville crisis and the marginal benefits from the Ok Tedi mine created a strain on Papua New Guinea’s fiscal management from which it had begun to recover through revenue flows from the Porgera and Kutubu Joint Venture. Nevertheless, the revenue flows from the mining boom, which followed the coming on-stream of the Porgera, Misima, and Kutubu projects, were mismanaged through a spending spree, whereby recurrent consumption escalated over the 1990-94 period.

It is possible that this was a consequence of the ‘Dutch Disease’ which led to an increase in government wages and consumption. However, the problems arose because revenue flows were not sterilised — a policy which should have logically followed from the establishment of the MRSF. Mining booms are, by their nature, transitory (AIDAB 1993:22), and should be used to fund high priority agriculture and other sustainable productive projects. Should this happen, then the impact of the spending effect would be mitigated.

What is required is a steady growth in the output of skills which are in demand by the mining sector, as well as those needed by the rest of the economy. Such human resource development will dampen the adverse impact of the spending effect. Also, this policy will dampen the rise in wages of skilled labour.
Table 6: Domestic Investment\(^a\), Gross Domestic Savings\(^b\), Resource Gap\(^c\), Gross National Savings\(^d\), Rate of Increase in Government Consumption\(^e\), and Rate of Increase of Gross Domestic Product\(^f\), 1969-1990 (as percentages)

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Notes:
- \(^a\) Gross Domestic Investment = Gross Fixed Capital Formation + Change in Stock.
- \(^b\) Gross Domestic Savings = Gross Investment - Import Surplus.
- \(^c\) Resource Gap = Gross Investment - Gross Domestic Savings.
- \(^d\) Gross National Savings = Gross Domestic Savings + Net Factor Income from Abroad + Net Current Transfer from Abroad.
- \(^e\) Rate of Increase in Government Consumption.
- \(^f\) Rate of Increase of Gross Domestic Product.
- \(^*\) Gross Domestic Investment, Gross Domestic Savings, Resource Gap, and Gross National Savings are percentage ratios of Gross Domestic Product.

Sources:
2. AGM (1985), Table A5.
   (1992 Budget Papers have higher savings data and higher GDP figures than the 1991 Budget Papers and these have been used here.)
By jettisoning urban minimum wages and adopting a single national minimum wage, the impact of the spending effect (and the subsequent constraint imposed on the growth of employment) will be reduced. Restraining the growth in public sector wages, in the face of an emerging bonanza from the mining sector, is essential. However, this will prove to be a challenge given that the 'private interests' of the public servants (who are influential in decision making) are likely to be couched in 'public interest' terminology. Such growth restraint in public sector wages is essential if Papua New Guinea is to translate some of the surpluses from the mining sector into a higher savings ratio.

The Gross National Savings Ratio, which averaged 31 percent during the 1969-74 period, has been in a state of secular decline since 1974 for a number of reasons (see Table 6). The renegotiated Bougainville Copper Agreement gave Papua New Guinea a share of surplus in 1974. However, since 1974, the real value of surpluses has declined. Real Australian aid flows peaked in 1973-1974 and have subsequently declined at an average annual rate of more than four percent in real terms. In the 1980s, the Gross National Savings Ratio has fluctuated between 19 percent (1980) and 11 percent (1985). During the 1990s, the Gross National Savings Ratio should pick up substantially if public sector consumption is restrained in the face of a large flow of surpluses from the booming mining sector to the government. The problem will be how to restrain government consumption, public sector wages, and the emergence of the Dutch Disease. The strategy for raising the Gross National Savings Ratio is tied to restraining government consumption during the 1990s. Table 6 shows that the high rates of growth in government consumption during the 1974-76 and 1980-81 periods were not sustainable, while government consumption had to be reduced in 1977. Growth in government consumption has to be restrained if the potential bonanza from the mining sector is to be converted into an increased savings ratio.

