

Relationship between exploration, new mines and equipment sales

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The Global Mining Sector (2018)

| | MINED ('000t) | AVERAGE PRICE (US\$/t) | VALUE PA (US\$ bn) |
|----------------------|------------------|---------------------------|-----------------------|
| Coal (commercial) | 6,500,000 | 113 | 735★ |
| Iron Ore (62% Fe) | 2,187,000 | 69 | 151 |
| Copper | 20,800 | 6,636 | 138 |
| Gold | 106 Moz 3.28 | \$1,312/oz 42,181,719 | 138 |
| Zinc | 12,620 | 2,892 | 36 |
| Nickel | 2,126 | 13,190 | 28 |
| Diamonds | 147 Mct 0.029 | \$100/ct 500,000,000 | 15 |
| Bauxite | 300,000 | 45 | 14 |
| Silver | 840 Moz 27 | \$16.3/oz 522,453 | 14 |
| Potash (K2O) | 37,000 | 290 | 11 |
| Top Ten Total | 9,059,380 | Av \$141/t | 1,280 |

Other major metals include Lead (4.6 Mt at \$2,249/t for \$10.3 billion),
and all the PGMs (16 Moz at a combined \$950/oz for total of \$15 billion)

★ 70% Thermal (\$85/t) + 20% Met (\$250) + 10% Lignite (\$30)

