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Regional issues in the global lead market

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Abstract

The world lead market will experience minor deficits in 2003 and 2004. These deficits alone are unlikely to reduce visible stocks of lead to the critically low levels necessary to provoke substantially higher prices. The world lead market is, however, undergoing structural change. Lead smelting has expanded rapidly in China and, in part due to a similar trend in zinc, is shifting away from the imperial smelting process (ISP). As a result, the production of refined lead in Western Europe is falling dramatically in 2003. Consumption patterns are also shifting. Consumption in the USA has been in decline since the collapse of the industrial battery sector in 2001, and there is growing evidence of a shift in battery manufacturing to China. Despite the generally neutral outlook for London Metal Exchange (LME) lead prices, these structural changes are causing disruption to the trade flows of lead, which is now impacting premiums and may impact LME prices. These issues are highly relevant to battery manufacturers.

Keywords: Chinese battery manufacturing; Imperial smelting process; Lead market outlook; Lead prices; Lead premiums

1. Introduction

The market for refined lead experienced a major surplus in the early 1990s as recession in the major Western economies coincided with a surge in exports from the CIS. This surplus was followed by a rapid switch to deficit in the mid 1990s, driven in part by a boom in consumption in the newly industrializing economies in Asia. At the turn of the century, lead mining was in decline due to a continued lack of investment, and industrial batteries were accelerating demand in developed economies as a result of the high levels of investment in IT and telecommunications infrastructure.

With relatively low stocks on the London Metal Exchange (LME), lead looked set for a classic commodity squeeze. Prices rallied away from lows near to US$ 400 per tonne in early 2000 to above US$ 500 per tonne in the first quarter of 2001. These levels were still well below the previous highs for lead, and some speculative participants in the market began to prepare for a spike in price. This did not eventuate.

In 2000, both the dot-com and telecommunication bubbles in the equity market burst, with the Nasdaq composite falling to just 30% of its peak by mid-2001. Although LME lead stocks fell below the psychologically important 100 000 t level at the end of 2002 (which corresponded with price rally to US$ 525 per tonne), it became clear in the first quarter of 2002 that something in lead's fundamentals had changed. The LME stocks began to grow, particularly in the USA, and reached a peak of 197 000 t in August 2002. LME lead prices began a steady decline from January 2002 and by September 2002 had returned to lows below US$ 420 per tonne. Although mine production was falling rapidly, demand was clearly also in crisis so the anticipated market deficit did not emerge. Accordingly, speculators and forecasters began to revise their opinion on the immediate market prospects for lead. The lead market was going to avoid a deficit. At the same time, it was also undergoing four specific structural changes, as discussed in the following sections of this paper.

2. Collapse in industrial battery demand in the USA

The quality of statistics relating to the battery market in the USA has deteriorated in recent years, with first the withdrawal of finished battery stocks from the data, and then the merging of the data with that of Canada and Mexico (with no historical comparative series provided). This has resulted in the statistics provided by the Battery Council International (BCI) becoming increasingly less useful from an observer's viewpoint. Also, information relating to industrial batteries has been either poor or non-existent.

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Given the above, the author's company undertook the construction of a model of lead demand in the USA in 2001, in part as a response to the deteriorating statistics, but also to gain a better understanding of the trend that was apparently underway. This model combines data relating to vehicle production and population, historical BCI data relating to original equipment and replacement battery production and shipments, lead consumption end-use data from the International Lead Zinc Study Group (ILZSG), and CRU's own database of US lead consumption. The model highlights a number of relevant trends. For example, from data relating to replacement battery shipments and automotive populations, it yields an indicative trend for average battery life. This upward trend is in line with comments made by leading battery manufactures that average battery life in the USA is increasing due to a combination of improved materials (particularly grid alloys that are less vulnerable to temperature extremes) and better production process control.

The slowly declining base of lead consumption forms the basis of lead demand in the USA. Other end-use sectors are included, but are generally stable or in modest decline. The model also yields an estimate of the size and trend of industrial battery demand, principally by difference from better known sectors.

