Cash in the ground

Working capital management in the mining sector
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Summary

Cash in the ground is the latest in a series of working capital (WC) management reports based on EY research.

With the commodities super-cycle now reaching its conclusion, the mining sector has started to focus more rigorously on cash, cost, capital discipline and project delivery as essential components in improving their productivity levels. As boards and CEOs seek to improve return on capital and dividends to deliver greater value to shareholders on a more sustainable basis, WC management is receiving far more attention. Many initiatives have been implemented with regard to lean processing and supply chain, billing and cash collection, spend consolidation, management of payment terms, IT and management systems, and simplification of functions and processes.

Despite this heightened focus on WC, our analysis of the performance of 80 of the largest mining companies paints a contrasting picture. Overall progress stalled between 2011 and 2013 (cash to cash (C2C), a measure of the cash conversion cycle, was up 2%) in sharp contrast with the improvement seen in the previous four years (C2C was down 24% between 2007 and 2011).

Results compared between and within commodity groups were also far from uniform over the periods under review, with some businesses continuing to improve their performance while others did not. Only 3 out of 10 commodity groups (and 42% of companies analyzed) reported a lower C2C in 2013 than in 2011, while every commodity group but one (and 55% of companies analyzed) posted better results in 2011 than in 2007.

Current WC performance between the commodity groups varies considerably. These gaps can be explained by the way different commodities are mined, processed and sold, as well as by the complex and not always fully understood trade-offs between cash, costs, delivery levels and risks that each company must take and manage given the need to maximize capacity utilization and offset considerable logistics and supply chain constraints in the business. The gaps are also due to fundamental differences in the intensity of management focus on cash and the effectiveness of WC management processes. However, evidence also suggests that the degree of management attention on cash and WC tends to weaken when the profitability of operations rises.

Our experience in the mining sector confirms that a dedicated focus on WC management will release additional cash flows totaling tens of billions of US dollars across the companies in our survey, given that their aggregate levels of gross WC – defined as the sum of trade receivables, inventory and accounts payable – amount to over US$200 billion.

To capitalize on this opportunity, mining companies will need to drive continuous operational and structural improvements, addressing “root and branch” aspects of WC policies, processes and metrics.

Key initiatives should include:

• Change in behaviors within the organization, focused on optimizing returns rather than on increasing production at any cost
• Management of WC as a strategic initiative, including the alignment of employee compensation with return on capital employed and free cash flow performance measures
• Further streamlining of processing and supply chains, including consolidation of warehouse locations for spares and virtual warehousing
• Improvements in shut down maintenance planning and new models for the purchase of inventory spares
• Greater collaboration and process alignment with customers where possible
• Better supply chain planning and effective integration between supply chain partners
• Better coordination between supply, planning, processing, procurement, logistics and sales functions and processes
• Focus on improving billing and cash collections
• More effective management of payment terms, partnerships arrangements and milestones on capital projects
• Intensification of spend consolidation and control
Setting the scene

For this survey, we have chosen to focus on 80 of the largest mining companies (by sales) in the world, engaged in the exploration, mining and processing of 10 core minerals (aluminium, coal, copper, gold, iron ore, nickel, platinum, potash, silver and zinc). Three minerals dominate our sample, accounting for more than two-thirds of the overall sales.

Mining is a highly cyclical and capital-intensive business. During the past decade, demand for mining products has shifted away from developed countries to fast-growing economies, while traditional sources of supply have been progressively replaced by production from more remote and challenging geographies.

Some of the largest mining companies have increasingly global or pan-regional footprints. In addition, they are diversifying and optimizing their capabilities across all or part of the value chain. Capital expenditure (capex) from mining companies has increased since 2009, peaking in 2012, with projects growing in scale and complexity. From mid-2013, stronger capital discipline and lower prices have resulted in a significant reduction in capex. While commodity prices have increased and then declined, production costs have continued to escalate because of a combination of rising labor, raw materials and equipment costs plus falling mine productivity. This has led to WC management receiving far more management attention.
Stalled progress in working capital performance in 2011–13

Our analysis of the mining sector’s WC performance shows overall progress stalling between 2011 and 2013, in sharp contrast with the improvement seen in the previous four years (2007–11).

