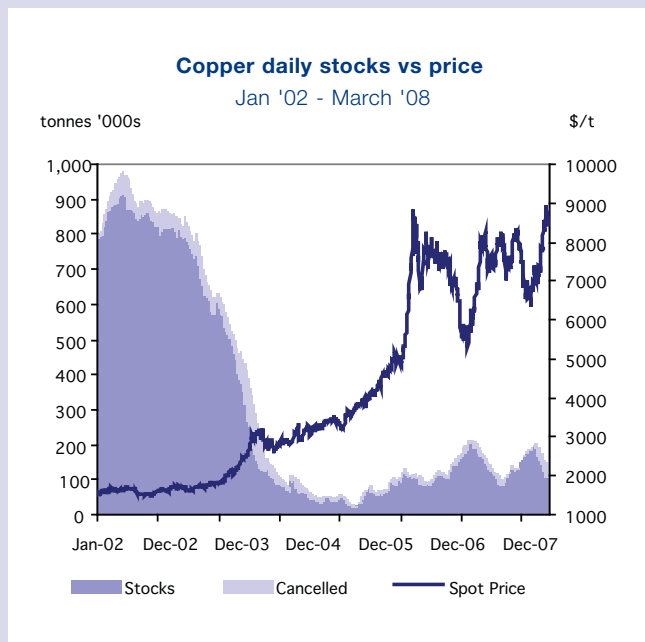


## COPPER: SUB-PRIME CRISIS, WHAT CRISIS?

THE PHRASE “CRISIS WHAT CRISIS?” IS SOMETIMES (WRONGLY) ATTRIBUTED TO JAMES CALLAGHAN, THE FORMER UK PRIME MINISTER, IN 1978 ON HIS RETURN TO THE COUNTRY FROM A JUNKET IN GUADELOUPE AS A WAVE OF STRIKES BROUGHT THE COUNTRY TO ITS KNEES. SHORTLY AFTERWARDS, THERE WAS A GENERAL ELECTION WITH MARGARET THATCHER GAINING POWER AND THE REST, AS THE SAYING GOES, IS HISTORY.

As highlighted in the chart below, copper's first reaction to the emergence of the sub-prime crisis in late summer 2007 was a predictable one. The cash quote fell from \$8,210/tonne on July 23 to a recent low of \$6,273/tonne on December 18. The bull market in copper has been written off prematurely a number of times in recent years. This again proved to be the case in late 2007, as copper prices have rallied to set a new high of \$8,881/tonne.



### A constant battle between supply and demand

The key features of the copper market have been exceptionally strong growth in China, generally weak demand within the OECD countries, myriad supply disruptions, a weak dollar and investment activity against a backdrop of low terminal market inventories and rising production costs. The level of the copper price has been determined by which of these factors are in the ascendency.

One surprising feature of the bull market has been the lack of support from underlying demand in the mature economies. We estimate that consumption in the US, Japan and the EU-15 fell by 3%, 2.3% and 4.2% respectively in 2007. More importantly, most current demand indicators in these regions are pointing to an extension of demand weakness. In the US the housing sector, in particular, continues to account for the majority of the decline in demand, with the threat that this downturn is spreading to some non-residential sectors. Reflecting this, the average daily rate of copper and brass service centers shipments for December fell 4.6% to 1.16m tonnes.

### Copper alloy shipments decline

In comparison to the US, European demand has held better in the early part of 2008. Reflecting this, European copper premiums have picked up from previous lows. They are seen at \$50-70/tonne on a cif Rotterdam basis for grade A copper. Delivery problems have forced consumers back into the market in search of replacements for the material they were due to receive. Having said that, Europe's construction sector continues to weaken. The European market for copper wire rod benefited from the high demand for cable and wires that was supported by increased investment in the energy sector. However, the other side of demand – copper and alloy sheet and strip – remains weak. We note that a similar situation prevails in Japan, where demand from the construction sector has collapsed, but offtake from the electronics/IT sector remains robust.

We analyse trends within China in a separate article (see page 3). Suffice to say that the copper industry is becoming increasingly reliant on consumption growth from this source. Any signs of weakness in China certainly would signal the end of the bull market. Overall, we are expecting global copper consumption in 2008 to grow by 4% compared to 5.5% in 2007.