Analysis shows a clear bubble in industrial battery demand, which is provisionally divided into telecom and non-telecom demand. The overall trend is remarkable. From approximately 250 000 t in the mid 1990s, it is concluded that lead demand from this sector reached, albeit briefly, 0.5 Mt. The collapse in demand in 2001 was compounded by aggressive de-stocking of industrial batteries and uninterruptible power supply (UPS) systems by end-users. It is further concluded that lead demand from this sector had approximately halved by 2002. This correlates with comments made at the time by Exide about the trend in sales from the industrial battery business it had acquired with purchase of GNB.

The collapse in battery demand in the USA was one of the major structural changes in the lead industry. If demand in this sector had continued to grow, or even just remained stable, the lead industry would have struggled to supply the lead required.

3. Growth in primary lead smelting in China

From a base of only 380 000 t in 1990, Chinese refined lead production grew to 1.32 Mt in 2002. In 2003, China will overtake the USA to become the largest producer of lead on a national basis, with an output of 1.43 Mt of lead. In contrast to the USA, however, the growth in Chinese lead production has been the result of a rapid expansion of primary production. In 2003, primary production will constitute only 23% of total refined lead in the USA, whereas it will constitute only 77% in China.

Until 1995, the Chinese primary smelting industry was able to be fed largely by domestic mine production, and China exported a small amount of concentrates. Since then, although mine production has grown from 0.52 Mt in 1995 to 0.70 Mt in 2002, primary refined lead production has outstripped this and grown from 0.42 Mt in 1995 to 1.01 Mt in 2002. This million tonnes of primary refined lead production now requires concentrate imports of 0.26–0.28 Mt of contained lead per year.

The entry of China into the global custom concentrate market has altered the dynamics of the lead smelting industry in the Western World. Lead smelters bid for raw materials by offering treatment charges, which are a deduction from the amount they pay miners for metal concentrates. Treatment charges constitute a significant portion of a lead smelter's revenue.

Two trends have been prevalent since 2000. Western World mine supply has declined significantly and Chinese buying of concentrates has accelerated. As a result, the concentrate market switched to a large deficit, and treatment charges were bid down to record low levels by Chinese lead smelters, which occupy the lower end of the cost curve. The average treatment charge between 1990 and 2002 was US$ 161 per tonne of concentrate. The charges plummeted to US$ 100 per tonne in 2002 and 2003, with Chinese smelters buying spot parcels of lead concentrates for charges as low as US$ 60 per tonne.Smelting lead concentrates is, therefore, an increasingly Chinese business. This is changing the point of where lead metal is being produced, and is directly linked to the third structural change in the lead market, namely, the decline of smelting in the West.

4. Decline in lead smelting in the West, particularly Europe

This could arguably be included as a sub-set of the above structural shift in lead smelting to China. There are, however, issues that warrant specific attention. These relate specifically to lead smelting in Europe, particularly its linkage with zinc through the imperial smelting process (ISP).

The ISP is a technology than accounts for a relatively small share of lead production. Zinc and lead are smelted simultaneously in a vertical furnace, with unrefined lead tapped from the bottom, and zinc recovered through the condensation of zinc vapour from the top of the furnace. Until 2002, there were 13 smelters world-wide, each typically produced in the order of 100 000 t per year of zinc and 30 000 to 40 000 t per year of lead. The competitiveness of these zinc smelters, which was always marginal, has been slipping. The zinc (PWG grade) is of a poorer quality than that produced by the more common electrolytic zinc smelters (SHG grade), and is more costly. Thus, the advantage of being able to treat mixed zinc–lead feeds has eroded due to the decline in the production of mixed zinc−lead bulk concentrates in the

late 1990s. Also, the zinc smelting industry has rapidly expanded its capacity in the past 5 years in response to a boom in zinc mine production. In fact, it has over-expanded both in China and, particularly, in the West. Consequently, the concentrate market switched to deficit. Zinc-treatment charges have fallen as a result, and this has been the final, and fatal, straw for several ISP smelters, especially in Europe where the recent appreciation of the Euro has compounded these trends.