The mining sector as a whole reported a drop of 24% in C2C between 2007 and 2011 (from 50 days to 38 days), and then a slight increase of 2% between 2011 and 2013 (to 39 days). It should be noted that two periods of the mining cycle have been distinguished to allow more meaningful comparisons of the sector’s WC performance relative to conditions in the sector.

The improved WC performance during the 2007–11 period came from each WC component, with a fall in both days sales outstanding (DSO) (down 21%, or 7 days, to 28 days) and days inventory outstanding (DIO) (down 6%, or 3 days, to 44 days), as well as an increase in days payable outstanding (DPO) (up 5%, or 2 days, to 34 days). The inventory and payables differential (DIO – DPO) was reduced from 15 days to 10 days.

For the 2011–13 period, the deterioration in WC performance came from a poor showing in inventory (DIO up 11%, or 5 days, to 49 days) and, to a lesser extent, in DSO (up 1% to 28 days), partly offset by better results in payables (DPO up 14%, or 4 days, to 38 days).

It is worth noting that using cost of sales (COS) rather than sales to measure change in DIO and DPO would have shown similar variations between 2007 and 2011. The picture would have been different for the 2011–13 period, with both DIO and DPO falling at a much lower rate (instead of both rising). However, a degree of caution should be exercised when reviewing these metrics. COS is greatly among companies.

Between 2007 and 2011, every commodity group but gold (and 55% of companies analyzed) reported a reduction in C2C. Iron ore and coal were the best-performing commodities.

Between 2011 and 2013, only three commodity groups (and 42% of companies analyzed) reported a lower C2C. Aluminium and zinc were the best-performing commodities, while platinum was the worst, with performance affected by inventory build-up in anticipation of strike action in South Africa.

Note: DSO is days sales outstanding; DIO is days inventory outstanding using the current portion of inventory; DPO is days payable outstanding; C2C is cash-to-cash, with metrics calculated on a sales-weighted basis.

Source: EY analysis, based on publicly available financial statements.

The change in WC metrics by commodity group, 2007–11 and 2011–13

<table>
<thead>
<tr>
<th>Commodity</th>
<th>DSO change (%)</th>
<th>DIO change (%)</th>
<th>DPO change (%)</th>
<th>C2C change (%)</th>
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</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>-7</td>
<td>-26</td>
<td>-4</td>
<td>6</td>
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<tr>
<td>Coal</td>
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<td>-12</td>
<td>17</td>
<td>-7</td>
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<td>Copper</td>
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<td>-8</td>
<td>2</td>
<td>-5</td>
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<td>Gold</td>
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<td>-27</td>
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<td>11</td>
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<td>Iron ore</td>
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<td>Nickel</td>
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<td>-3</td>
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<td>Platinum</td>
<td>-13</td>
<td>-36</td>
<td>60</td>
<td>18</td>
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<td>Potash</td>
<td>-4</td>
<td>-18</td>
<td>13</td>
<td>4</td>
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<td>Silver</td>
<td>11</td>
<td>-39</td>
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<td>Zinc</td>
<td>-35</td>
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<td>Grand total</td>
<td><strong>1</strong></td>
<td><strong>-21</strong></td>
<td><strong>11</strong></td>
<td><strong>-6</strong></td>
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Change in WC metrics by commodity group, 2007–11 and 2011–13
For each commodity, there has also been major variations both in the level and degree of change in C2C between individual companies. For example, the spread in C2C (using standard deviation as a measure) for coal decreased from 24 days to 17 days between 2007 and 2011, and then increased to 25 days between 2011 and 2013. For iron ore, the spread decreased from 32 days to 28 days, before rising to 39 days. In contrast, for copper, the spread dropped from 29 days to 25 days, and then to 21 days.

A number of factors can explain these WC trends overall and for each commodity group:

**Increased proportion of sales coming from Asian economies:** A significant factor influencing the sector’s C2C over time has been the dramatic increase in the proportion of sales coming from Asian economies. This shift has had a positive impact on overall DSO, as payment terms in some of these Asian economies, such as China, are generally shorter than those in the US and Europe.

**Change in pricing practices for supply contracts:** The proportion of commodities negotiated on a spot basis instead of being sold on contract has increased in recent years, contributing to lower DSO. This is particularly the case for iron ore.