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## More of the same on the supply-side

Supply disruptions have played a critical role in the bull market. Below, we detail the initial production forecasts of copper prepared by the International Copper Study Group (ICSG) with the actual outcome. In common with most forecasters, the actual outcome in terms of output was well below initial expectations, due to the variety of supply problems that emerged – strikes, technical problems, lower grades etc. In November 2005, ICSG forecast global mine output in 2006 at 15.74m tonnes compared to an outcome of 15.06m tonnes, a difference of 686,000 tonnes. Its estimate for mine output last year was 16.204m tonnes with a final outturn estimated at just over 15.5m tonnes. In its projections for 2008 (released in October 2007) the organisation was projecting a 7.6% advance for this year, which now appears unlikely.

The impact of supply disruptions on projected output (1)

| Date of Forecast | 2006 (f) | Actual    | Difference | Percentage |
|------------------|----------|-----------|------------|------------|
| Nov 16, 2005     |          |           |            |            |
| Mine             | 15,743   | 15,057    | 686        | -4.4       |
|                  | 2007 (f) |           |            |            |
| Mine             | 16,204   | 15,540    | 664        | -4.1       |
| Oct 2, 2007      | 2008 (f) |           |            |            |
| Mine             | 16,991   | 16725 (2) | 226        | -1.6       |

Source: (1) ICSG forecast 000 tonnes, (2) GFMS Metals Consulting's forecast

Most of the supply side news released so far this year has been bullish. Detailed below are just a small proportion of the disruptions that have emerged. For example, the strike at Cananea in Mexico, which began in July 2007, is still on-going. In early March, there was a short-lived wildcat strike at 180,000 tpy Ok Tedi mine. Codelco confirmed that its output fell by 5.6% last year to 1.58m tonnes (excluding its share at El Abra) due to a mixture of strikes, technical problems, earthquakes and perhaps, most importantly, a 6.3% decline in grades. Total Chilean output rose by just 3.8% at 5.89m tonnes in 2007. However in January output was 1.4% down year-on-year at 439,123 tonnes and was the fourth consecutive month-on-month decline. Zambian production came in at an estimated 520,000 tonnes last year compared to an initial government forecast of 670,000 tonnes.

## Sub prime crisis, what crisis?

Poor returns in other financial markets and signs that inflation is accelerating have seen investors increase their exposure to the whole commodity sector. It is certainly understandable that precious metals have benefited from such an environment.

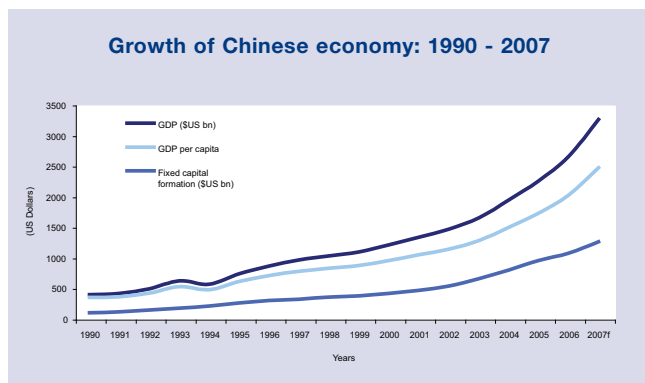
However, the potential for stagflation (although obviously not on the scale of the 1970s) is not necessarily the perfect backdrop to invest in base metals, particularly given the inflated base seen in March 2008.

In March, some of the central banks, led by the Fed, provided a massive injection of liquidity. However, the problem facing the base metals producers is that the sub-prime crisis is not only a financial crisis such as the collapse of the LTCM hedge fund in 1998, but also an economic problem that will take much longer to resolve. We believe that as the second quarter develops, the focus of the market may switch away from the perceived "perfect storm" conditions in commodity markets, which have attracted increased speculative interest and focus on the poor demand outlook. Under such a scenario, we could see a move back towards the 2007 Q4 low of \$6,273/tonne, with the potential of the sub-prime difficulties becoming a crisis for the copper market. Given the inflated level of prices early in 2008, we expect an average annual price of \$7,150/tonne in 2008 compared to \$7,100/tonne in 2007.