At least four ISP smelters will close in 2003. Three of these closures have already occurred in Europe: the Mount Isa Mines (now Xstrata) plant at Avonmouth in the UK; the Metaleurop plant at Noyelles-Godault in France; the Glencore plant at Titov Veles in the former Yugoslav Republic of Macedonia. Pasminco will close Cockle Creek in Australia in September 2003. In addition to these firm closures, Glencore may also close its Porto Vesme operations later this year. Although ISP smelters each produce only 30 000–40 000 t per year of lead bullion, the closure of Noyelles Godault also included the adjacent lead blast furnace, while the closure of Porto Vesme may include the adjacent Kivcet smelter. The output of each of these plants is more in the order of 100 000 t per year.

Total smelting capacity lost in Europe in 2003 could top 300 000 t per year. A fall of 9.6% in potential Western primary lead output is forecast for 2003, which would bring production down to only 1.48 Mt, i.e. the lowest level since the early 1960s.

The impact on the refined lead balance in Europe is clear. Western Europe has been a deficit market for refined lead for some time, though this deficit has been easily met through exports of refined lead from Eastern Europe and the CIS. Despite falling lead consumption in Western Europe, the closures of smelting capacity in 2003 have accelerated the deficit in this region to 300 000 t. Eastern Europe is slowly switching from a net exporter to a net importer of lead due to growing domestic consumption, and as a result, Western European lead imports from North America and Asia have grown considerably.

This need for lead from further away has had a direct impact on metal premiums. Consumers in Europe have paid up to US$ 130 per tonne (and occasionally higher) in early 2003 due to the uncertainty of supply from local smelters. Shipments have been made into Europe from warehouses in Singapore and the USA (most of the current stock of LME lead resides in the USA), from producers in the USA directly, and also from producers in Asia. Consumers in Europe are sufficiently worried about their lead supply in 2004 negotiations over annual contracts have already commenced. Western Europe will continue to require large quantities of imports, though this requirement may reduce slightly in 2004 if there is yet another decline in consumption.

Although Western Europe is currently the most dynamic region in terms of changing patterns of lead trade, Asia in the past has fulfilled this role. Although separate data are available for China, non-Chinese Asia and Australia, it is more instructive to combine these three into one bloc to examine the effect of the regional balance on premiums in Asia. This is because the natural market for Australian and Chinese lead is in South East and North Asia.

The data for Australia and Asia show a distinct inflexion point in 1998. Prior to then, the region was in deficit. This is in accordance with anecdotal evidence—in the mid 1990s, several North American producers and one or two European producers had agreements with consumers in Asia for moderate quantities of physical lead deliveries on annual contract. The Asian crisis in 1997 was, however, followed by higher regional production, particularly in China, and the region switched to surplus. The situation is only now moderating due to growing lead consumption in China.

Declining consumption in Europe and the USA, as well as the change in the Asian lead–metal balance, all are strongly related to the fourth, and final, structural change—a shift in battery manufacturing to China.

5. Growth in Chinese battery manufacturing

China is now the largest national consumer of many metals. In lead, it remains in second place. Lead demand in 2003 is expected to reach 1.05 Mt, which is still a wide margin behind lead consumption in the USA, at 1.465 Mt. These two markets, however, are on divergent paths. Chinese lead demand is now growing at a double digit rate, well above the 1–2% that is typical in developed, mature markets such as North America and Europe. In 2001, CRU undertook a detailed end-use calculation of Chinese lead demand and forecast rapid growth. Yet even these projections are now looking conservative.

Whilst reported lead consumption in China has all of the problems associated with Chinese data (see note at the end of paper), the local production of refined lead has grown rapidly and exports have not risen. These two firmer sources of data imply that Chinese lead demand must be growing at rates similar to, or greater than, those reported by official sources.

