

# Mining in the New Zealand Economy

Paper for IPS symposium “Mining in the Conservation Estate:  
Lasting Lessons from the Schedule 4 Debate”

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Like most economic activities, mining contributes to human welfare. Also like most economic activities:

- mining is best done where the relevant resources are relatively abundant and where economic costs (in the widest sense) are lowest
- mining presents industry-specific problems for regulators and policymakers
- mining can fail to raise welfare and can even reduce it if done in the wrong place, or in the wrong way, or without a proper legal and regulatory framework of rules

Mining is one of a set of resource-intensive extractive activities that present macro management problems: the “resource curse”

- Empirically, the curse is a negative observed relationship between reliance on natural-resource exports and economic growth performance.
- One of the earliest statements of the underlying economic theory was in 1977 by Bob Gregory in Australia – ironic in one sense given Australia’s subsequent success, but Gregory did influence policy thinking
- The resource curse is now a staple of the economic development literature. The conclusion from four decades of research on the topic is that there are real negative spillovers from resource-based industries onto other tradable goods sectors, and that careful policy management is required to secure growth on the basis of resources-based exports
- The lesson is: tread carefully and be sure that policymaking and regulatory institutions are not captured by the industry’s resource rents and rent-seeking

# Mining is also an “extractive” industry based on depletable resources

- Comparisons between extractive and non-extractive industries have to be done with care
  - For example, comparing mining with the wine industry is not an economically-interesting exercise unless the renewable/nonrenewable distinction is borne in mind
  - Ditto tourism and recreation, which are non-consumptive uses of the conservation estate and recognised as such in the Conservation Act 1987
- From a long-run point of view, extractive industries tend to have a boom-and-bust character, which makes it important to provide for the post-depletion phase (Norway, Nauru....)
- Accounting for depletion of natural capital is important when looking at long-run wealth impacts – avoid loose talk about “wealth being **created**” by selling non-reproducible assets
  - What’s really happening there is that an asset is being converted into cash (the family-silver effect)
  - Real wealth creation requires some rents accruing to other factors of production, or dynamic learning-by-doing, or something of that sort

# New Zealanders are generally relaxed about mining activity that extracts obviously useful things for the general good

- Most places have a quarry in the vicinity
- Quarrying is the dominant open-cut mining activity around the country
- Most of the mining consents in the conservation estate have been for quarrying
- But quarrying, like any large-scale extractive activity, sometimes comes up against competing values; e.g. Red Rocks at Ohiro Bay

# The issue thus is not whether the mining sector in general should be encouraged or discouraged

- Mining in this country seems currently too small a part of the economy to raise serious resource-curse issues at macro level (though Maui gas pushed into that territory)
- The salient issue for New Zealand is project selection at the micro level
- Debate on this cannot be pre-empted by general sweeping claims about the sector as a whole, or as a wealth generator
- The difficult issues lie at the margins, and relate to which new projects ought to proceed, and where, and which ought not to proceed
- So institutional design for adjudicating among competing values is fundamental, especially where non-market, and often non-quantifiable, values are at stake
- Hence Schedule 4 as a device to avoid the chilling effect of regulatory uncertainty
- Regulatory uncertainty is increased when industry lobbies seek to overturn institutions and rules rather than to work within them
- Remember Think Big, the National Development Act 1979 and the Clutha Development (*Clyde Dam*) Empowering Act 1982 ...

# Implications

- Need more detailed statistical data than is generally available, to enable analysts to profile particular types of mining
  - Oil and gas
  - Quarrying
  - Ironsands
  - Coal
  - Precious metals
  - Rare earths etc
- Effective regulatory procedures are needed where competing values are at stake and there are significant potential spillovers
- The Schedule 4 debate has been a good test run for the institutional decision-making framework and a couple of serious weaknesses have shown up
  - Government's own economic analysis seems utterly inadequate
  - The resulting vacuum has been willingly filled by mining interests and their consultants
  - The decision-making process under the Crown Minerals Act and the Conservation Act has come under scrutiny: the privileged position of mining is hard to justify
- The final outcome looks like the right one, but the need for better-informed and less partisan policy analysis is clear as we move towards new proposals for mining in the non-Schedule 4 conservation estate

# Weighing costs and benefits

- Social cost-benefit assessment (SCBA) is a systematic way of thinking through the full implications of a project
- Some costs and benefits are quantifiable, some are not
- A big temptation for policymakers is always to focus on quantifiables and ignore the non-quantifiables
- This is especially dangerous when considering projects in the conservation estate, where a wide range of relevant considerations are non-quantifiable or can be quantified only in rather broad terms
- Ideally, the analyst would have available full quantitative valuations of things like existence value, option value, national brand value, willingness to pay for recreational and aesthetic values and so on
- In practice there is usually a large component of judgment required about qualitative issues and non-marketed values. Economists have to be keenly aware of the point at which their professional expertise runs out and judgment from mandated decision-makers is required

# Outline of the rest of the paper

- Set up the analytical framework for social cost benefit analysis
- Discuss straightforward quantifiables
- Review the less-accessible quantifiable stuff (spillovers, contingent liabilities)
- Look (very briefly) at the non-market issues
- Thanks to Forest & Bird for permission to use research results

# Quantifiables agenda

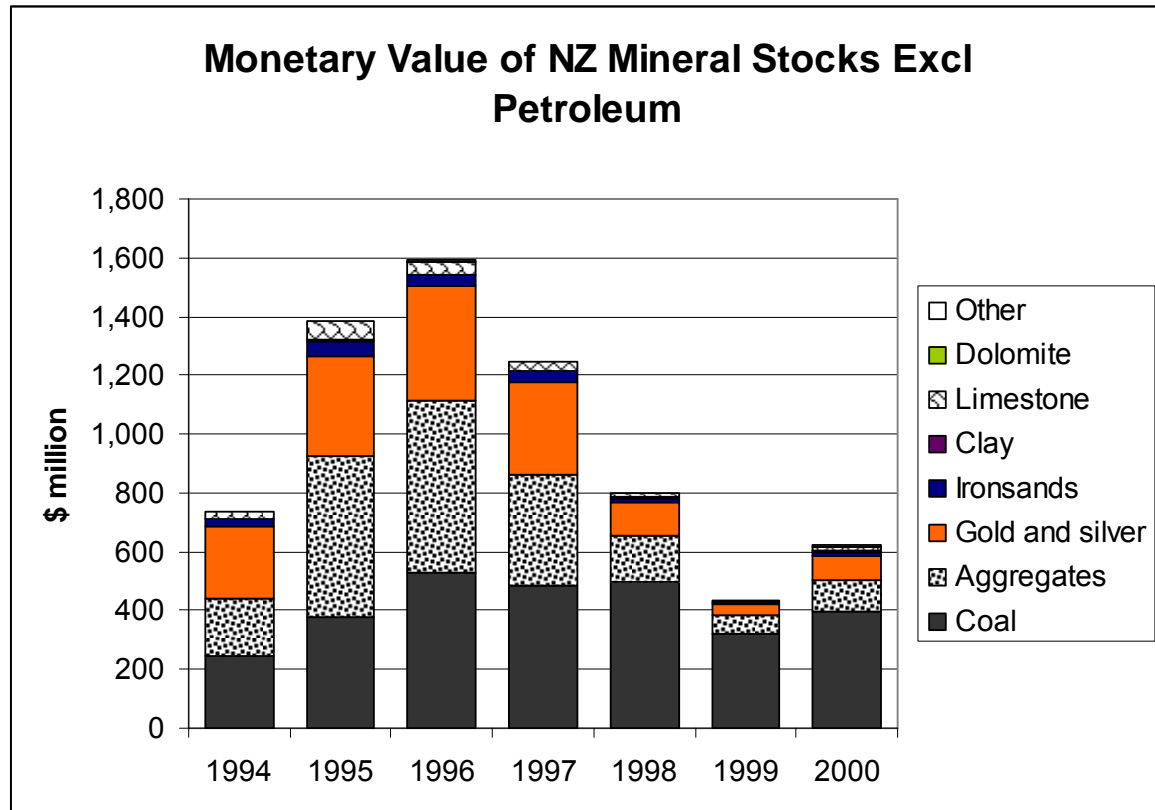
- A simple reality check: the sale value of the mineral estate
- More systematic analysis of the value added by mining, i.e. the sector's contribution to GDP
- Distribution of value added to various income recipients
- Value-added analysis at detailed sector level (coal, quarrying, ironsands, gold and silver)
- Balance of payments considerations: how much spending and income are retained in the New Zealand economy?
- How are contingent liabilities managed?
- Spillover effects onto other sectors (externalities)

# Valuing the mineral resource as an asset

- One straightforward cost-benefit approach is a threshold test: push quantification as far as possible and then consider the net benefit (if any) emerging from this as the price being offered for sacrifice of non-quantifiable/non-market values
- If the price seems reasonable in the eyes of whatever constituency determines the outcome, then the project proceeds; if not, not
- As an example of a rough-and ready threshold test for the Schedule 4 issue, consider the following.

- Suppose that in fact New Zealand contains non-petroleum minerals that could be sold for total revenue of \$200 billion (the Government's March 2010 figure)
- Ask: what could the nation expect to get from the highest bidder on an open market, if full rights to extract and sell the entire mineral stock were offered for sale on a once-for-all basis?
- The fair-value price would be the discounted present value of the rent income that the resource could yield, after covering all costs of getting the minerals to market (and, ideally, compensating for any negative impacts on local third parties)
- This is a central part of how the UN System of Environmental and Economic Accounts values natural capital
- Statistics New Zealand did such a calculation back in 2002-2003 and came up with the following estimates:

Year	Stock \$million
1994	739
1995	1,385
1996	1,589
1997	1,248
1998	797
1999	437
2000	621



Source: <http://www.stats.govt.nz/publications/nationalaccounts/minerals/interpretation-of-the-mineral-stock-account.aspx> and *Energy Monetary Stock Account 1987-2002* Table 5.1 p.16.