## WILL CHINA CONTINUE TO ABSORB HIGHER COPPER OUTPUT?

### China's economic boom continues

For the past two decades China's economy has been growing at unprecedented rates. China is now the third largest economy after the US and Japan. According to the IMF, total GDP in China grew by 11.5% year-on-year to \$US 3.25 trillion in 2007 (refer to chart below). This is despite monetary tightness – with intentions to slow the rapidly growing economy. China's per capita income has also escalated over the years. However, according to the IMF, it is classified as low, at about \$2,400. Moreover, the pace of expansion in China's industrial output continues to surprise on the upside, likely reflecting the country's still strong tradeables sector. In 2007, China's industrial production grew by over 18% year-on-year. It is estimated by the end of 2007, fixed capital formation (representing fixed asset investment, due to unavailability of data) totalled an impressive \$US 1.25 trillion. Most indicators point to a continuation of double-digit growth.



### What does a robust economy mean for Chinese copper?

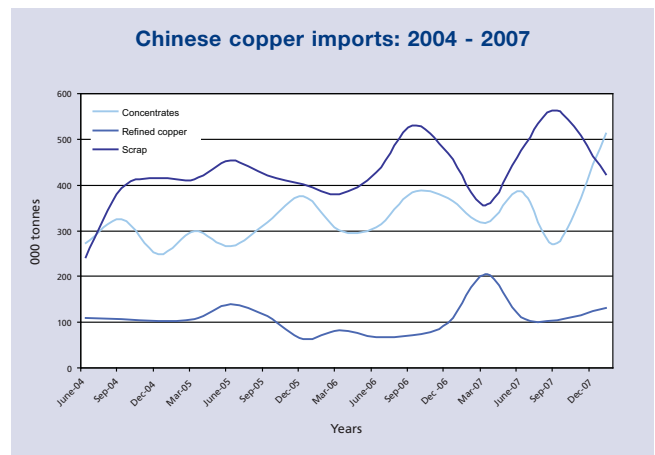
Since the start of the millennium, the average annual growth rate for copper in China has by far exceeded the growth rate of GDP. We believe this metals-intensive growth is set to continue on the back of two major reasons, which are:

- Rising per capita incomes, particularly in urban areas, has allowed expenditure on metal-intensive consumer durable goods to soar.
- The massive spending on infrastructure – housing, factories, transport and power generation/transmission.

### China's copper imports remain upbeat

Since 2004, China's copper trade data confirms the picture that copper imports have remained high, despite the slump in 2006. March 2007 represented a major peak in the refined copper

imports cycle, surpassing 200,000 tonnes. Imports of copper concentrates have also been rising since the start of the bull market. In January 2008, Chinese copper concentrate imports increased to a huge 510,000 tonnes, representing a 54.3% year-on-year increase. It is also worth noting that imports of copper scrap touched an all-time high of 561,000 tonnes in September last year, as smelters increased scrap feed to their production in light of the shortage of concentrate and low TC/RCs.



### Is copper demand easing?

Data relating to key consuming industries over the past year confirms the strong underlying demand conditions in the country. Auto production in January 2008 was 22.1% ahead of the corresponding period of 2007. With the exception of refrigerator production, which increased by 24.5% y-o-y, air conditioners and electricity-generated equipment were all up by over 10%.

However, reports from China indicate that high prices – \$8,881/tonne (an all-time high cash quote) on the LME in early March this year – are having an adverse impact on demand. Although imports may rise in the next few months, they will certainly be lower than the strong levels in the year-earlier period, when heavy re-stocking caused imports to peak. Moreover, Chinese importers reduced annual bookings for refined copper for delivery in 2008 amid fears that Beijing's economic tightening will crimp demand for the metal. Worries over softer exports of copper tubes and pipes also led to a decline in imports of copper cathode from 2007's inflated levels.