**Increased exposure to commodity trading:** A number of mining companies have set up trading arms in recent years, adopting some of the strategies used by the big commodity trading houses to make money by exploiting different prices for products in different parts of the world. This increased exposure to trading which generally carries short trade terms has also contributed to lower DSO.
Change in capex: Another factor has been change in the sector’s level of capex, with companies accelerating investments to grow capacity and improve infrastructure. For the mining companies in our survey, overall capex jumped from 13% of sales (or US$67 billion) in 2007 to 22% in 2012 (US$156 billion). This proportion then fell back to 19% (US$134 billion) in 2013 as the sector sought to contain costs and focus on those projects providing the best returns. Rising capex leads to higher DPO.

Change in the sector’s capex in value and percentage of sales, 2007-13

Volatility in mineral prices: Variations in mineral prices have also played some part in driving the sector’s C2C. This has led to a significant change in behaviors within organizations, but the scale of their impact remains difficult to assess. This is due to a number of factors, including timing differences in passing on these changes to customers, futures or spot prices arbitrage arrangements, differential between prices at year average and at year end, and investment decisions based on mineral prices. The next graph reveals a direct relationship between mineral prices and the sector’s C2C before 2008 and between 2010 and 2013, after a period of disconnection between 2008 and 2010, affected by exceptional price volatility during the global downturn and the subsequent phase.

Change in the sector’s C2C and mineral prices, 2007-13

Initiatives taken by individual companies: While some of the above factors played a significant role in driving the sector’s C2C in recent years, progress in WC performance also came from a number of initiatives taken by individual companies.

These initiatives focused on reconfiguring logistics and supply chains to make them leaner and more agile, improving billing and cash collections, managing payment terms for customers and suppliers more effectively (including renegotiation of terms), leveraging and consolidating procurement, improving IT and management systems, creating a more unified shared-service organization, and reducing complexity in functions and processes.

Other actions included sharing infrastructure and coordinating transportation of products with other producers and logistics service providers, and optimizing spare parts planning and inventory management.

Expectations of wider divergences in WC performance: For 2014, we expected the WC results to reveal even wider divergences in performance between commodity groups and individual companies, as some embrace more substantial and sustainable operational and structural changes in the way they address WC. The more the pain, the more urgency to gain. Changes in capex programs (with some choosing to be more selective) will be another contributory factor.
Case studies

- **Global WC reduction program**: EY was chosen by a large global miner to develop a global WC reduction program. This program involved: defining roles and responsibilities for WC across all relevant functions; validating reporting processes with relevant stakeholders and supporting WC decision-making; reviewing existing WC processes and identifying areas for improvement; developing detailed action plans to implement leading practices and measure progress through the design of appropriate KPIs; and putting in place the right incentives to motivate and change internal behaviors.

- **“Purchase-to-pay” process improvement**: EY was engaged to improve the management of its “purchase-to-pay” processes. This program involved: segmenting the supplier base according to payment terms, trigger and frequency; renegotiating and harmonizing payment practices for each segment, while ensuring compliance; eradicating the root causes of invoice processing delays; and introducing reports and metrics to monitor and assess progress.

- **Inventory management improvement**: A mining company had pursued a number of initiatives to improve its inventory management over a three-year period, but felt that there was still scope to further improve performance. An EY project team was engaged to review the existing processes and design an action plan to reduce inventory levels. Inventory target levels were calculated to reflect the characteristics of each stock-keeping unit (SKU), including supply lead times, forecast accuracy, order-fill rate goals and ordering minimum quantities. Forecast accuracy was improved via the planning process, while lead times were reduced for key products. This program led to an overall reduction in inventory levels and write-offs (however, with some SKUs reporting higher levels of inventory to support improving service levels).

- **WC dashboard**: For a large mining company, EY created a WC dashboard, providing forecasts of future WC balances and establishing a new variance reporting capability.
Wide variations in current working capital performance among commodity groups

Current performance in WC among the commodity groups varies considerably. These variations are driven by a combination of factors specific to each commodity and by structural and operational factors specific to each company within each group.

In 2013, the average C2C for the mining sector was 39 days (on a sales-weighted basis), with iron ore and coal displaying the lowest levels (25 days each) and platinum and nickel the highest (with their C2C exceeding 95 days). Aluminium also figures among the best performers (with C2C of 37 days), while gold and copper stand in the middle (C2C of 48 days and 51 days, respectively).