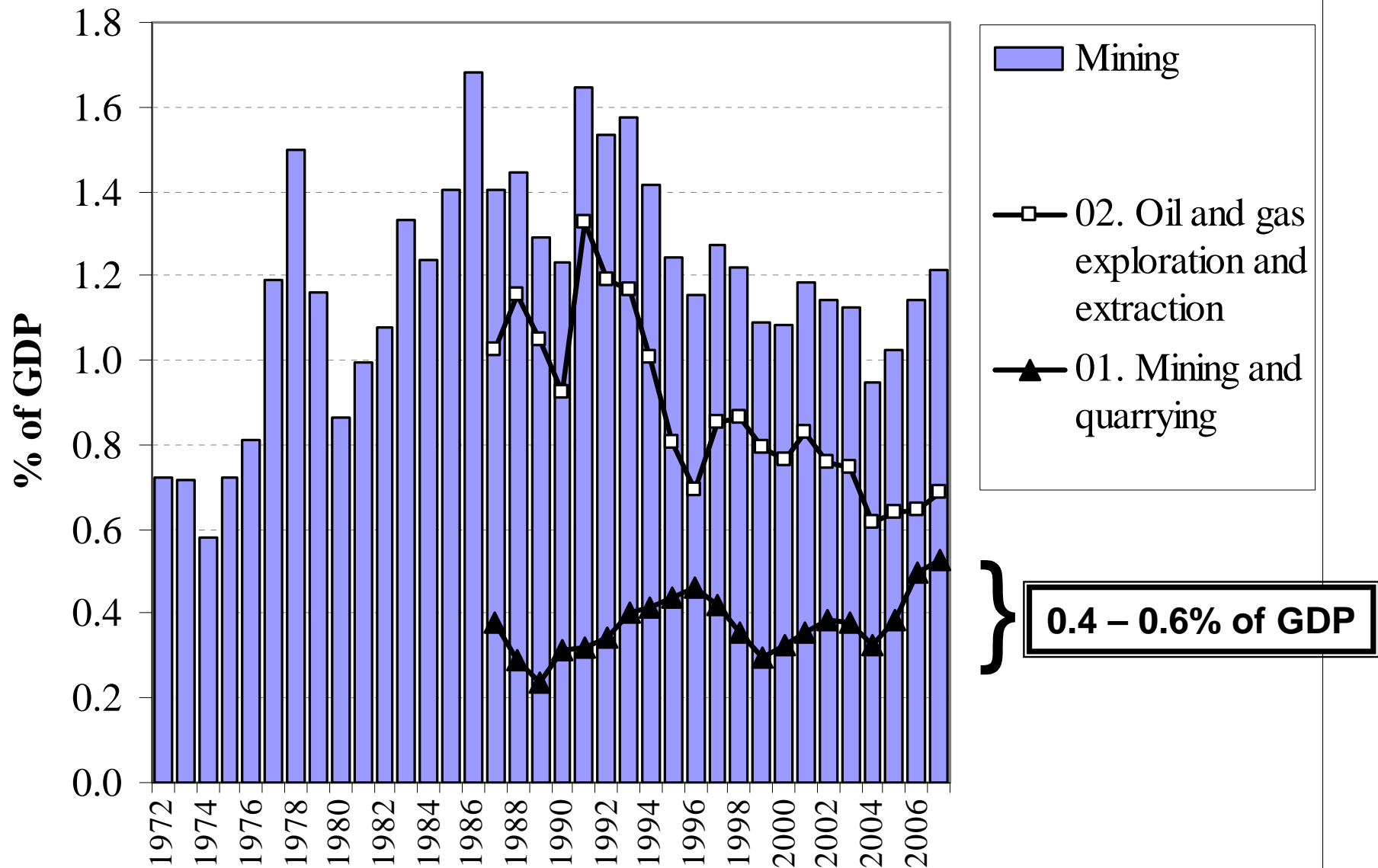
- The big year-to-year fluctuations were dominated by price swings (each year's estimate is for the same physical stock).
- In the high-price years 1995 and 1996 the mineral stock was valued at \$1.4-1.6 billion; in low price years, \$0.4-0.6 billion.

# \$1 billion is a reasonable order of magnitude estimate.

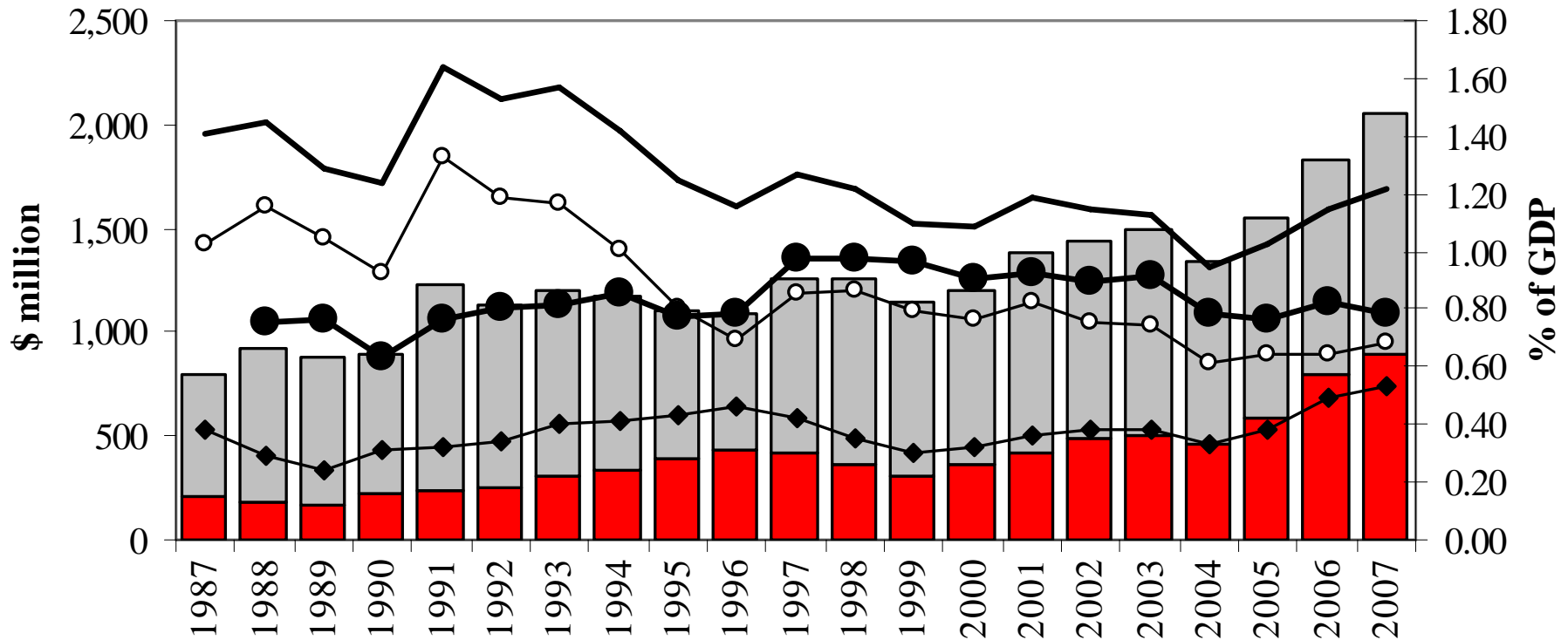
- (Maybe \$2 billion when world commodity prices are really high)
- $\approx 1\%$  of the \$200 billion gross sale value
- The Schedule 4 mineral reserves at stake in the 2010 debate (10% of the NZ total) would then sell for \$100 million, or \$36 per taxpayer
- The total Schedule 4 mineral reserves (40% of NZ total) would sell for \$400 million or \$143 per voter

**Next: contribution to GDP and  
distribution of income**

# Mining contribution to GDP, 1972-2007



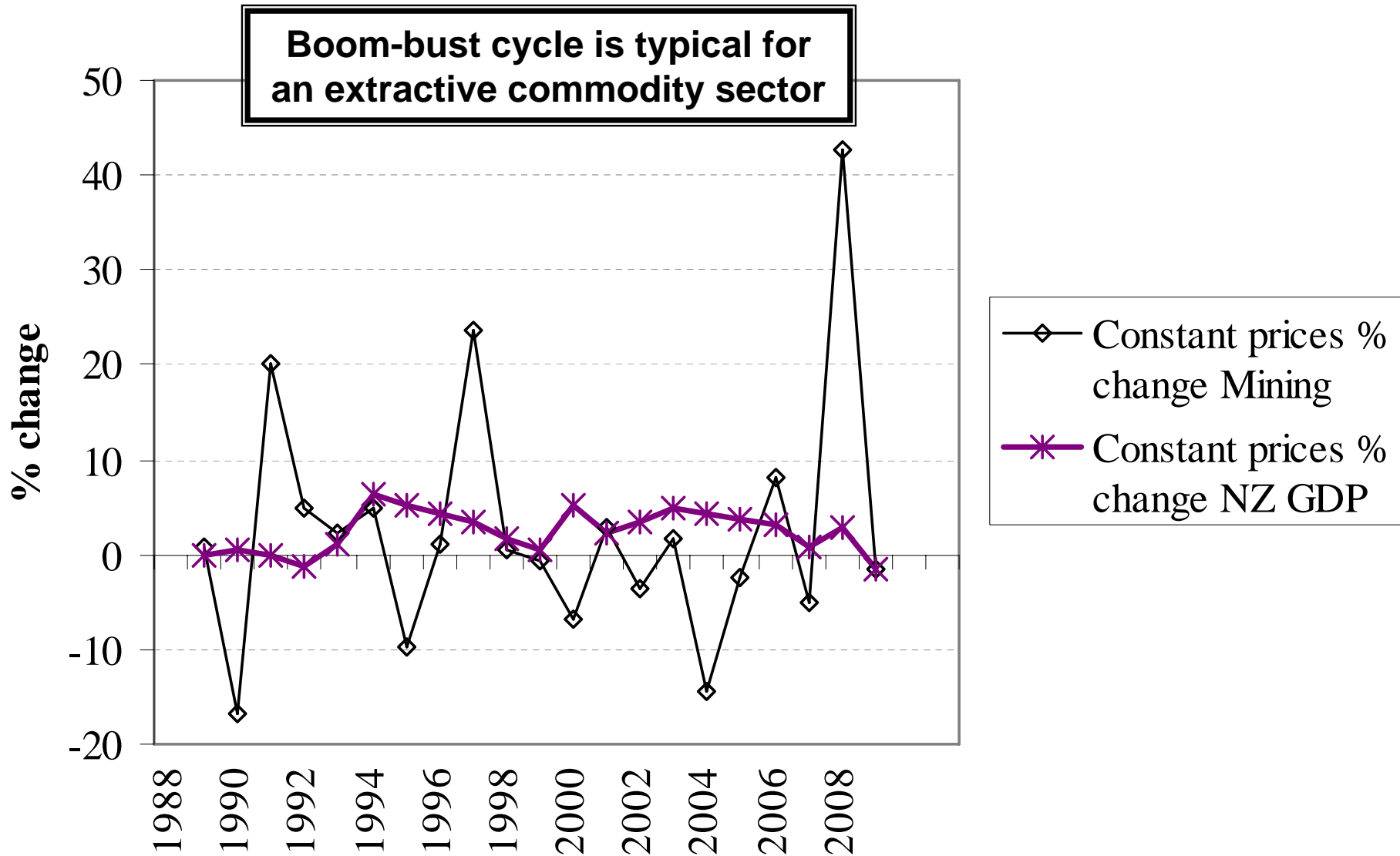
# Contributions to GDP, current and constant price data