China's Ministry of Finance announced a series of changes to the country's taxation levels for metal imports and exports, all effective from January 1, 2008. Last year's 2% tax on imports

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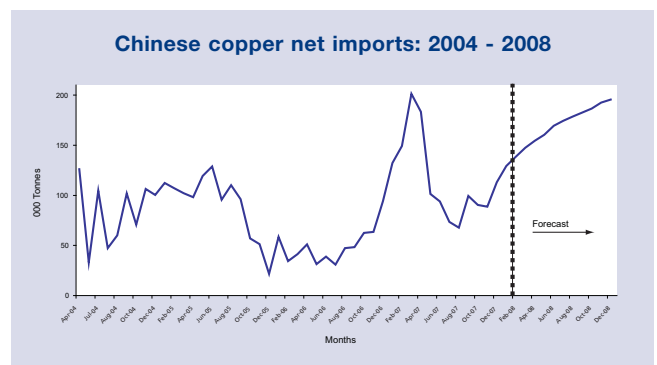
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of refined copper has been dropped, while export duty on copper (99.99%) has been reduced from 10% to 5%. Similarly, China re-implemented a 17% value-added tax on all scrap recyclers in January, in turn raising the cost of procuring scrap copper, which would raise smelter costs and possibly dent domestic production. However, with a relatively low copper content, this additional cost to importing scrap is likely to make importing refined copper relatively more attractive. We believe these changes will continue supporting the strong demand, despite higher prices.

## China set to be a net importer in 2008

China is expected to remain committed to expanding domestic consumption in an attempt to make the economy less dependent on export and investment-led growth and thus less vulnerable to the global business cycle. In particular, industrial production in China is expected to slow in the coming months as the housing-related economic slowdown in the US tempers demand for China's manufactured wares.

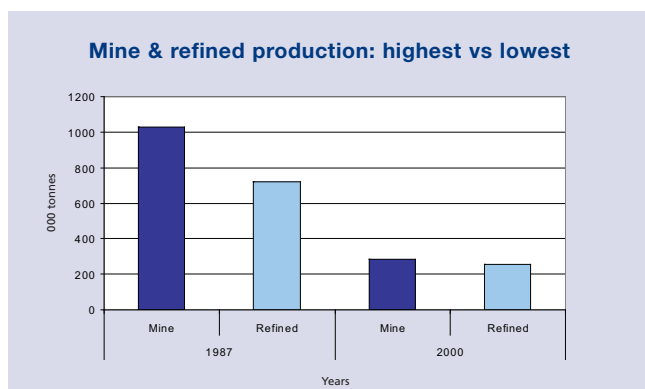
However, as imports did not collapse in the way they did during the de-stocking cycle of 2006 – as obvious from the chart below – imports may indeed rise, but possibly not on anything like the scale seen in 2007. Generally the country will continue to suck in huge amounts of imports of copper in both the form of raw materials and refined metal.



## COPPER: REVIVAL OF PRODUCTION IN AFRICAN COPPERBELT

### African Copperbelt experiences all-time highs

In the late 1980s, Central Africa was at the forefront of the copper market. The African copper-belt saw its mine and refined production peaking to their all-time highs. Mine production exceeded 1m tonnes, while refined production peaked at 718,000 tonnes in 1987. Production costs at the time averaged just below \$90c/lb. However, like most countries in Africa during that period, Zambia, in particular undertook an experiment with socialism and slowly nationalised the copper industry. Corruption, political unrest, crumbling infrastructure and mismanagement of state-owned mines drove foreign investors away. Moreover, in Zaire – now called the Democratic Republic of Congo – upheavals intensified in the 1990s. This constricted new investment into the country's mining industry and the result was that metal production declined, until it reached an all time low at the turn of the millennium (refer to chart below).



### Investors give up

Many of the world's largest mining companies, including Phelps Dodge Corp. and Anglo American who had done business in the region in the past, eventually withdrew from the region. By 2000, it is estimated by the World Bureau of Metal Statistics (WBMS) that copper mine production in the African Copperbelt dropped 72.5% to 282,300 tonnes from 1987, while refined production of the red metal declined by 64.5% to 255,200 tonnes from the 1980s peak. More specifically, while Zambia's production was approximately 250,000 tonnes at the time, DRC's output fell to almost nothing.

