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The size and structure of metals markets: how gold compares with other non-ferrous metals

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Gold is a large global business which is quite different to any of the other non-ferrous metals, due to its role as a monetary asset and the very large level of above-ground stocks relative to annual fabrication demand or mine production. The value of world mine production last year was over US$30 billion, but turnover on the main physical and futures markets was a multiple of over 70 times this, making gold more liquid than any commodity market other than crude oil.

However in this report we ignore gold's mystique as a financial asset and look at the underlying shape of the industry in comparison with other metals – base and precious. After presenting some basic comparative statistics on production, stocks and turnover we move on to a key issue for the industry: does consolidation of ownership improve performance? As a result of a multi-year boom in mergers and acquisitions activity, gold companies have been growing faster than other metals producers, although the largest gold producers are still much smaller than the global diversified giants. We look at the long-term financial performance of the gold sector in relation to other metals industries using CRU's Minerals Industry Competitor Analysis (MICA) database, to see if there are any relevant lessons from elsewhere in the metals and mining industry.

Size comparisons

Table 1 and Figure 1 compare the value of gold mine production last year with that of pgms, silver and the six refined metals traded on the London Metal Exchange (LME), the most important

Table 1: Size of global metals industries, 2004

	Production 000 tonnes	Value US$ million	Price $/tonne
Aluminium	29,836	51,214	1,717
Copper	15,913	45,644	2,868
Lead	6,833	6,070	888
Nickel	1,257	17,411	13,852
Tin	318	2,703	8,513
Zinc	10,132	10,617	1,048
	tonnes		**$/oz**
Gold	2,435	32,098	410
Palladium	207	1,529	230
Platinum	208	5,655	846
Silver	19,139	4,104	6.67

Data: CRU

[1] This report was prepared by CRU Analysis on behalf of the World Gold Council. Please read the disclaimer on the final page.

Figure 1: Value of world production of base and precious metals in 2004: aluminium and copper ahead of gold

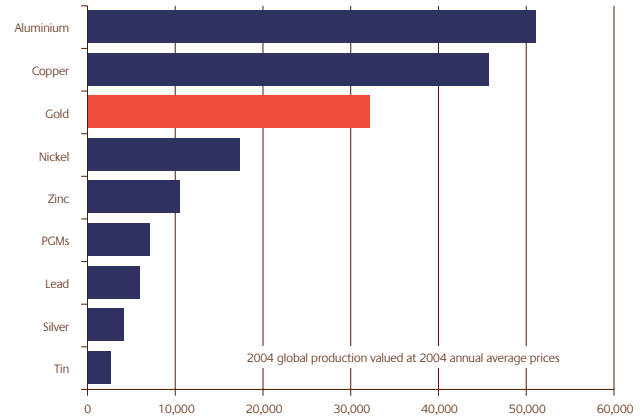

Table 2:. Sector comparisons (2004 FY data, US$ billion)

	Turnover	EV	EBITDA	EV/EBITDA	ROCE (%)
Aluminium	50.2	62.6	6.2	10.0	6.7
Copper	24.1	28.2	8.5	3.3	35.0
Lead/Zinc	3.9	4.5	0.6	7.3	7.0
Nickel	11.1	17.7	4.0	4.4	21.5
Gold	16.1	76.0	4.7	16.2	4.7
Platinum	6.2	17.6	2.0	8.7	24.8
Diversified	138.0	233.9	35.2	6.7	19.9

Aggregate results for companies included in CRU's MICA database

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global futures exchange for base metals. Gold production of 2,435 tonnes (78.3 Moz) would have been worth US$32 billion at last year's annual average spot price, ignoring the impact of hedging activity on realised prices. This makes it the third largest non-ferrous metals industry, after aluminium and copper. The comparison – as are others that follow – is significantly influenced by the fact that there has been a major revival in the prices of all LME metals in the last three years. Since the low point in the market cycle copper prices have more than doubled. Aluminium has been the slowest of the LME metals to recover, but had still risen by 50% in value from late 2001 to the first quarter of 2005.

Gold and the two largest LME metals are much bigger businesses than any of the other non-ferrous metals. This point is also clear from the aggregated financial data from the 100 plus active companies in our MICA database. In Table 2 gold is identified as the biggest single metal sector in terms of enterprise value (market capitalisation plus net debt) and the third largest in terms of turnover. However the diversified miners were far larger than any single-metal sector.