- Oil and gas \$m LHS
- Mining and quarrying \$m LHS
- Total mining % of GDP RHS
- Oil and gas % of GDP RHS
- Mining and quarrying % of GDP RHS
- Total mining contribution to GDP constant prices \$m LHS

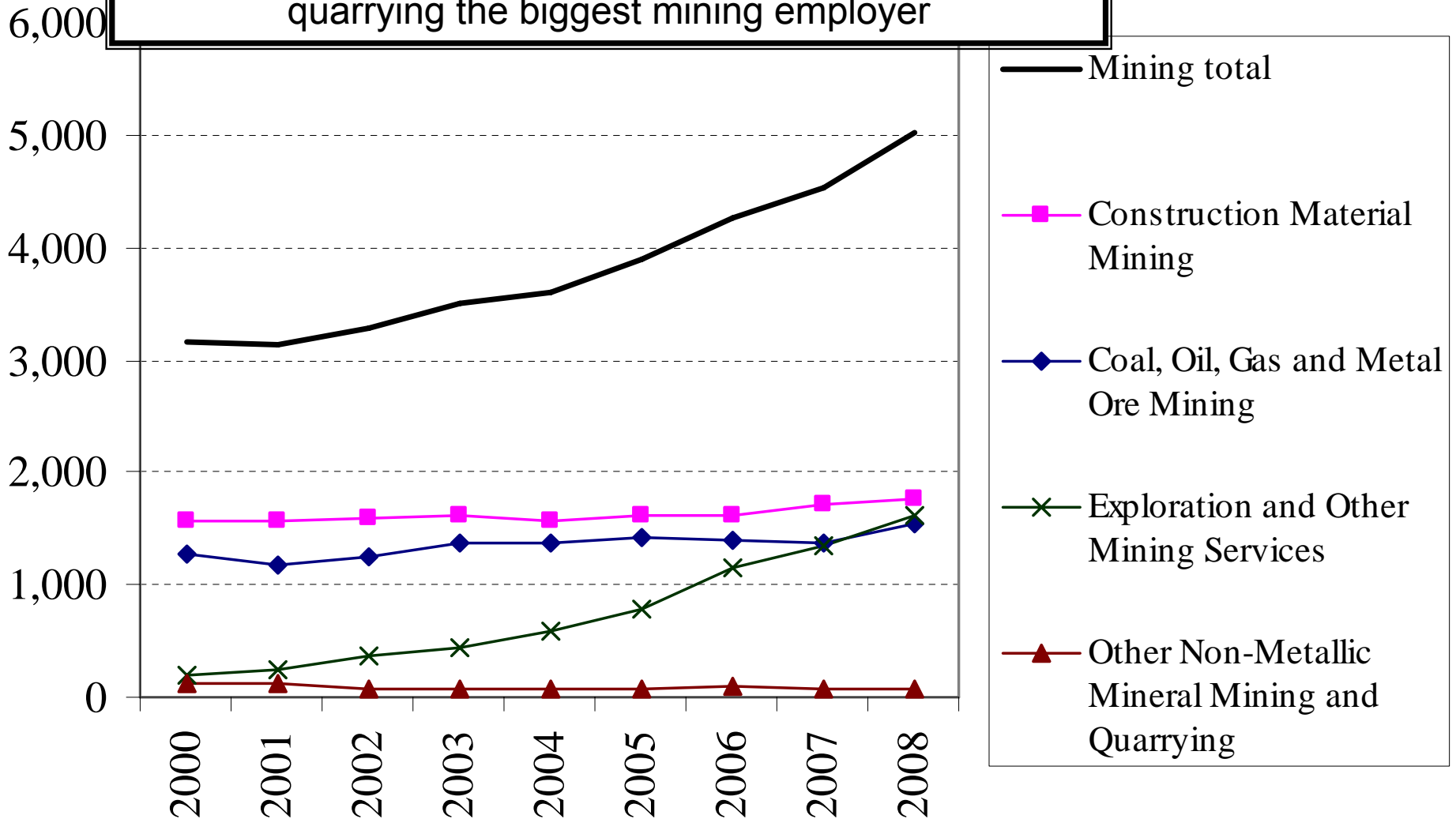
**Focus on these**

# Annual change in real gross value added



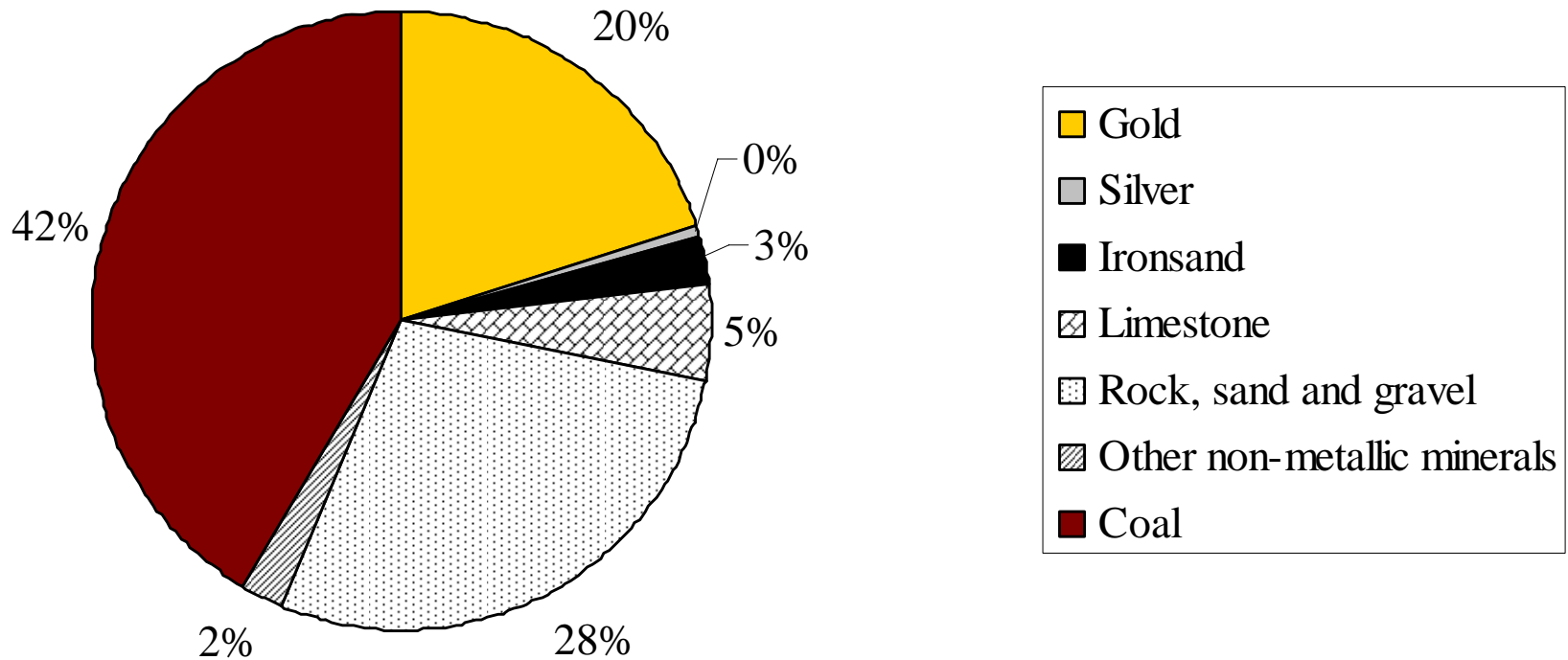
# Mining sector employment

Only 0.3% of total employment in the economy;  
quarrying the biggest mining employer