End-use analysis points to three large, and high growth, sectors of Chinese lead demand. These are the replacement automotive battery sector, the industrial battery sector, and the export battery sector. CRU calculates that these sectors each accounted for an approximate annual lead consumption of 170 000–190 000 t in 2002.

China exported four, five and six million automotive batteries in 1999, 2000 and 2001, respectively. This upward trend accelerated in 2002, when China exported 9 million batteries. In the first 5 months of 2003, China exported 6 million batteries, and in June 2003 alone (the latest available data) 2.3 million batteries. In the absence of information on the average size, weight or lead content of this battery trade, as a cross-check, the reported export revenue has been examined. It is found that, since 1999, the apparent average price per battery exported has remained approximately in the

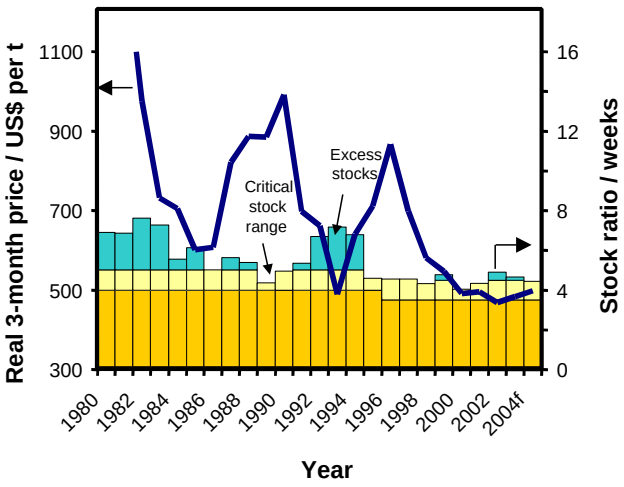

Fig. 1. Fluctuation of lead prices and stocks is decreasing.

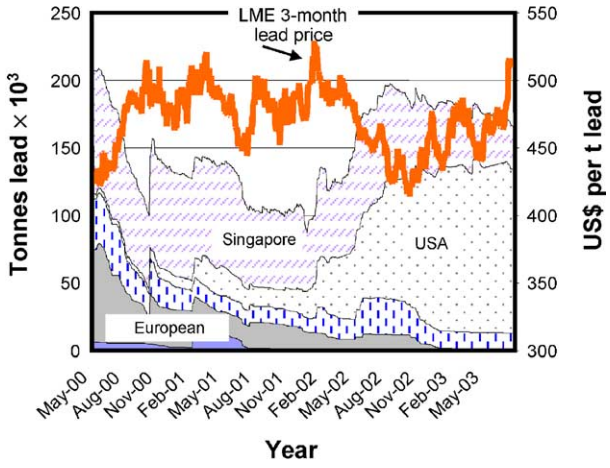

Fig. 2. Lead prices are increasing in late 2003.

range of 8–12 US$, which is not unreasonable for standard automotive batteries. These batteries are being exported to a wide spread of world markets, including the USA, Europe, the Middle East and Africa.

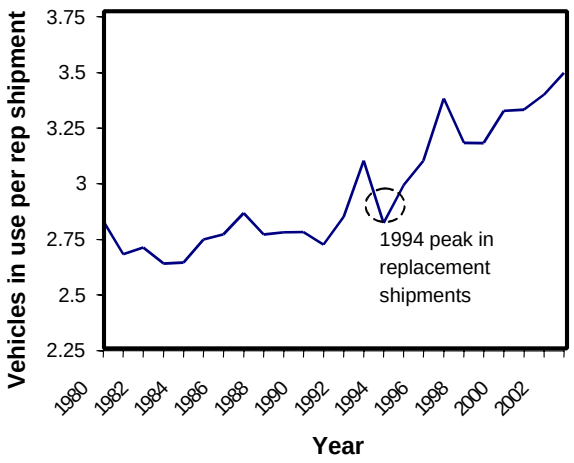

Fig. 3. Average life of batteries in the USA is increasing.