Interestingly, larger producers (using sales as the indicator of size) tend to exhibit a lower C2C than their smaller peers. For example, the two largest producers of coal, which are based in China, exhibit a C2C of as little as 2 days, owing to the combination of a negative 22 days receivables and payables differential (meaning that they are able to collect from customers 22 days faster than they pay their suppliers) and a very low DIO. In a time of razor-thin margins, this lower draw on working capital can be the competitive difference between success and failure. For aluminium and gold, the largest producers (two and three in number) display a C2C of 23 days and 36 days, respectively, which is 60% and 40%, respectively, below that of their smaller peers. For both commodity groups, this was due to lower DSO and DIO, and for gold, due to a much higher DPO.

In today’s environment, scale has become essential to optimize operating and financial performance and mitigate the risks associated with major projects. It provides companies with greater opportunities to drive further efficiencies in their processing and supply chains operations and negotiate favorable payment terms with their customers and suppliers.

WC metrics by commodity group, 2013

<table>
<thead>
<tr>
<th>Days</th>
<th>Overall</th>
<th>Alu</th>
<th>Coal</th>
<th>Copper</th>
<th>Gold</th>
<th>Iron ore</th>
<th>Nickel</th>
<th>Platin</th>
<th>Potash</th>
<th>Silver</th>
<th>Zinc</th>
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<tbody>
<tr>
<td>DSO</td>
<td>28</td>
<td>23</td>
<td>39</td>
<td>28</td>
<td>12</td>
<td>28</td>
<td>21</td>
<td>10</td>
<td>41</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>DIO</td>
<td>49</td>
<td>57</td>
<td>33</td>
<td>55</td>
<td>73</td>
<td>37</td>
<td>99</td>
<td>120</td>
<td>48</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>DPO</td>
<td>38</td>
<td>43</td>
<td>46</td>
<td>32</td>
<td>37</td>
<td>39</td>
<td>21</td>
<td>36</td>
<td>26</td>
<td>26</td>
<td>29</td>
</tr>
<tr>
<td>C2C</td>
<td>39</td>
<td>37</td>
<td>25</td>
<td>51</td>
<td>48</td>
<td>25</td>
<td>99</td>
<td>95</td>
<td>63</td>
<td>60</td>
<td>33</td>
</tr>
</tbody>
</table>

Source: EY analysis, based on publicly available financial statements.
There are a number of drivers as given below that need to be considered when comparing current WC performance between commodity groups. These include:

**Business models:** While sharing many common features, each commodity clearly has its own business characteristics, with each operating phase (exploration, development and construction, extraction, crushing and milling, flotation and drying, and then smelting and refining) varying in complexity and length according to the type of mineral.

- The establishment of a mine – from the discovery of a deposit to commissioning and operating – can take years, while the period between the extraction of the ore and the refining phase takes weeks or months. For platinum, this latter period can reach up to 6 months, which largely explains a DIO of as much as 120 days.
- Companies within a commodity group also operate at various points – and with varying degrees of involvement – in a complex value chain. This affects their inventory as well as payables performance. For example, in aluminium, some producers are fully integrated (from mining bauxite, refining it into alumina, making primary aluminium and producing midstream and downstream products), with assets jointly- or fully-owned. Others are partially integrated, or have chosen to focus on just one stage of the production value chain, such as smelting.
- Inventory levels between companies can also vary according to their supply chain and proprietary trading inventory acquisition strategies, with some choosing to hold more (when the market is in contango) or less physical stocks (e.g., when the market shows a strong backwardation).

**Payment practices:** There are many possible causes for the gap in receivables performance across the mining sector (with DSO ranging between 10 and 12 days for platinum and gold and 41 days for potash).