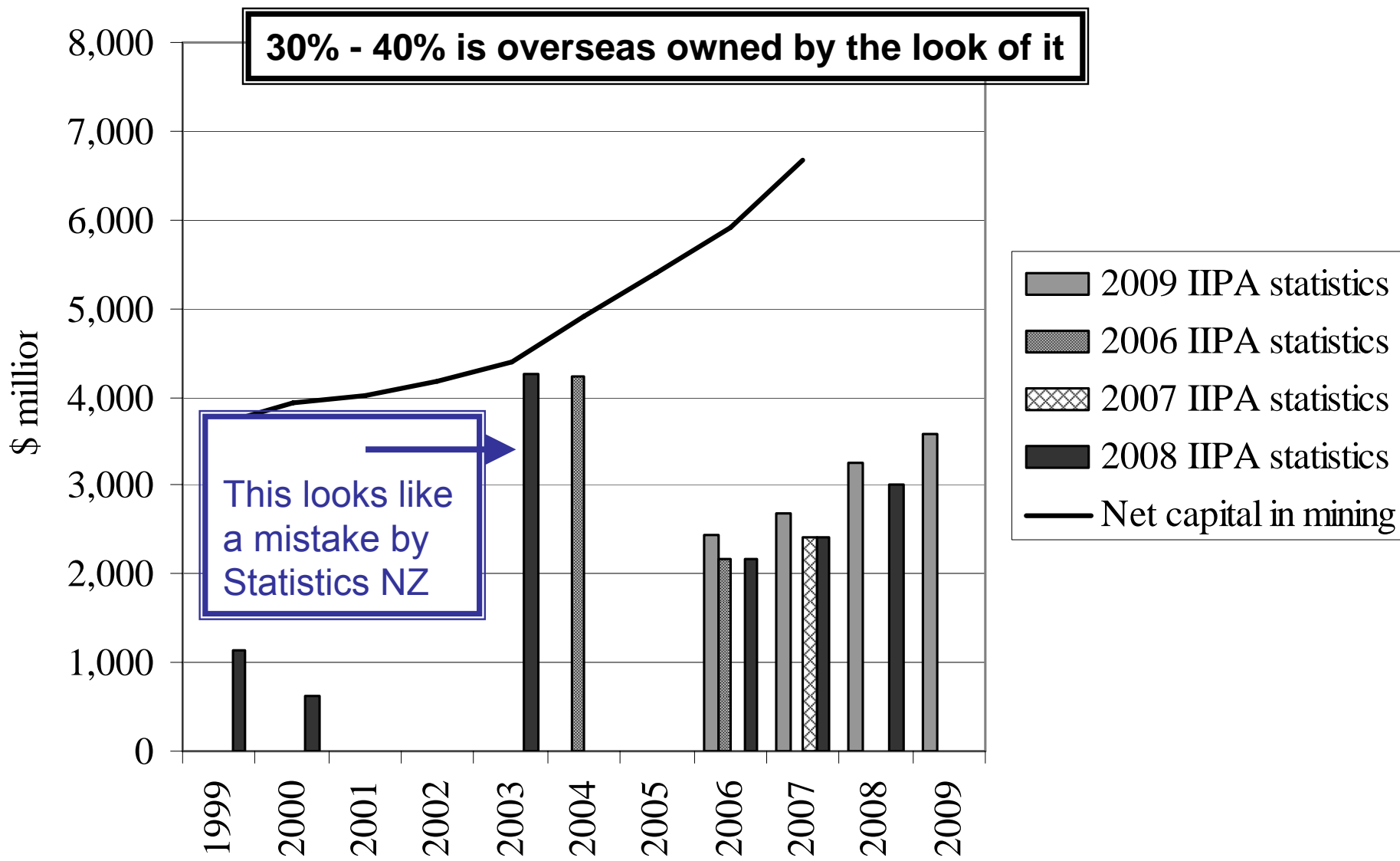


## Breakdown of mining output by gross sale value 2007

**Quarrying and coal are three-quarters of the total**



# Overseas investment in mining compared with mining net capital stock

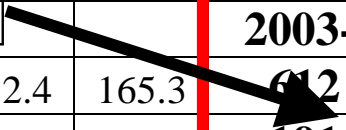


- Royalties for non-petroleum mining run at around 1% of gross output value
- Company tax payments tend to be a discretionary activity for big mining companies because of ability to tax-deduct expenses (especially depreciation and amortisation) and to carry tax losses forward

# Income Tax Provisions by Major Companies

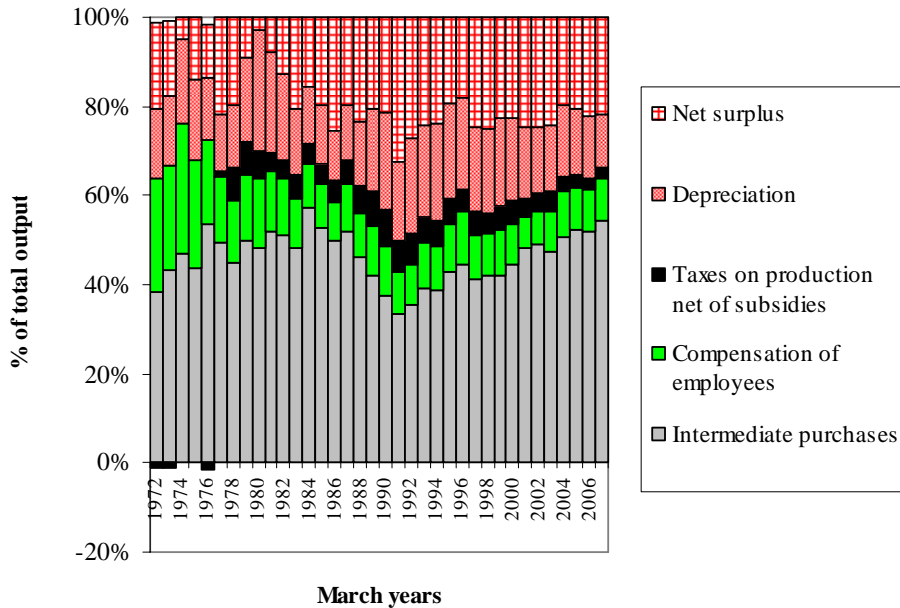
		2003	2004	2005	2006	2007	2008	2009	<b>Aggregated</b>	
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	Tax %
<b>Newmont Waihi Gold Ltd</b>									<b>2004-2009</b>	
	Pre-tax profit		8.5	-11.4	62.4	26.8	44.6	45.9	<b>176.8</b>	<b>22</b>
	Provision for income tax		3.6	-0.6	15.2	-7.3	13.3	15.1	<b>39.4</b>	
	After-tax profit		4.9	-12.0	47.2	34.1	31.2	30.9	<b>136.3</b>	
<b>Oceana Gold NZ Ltd</b>									<b>2003-2009</b>	
	Pre-tax profit	35.3*	24.4	22.9	-28.4	-232.6	9.0	181.1	<b>11.7</b>	<b>0</b>
	Provision for income tax	-13.0*	-8.5	7.6	-9.7	-67.9	-0.4	54.3	<b>-37.6</b>	
	After-tax profit	22.3*	15.9	15.4	-18.7	-184.9	9.4	126.8	<b>-13.9</b>	
<b>NZ Steel Mining Ltd</b>									<b>2004-2007</b>	
	Pre-tax profit		-0.6	3.1	9.8	5.5	na	na	<b>18</b>	<b>0</b>
	Provision for income tax		0.0	0.0	0.0	0.0	na	na	<b>0</b>	
	After-tax profit		-0.6	3.1	9.8	5.5	na	na	<b>18</b>	
<b>Solid Energy</b>									<b>2003-2009</b>	
	Pre-tax profit	60.7	52.5	8.9	125.8	146.4	52.4	165.3	<b>612</b>	<b>31</b>
	Provision for income tax	4.7	18.9	2.5	40.0	52.3	18.0	54.5	<b>191</b>	
	After-tax profit	56.1	33.7	6.4	85.8	94.1	34.4	110.8	<b>421</b>	

**Yes, that's the SOE**

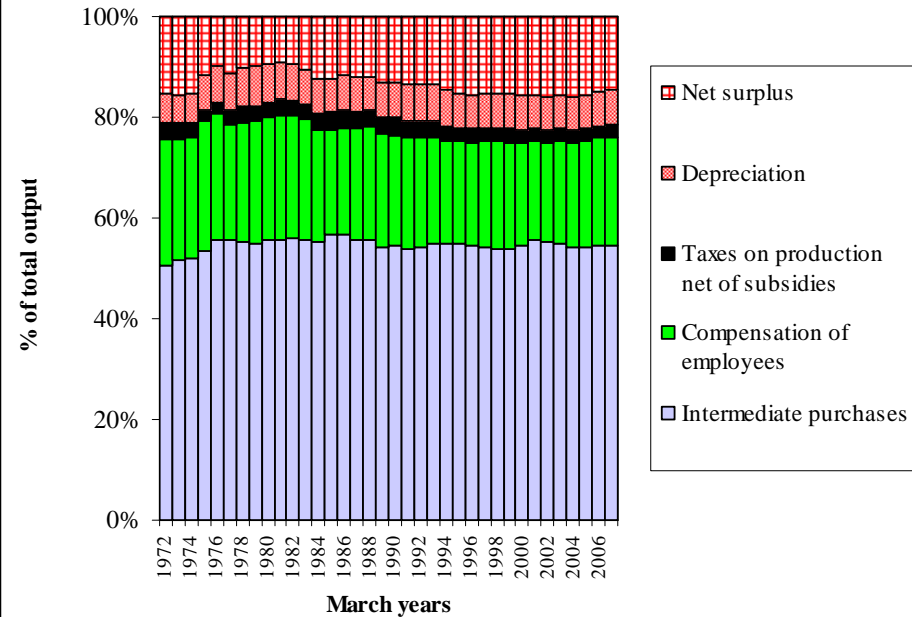


# Distribution of Gross Output: Mining Sector (Including Petroleum) Compared with New Zealand Economy

**Breakdown of Gross Revenues of the Mining Sector**

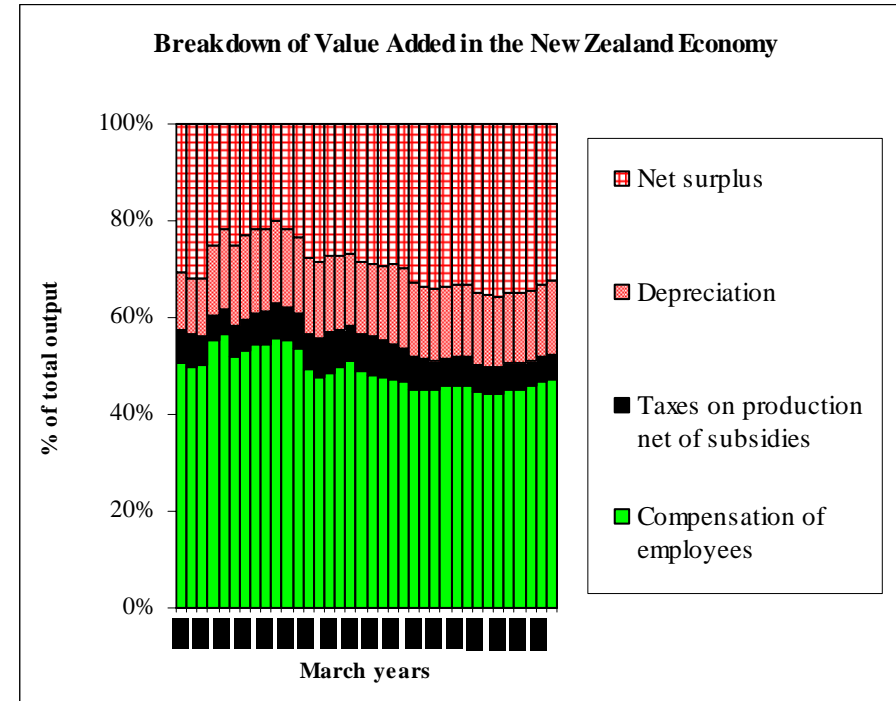
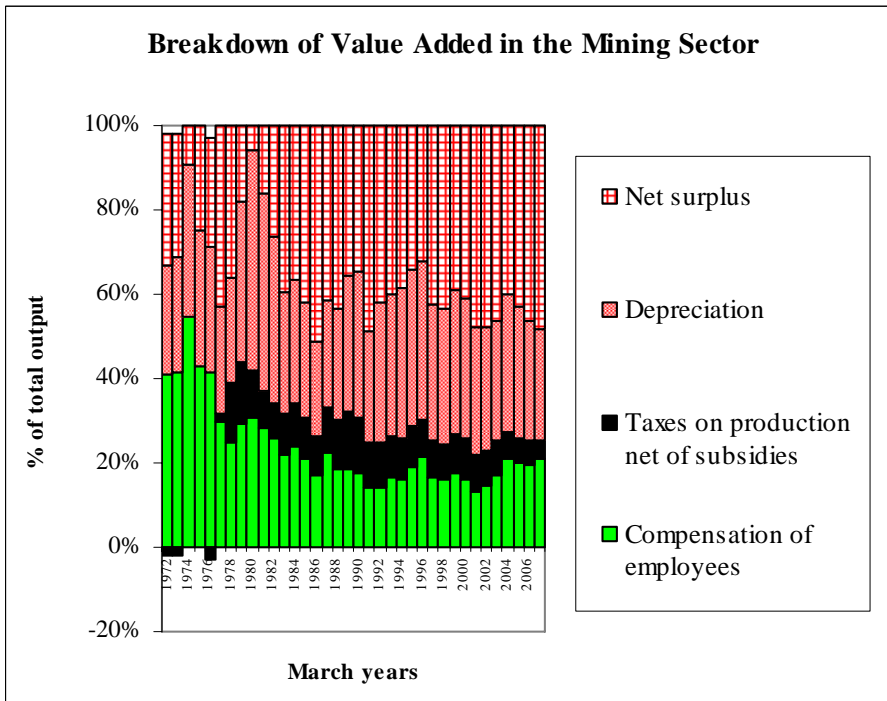