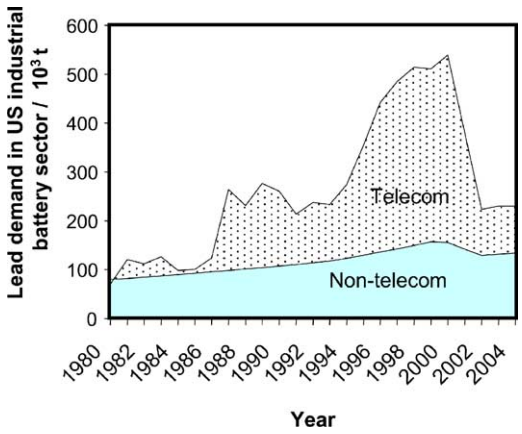

Fig. 4. Lead demand in USA industrial battery sector has halved.

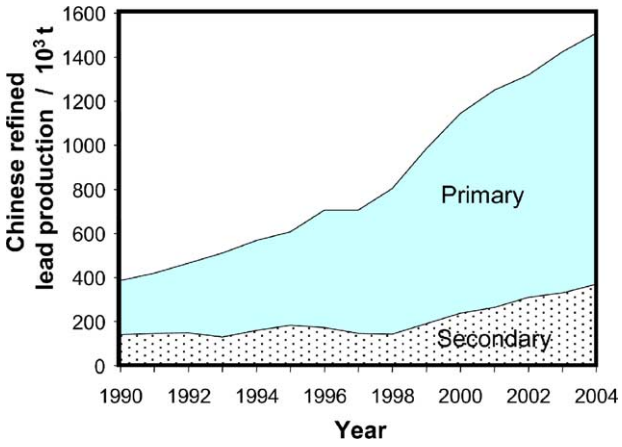

Fig. 5. Production of lead from primary sources has grown strongly in China.

This is potentially a significant structural change to the pattern of lead consumption. Lead–acid batteries are manufactured goods with a reasonable degree of labour cost in their production. They are easily tradable, not overly brand

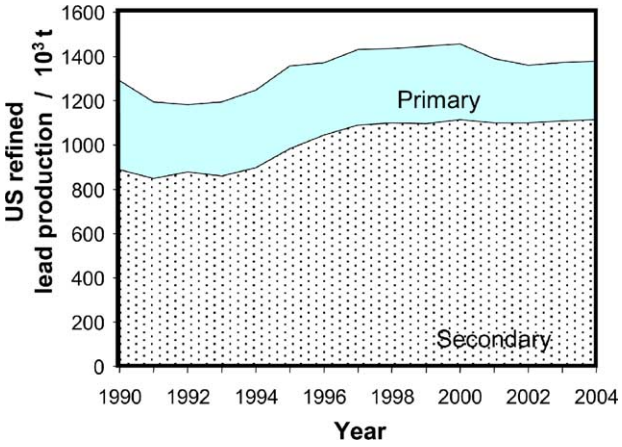

Fig. 6. Production of lead from secondary sources accounts for the majority of supply in the USA.

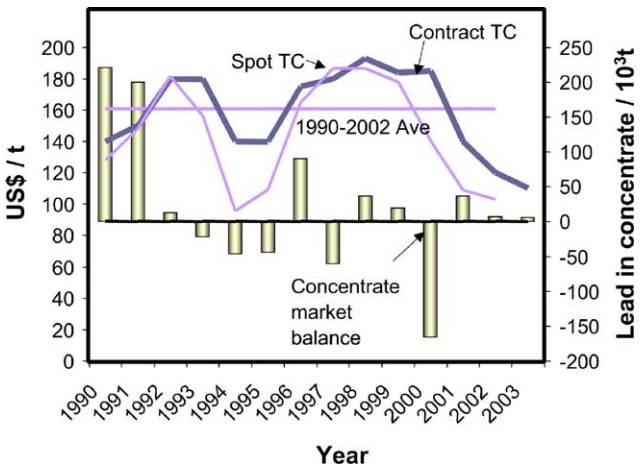

Fig. 7. Concentrate treatment charges have fallen due to demand from China.