Given Central Africa's ongoing political problems, and since its nadir of 282,300 tonnes produced in 2000, the region's copper mine and refined production has increased during subsequent years to reach 667,200 and 510,900 tonnes, respectively, by the end of 2007. However, it is important to note that Zambia has contributed a larger share towards the increases in production. For example, in 2007 Zambia contributed 81% towards copper mine production and 100% of copper refined production. Although, the DRC is experiencing increases in production, it is at a very slow rate.

### Copper production rebounds

The downward trajectory in Central Africa has been reversed in the years subsequent to 2000, and there is every indication that production will continue this upward trend. Some of the highlights of this new entrepreneurial vision include progress with new and existing copper supply-developments. These include:

- First Quantum's Bwana Mkubwa, located just on the DRC side of the border with Zambia used to truck its ore from the Lonshi mine. In 2003, Bwana Mkubwa produced 38,000 tonnes of copper. This went up to 43,000 tonnes in 2004 and in 2005, production stood at between 45,000 – 50,000 tonnes.
- After re-opening in 2003, Zambia's Chambishi copper mine, operated by China Nonferrous Metal Mining, produced 50,000 tonnes of copper concentrate and 23,000 tonnes of copper in ore in 2006. The mine is estimated to have produced 25,000 tonnes in 2007.
- Over the past ten years, the Nchanga mine in Zambia – owned by Konkola Copper Mines (KCM) – has been producing an average of 93,000 tonnes per year of contained copper. It is estimated in 2006 and 2007 the mine produced 100,000 tonnes of copper.

**Future supply-side developments:**

The following are examples of supply-developments due to come onstream.

- First Quantum found opportunity amid the gloom. In 2003, First Quantum announced the discovery of the Frontier copper deposit, located in the south-eastward continuation of the Copperbelt from Zambia into the Congo Pedicle, which began in the fourth quarter of 2007. During the life of the mine – 19 years – Frontier is expected to produce 1.43m tonnes of copper-in-concentrate.
- Katanga produced the first copper cathode from its Kamoto Joint Venture in December 2007 following the completion of phase one of a planned four-phase refurbishment of the brownfield mine complex. It expects to be producing 150,000 tonnes via SX-EW in 2011.
- First Quantum's Kansanshi copper-gold mine, located in North Western Province of Zambia, came onstream in 2005. It is estimated that in 2006, the mine produced over 100,000 tonnes of copper, while in 2007 production increased to 163,824 tonnes. First Quantum expects the mine to produce 181,000 tonnes in 2008 and approximately 200,000 tonnes in the subsequent years to 2011.
- Equinox is presently constructing Lumwana mine, situated in North Western Zambia. With a mining life of 37 years and production due to start in mid-2008, the mine is expected to be producing 170,000 tonnes of copper concentrates from 2009 onwards.
- Since Vedanta Resources Plc became the majority shareholder in Konkola Copper Mines in 2004, a number of projects have been implemented with the ultimate aim of expanding the production capacity of the operations. The mine is expected to be producing 85,000 tonnes of concentrate in 2009 and then ramp-up to 100,000 tonnes in 2010/11.

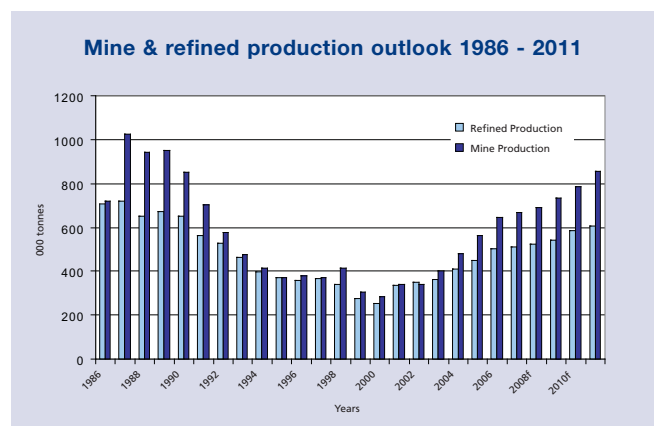
**Has Africa's mining laws made a difference to its production levels?**

In 2003, the government of the DRC adopted a new mining code aimed at improving investment in the country's mining industry. The mining code, based upon "best practices", provided a transparent framework for the exploration, development and mining of mineral resources. Moreover, there have been a number of financial incentives created specifically to encourage investment in the mining industry. They include: royalties; taxes; and licences for companies.

