

Prospects for Tanzania's Mining Sector

Per Granberg

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Summary

The success of Tanzania's structural reform efforts will (*inter alia*) depend on its ability to generate foreign exchange incomes. Mineral exports seem a promising source of such incomes. Tanzania is reportedly well endowed with minerals, with considerable developments already under way to explore them. Any attempt to make plans for the Tanzanian economy must take this into account. The present paper, which is part of the larger Macmod project, aims to make a contribution towards this end. It seeks to assess the prospects for mining developments in Tanzania during the next few years, and to propose a set of quantitative estimates indicative of these developments. In so doing the focus is limited to the standard economic variables of production and investments.

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1 : Introduction

The success of the Tanzania structural reform policy will ultimately depend (*inter alia*) on the country's ability to earn foreign exchange incomes. Mineral exports are often considered a typical source of such incomes. This also seems a promising option in Tanzania's case: the country is understood to be fairly well endowed in terms of gold and other types of mineral deposits. Considerable developments, both in terms of prospecting and of productive investments, are reportedly under way, in order to explore these deposits.

Thus, according to the South African Department of Finance (see SAdepFin/SADC): "Tanzania is rich in mineral resources. Investment is, however, required to upgrade technology and renew ageing plant and machinery.... Some analysts are predicting that Tanzania could become the third biggest gold producer in Africa, after Ghana and South Africa. Other minerals include gemstones, coal, phosphates, iron, and to a lesser extent, tin, salt, gypsum and kaolin. Nickel deposits have also recently attracted important new investment in the sector."

Representatives of the Tanzanian government have made similar claims. In a 1998-interview with the South African newspaper Business Day the Tanzanian Deputy Mining Minister stated that (see Dodd (1998)):

- Tanzania aimed to lift annual gold exports from the 1998-level of approx. 0,5 ton to 26 tons by the year 2001 when there would be four or five gold mines in operations.
- Of nine major companies operating in Tanzania, seven were attracted by gold. Investment in prospects nearing production would reach \$360m over the period 1998-2000.
- Mining exploration, mainly gold related, had risen rapidly during the period 1993-98 with estimates of proven Tanzanian gold reserves at about 20-million ounces and annual exploration expenditure jumping to \$80m.
- The embryonic mining sector, dominated by gold, accounted for about 2% of gross domestic product (GDP) in 1998, but was expected to rise to between 10% and 15% within five years.
- Tanzania is also a significant diamond producer, mostly via De Beers subsidiary, Williamson Diamonds. After declining from 300 000 carats in the early 1980s to 68 000 carats in 1992, production has shot up to 120 000 carats after rehabilitation of the mine.

The above statements give a definite impression of high expectations. If proven right, they will obviously have significant positive impact on the economic situation of the country. *Vice versa*, a failure to meet these hopes will evidently mean the loss of such an impact. Any attempt to formulate forecasts or plans for the Tanzanian economy ought to take this into account.

Ideally, such efforts ought to be based on "firm and realistic" predictions about the volume etc of future mining activities. In practise, however, one must recognise the fact that the future is both unknown and uncertain, and that this is also very much the case for the mining sector. The best one can in practise hope to achieve is to base our efforts on "best guesses" or "considered opinions" or similar.

The present paper, which is part of the Macmod project, aims to make a contribution towards this end. It seeks to assess the prospects for mining developments in Tanzania during the next few years, and to propose a set of quantitative estimates indicative of these developments. In so

doing the focus is limited to the standard economic variables of production and investments. This, of course, is not to deny that the development of the mining sector will impact the nation in a variety of ways, for instance with respect to environmental issues, land use issues etc. These, however, are outside the limited scope of the present paper.

2 : The setting

2,1: The mining sector during the 1990s

The aim of this paper is to assess developments in Tanzania's mining sector during the next few years. Before doing so, however, it may be worthwhile to take a quick look at the setting for these developments, i.e. at the existing situation in the sector, and the developments it has undergone during recent years.

Table 2,1 portrays Tanzania's overall real-term GDP growth and the corresponding GDP growth in mining. It is readily seen that mining and quarrying has outgrown the rest of the economy during the 1990s, and that it has done so both consistently and considerably. The growth rates achieved in the mining sector are impressive by most standards, and especially so for the last two years (1997 & 1998). The impression given by table 2,1 therefore tallies with the bright prospects for the sector indicated above.