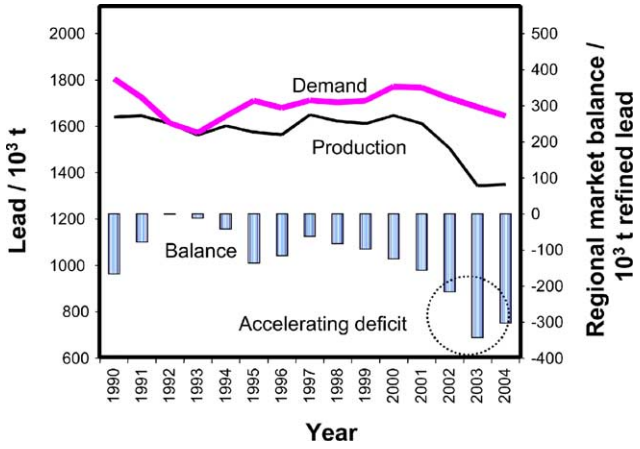

Fig. 8. Western Europe will require more lead imports.

dependent, and transport costs from China are potentially smaller than other cost savings. The batteries also do not require a great deal of capital costs for potential manufacturers, and production at existing battery factories can be

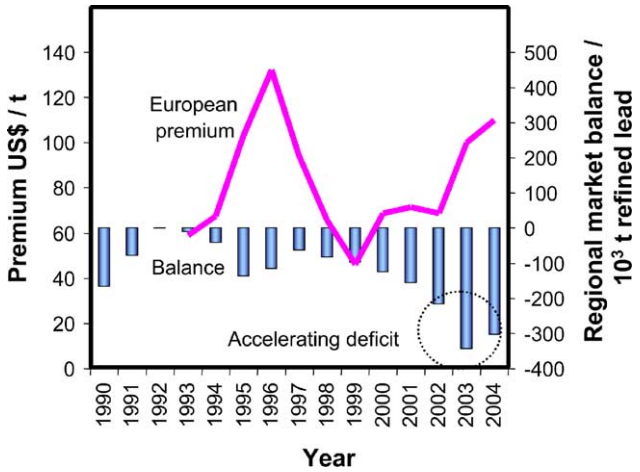

Fig. 9. The growing deficit in Western Europe is increasing lead premiums.

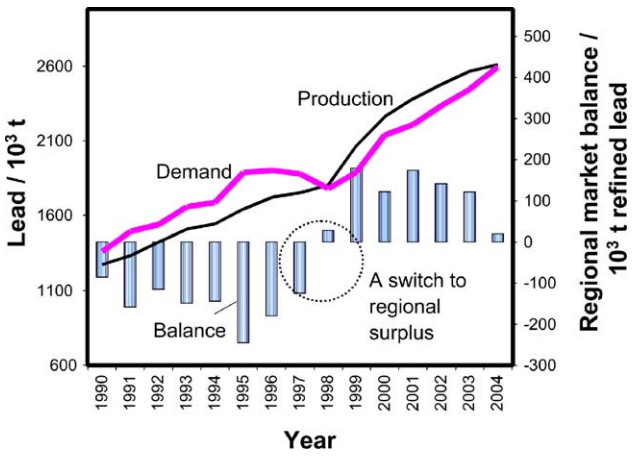

Fig. 10. Asian/Australian market switched to surplus in 1998, although this surplus is now shrinking.

incrementally expanded relatively easily. Of all metals, lead may be particularly exposed to a shift in consumption to China.

Even assuming average weights from previous research by CRU on China, this battery trade may account for as much as 280 000 t of refined lead consumption in 2003. This is above the estimate of 190 000 t of contained lead for 2002 and is a continuation of the upward trend that has been seen since 1998, when the lead content of exported batteries was just 60 000 t. From the perspective of traditional commodity analysis, the issue is entirely neutral. The location of consumption does not matter—if battery manufacturing relocates in its entirety to China, it should not alter absolute lead consumption as battery demand is inelastic to manufacturing cost (battery demand, particularly for automotive applications, is finite). Nevertheless, such a shift, if it is indeed underway, will have a far more profound impact on manufacturers of lead–acid batteries in all markets Figs. 1–12.