**Breakdown of Gross Output of the New Zealand Economy**



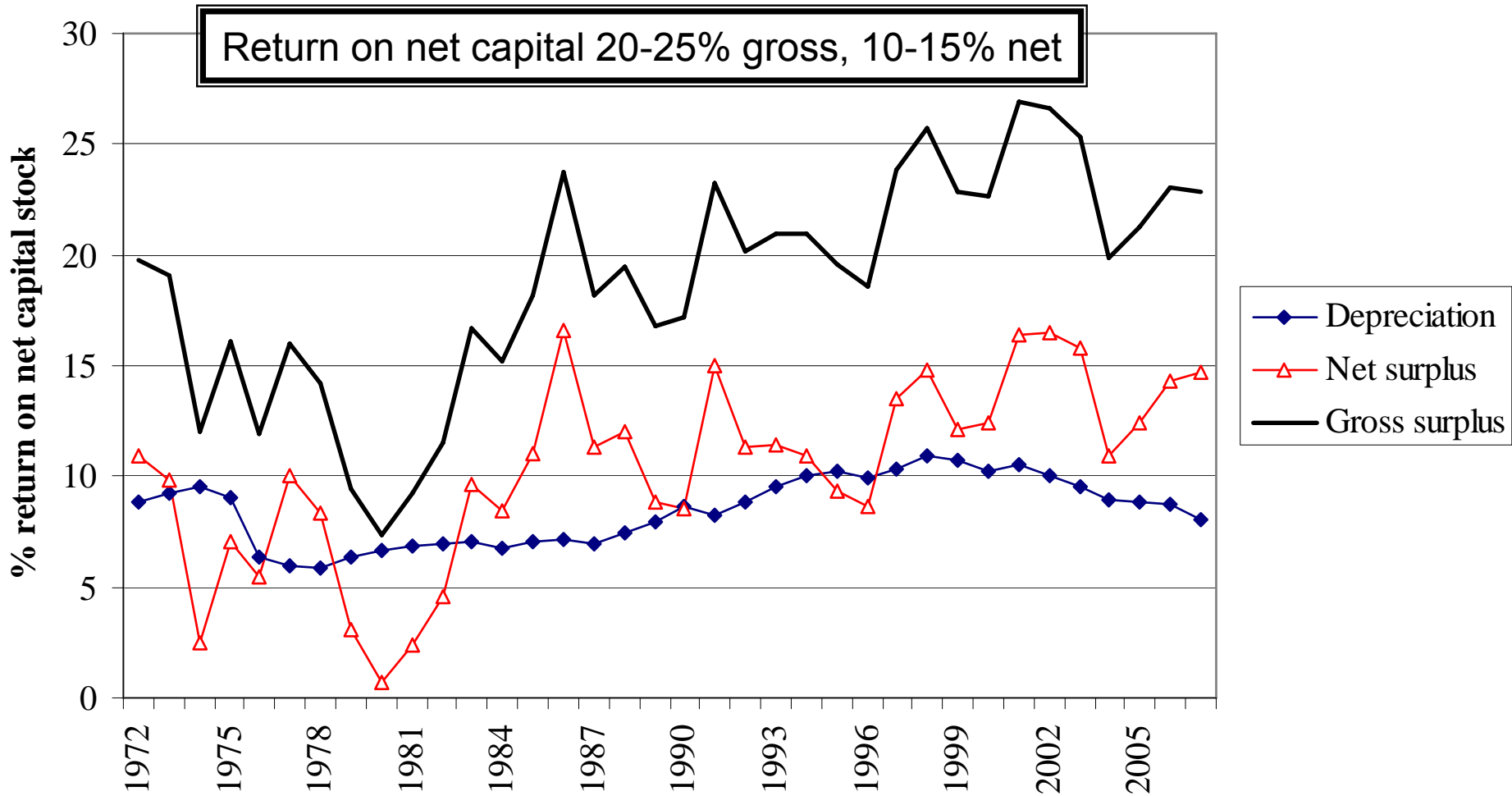
**Mining (including petroleum) has a higher share of value added than the average because of its high gross profit share (it has a dramatically lower wage share)**

# Distribution of Value Added: Mining Sector (Including Petroleum) Compared with New Zealand Economy



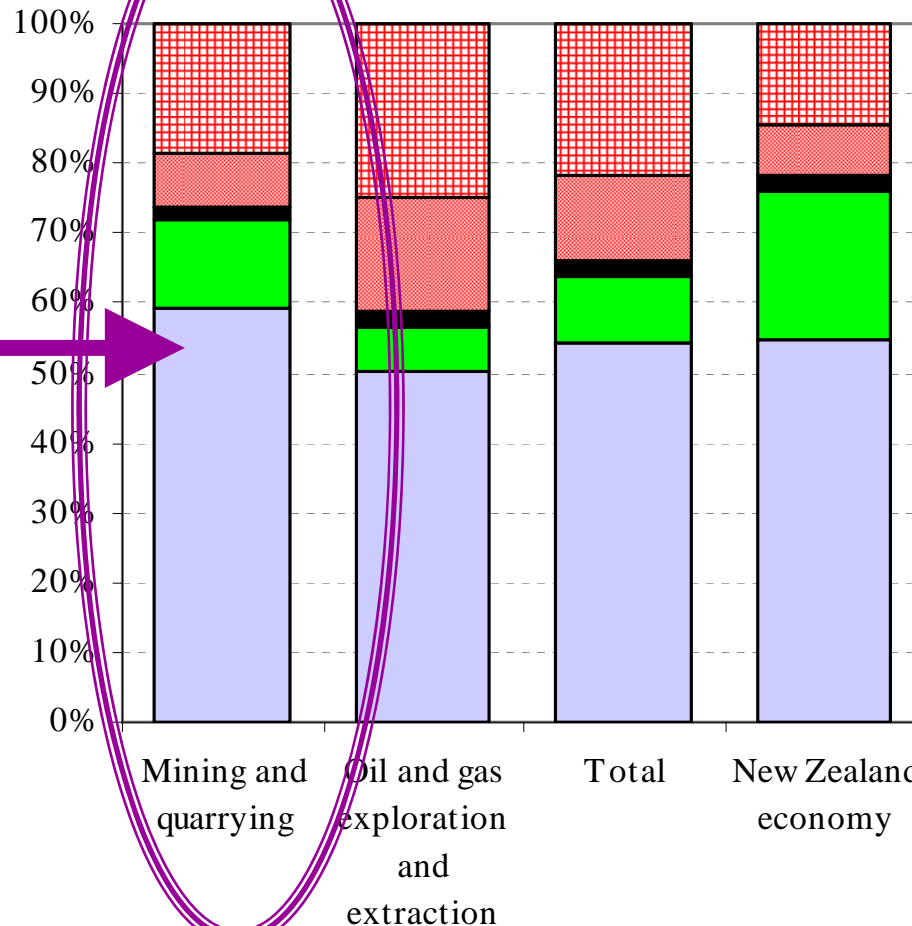
**An extremely capital-intensive sector: so development impacts will tend to come via profit, not employment => it makes a big difference who owns the capital and collects the gross profits**