*Table 2,1 : Real-term growth in total national GDP, and in mining GDP
(TZS'mill. at constant 1992 prices)*

	Total GDP at factor cost		of which: Mining Sector's GDP	
	Value (TSZ'mill.)	Growth (%pa)	Value (TSZ'mill.)	Growth (%pa)
1990	1 219 236	NA	11 226	NA
1991	1 253 134	2,8 %	12 536	11,7 %
1992	1 275 917	1,8 %	13 503	7,7 %
1993	1 281 006	0,4 %	14 608	8,2 %
1994	1 298 942	1,4 %	16 803	15,0 %
1995	1 345 246	3,6 %	18 768	11,7 %
1996	1 401 711	4,2 %	20 579	9,6 %
1997	1 448 214	3,3 %	24 097	17,1 %
1998	1 505 826	4,0 %	30 700	27,4 %

Source: BOT web site

Table 2,2 provides a slightly different picture of the mining sector. The table pictures Tanzania's total GDP, and the share attributed by the mining sector. The brisk growth of the mining sector is reflected in the fact that the sector has increased its percentage contributions to Tanzania's overall GDP fairly steadily throughout most of the 1990s. Even so, the table makes it quite clear that the mining sector has been, and still is, a rather insignificant contributor to Tanzania's total economic activity, accounting for no more than approx. 1% of Tanzania's overall GDP.

*Table 2,2 : Total national GDP, and the part of it attributed to mining
(TZS'mill. at current prices)*

Year	Total GDP (factor cost)	of which: Mining	Mining as % of total
1 990	760 005	6 525	0,9 %
1 991	989 594	8 840	0,9 %
1 992	1 275 917	13 503	1,1 %
1 993	1 607 763	19 062	1,2 %
1 994	2 125 324	26 170	1,2 %
1 995	2 796 642	35 190	1,3 %
1 996	3 452 558	38 511	1,1 %
1 997	4 281 600	53 515	1,2 %
1 998	5 125 311	74 386	1,5 %

Source: BOT web site

Table 2,3 similarly portrays Tanzania's total commodity exports, and the part of it attributed to mining. The latter is seen to account for a significantly higher share of exports than of GDP. Mining is consequently one of Tanzania's more export-oriented sectors. But even so, with export-shares mostly in the region of 5-10%, mining can hardly be counted among Tanzania's major export earners. Moreover, the export-share is seen to have declined significantly during the 1990s.

*Table 2,3 : Total exports, and the part of it attributed to mining
(TZS'mill. at current prices)*

Year	Total Exports	of which: Minerals	Minerals in % of total
1 990	66 561	3 620	5,4 %
1 991	75 981	8 479	11,2 %
1 992	123 966	12 920	10,4 %
1 993	181 148	28 074	15,5 %
1 994	265 177	15 390	5,8 %
1 995	390 378	25 545	6,5 %
1 996	455 419	31 450	6,9 %
1 997	459 549	31 303	6,8 %
1 998	391 805	17 509	4,5 %

Source: BOT web site

Table 2,4 illustrates the commodity structure of Tanzania's mineral export. The data cover the period 1990-92 only, but are nevertheless suggestive of a general structure that seems valid even today. Thus, as already indicated earlier:

- Precious rather than base minerals represent the backbone of Tanzania's mining exports, and probably also of its mining production.
- Gold is by far the most important mineral produced.

Table 2,4 : Mineral exports by commodity

	Value (US\$'million)			Percentage distribution		
	1990	1991	1992	1990	1991	1992
Gold	13.6	29.1	40.4	51.8%	65.7%	76.0%
Diamonds	10.0	11.9	8.4	38.2%	27.0%	15.8%
Gemstones	1.6	1.7	3.2	6.1%	3.8%	6.0%
Salt	0.9	1.5	1.0	3.4%	3.4%	1.9%
All other	0.1	0.0	0.2	0.5%	0.1%	0.3%
Total	26.3	44.0	53.2	100.0%	100.0%	100.0%

Source: Nanyaro (1994)

Table 2,5 portrays the production of precious minerals during the period 1990-98. The table gives an immediate impression of volatility; there are remarkably large variations in annual production for each of these three commodities. The case is especially clear for gold, which grew from 1.64 tons in 1990 to 4.53 tons in 1992, only to fall back to 0.23 tons in 1997.