- The nature of mining supply contracts varies. Financial and physical mineral trade settlements have different conventions based on the product and region. Prices are negotiated quarterly, monthly and increasingly on a spot and FOB (free on board) or delivered basis. Typically, invoices are settled net, meaning multiple transactions settling on the same day with the same counterparty are netted together. These contracts often include provisional pricing and an adjustment invoice following delivery. Some of them are take-or-pay arrangements and can contain terms and conditions of varying degrees of complexity. For example, the low levels of DSO displayed by platinum and gold largely reflect the cash-equivalent, freely tradeable nature of these minerals, generally sold or toll refined through a handful of large refineries around the world, enabling the enforcement of favorable payment terms.
- Supply contracts may also include a cash in advance payment or deferred revenue element (which has not been factored in the calculation of our WC metrics, because it is not often separately disclosed and its accounting treatment differs). This element when compared with sales varies greatly across and within commodity groups. For copper and iron ore producers, the current portion is generally below 1%. For coal producers in China, the corresponding figure represents the equivalent of 2% of sales.
- DSO performance can be influenced by a small number of customers. For example, demand from China represented 40%–60% of global demand for all core minerals in 2013. For BHP Billiton, Rio Tinto and Vale, Asian economies accounted for around 60% of sales during the same year, with 30%-40% coming from China.
- Significant disparities in the levels of payment delays and defaults (and subsequently in provisioning and write-offs policies) can also be observed among commodity groups. While country payment practices and behaviors do play a role, these differences can also be explained by variations in the degree of effectiveness of credit management policies and legal enforcement procedures.

**Trade-offs between cash, costs, delivery levels and risks:** Variations in WC performance across the sector also reflect the complex and not always fully understood trade-offs between cash, costs, delivery levels and risks that each commodity group and company must take and manage given the need to maximize capacity utilization and offset considerable logistics and supply chain constraints in the business (from the mine to the customer and back to the supplier, using multiple infrastructures, such as roads, railways and ports).

**Expansion capex:** With companies having accelerated investments in recent years, expansion capex has become a critical differentiator in driving payables performance across the sector.

**Management focus on WC:** While part of the WC performance gaps among commodity groups can be explained by the above factors, they are also due to fundamental differences in the intensity of management focus on cash and the effectiveness of WC management processes between and within commodity groups. However, evidence also suggests that the degree of management attention on cash and WC tends to weaken when the profitability of operations rises.
Driving working capital excellence

As the pace and scale of industry change continue to escalate, mining companies seeking to achieve further progress in WC will need to focus on a number of key initiatives as mentioned below.

- **Further streamlining of processing and supply chains** to drive greater efficiencies, optimize asset utilization and build higher responsiveness into systems and processes
- **Greater collaboration and process alignment with customers** to reduce costs, lower inventories and improve service levels
- **Better supply chain planning** to ensure efficient allocation of supply chain resources across the organization, improved coordination of maintenance activities and capital project delivery on time and within budget
- **Effective integration between supply chain partners**, enabling enhanced demand and supply visibility, improved forecasting accuracy and better supply chain reliability
- **Better coordination between supply, planning, processing, procurement, logistics and sales functions and processes**, in order to align the level of demand, mine and production and capacity to customer demand, while balancing cash and costs with delivery service
- **Improvements in billing and cash collections** by setting an effective organizational structure of collections and dispute management, tightening controls around terms and contracts, and consolidating billing processes to accelerate invoice production
- **More effective management of payment terms for customers and suppliers**, including renegotiation of terms and management of payment milestones on capital project delivery – sometimes challenging “customary contracting arrangements”
- **More effective management of partnerships payment arrangements**, including paid and received royalties
- **Improvements in cash flow forecasting processes**, including more rigorous budgeting and planning, especially for new capital projects
- **Intensification of spend consolidation and control**, by working more closely with suppliers, increasing global sourcing while rationalizing the supplier base, and reducing complexity in processes
- **More effective management of sourcing contracts** by having dedicated structures with clearly defined roles and responsibilities, trusted providers with contracts that are carefully configured and managed with improved communication and planning, and adequate contingency plans in place
- **Optimization of spare parts planning and inventory management**
- **Implementation of a larger, more unified shared services organization**, comprising processes and functions related to receivables and payables, order-fulfilment and purchasing, human resources, information and legal services
- **Alignment of business processes and information systems up and down the value chain** to share real-time and accurate supply and demand information
- **Increase in the use of financing solutions** directly or through a third-party as a way to provide attractive and flexible alternatives to customers and suppliers
- **Active management of the trade-offs between cash, cost, delivery levels and risks**, that are sometimes required with various WC strategies – choosing, for example, between capacity utilization or cost-to-serve and inventory levels; customer payment terms and sales price rebates; supplier payment terms and early payment discounts; and inventory levels for consignment stock arrangements and customer delivery levels
- **Driving WC synergies from acquisitions**, by improving processes from integrating businesses and sharing internal WC leading practices more widely across the extended organization
- **Changing internal behaviors**, by setting adequate targets for improvements in WC using monthly or year-average rather than year-end balances, accurately assessing the progress being made at both the corporate and the unit level, and aligning the compensation of different groups (with multiple and sometimes conflicting interests) to the relevant performance measures
How EY can help