During 1992, government consumption exploded by 10.1 percent, and in 1993 it increased by 4.3 percent (1995 Budget Supplementary Documents, Table 2). Despite this, the Gross Domestic Savings Ratio rose in 1991, 1992 and 1993 (see Table 7), showing the strength of mining and forestry exports during those years. Mining and petroleum exports increased from K757.5 million in 1990 to K1 858.7 million in 1993 — an annual average increase of 35 percent. During the same period, the value of log exports increased from K79.6 million to K401.4 million — an average annual increase of 71 percent. However, it is tending to decline in the mid-1990s as mining and log exports stabilise.

<table>
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<th>Period</th>
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<th>Minerals</th>
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<td>1990</td>
<td>21.6</td>
<td>757.5</td>
<td>79.6</td>
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<td>23.4</td>
<td>1 005.3</td>
<td>90.2</td>
<td>1 411.0</td>
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<td>26.0</td>
<td>1 371.5</td>
<td>148.2</td>
<td>1 882.0</td>
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<tr>
<td>1993</td>
<td>29.1</td>
<td>1 858.7</td>
<td>401.4</td>
<td>2 540.9</td>
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<tr>
<td>1994*</td>
<td>25.1</td>
<td>1 840.8</td>
<td>484.7</td>
<td>2 737.8</td>
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Note: * Estimated percentage and values.
Source: 1995 Supplementary Budget Documents, Tables 2, 8 and 9.
Conclusion and Policy Suggestions

The contributions from the mining sector should improve during the second half of 1995. Profits and equity are likely to be high because of the depreciation of the kina and higher mineral prices. The Kutubu project's debts for the 'carried' interest should be paid off by October 1995, making government revenues available from then onwards from its equity share. OTML should be paying taxes to the government and commence paying dividends in 1996, and Lihir project finances have been finalized. Also, there is increased petroleum and liquefied natural gas exploration, and the Bougainville situation is looking much better than before.

One important issue which is frequently raised is whether or not the government should take equity in mineral resource projects. Any government decision will depend upon the potential profitability of the mine in question. It is difficult to predict the future of mining operations because mineral prices are unpredictable and the quantity and quality of the ore, oil, or gas reserves are sometimes difficult to estimate accurately. Nevertheless, one way of deciding whether or not to take equity in a project, and what percentage equity to take, is for the leading politicians and bureaucrats to ask themselves whether they would buy shares in the venture. If their answer is yes, then obviously it is worth the government taking an equity stake in the project. The percentage equity which the government should take would depend on how much of their own capital the same politicians and bureaucrats would be willing to invest. If it is a lot, then obviously a high equity should be taken up. Alternatively, if it is only a small amount, then only a small equity should be taken up. Also, professional and academic inputs, comments, and recommendations should be sought from leading research bodies such as the National Research Institute. As has become apparent from the Bougainville crisis, with its high cost to the State and society, and the poor return from the Ok Tedi project combined with the added cost of the private partners carrying the State's share, there is a need to strengthen the institutional capacity of the Department of Mining and Petroleum. The department should be strengthened to enable it to consider and bring problems and policies to the attention of the National Executive Council to enhance planning for future projects.

The Kutubu 'carried' share issue also raises a number of policy dimensions. It is obvious that the State should be able to borrow at a rate of interest that is lower than the commercial rate at which the State's interest is being carried by the private partners. However, sovereign risk rises with political uncertainty and, in particular, with irresponsible fiscal policies; that is, a stable mining regime with regard to the government's equity stake, as well as general mining legislation, will help. In addition, a hard kina policy, which forces a responsible fiscal policy, enhances the credit rating of the government and thus reduces the risk premium on sovereign risk. In the context of fiscal responsibility, it is imperative for the government to control its consumption expenditure and not allow it to blow out with each mining or petroleum boom. Adequate control over consumption expenditure, as the past demonstrates, will lift Papua New Guinea's savings ratio and enable a high growth rate to be sustained, without the threat of a debt trap.

The government also has the option to restructure the Mineral Resources Development Company, to make it the agency to manage its equity stake in mining and petroleum projects and thus assist in increasing returns on government investment. The role of the Bank of Papua New Guinea, in conjunction with the Department of Finance,
is crucial in sterilising the revenue flows from mining, particularly from taxation, during resource boom periods. This is important in order to avoid the impact of the Dutch Disease, which has affected Papua New Guinea’s economy from time to time. A tight fiscal policy is essential during mining ‘booms’, because they are almost certainly followed by mining ‘busts’.