Table 2,5 : Mineral Recoveries

Item	Unit	1990	1991	1992	1993	1994	1995	1996	1997	1998
Diamond	000'Carat	85	100	67	41	26	50	127	123	95
Gold	000'Kg	1.64	3.78	4.53	3.37	2.86	0.32	0.32	0.23	0.43
Gemstone	000'Kg	38.7	59.6	48.9	33.0	48.5	111.4	137.2	124.6	48.5

Source: BOT web-site

The near collapse of gold mining may seem to refute the high hopes for the sector. Before drawing such a conclusion, however, a closer look into the background for these events is in order. Doing so, it soon becomes clear that the developments depicted by table 2,5 must in large measure reflect the small-scale, "quasi-informal" nature of the Tanzanian mining industry.

During the 1990s Tanzania had few if any operational mines of the type commonly found in richer countries, i.e. large, capital intensive operations. The mining structure of Tanzania, in contrast, has been one of "hundreds of small gold occurrences and deposits...operated by more than 500,000 artisanal miners and a couple of semi-mechanized small companies".¹ The state-owned Buckreef mine appears to have been the only large-scale gold mine in operation at the dawn of the 1990s. When it closed down in 1990 it left "the country once again without a commercial gold mine." (Nanyaro (1994))²

Mining in Tanzania during the 1990s may consequently be described as a small-scale labour intensive activity. The sector consisted of a host of simple private-sector operations, simple in technology and low in fixed investments. The mines were manned by an army of workers, many of whom may have tended to look upon mining as a seasonal occupation, or to migrate between mining and other sectors in pursuit of an acceptable income. Richer prospects (relative to other

¹ Roughly the same structure applied for gemstone and diamond mining (according to Nanyaro 1994)

² Another source of information on African affairs, the South African web-site: Mbendi, states that: "Most of Tanzania's gold prospects are located in the greenstone belt south of Lake Victoria, where commercial mines operated in the 1950s but later closed for economic reasons." (MBendi TzMine)

low-skill alternatives) may therefore have attracted a surge of new entrants into the sector (and *vice versa* for poorer prospects).

This is apparently what happened in the early 1990s. As argued by Nanyaro (1994) the growth in gold production resulted from the introduction of new mining policies, and competitive producer prices. Thus:

- In May 1990 gold mining and selling activities were liberalised. As from that date, anyone could sell gold to appointed banks, at competitive market prices, with no question asked.
- The Buckreef mine suspended operation in 1990, leaving the country without "commercial" gold mining activity. Even so, gold production rose sharply, reaching an all time record of 4.5 tonnes in 1992. The dramatic rise was a result of very active participation by artisanal miners (very small-scale miners) who were motivated by the new liberal mining policy and the good prices offered them.

The realities behind the dramatic decline in gold mining reported in recent years are not immediately obvious; neither the true extent nor the underlying reasons for the decline seems clear. Focusing on the first issue it may be noted that the veracity of the dramatic production decline depicted in table 2,5 may be subject to dispute. This is because these estimates, which we interpret in terms of *actual* mineral *extraction*, do in fact record *reported* mineral *sales*. The latter may differ considerably from the former if sales are under-reported (for tax reasons), production smuggled in/out of the country (due to differences in local prices) or similar.