The marked variations in the different measures of industry size between gold, copper and aluminium are explained by three main factors: first, the world's largest copper producer, Codelco, is state-owned and therefore has no market capitalisation; secondly, a relatively large proportion of world copper production is controlled by diversified companies such as BHP Billiton and Rio Tinto and turnover from this business appears in the large "Diversified" section in the bottom row; and thirdly, the relatively large enterprise value of the gold companies is explained by big valuation multiples (EV/EBITDA) at the end of last. Cashflow from gold mining companies is worth more to shareholders than earnings generated from the production of any other metal. At the end of last year the average enterprise value of gold companies was more than sixteen times cashflow (which compares with a historical range of roughly 7-17), whereas the next highest multiple – for aluminium – was only 10.

The importance of big companies that produce everything everywhere is illustrated by the ranking by enterprise value of the top 10 major metals and mining groups in Figure 2. Two gold companies do appear (in 7th and 10th place), but they look quite small in relation to the biggest diversified and aluminium companies. We consider concentration of ownership metal by metal later in the report, but there is also an inexorable movement towards consolidation for the mining sector as a whole, with the big three London-listed companies now accounting for over a third of the enterprise value of the whole industry.

There is quite a dash for growth going on in all the metals industries. In the last five years most of the larger companies covered in our database have either grown rapidly or been swallowed up by a rival. All of the major companies still in existence at the end of last year had more than doubled in size, measured in terms of net assets, in the last decade. Gold companies have been very much at the forefront of this trend, expanding mainly by acquisitions rather than via organic growth. Rapid growth in size does not necessarily result in superior returns to shareholders, but failure to bulk up usually means death by acquisition (which may, of course be very good for shareholders in the acquired company!).

Figure 2: The top ten metals and mining companies: big three account for over a third of total industry enterprise value

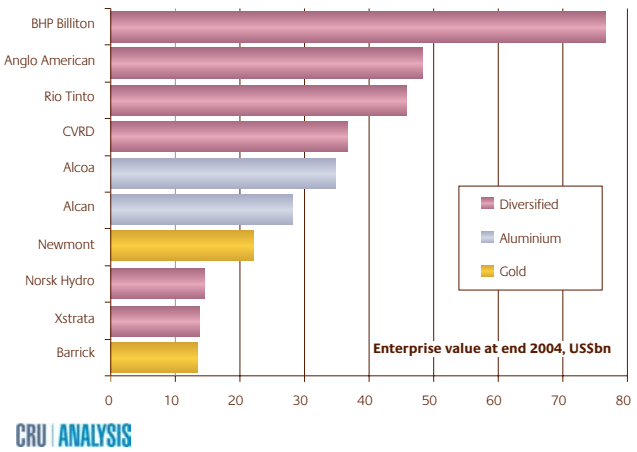
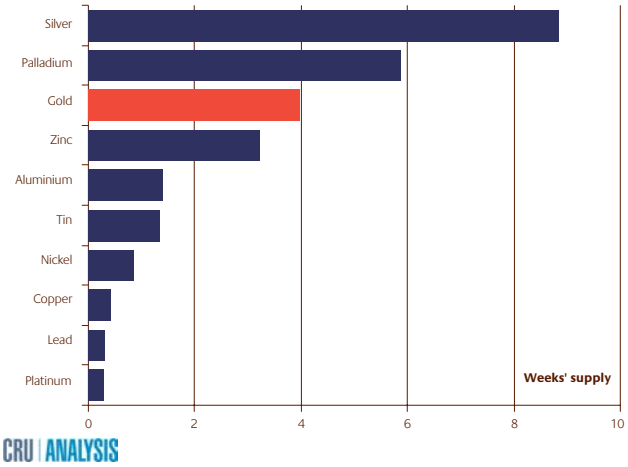


Figure 3: Futures exchange stocks measured in weeks' supply: position at end-2004



Stocks and turnover

Table 3 compares reported stocks figures for the different metals at the end of last year, identifying both exchange inventories and other stocks held by producers, consumers and a variety of official institutions. In the case of gold, central bank holdings vastly exceed exchange stocks. Other official holdings of precious metals taken into account in the table are Russian and US DLA stocks of pgms and US Treasury stocks of silver. In contrast to precious metals, reported non-exchange stocks of base metals are nearly all holdings by commercial companies. However information on stocks held by producers, consumers and traders is far from comprehensive. In particular there is virtually no published data on China, and information on consumer inventories around the world is very patchy.