# Depreciation, Net Surplus and Gross Surplus Relative to Net Capital Stock



# Distribution of Gross Output: Oil and Gas compared with Other Mining, 2007

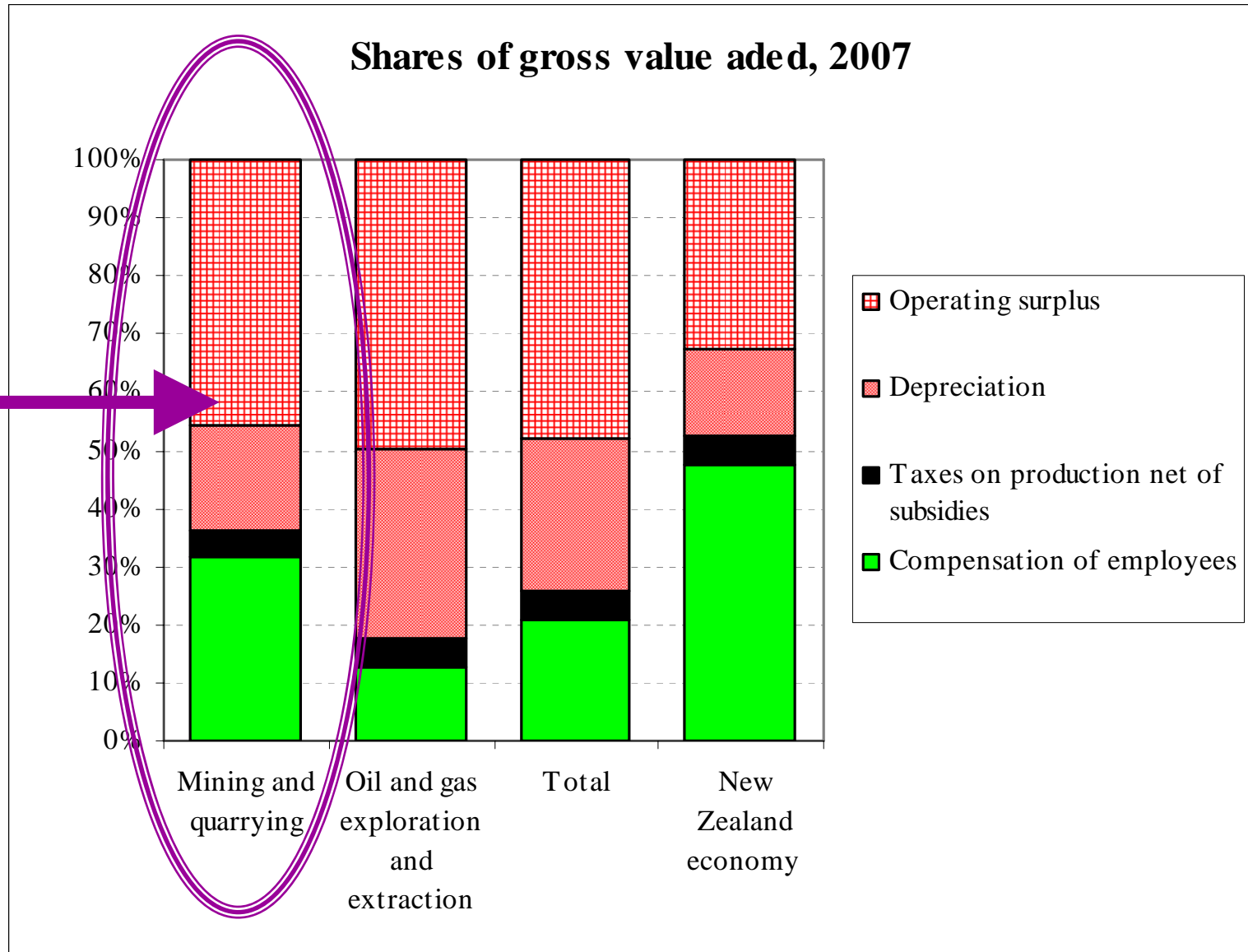
Shares of total output, 2007



- Operating surplus
- Depreciation
- Taxes on production net of subsidies
- Compensation of employees
- Intermediate consumption

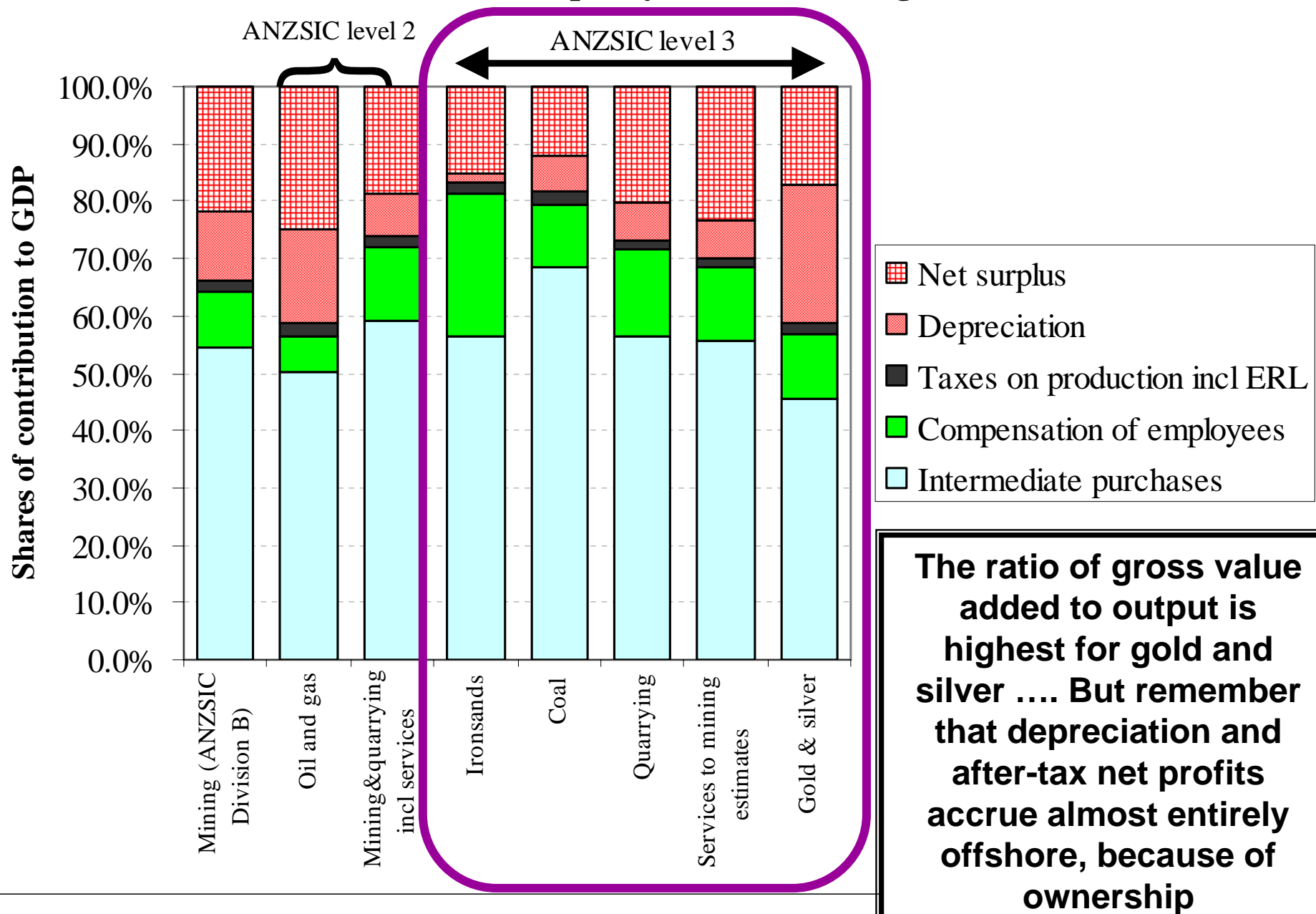
We shall focus on this somewhat less capital-intensive (at least compared with petroleum) group of detailed sectors

# Distribution of Gross Value Added: Oil and Gas compared with Other Mining, 1996 and 2007

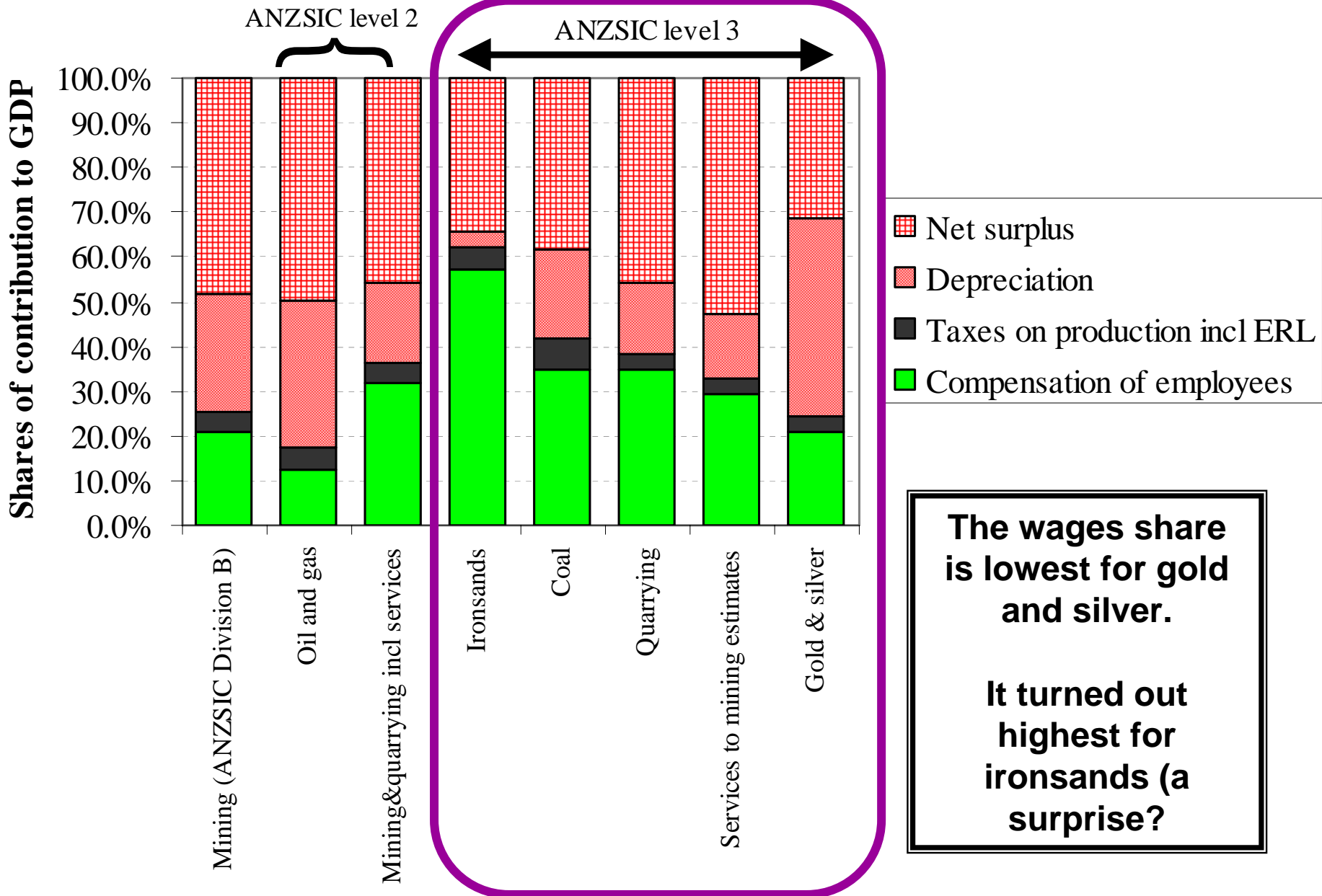


- Here the Statistics New Zealand national accounts run out of detail (“confidentiality”)
- So we just have to push on with whatever information can be assembled....
- ....(the reconstructed sector accounts shown next do reconcile with the national accounts totals though)