It is common knowledge that significant quantities of gold and precious stones have been smuggled out of Tanzania over the years. One observer (Chachage (1995)) even argues that large-scale smuggling of gold occurred also during the early 1990s, i.e. when local gold sales were record high. The subsequent fall in local gold sales may therefore reflect increased smuggling, at least in part. The argument is lent some support by the Tanzanian authorities. Describing the state of the Tanzanian mining industry in 1998 the Deputy Mining Minister maintained that: "smuggling to Kenya by small-scale miners who currently dominate gold production accounted for more than official exports" (Dodd (1998))

Even so it seems difficult not to conclude that gold mining must have suffered a considerable decline during recent years. The underlying reasons are not immediately obvious, but the following may be offered as a (partial) suggestion. "Pick and shovel" operations of the kind described in the above will typically have to limit their activity to the easy-to-extract surface-deposits. The rewards reaped from such gold fields will tend to decline after a while, and especially after a period of rapid excavation activity. Sooner or later the miners in question will want to move on to richer fields. These, however, may be difficult to find, especially towards the end of a "gold rush" era. The result may be a serious drop in production, as mine-hands move on to other sectors in pursuit of better incomes.

The industry will consequently go into decline. This, however, may be no more than a temporary occurrence, lasting until fresh exploration areas are found. Even if such areas, suitable for today's small-scale mines, should fail to materialise, however, other types of mining are not necessarily ruled out. The fact that Tanzania's traditional gold miners may have experienced hard times does therefore not rule out the possibility that there may exist rich opportunities in mining zones left

untouched by these miners. In Tanzania's case these zones may possibly include the greater part of the country's potential below-surface deposits.

2,2: Prospects for the future

In view of the above discussion it would therefore seem unwise to take the mining sector's performance in the past as a guide to the future. Crucial policy changes, both in respect of mining and other sectors, have been introduced to address the problems experienced in the past. While the then economic regime tended to be stagnant and inward looking, the new policies endeavour to turn the economy towards greater openness, both with respect to private enterprise and foreign investments.

According to the Bank of Tanzania (BOT) these efforts are bearing fruit: considerable amounts of foreign investments are now directed towards Tanzania, indicating the renewed confidence of the international business community in Tanzania's economic prospects. Thus, in its Annual Report for the year ended 30.6.1999 the Bank reports that: "By end June 1999, there were 1,350 domestic and foreign investments worth more than USD 360.0 million, licensed to undertake mining and mineral activities in the country...." (BOT web site)

This development is also reflected in official UN statistics. A recently issued UNCTAD publication on Foreign Direct Investments (FDI) in Africa (UNCTAD (1999a)) shows that Tanzania has recently become one of the continent's more prominent recipients of FDI funds. Thus, Tanzania's average inflow of such funds amounted to 100 US\$'mill. per year during the period 1993-97 (versus 4 during 1988-92 and 0 during 1983-87). A fair share of these funds is presumably directed towards the mining sector.

Representatives of the international mining community are also on record with optimistic assessments of Tanzania's mining potential. In a recently published paper Dr Martineau, president of SAMEX mining company, states that: "The Kukuluma deposit is one of several discoveries in Tanzania which is likely to catapult Tanzania to second place in the league of Sub-Saharan African producers. Its development, planned for the year 2000, will be assisted by the new mining and fiscal codes being introduced this year by the Tanzanian Government which set fair levels of mining taxation and which draw on the experience of more forward African countries." (Martineau (1997))

A South African information site on African affairs makes statements of a similar nature. It asserts that "Tanzania is a key exploration area in Africa.....with 20 million ounces³ of gold having been discovered in Tanzania in recent years." (MBendi TzMine) The same source states that "The World Bank offers insurance cover for foreign investments in Tanzania. These measures have all assisted in attracting exploration capital to the country. Annual investments in mineral exploration has increased from \$US 0.5 million less than 10 years ago to \$US 150 million."

In conclusion we consequently accept the argument that there exist convincing evidence in support of the hopes for a better future for the Tanzanian mining industry, and especially for the gold mining one. What remains to be done, then, is to translate these general expectations into

³ Corresponding to 567 metric tons.

tangible numbers; i.e. into the type of concrete forecasts that are required for economic planning and analysis (via the Macmod model).