It has become obvious from the Bougainville crisis and the Ok Tedi development that the landowners and people living around mining areas have immense power, and can make or break mining operations. It is also apparent that the perception of environmental degradation worsens with time. Therefore, offering a free equity of five percent to the landowners is a move in the right direction for any mining project. By making the landowners part-owners and stakeholders in a mine reduces their likelihood of disrupting mining operations. Where a mine is likely to last for more than 12 years and is constructed without an effective tailings dam or some environmentally acceptable method of discharging tailings into the ocean at a depth, the lead agent is asking for trouble. If a mine is not likely to be profitable without a tailings dam (which is seen as a necessity by the landowners, because the tailings cannot be disposed of at ocean depth and sterilised), then that project should not be allowed to proceed. Improvements in technology are likely to make mining projects more profitable in the future, even with a tailings dam.

Another problem arises when landowners mismanage funds and split into warring factions, as happened in Bougainville. Thus, it is in the interests of the mining companies as well as the national government to provide capable management teams to help the landowners manage and invest their funds in viable, sustainable capital ventures. Such investments will continue to produce income for the landowners, even after a mine has ceased operations.

Intraprovincial inequalities are increasing as landowners try to keep the benefits and spin-offs from the mining ventures to themselves. However, it is unclear what can be done in this respect. One of the best ways of reducing income inequalities in the long term is to produce a general lift in human capital. This is more likely to happen with an extended school week and increased homework as well as through offering schooling to those people who currently miss out. Increasing people’s mathematical skills, general discipline, and ability to do well will enhance their confidence to take up new skills and new ventures.

Obviously, if local skills are enhanced, this will reduce the cost of exploration, construction and operating mines in Papua New Guinea. Such human resource development will benefit the mining companies as well as other shareholders, such as the landowners, provincial governments and the national government. Mining companies may singularly not have an interest in developing appropriate skills through the establishment of a Mine Training College and similar facilities at Unitech, because persons with such skills can be poached by other mining companies. However, collectively, they have an interest in setting up such training facilities. In this respect, the Papua New Guinea Chamber of Mines and Petroleum should facilitate the creation of such training facilities through contributions (possibly levies) from the mining companies, including the Mineral Resources Development Company.

The fly-in fly-out arrangement with cities outside Papua New Guinea should be minimised because the resultant multiplier effect is enjoyed by other countries at the expense of Papua New Guinea. Obviously, it is not appropriate to build a large township and facilities in remote areas, where schooling and health infrastructure are
not available for expatriate and national staff. Therefore, the Tax Credit Scheme could be used to construct housing facilities in larger urban centres, which have a cosmopolitan population.

There is a danger that, in striving for industrialisation the government will end up pursuing policies that are harmful to the economy and society. Projects must be approved on a competitive and commercial basis. The agreements of the two oil refineries should not be altered for the benefit of one. The prices of final products should be at international market prices and in line with Papua New Guinea’s commitment to free trade (APEC and WTO memberships).

The taxation regime proposed in the gas policy is consistent with that for petroleum, which is already in place. However, in both resource areas there is a bias in favour of downstream processing. Although this may enhance the industrialisation process, the government should avoid excessive concessions for downstream processing because it reduces tax revenue and the ability of the government to extend and maintain social and physical infrastructure.

As a result of the Bougainville crisis and the shutdown of the Panguna mine, mining companies have increasingly sought to place high profile, competent nationals in senior managerial positions. This initiative enhances the capacity of nationals to think through, understand, and implement policies relating to mining.

In due course, Papua New Guinea will be in a position to provide qualified local mining expertise to assist neighbouring countries in the region. Such competent national personnel should also facilitate the formation of local mining companies.

Papua New Guinea’s future should be reasonably bright provided it maintains control over its fiscal outlays — particularly government consumption.
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