EY’s global network of dedicated WC professionals can help you to identify, evaluate and prioritize realizable improvements to liberate significant cash from WC through sustainable changes to commercial and operational policy, process, metrics and procedure adherence.

We can assist you in your transition to a cash-focused culture and help implement the relevant metrics. We can also identify areas for improvement in cash flow forecasting practices and then assist in implementing processes to improve forecasting and frameworks in order to sustain those improvements.

WC improvement initiatives often create value. In addition to increased levels of cash, significant economic benefits may arise from productivity improvements, reduced transactional and operational costs and lower levels of bad and doubtful debts and inventory obsolescence. Our WC professionals are there to help wherever you do business.
Methodology

This report is based on a review of the WC performance of 80 of the largest mining companies (by sales) engaged in the mining and processing of 10 different minerals across the world (aluminium, coal, copper, gold, iron ore, nickel, platinum, potash, silver and zinc). It should be noted that diversified companies have been allocated to the commodity group representing their most important revenue. Steel will be covered in a separate study, and commodity trading companies have been excluded from our review because of the difficulty of assessing their “true” performance given the intertwined nature of their trading and mining and metals activities, and differences in financial reporting and disclosures.

The insights are derived from an analysis of publicly available annual sources of information, with the number of companies shown next to each commodity group.

- Aluminium (6)
- Coal (12)
- Copper (16)
- Gold (16)
- Iron ore (9)
- Potash (5)
- Nickel (3)
- Platinum (4)
- Silver (6)
- Zinc (3)

While the findings are based on publicly available data, the performance of individual companies is not discussed or disclosed. Any broader industry commentary is based on general sector and commodity group observations and not on views of any single organization.

Glossary

- **DSO (days sales outstanding):** year-end trade receivables net of provisions, including value-added tax (VAT) and adding back securitized receivables, divided by full-year pro forma sales and multiplied by 365 (expressed as a number of days of sales, unless stated otherwise)

- **DIO (days inventory outstanding):** year-end current inventories net of provisions, divided by full-year pro forma sales and multiplied by 365 (expressed as a number of days of sales, unless stated otherwise). Note that some producers of copper, gold and silver also hold long-term inventories, including mill and lead stockpiles and leach pads.

- **DPO (days payable outstanding):** year-end trade payables, including VAT and adding back trade-accrued expenses (including accrued capital expenditure and royalties), divided by full-year pro forma sales and multiplied by 365 (expressed as a number of days of sales, unless stated otherwise). Note that for a number of UK plc companies, accruals reported separately in accruals and deferred income have been added back to trade payables.

- **C2C (cash-to-cash):** equals DSO, plus DIO, minus DPO (expressed as a number of days of sales, unless stated otherwise)

- **Pro forma sales:** reported sales net of VAT and adjusted for acquisitions and disposals when this information is available
## Contacts

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<tr>
<th>Country/region</th>
<th>Local contact</th>
<th>Telephone/email</th>
</tr>
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<tbody>
<tr>
<td>Americas</td>
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<td>+1 212 773 0562 <a href="mailto:steve.payne@ey.com">steve.payne@ey.com</a></td>
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EY's Global Mining & Metals Center
With a volatile outlook for mining and metals, the global sector is focused on cost optimization and productivity improvement, while poised for value-based growth opportunities as they arise. The sector also faces the increased challenges of changing expectations in the maintenance of its social license to operate, skills shortages, effectively executing capital projects and meeting government revenue expectations.

EY's Global Mining & Metals Center brings together a worldwide team of professionals to help you succeed – a team with deep technical experience in providing assurance, tax, transactions and advisory services to the mining and metals sector. The Center is where people and ideas come together to help mining and metals companies meet the issues of today and anticipate those of tomorrow. Ultimately it enables us to help you meet your goals and compete more effectively.

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