3 : Towards concrete forecasts

3,1: Searching for concrete project data

The present effort did not have the benefit of relevant, project-specific data supplied by the international mining companies concerned, or by the Tanzanian authorities. Instead we had to make do with whatever information could be secured from open sources. A search for data was conducted through the Internet. This resulted in the following "introductory" information:

- The BOT "Annual Report for the year ended 30.6.1999" identifies the following main mining companies active in Tanzania:
 - By end June 1999, there were 1,350 domestic and foreign investments worth more than USD 360.0 million, licensed to undertake mining and mineral activities in the country. They include Ashanti Goldfields of Ghana, Anglo-American of South Africa, Resolute/Samax Resources of the United Kingdom and Sutton Resources of Canada. Resolute/Samax Resources project started production in November 1998. (BOT web site)
- In a 1998-interview with the South African newspaper Business Day the Tanzanian Deputy Mining Minister stated that:
 - Tanzania's first operational gold mine since independence from Britain in 1961 is expected to be a \$50m joint venture between Australian company Resolute Mining and its British partner, Samax Resources, at their prospect on the booming Lake Victoria gold field. Production is expected to begin before December. Kahama Mining, a subsidiary of Canada's Sutton Resources, plans to start production nearby in 1999, and has invested \$135m in mine development. Others to start production by 2000 include Australian-owned Africa Mashariki (East Africa Gold) which has invested \$75m in property at Tarime. Ghana's Ashanti Goldfields has invested \$100m in its prospect. SA's Randgold Resources has a 1,5-million ounce resource base at Shinyanga, while Australian mining giant BHP Minerals is searching for base metals in Tanzania's far western Kigoma region. In the same region, Anglo American is on the prowl for nickel, cobalt, copper and base metals.(Dodd (1998))
- The South African Department of Finance has published some information on Foreign Direct Investment in SADC countries, naming the following companies and mines:
 - Foreign direct investment into Tanzania has increased substantially over the past two years. Most of the foreign direct investment into Tanzania flows into the mining and exploration sector - during 1997, Tanzania received investments to the value of USD300m in mining and exploration. The companies involved have included Sutton Resources (Bulyanhulu), Pangea Goldfields of Canada and Randgold of South Africa (Golden Ridge in Sukumaland), and Resolute of Australia and Samax Resources of Britain (Golden Pride on Lake Victoria). (SADepFin/SADC web-site)

The three sources of information are consequently not in full agreement; they specify somewhat different lists of companies involved in mining in Tanzania. In total, we get the following list of companies:

- Africa Mashariki (East Africa Gold)
- Anglo-American
- Ashanti Goldfields
- BHP Minerals
- Pangea Goldfields
- Randgold Resources
- Resolute Mining
- Samax Resources
- Sutton Resources

An Internet search was made to obtain concrete information about the of investment projects of these companies (and of the additional companies Spinifex⁴, Iscor and JCI (Johannesburg Consolidated Ind.), which were subsequently identified.) The effort meet with little success; few of the companies in question appear to have publicised anything in the way of concrete project-relevant web information of the kind required for our present purpose.

Some information was nevertheless secured through this effort. Thus:

- Pangea describes the Tanzanian mining scene as follows:⁵ "In the next several years, over US\$500⁶ million will be invested in Tanzanian gold mining ventures and five gold mines are expected to come into production. These Tanzanian projects comprise the Golden Pride deposit (2.7 million ounces), the Bulyanhulu deposit (8.8 million ounces), the Geita Complex 12 million ounces), the Golden Ridge deposit (1.6 million ounces), the North Mara deposit 2.0 million ounces) and the Kahama deposit (1.8 million ounces)." (Pangea web-site)
- Resolute web-site describes the company's own operation as follows:⁷ "Resolute acquired 50% of the Golden Pride deposit from Samax Gold Inc late in 1996..... Late in 1998 Ashanti Goldfields Company Limited acquired Samax Gold Inc, and with it, 50% of the Golden Pride Gold Project. In July 1999, Resolute agreed to acquire the remaining 50% of the project from Ashanti. Construction of the project commenced in November 1997.the project was completed on budget (US\$48million) and first gold was poured on 10 November 1998. The Golden Pride mine is expected to produce an average of 180,000 ounces of gold per annum at a cash cost of US\$200/oz." (Resolute web-site)

Additional data on the foreign involvement in Tanzania's mining sector was obtained from a commercial South African data bank: BusinessMap SA. The information is summarised in table 3,1.

⁴ Spinifex is probably the same company as the above mentioned Africa Mashariki (East Africa Gold).