Bearing in mind these qualifications, some interesting comparisons can still be made between gold and base metals stock holding patterns. At the end of last year, reported base metals stocks in most cases equated to some 4-5 weeks' supply, whereas gold stocks were equivalent to more than 13 years' mine production. This structural feature of the gold market resembles more closely that of a currency market than a commodity market, a reminder of gold's dual role. The availability of a large stock of gold that can be mobilised relatively quickly also underlies the low volatility of the gold price, which is also more currency-like than commodity-like. It should be noted that base metals stocks at the end of last year were quite low compared to typical historical levels, following several years of strong growth in consumption (especially from China) and various supply constraints.

Table 3: Reported stocks of metals at end 2004
(LME metals in '000 tonnes, precious metals in Moz)

	Exchanges						Comparisons:		
	LME	Comex/ NYMEX	TOCOM	Shanghai	Total	Non-exchange	Total	Exchange/ Total	Total* / Production
Aluminium	692.8	49.4	5.5	60.4	808.1	1,966.9	2,775.0	29%	4.8
Copper	48.9	44.0	–	31.7	124.6	319.4	444.0	28%	1.5
Lead	40.5	–	–	–	40.5	281.4	321.9	13%	2.4
Nickel	20.9	–	–	–	20.9	102.9	123.8	17%	5.1
Tin	8.2	–	–	–	8.2	20.0	28.2	29%	4.6
Zinc	628.6	–	–	–	628.6	390.3	1,018.9	62%	5.2
Gold	–	5.795	0.183	–	5.98	1,035.0	1,041.0	1%	691.4
Palladium	–	0.026	0.724	–	0.7495	5.9	6.6	11%	52.0
Platinum	–	0.019	0.019	–	0.0378	0.7	0.8	5%	6.0
Silver	–	103.589	1.206	–	104.795	7.1	111.9	94%	9.5

Data: CRU

**Total stocks/production expressed as weeks' supply*

Figure 4: LME is "last resort" outlet and source of physical metal, with pronounced cycles in stock levels

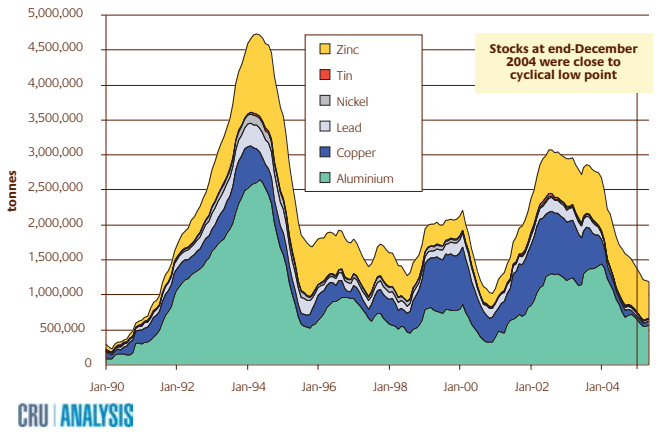
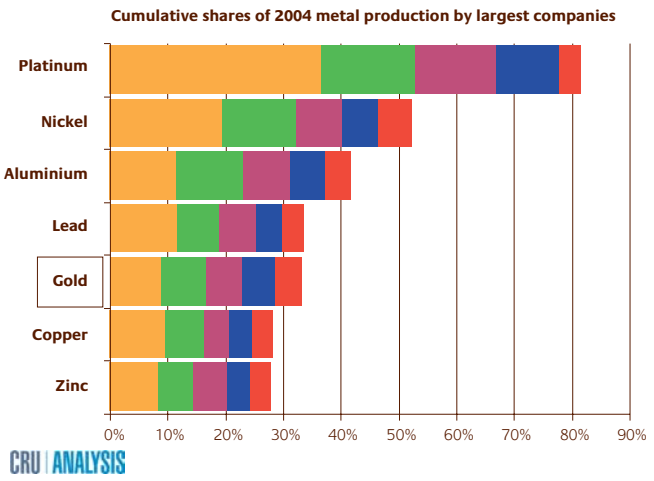