However, the revocation of the licences falls outside an industry-wide review of mining agreements in that country to weed out corrupt and fraudulent deals. DRC's investigation into the corrupt issuance of mining licences and Zambia's recent draft to change royalties lie within the heart of the problems in the African Copperbelt. Nevertheless, it is difficult to state whether these problems have impacted on production.

**Could there be a retest of Central Africa's all-time high?**

It is conceivable that over the next few years the African Copperbelt could once again approach production levels not seen for three decades. Taking into account the new supply-side developments, we believe copper production is likely to continue increasing. However, it will be a slow process before we see production levels reaching its historical high. By 2011, we forecast mine production will be just short of producing 900,000 tonnes, while refined production will just run over 600,000 tonnes (see chart below). Nevertheless, continued growth will depend largely on political developments, particularly in the DRC. Overall, a recent "cautious but optimistic" evaluation by The Mineral Corporation in Johannesburg, presents both the DRC and Zambia in a positive light for future copper-based development.



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## TRINITY - THE COMPLETE, INTEGRATED COMMODITIES SOLUTION

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However, Trinity can be seamlessly integrated with other best of breed business applications, such as SAP and Oracle based Enterprise Resource Planning (ERP) and accounting systems, in order to enhance existing operations by providing much higher quality data input. This approach also provides the flexibility to rapidly extend Trinity's functionality, as requirements change or new features and tools are made available, without impacting on any other operations – significantly reducing "lost opportunity cost".

Proven and tested in some of the most demanding business environments and regularly enhanced in line with both the latest industry standards and the evolving needs of our customers, Trinity provides a highly flexible and cost-effective framework for the proactive management of all aspects of commodity trading:

### Physical Material Management

With its complete supply chain management capability, Trinity can be used to control the movement of a wide range of physical and financial instruments. In particular, it:

- captures information about physical commodity purchase/sale contracts, including deal pricing and credit line controls
- identifies and accrues costs associated with contract fulfilment, inventory management, stock allocation, multi-modal transportation and scheduling logistics
- manages payments through partial and final invoicing.

| Physical Material Management                           |   |   |  |   |
|--|---|---|--|---|
| Sales and Procurement Planning                         | Contract Management   | Transportation and Scheduling                             | Material and Resource Management                                   | Global Trade Management   |
| Supply-demand forecasting<br>Trade analysis            | Trinity explorer<br>Sales and Purchase contracts                        | Freight costing<br>Load and discharge confirmation        | Inventory management<br>Exchange receipts                          | Logistical expense tracking<br>Position Management                                  |
| Account Management<br>Deal Pricing<br>Stock allocation | Product quality data adjustments<br>QP Price fixings<br>Hedge contracts | Schedule freight<br>Document centre<br>Transport tracking | Weight fixing<br>Stock audit<br>Partial allocations from shipments | Risk analysis<br>Credit line control<br>Payments<br>Provisional and final invoicing |

### Financial and Hedge Transaction Management

Trinity is a powerful and flexible market leading solution for derivatives trading and risk management. In particular, it:

- proactively tracks the lifecycle of each transaction
- provides easy to use tools for secure data input, processing and analysis
- supports pricing models that are either industry standard or user-defined.

| Financial Transaction Management  |  |  |  |
|---|--|--|--|
| Pricing Screens and Deal Support  | Trader tools and Analytics   | OTC and Exchange Products  | Capital Markets  |
| Deal capture screens<br>Swap and Option pricing models<br>On-screen trade blotter<br>Strategy generator<br>Limit monitoring | Delta position card<br>Stress testing<br>Option 'Greeks'<br>Funding gap analysis<br>Real-time market feeds | OTC and FX options calculator<br>Futures and options pricing (all major exchanges)<br>Interest rate swaps<br>LME sword warrant interface | Money Market Instruments<br>FX swaps calculator<br>Loans and deposits<br>Interest accruals |

### Treasury Management

In addition to managing your physical and hedge commodity trades Trinity's wide-ranging Treasury trading, risk management and settlement functionality addresses the requisite foreign exchange, money market and securities market requirements. These functions can be used stand-alone, but offer major benefits as an integrated tool when used with other areas of the system. In particular it:

- seamlessly integrates with Physical Material Management and the Reuters Dealing 2000 system for maximum efficiency
- achieves straight through processing, from the dealer in the front office, through to the risk manager in the middle office, to the financial controller in the back office
- is a unified trading system that includes deal capture, decision support and risk management.

| Treasury, Risk and Contract Management   |  |   |   |  |
|--|--|---|---|--|
| Pricing and Transaction Capture  | Middle Office  | Cash Management   | Risk Management   | Operations Management  |
| Pricing screens<br>On-screen deal blotters<br>Commodities<br>Foreign exchange<br>Money markets<br>Fixed income<br>What If Scenario | Trinity explorer<br>Deal modelling<br>Revaluation methods<br>Exchange clearing services<br>Confirmations | Margin calculation<br>Asset and liability management<br>Treasury accounts<br>Yield curve management<br>Payments and settlements | Market and credit data<br>Static data modules<br>VaR<br>Historical date portfolio rollback<br>Regulatory and compliance reports<br>Mark-to-Market P/L | Administration tools<br>General ledger interface<br>Reconciliation<br>Security and audit<br>Functions<br>Report generation |

## OPVAL

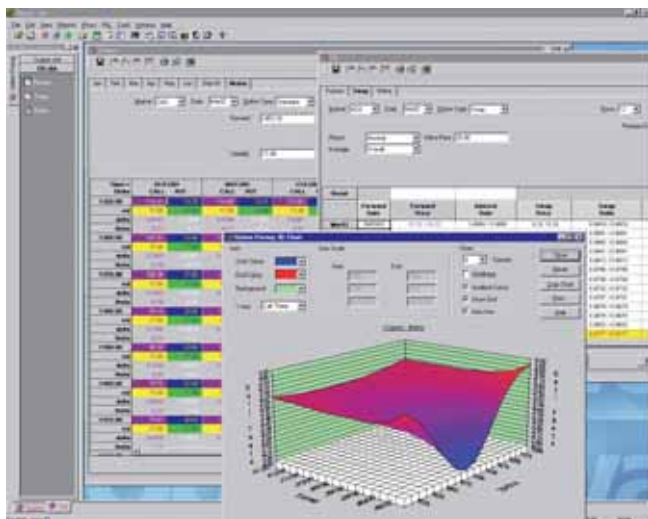
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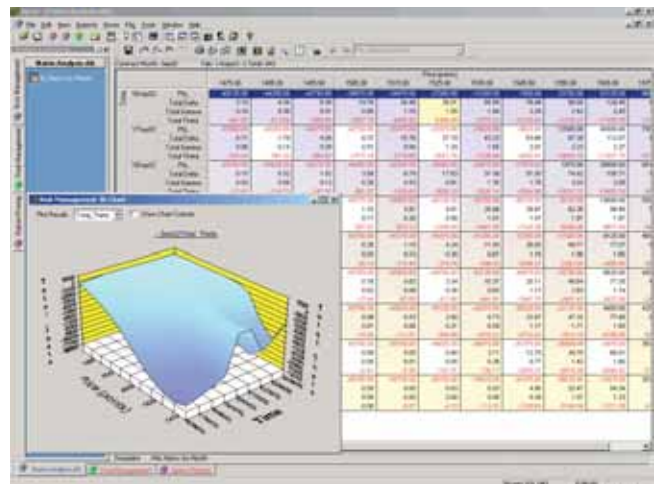
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### People

Our project consultants and development team are highly skilled in unifying the mission critical supply chain and risk management needs of organisations and delivering the sophisticated system features that are essential to effective trading in the metals and mining industry

### Knowledge

Our knowledge collectively spans every aspect of international trade in commodities and software development and each of our dedicated professionals brings direct industry knowledge and experience of working in banks, producers and trading companies

### Experience

Brady has a proven track record of successfully delivering highly tailored solutions to a wide variety of organisations that have resulted in dramatic performance improvements and reduced the risks and costs of commodity trading.

### A global customer base

Extensively used by a wide range of producers, fabricators, banks and trading companies involved in the international trade of metals and mining commodities, including over 50% of the Category 1 London Metal Exchange (LME) members.

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