⁵ The text refers to total gold mining in general, not only to Pangea's part in it.

⁶ The corresponding figure given in Pangea's Annual Report for 1998 is 360. Unfortunately, we have not been able to establish whether the estimate of 500 reflects a misprint or more up-to-date information.

⁷ This quote may also serve to illustrate a specific problem encountered when investigating the Tanzanian mining ventures. It appears that a number of projects have had their ownership arrangement etc changed over time. As a result, it becomes quite difficult to trace them correctly through the information flow.

Table 3,1 : Foreign interest in Tanzanian mining ventures

Data record No.	Source Company	Target company	Status ⁸	Investments USD'mill.	Investment period
1	Spinifex Gold (Australia)	Buckreef ⁹	Expression of interest	0	1998
2	Sutton Resources (Canada)	Bulyanhulu	Expression of interest	0	1998
3	Resolute Ltd & Samex Gold (Australia)	Golden Pride Mines	New Investment	47	1997
4	Anglo-American Corp. (RSA), Sutton Resources (Canada)	Kabanga Nickel-Cobalt-Sulphide Project	Expression of interest	0	1998
5	Spinifex Gold (Australia)	Kitongo	Expression of interest	0	1998
6	Anglo-American Corp. (RSA), Sutton Resources (Canada)	Nickel-Cobalt Project	Intention	108+27 =135	1997
7	Spinifex Gold (Australia)	Nyakafuru	Expression of interest	0	1998
8	Iscor (RSA)	Pangea Goldfields (Tz)	Expression of interest	0.83	1996-98
9	Randgold Resources (RSA)	Pangea Goldfields, Golden Ridge Mine Project	New Investment	1	1995-98
10	Johannesburg Consolidated Ind (RSA)	Tanzanian Prospects	Expression of interest	0	1996
11 *)	Sutton Resources (Canada)	Various mines	Expression of interest	350	1998-2000
12 *)	Ashanti Goldfields Corp. (Ghana)	Various mines	Expression of interest	350	1998-2000
13 *)	Resolute/Samex Resources (UK)	Various mines	Expression of interest	350	1998-2000

Source: BusinessMap SA

*) Note to data record 11-13: These records also state that the four international gold mining companies in question (Samex, Sutton, Ashanti and Anglo-American) are expected to invest \$360 millions during the period 1998-2000. The companies plan to operate at Geita in Mwanza; Kahama in Shinyanga; and Nzega in Tabora. The companies began operations in 1992-94; the projects are now at advanced stage. Samax would start producing gold between October-December 1998; Sutton, operating under name Kahama Mining Corp, plans to start production late 1999. Ashanti and Anglo are to start production in 1999 or 2000. The four companies are expected to produce 25t worth \$250m per year, by the year 2000.

The records of table 3,1 are seen to leave out some of the mining companies mentioned earlier. This may possibly reflect changes in ownership, name or similar, but the main reason is probably that the table does not give a full coverage of all tentative mining ventures in Tanzania. Thus, it seems likely that all already-decided projects are covered, and most of the relatively-soon-to-be-decided ones, while the further-into-the-future ones (i.e. those still under preliminary investigation) are largely ignored.

The Mbendi web site (MBendi TzMine) tends to corroborate the list of companies given above. It names quite a few companies that have demonstrated an interest in Tanzanian mining ventures,

⁸ It is a little unclear exactly what "Expression of interest" implies. It is assumed that the company in question has stated its intention to undertake concrete investigation of given mineral sites.

⁹ This appears to be the former state-owned and -operated Buckreef mine. It is recalled that this mine was closed down in 1990, closing the book on "commercial" gold mining in Tanzania (before recent events). It appears that the mine may now possibly be reopened under new management and ownership arrangements.

including one or two not mentioned by other sources.¹⁰ It does not, however, provide much concrete data directly applicable to our present needs (i.e. project specific information about investment and production variables). Even so, it does give the following additional information:

- *Nickel Cobalt Mining:* Sutton Resources and BHP Minerals are investigating the prospects of potentially rich cobalt and nickel deposits at Kagera in Tanzania.
- *Diamond mining:* In 1994 De Beers increased its stake to 75% of the equity of Williamson Diamond Mines as part of the government's privatisation initiative. Operations were suspended and the mine rehabilitated as a small mine. The mine resumed operation in 1996. A further development was completed in 1997. Regrettably the high-grade diamond rich gravel is almost depleted. The most one can hope for is that the operation repays its US\$16 million loan in the agreed five year and that it operates with sufficient efficiency to produce some return in the following two or three years.
- *Coal mining:* China will supply equipment for the rehabilitation of the Kiwira coal mine. This will permit an annual production of 150 000 tons. USD 2 million will be spent on a power unit, heating unit, turbines and a mineral treatment plant.