Figure 5: Top 5 ownership shares compared



Even if we exclude official holdings and look only at exchange stocks, precious metals inventories relative to physical market size are higher than base metals. This is again partly down to the timing of the comparison, with nickel, copper and lead stocks on the LME all well below normal levels at the end of last year. The cycle in LME stocks is illustrated in the next chart Figure 4. The exchange warehouses are traditionally the last resort outlet for producers to sell metal in an oversupplied market and the last resort source of metal for consumers in an under-supplied market. Exchange inventories tend to fluctuate more than other reported holdings, so the ex-change share in total reported stocks at the end of 2005 was lower than normal.

Table 4 shows futures volumes in metals on the major exchanges in 2004 in relation to the world production numbers presented earlier. The average ratio of turnover to physical supply for the LME metals is about 25:1. This is pretty much the same ratio as for Comex plus TOCOM gold futures trading to world mine production. However the gold comparison does not take into account activity on the London Bullion Market. Daily clearing turnover figures issued by the LBMA indicate that the volume of gold transferred in London last year was over 3.7 billion ounces, around two and a half times the Comex futures volume. If we add this to the futures volumes, then trading activity relative to mine production rises to a ratio of over 70:1. Silver volumes in London were about the same as futures turnover in New York. Of all the futures markets compared, the liveliest ones appear to be the TOCOM platinum contract and the Comex silver market.

Concentration of ownership

We have already referred to both the "Acquire or be acquired" factor which has helped drive M&A activity in recent years and the rise and rise of the giant diversified companies. In addition consolidation of ownership within single metal industries is also seen as potentially bringing in better management of supply and cap-

Table 4: Metal trading volumes on futures exchanges, 2004

(Futures volumes, LME metals in '000 tonnes, precious metals in Moz)

	LME	Comex/NYMEX	TOCOM	Total	Total*/Production
Aluminium	730,823	1,440	?	732,263	24.5
Copper	454,280	36,182	–	490,462	30.8
Lead	94,659	–	–	94,659	13.9
Nickel	19,063	–	–	19,063	15.2
Tin	4,858	–	–	4,858	15.3
Zinc	255,277	–	–	255,277	25.2
Gold	–	1,495.96	559.06	2,055.02	26.2
Palladium	–	26.76	7.06	33.81	5.1
Platinum	–	14.78	223.29	238.07	35.6
Silver	–	25,030.63	2,842.19	27,872.82	45.3

Data: CRU, LME, NYMEX, TOCOM

* Total futures volumes expressed as a ratio to world production

ital. The tables and Figure 5 show the current positions in terms of concentration of ownership for LME and precious metals. In general acquisitions of large and medium-sized companies have tended to increase the share of world production accounted for by the top 5 or 10 companies in recent years, although this has been offset by rapid growth in production by small Chinese producers. Despite all the activity of recent years, gold's top 5 or 10 share is still quite low relative to the other main metals industries. But would more consolidation result in a better, more profitable industry? The scatter chart in Figure 7 superficially suggests that returns on capital are closely related to concentration of ownership. However the correlation identified is very strongly influenced by the high returns/high concentration of the platinum business, which is a natural oligopoly based on the highly uneven disposition of world ore reserves (Figure 6).

Table 5: Top 10 producers of LME metals, 2004

Aluminium

	Company	Production ('000t)	% share	Cumulative % share
1	Alcan	3,454	11.6%	11.6%
2	Alcoa	3,444	11.5%	23.1%
3	Russian Aluminium	2,474	8.3%	31.4%
4	Hydro	1,742	5.8%	37.2%
5	BHP Billiton	1,339	4.5%	41.7%
6	Chalco	980	3.3%	45.0%
7	Sual Holding	913	3.1%	48.1%
8	Comalco	761	2.6%	50.6%
9	Dubal	683	2.3%	52.9%
10	CVG	558	1.9%	54.8%
	World total	29,836		