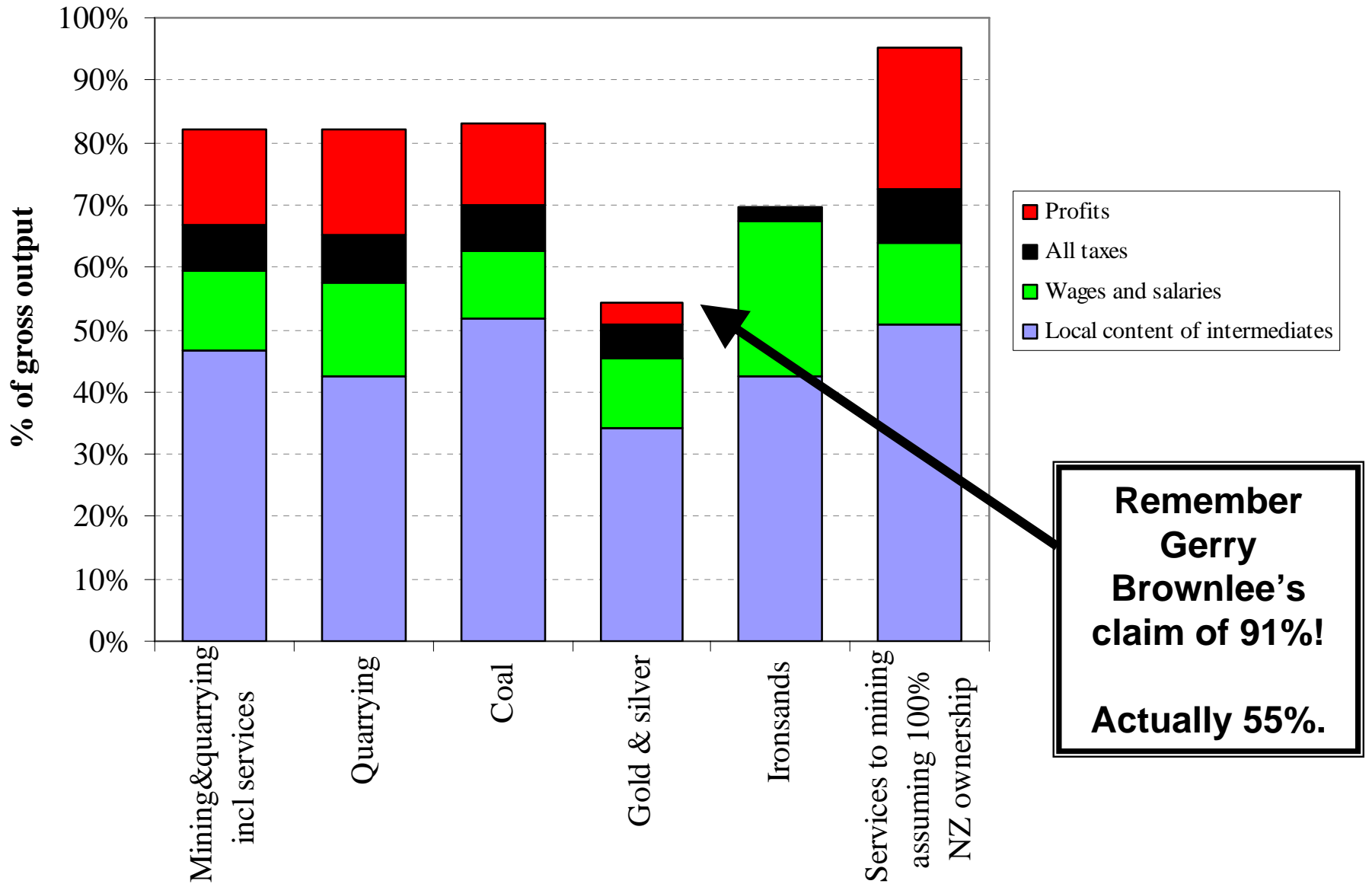
## Distribution of Gross Output by Detailed Mining Sector, 2007



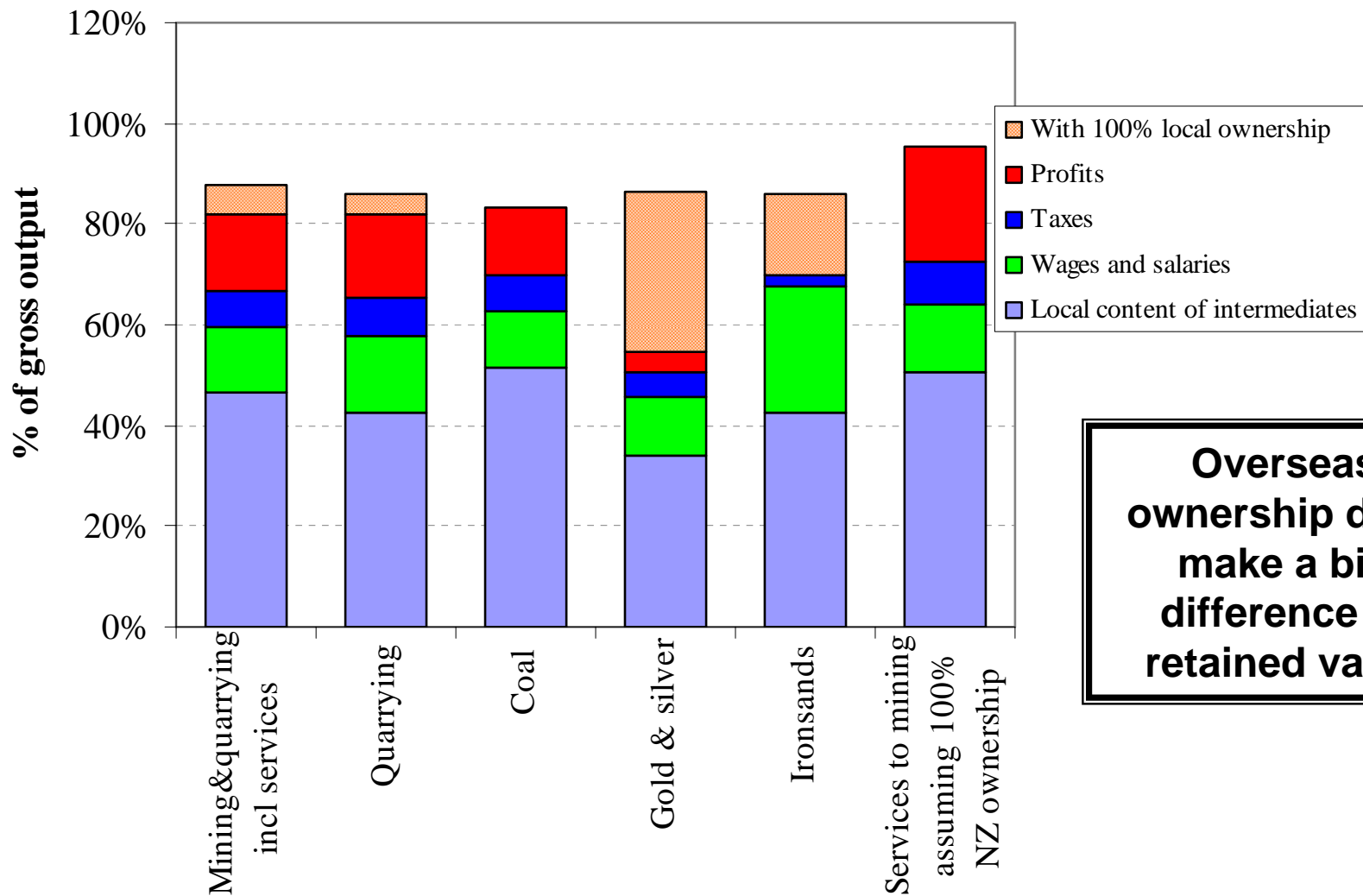
# Distribution of Gross Value Added by Detailed Mining Sector, 2007