3,2: Analysing the available data

3,2,1: Information overlap

The concrete interpretation and aggregation of the above information is not an altogether straightforward task. The data of table 3,1 are the more concrete, comprehensive and relevant to our task, but even so they are *far* from flawless. Thus, they serve to illustrate the existence of foreign companies' "expressions of interest" in Tanzanian mining ventures, but they do not, on the whole, provide much concrete data about likely investment and production values.

There is also a definite risk of information overlap, i.e. that some projects/investments are covered by more than one data record. This is for instance the case for record no. 11-13, all of which refer to an investment of UD\$ 350 million into "various mines". Obviously, these records all refer to the *same* investment-aggregate, not to three different aggregates each of this magnitude.

Moreover, it appears that part of the UD\$ 350 million investment is specified also among record no.: 1-10, i.e. that the latter overlap with record no.: 11-13. Thus: the Resolute/Samex investments recorded under data record 3 are evidently part of the "joint" investment total recorded under record 13. This is reasonably clear from the Martineau (1997) paper which states that Samex is developing the following two gold mines in Tanzania:

- Golden Price, which is covered by record 3¹¹ (and by record 13);
- Kukuluma, which appears uncovered by any of records 1-10.¹²

¹⁰ This is possibly because the companies in question are known under alternative names, or because they are fairly marginal actors on the Tanzanian scene, (for instance co-financing preliminary prospecting activities).

¹¹ A comparison of specifics given for the Golden Pride mine in (Martineau (1997)) and the footnote to record 13 makes it clear that we are dealing with the same mine. Thus, both sources state that Samax would start production at this mine between October-December 1998.

Other possible cases of overlapping concern data records 2 and 11¹³ (where, to be true, record 2 does not specify any investment sum), and data records 4 and 6.¹⁴ There may well be more cases of double counting, but we are unable to pin them down. Fortunately, our failure to detect all such cases does not really matter because record no. 3 is in reality the only record of any genuine concern (among record no.: 1-10).

This is because data records 11-13 deal with *gold mining only*, while record 3 is alone (among 1-10) in specifying substantial investments into gold mining. True, record 6 does specify an even larger investment, but *not* into gold mining. Records 8 and 9, on the other hand, which do specify investment into gold mining, are both rather insignificant in size. The rest of the records do not specify any concrete investment estimates at all, indicating instead that a potential interest has been indicated for doing so later (subject to future investigation, prospecting etc.)

Translating such indications of interest into concrete estimates, representing future production volumes, is no easy matter. In most cases we have no alternative but to rely on fairly loose guesses and unsubstantiated presumptions. This is also true in the present case. Given this state of affairs, the potential problem arising as a result of undetected double counting seems minute. We will therefore move on to the question of investment fallout without further deliberations in respect of double counting.

3.2.2: Investment fallout

The data of table 3,1 do not specify the dates to which the information refers. We do not know when the information was collected, or whether it has recently been updated or reaffirmed. In consequence, we cannot be entirely certain that the information given about the various investment projects are quite up to date. This may be a bit of a worry, given the possibility of cost overruns and implementation delays.

Nor do the data of table 3,1 specify the date of decision making, i.e. it does not specify the data on which the investing company decided to go ahead with a given project, as "described" in table 3,1. We can therefore not be sure that the various "expressions of interest" registered in table 3,1 still remains valid. The possibility exists that they reflect "fundamentals" that have since wors-

¹² The possibility exists that it may also be uncovered by record 13. However, Martineau states that the Kukuluma mine is situated at Geita in Mwanza, which is one of the locations specified in the footnote to record 13. The Kukuluma/Geita project consequently appears to be one of the "various mines" covered by record 13.