Nickel

	Company	Production ('000t)	% share	Cumulative % share
1	Norilsk	243.0	19.3%	19.3%
2	Inco	161.7	12.9%	32.2%
3	Falconbridge	100.9	8.0%	40.2%
4	BHPBilliton	80.4	6.4%	46.6%
5	Jinchuan	70.2	5.6%	52.2%
6	WMC Resources	61.4	4.9%	57.1%
7	Tokyo Nickel	60.0	4.8%	61.9%
8	Sumitomo	56.2	4.5%	66.3%
9	Eramet/SLN	55.2	4.4%	70.7%
10	OM Group	49.2	3.9%	74.6%
	World total	1,256.9		

Copper

	Company	Production ('000t)	%share	Cumulative % share
1	Codelco	1,550	9.7%	9.7%
2	Phelps Dodge	1,054	6.6%	16.4%
3	Nippon	695	4.4%	20.7%
4	Grupo Mexico	627	3.9%	24.7%
5	Norddeutsche	570	3.6%	28.2%
6	KGHM	545	3.4%	31.7%
7	Mitsubishi	542	3.4%	35.1%
8	Norilsk	446	2.8%	37.9%
9	Kazakhmys	427	2.7%	40.6%
10	Jiangxi Copper	415	2.6%	43.2%
	World total	15,913		

Tin

	Company	Production ('000t)	%share	Cumulative % share
1	Minsur	40.2	12.7%	12.7%
2	Yunnan Tin	36.3	11.4%	24.1%
3	PT Timah	34.8	10.9%	35.1%
4	Malaysia Smelting	33.7	10.6%	45.7%
5	PT Koba Tin	23.5	7.4%	53.1%
6	Thaisarco	20.7	6.5%	59.6%
7	Yunnan Chengfeng	13.3	4.2%	63.8%
8	Liuzhou China Tin	11.9	3.7%	67.5%
9	Gejui Zi-Li	11.9	3.7%	71.3%
10	CM Colquiri	11.3	3.6%	74.8%
	World total	317.5		

Lead*

	Company	Production ('000t)	% share	Cumulative % share
1	Quexco Group	880	11.6%	11.6%
2	Exide	559	7.4%	19.0%
3	Doe Run	475	6.3%	25.3%
4	Glencore	337	4.5%	29.7%
5	Zinifex	281	3.7%	33.5%
6	Korea Zinc	200	2.6%	36.1%
7	Yuguang	200	2.6%	38.7%
8	Penoles	180	2.4%	41.1%
9	Yuzhpolimetall	160	2.1%	43.2%
10	Toho Zinc	150	2.0%	45.2%
	World total*	7,570		

Zinc

	Company	Production ('000t)	% share	Cumulative % share
1	Korea Zinc Group	857	8.5%	8.5%
2	Zinifex	622	6.1%	14.6%
3	Umicore	570	5.6%	20.2%
4	Teck Cominco	401	4.0%	24.2%
5	Xstrata	370	3.7%	27.8%
6	Glencore	334	3.3%	31.1%
7	Zhuzhou Smelter Corp	302	3.0%	34.1%
8	Anglo American	299	2.9%	37.1%
9	Votorantim	262	2.6%	39.6%
10	Huludao NF Metals	243	2.4%	42.0%
	World total	10,132		

** figures are for smelting capacity*

Data: Company annual reports, CRU

Figure 6: Geographical concentration of production for pgms and gold

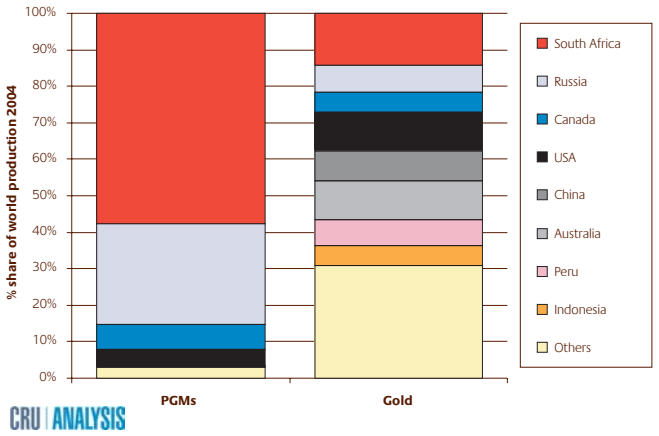
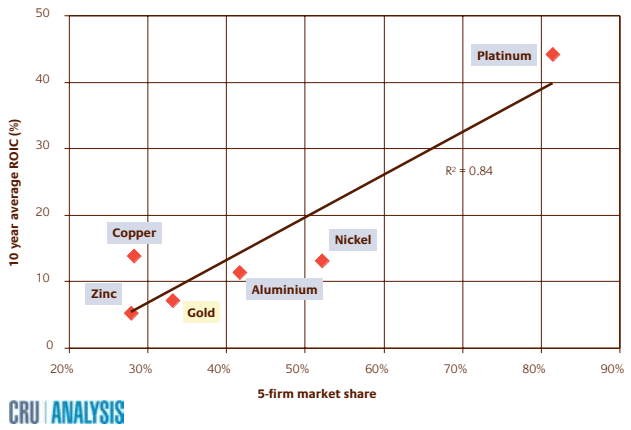