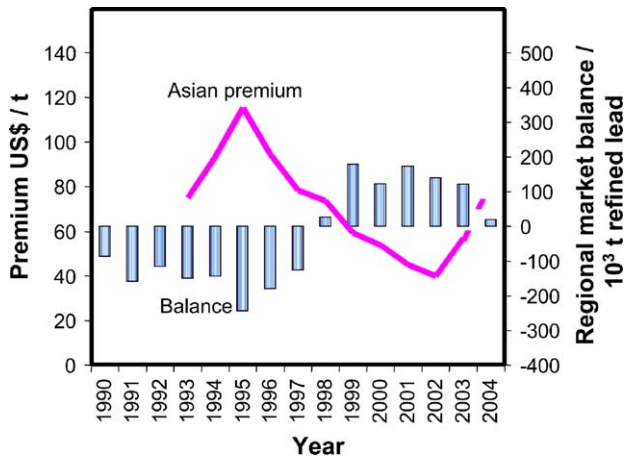

Fig. 11. Lead premiums in Asia have an inverse relationship with the regional market balance.

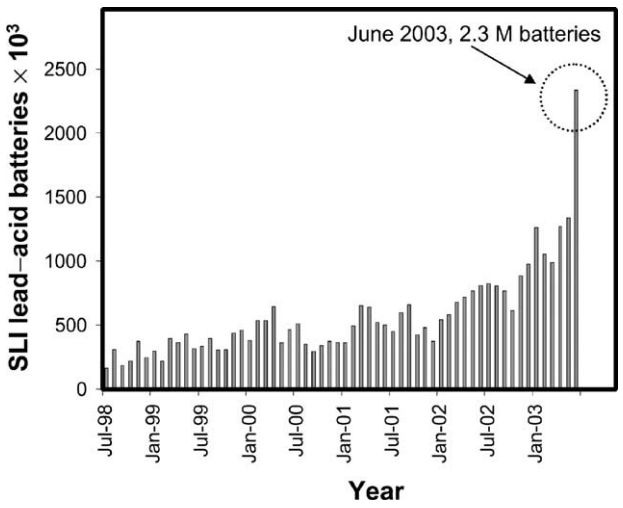

Fig. 12. Chinese battery exports are rapidly growing.

6. Conclusions

The above study has addressed a number of structural issues currently in progress, and has intentionally not addressed the potential impact of each of these on the global lead market. This is because these issues will, in the long term, be neutral to lead's outlook. With primary smelting capacity in excess (which it still is—and by up to 0.5 Mt), mine production must fall or demand must grow if the lead market is to turn decisively. Equally, a relocation of battery manufacturing to China will depress consumption in developed economies, but boost it in China by an equal amount.

On the other hand, these changes are of significant concern to battery manufacturers. Not only may they increasingly be competing with cheap Chinese batteries in export markets, but they may also be paying higher premiums for lead purchases due to the growing dominance of the Chinese in lead smelting.

Note on Chinese data

Caution needs to be exercised with all data relating to China. CRU has been actively researching the Chinese lead and zinc industries for much of the past decade and has published major studies in 1995, 2000 and 2001. It is acknowledged that whilst detailed data relating to production and consumption is available, it tends not to cover the entire industries concerned. This is particularly the case in the mining and secondary smelting sectors, where there are numerous small operations.

The lack of data, including information relating to proven and probable mine reserves, should not, however, lead to a conclusion whereby discontinuities are predicted. For example, limited information on mine reserves and production could lead to a conclusion (based on experience in the West) that mine production was at an unsustainable level and about to fall. Yet Chinese mine production was in that same position 5 years ago, and has grown nonetheless. CRU analyses China on the basis of operation-by-operation data, field research, and a system for mining, smelting and consuming lead.