# Local-economy spending out of gross sales

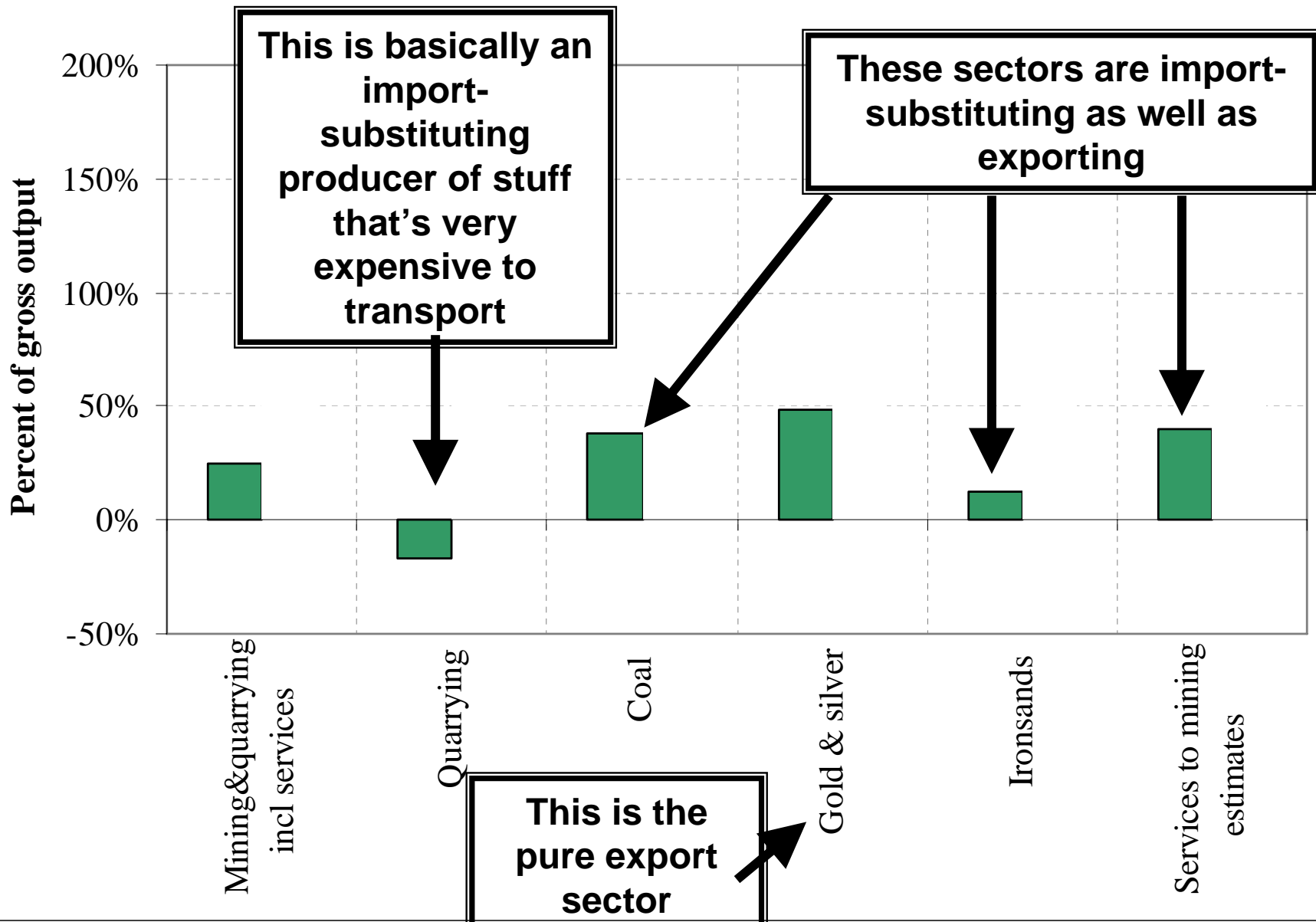


# Local-economy spending if all sectors 100% local-owned



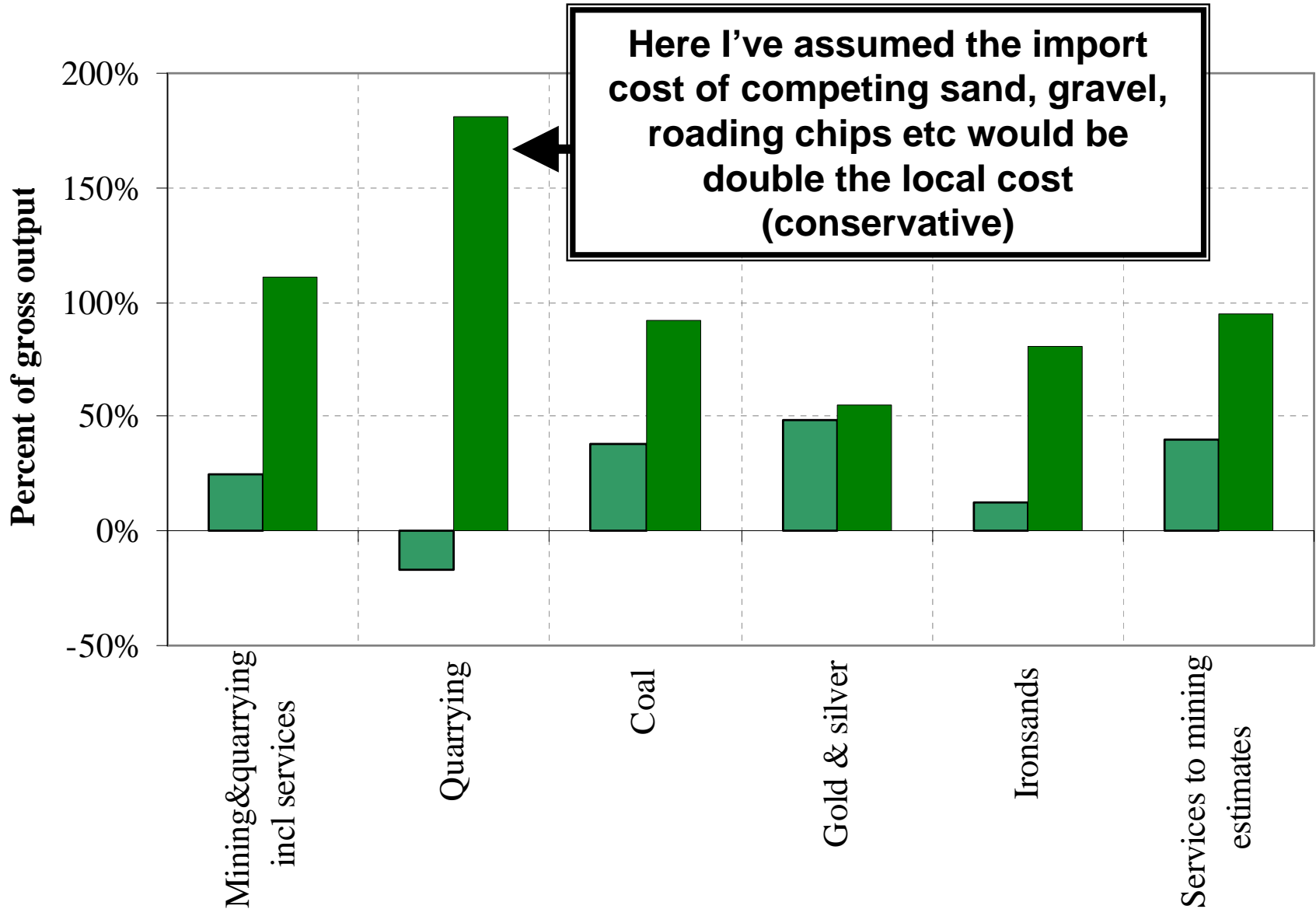
**Overseas ownership does make a big difference to retained value**

# Direct foreign exchange contribution as % of gross output



So (as a rough-and-ready adjustment), let's credit imports saved as well as export earnings:

# Direct and indirect foreign exchange contribution as % of gross output



# Contingent liabilities

- **Issues around site rehabilitation after mining ceases, and tailings containment and management during and after the mine life**
- **Of four major mines in the Hauraki-Coromandel area since the 1960s, two (Tui and Golden Cross) have had tailings containment failures and one (Martha Hill) had subsidence damaging properties in the township**
- **Tui cleanup costs for the taxpayer will be over \$20 million. Golden Cross tailings dam remediation cost the owners \$30-60 million**
- **This emphasises the need for adequate bonds to be posted, and for clear regulatory guidelines**
- **Non-compliance with consent conditions, especially in relation to waterways pollution, is still a recurrent feature of the industry; suggests need for either better-resources and more stringent regulation, or a mindset change in the industry itself (that doesn't mean just rhetorical commitments)**

# Existence values

- Here the going gets progressively tougher – Viktoria Kahui's paper coming up
- But existence values are no less real than commercial values
- Not helpful to dismiss them as “emotion” – human welfare is ultimately experienced as happiness by individuals
- Non-consumptive uses of the New Zealand landscape do not generally have to be paid for (except travel costs etc), so value is understated by market measures
- There are negative spillovers to recreation and tourism when mining encroaches onto highly-valued landscapes

# Spillovers onto tourism

- Estimates in early 2000s were that damage to the tourism brand as a result of environmental degradation, or policies perceived as anti-environment, could reduce overseas tourism by a large amount (over half in PA Consultants' 2001 study\*, less in BERL's 2003 study\*\*)
- Because of tourism's large weight in GDP the negative GDP impact of a loss of brand image could easily be 1-2%
- This would be a big spillover effect which suggests a need for policy on mining development to be framed and presented in "clean-green" brand-friendly terms

\* PA Consulting Group, *Valuing New Zealand's Clean Green Image*, report to Ministry for the Environment, August 2001, <http://www.mfe.govt.nz/publications/sus-dev/clean-green-image-value-aug01/index.html>

\*\* Kel Sanderson, Carolyn Saunders, Ganesh Nana, Adolf Stroombergen, Hugh Campbell, John Fairweather and Andy Heinemann, *Report to Ministry for the Environment and Treasury on Economic Risks and Opportunities from the Release of Genetically Modified Organisms in New Zealand*, April 2003, <http://www.mfe.govt.nz/publications/organisms/economic-impact-apr03/> .

# Final reflections

- The lessons from Think Big (1977-1984) were partially incorporated into the RMA, but that is now under industry attack
- The Conservation Act 1987 provides reasonable protection for the conservation estate
- But mining was exempted from its provisions by the Crown Minerals Act 1991 and placed under a less stringent consenting regime
- There's a good case for applying the same Conservation Act provisions as for other non-tourism activities

# Economists have not been much help so far in this year's public debate

- The most substantial piece of research is NZIER's piece for Straterra
- It basically uses the apparent authority of a CGE model to give persuasive impetus to an empty GIGO story
- NZIER's study purports to analyse "social and economic benefits and costs" of mining expansion but actually assumes no environmental costs, no spillovers onto the tourism brand, no losses of existence values
- The modelled "shock" is a rise in mining-industry productivity triggered by a notional planner's demand for more output in the absence of any economic signal or incentive or any change in policy or regulations
- Rather like saying it's nice to win Lotto – true but not informative
- The unexplained productivity windfall (in the shape of a goldmine and an oilfield) is described as "unlocking" wealth and there's a piece of heavy special pleading against unspecified 'policies' that allegedly hold back mining development

# The NZIER shock

“To model these export shocks, we fix the export price and require the necessary increases in export quantities in the model. We allow the productivity of the industry to be determined endogenously, increasing by the amount necessary to achieve these increases in production. The productivity gain is a proxy for the wealth generated by use of the mineral resources from these developments. Intuitively, the productivity gain approximates the growth in resources available to the industry and causes production and export volumes to rise.”\*

\* *Diamond in the Rough: The current and potential economic contribution of New Zealand’s mineral resources sector*, NZIER May 2010, [www.pepanz.org/publications.cfm](http://www.pepanz.org/publications.cfm) , p. 23, emphasis added.

NZIER does incorporate some resource-curse (Dutch-disease) effects though

- “Competing export industries are negatively impacted by the increase in demand for the New Zealand dollar caused by increased oil and gold exports. The exchange rate appreciation results in them becoming less internationally competitive”
- The economy-wide wage rises 2% in real terms (!!!!)(feels like a Tui ad coming on...)
- There is no discussion of the distribution of the increase in GDP between gross profits accruing overseas and changes in the disposable income of New Zealand residents
  - seems possible that foreign investors might get the gains and existing New Zealand firms be left worse off
- Still, it's start at least....

**End**