¹³ Thus, the footnote to record 11 states that: "Sutton, operating under name Kahama Mining Corp, plans to start production late 1999." From Mbendi TzMine we learn that: "Kahama Mining, a fully owned subsidiary of Sutton Resources of Canada, is operator on Bulyanhulu in the Lake Victoria Goldfields, which starts production in early 1999 with a target of 300,000 oz. per annum." Applying this information to record 2, where Sutton Resources is specified as the source company and Bulyanhulu as the target, it is evident that records 2 and 11 overlap.

¹⁴ In the latter case, however, it seems more likely that although both data records refer to the same mine, they refer to different stages of mine expansion. Thus, the Mbendi web-site provides the following information about this project: Anglo American acquired a majority stake in Kabanga Nickel Company, which holds the rights to the Kabanga Nickel Cobalt Project, from Canadian company Sutton Resources. Anglo American expects to contribute \$27 million towards the development of Kabanga commencing with a programme of *additional exploration drilling* to be completed by 2001. (NB: It may be noted that the said US\$ 27 million may represent prospecting finance rather than investments into processing capacity as such.)

ened significantly. An attempt should be made to assess this risk, focused on the sales-price of the metal concerned (this presumably being one of the key "fundamentals").

Table 3,2 : World market price for gold, nickel & cobalt^{15 16}

Period	Gold		Nickel		Cobalt		NC-comp. ¹⁷	
	Price	Index	Price	Index	Price	Index	Price	Index
1990	384	99	402	118				
1991	362	93	370	109				
1992	343	88	318	94				
1993	360	99	241	71	15	63	36	63
1994	384	99	288	85	23	96	54	95
1995	384	99	373	110	29	121	68	120
1996	388	100	340	100	24	100	57	100
1997	331	88	314	92	24	100	57	99
1998	294	76	210	62	18	75	42	74
1999	279	72	273	80	15	64	36	64
2000 (Jan-Jun)	285	74	427	126				

Sources: Various, see footnote.

Table 3,2 depicts the movements of the gold price during the 1990s. The table shows that the price of gold remained fairly stable, and high, prior to 1997. During the mid-1990s the price was approx. 380-390 US\$ per ounce. It subsequently fell to around 280 US\$ per ounce in 1999, taking more than a quarter off the mid-1990s price.

A reduction in the gold price of this magnitude will presumably have negative implications for the prospective investor's interest in investing in gold mining, and especially so if the depressed price is expected to remain in force for an extended period. In the present case there may be reasons to fear that the gold price may remain depressed for quite some time. Thus, the IMF and a number of central banks, presently holding huge gold reserves, have indicated their intention to sell off significant amounts of gold. It may therefore be a real possibility that the information given in table 3,1 about gold mining interests are too optimistic given today's price realities.¹⁸

Looking a little further into this matter we return to the data of table 3,1. Although they do not specify the date of the underlying business decision, they do give the so called "investment year" (and sometimes the "investment period"). The investment year given by the various records of table 3,1 all fall within the period of 1995-98, and most fall within the period of 1997-98. Pre-

¹⁵ The price for gold refers to US\$ per ounce, for nickel US\$ per metric ton, for cobalt US\$ per pound, and for the NC-composite US\$ per kg. All indexes use the 1996 price as base.

¹⁶ The prices for gold and nickel for 1990-98 are from IMF's IFS series. The corresponding prices for 1999-2000 are based on data from World Bank Pink sheets. The price data for cobalt for 1993-98 are crude approximations, based on (UNCTAD (1999)). The corresponding estimate for 1998 is based on data from the London Metal Exchange (<http://nickelaloy.com>).

¹⁷ Nickel-Cobalt-composite, calculated by first translating the nickel and cobalt prices into kilo-term, and next calculating the price of a "composite product" consisting of 12.5 kg of nickel and 1.0 kg of cobalt. The background for these calculations is explained in the main text.

¹⁸ Thus: "The Tanzanian Chamber of Mines cautioned last year that the sector could be hurt if the gold price continued to fall below \$300/oz." (Dodd (1998)).