Figure 7: There is a high degree of correlation between five firm concentration ratios and return on capital



Although barriers to entry may be eased slightly by the South African government's new mining policy, it will still be difficult for new entrants to come into the business. No such natural barriers to entry exist in gold.

The other most widely discussed example of successful consolidation of ownership recently is the copper industry. Table 5, Top 10 producers of LME metals, shows ownership of refined copper production, but consolidation of ownership has occurred upstream in mining, where the diversified companies such as BHPB and Rio Tinto have been heavily involved, as well as the specialist copper firms such as Codelco and Phelps Dodge. In copper the leading companies were actively involved in responding to poor market conditions in 2001-3 by both cutting production and stockpiling inventory. Prices and profitability have rebounded subsequently, but evidence of improved management is provided by the fact that recent returns on capital have been well above the levels associated with similar prices in the past.

Table 6: Leading producers of precious metals, 2004

Gold

	Company	Production (tonnes)	% share	Cumulative % share
1	Newmont	217.4	8.9%	8.9%
2	AngloGold Ashanti	188.2	7.7%	16.7%
3	Barrick Gold	154.2	6.3%	23.0%
4	Gold Fields	136.1	5.6%	28.6%
5	Placer Dome	113.6	4.7%	33.2%
6	Harmony	101.5	4.2%	37.4%
7	Kinross Gold	51.3	2.1%	39.5%
8	Buenaventura	51.1	2.1%	41.6%
9	Rio Tinto	48.3	2.0%	43.6%
10	Freeport McMoRan	45.3	1.9%	45.5%
	World total	2,435.1		

Silver

	Company	Production (tonnes)	% share	Cumulative % share
1	BHP Billiton	1,619	8.5%	8.5%
2	KGHM	1,344	7.0%	15.5%
3	Penoles	,336	7.0%	22.5%
4	Grupo Mexico	560	2.9%	25.4%
5	Kazakhmys	550	2.9%	28.3%
	World total	19,139		

Platinum

	Company	Production (tonnes)	% share	Cumulative % share
1	Angloplats	76.3	36.7%	36.7%
2	Implats	33.9	16.3%	53.0%
3	Lonplats	28.6	13.7%	66.8%
4	Norilsk	23.3	11.2%	78.0%
5	Norplats	7.4	3.5%	81.5%
	World total	207.9		

Palladium

	Company	Production (tonnes)	% share	Cumulative % share
1	Norilsk	84.0	40.6%	40.6%
2	Angloplats	38.3	18.5%	59.1%
3	Implats	15.6	7.5%	66.7%
4	Stillwater	13.7	6.6%	73.3%
5	Lonplats	12.4	6.0%	79.3%
	World total	206.8		

Data: CRU

Conclusions

If we compare the underlying sizes of metals markets, as measured by the value of world production in 2004, gold is the third largest non-ferrous metals industry, after aluminium and copper.

If, on the other hand, we look at the value of reported stocks or volumes on clearing/futures markets, gold is far larger and more liquid than any of the other metals markets. Combined turnover on the main futures exchanges and the London bullion market is some 70 times larger than world gold production, whereas the ratio for base metals is around 25:1.

The top 10 gold miners now account for some 46% of world production, a similar level of concentration of ownership of production as in copper, but much lower than in some industries, such as nickel and platinum.

There is evidence that increased levels of concentration are associated with higher returns on capital in other industries, but it is doubtful whether these "lessons" are transferable to gold. Nevertheless growth in size appears to be essential for corporate survival in the equities markets.

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