Mining's Five-Year Slump

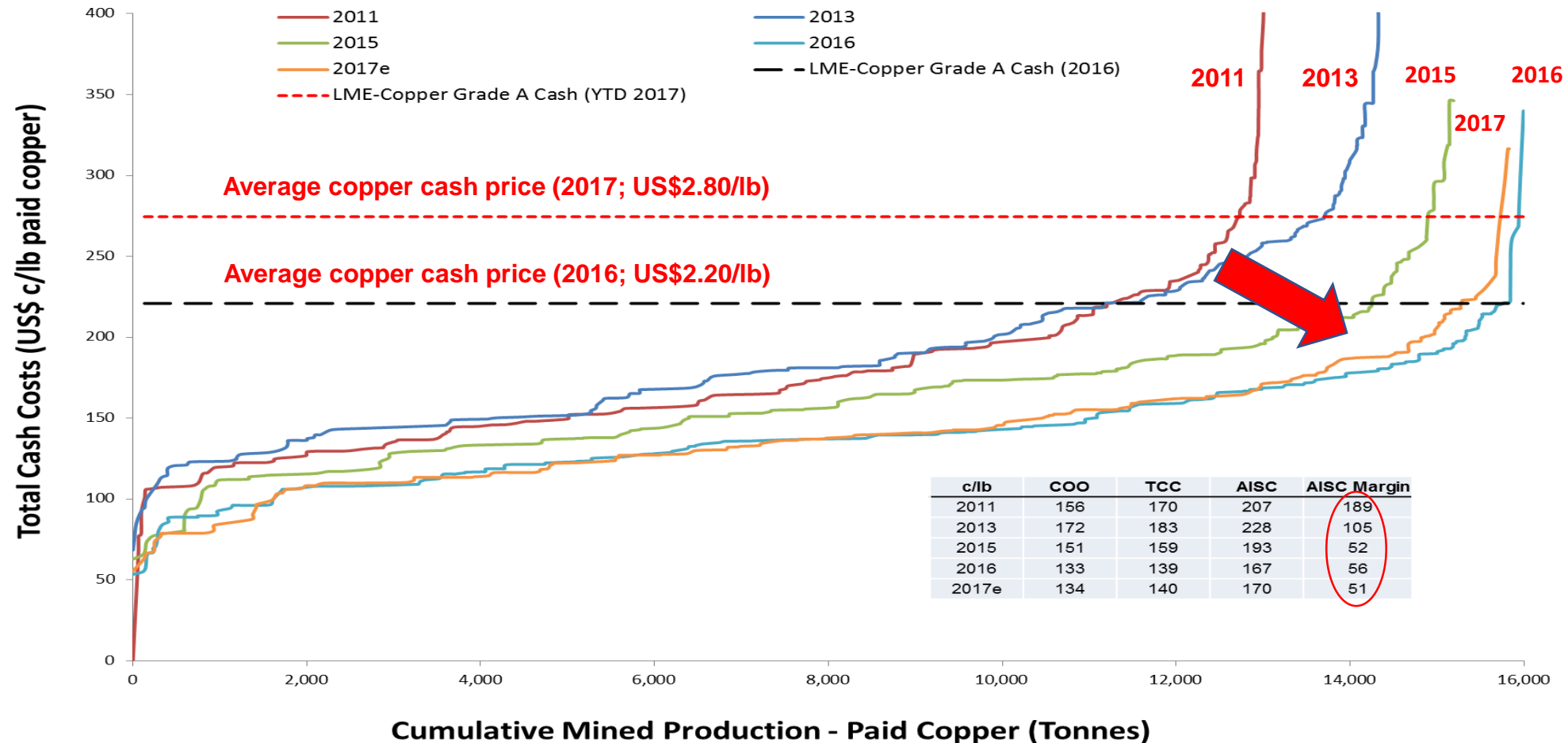


* Australian thermal coal; FOB Newcastle

Source: S&P Global Market Intelligence

Industry's Reaction to the Falling Prices

i) Lower, and Flatter, Cost Curves



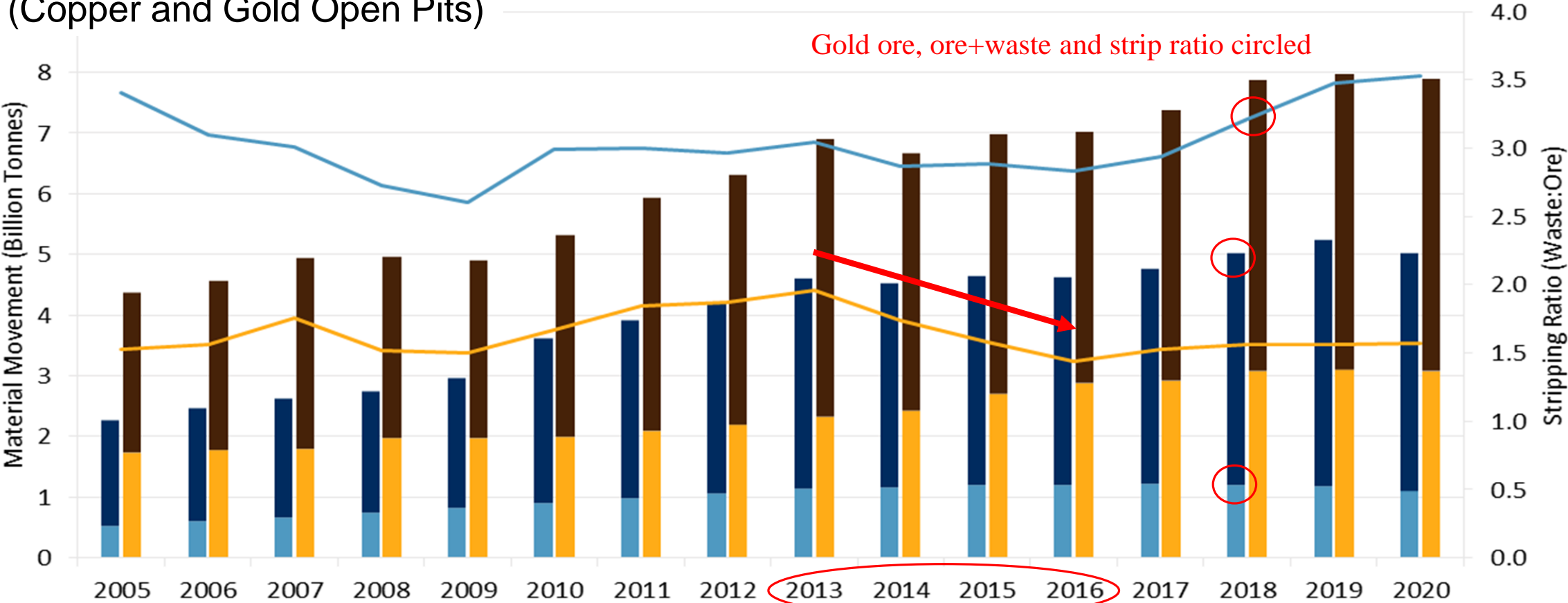
COO = Cash Operating Cost (excludes royalties). TCC = Total Cash Costs.
AISC = All-in-Sustaining Cost. Margin = Operating profit.

Source: S&P Global Market Intelligence

Reducing Costs — Mining Less Waste



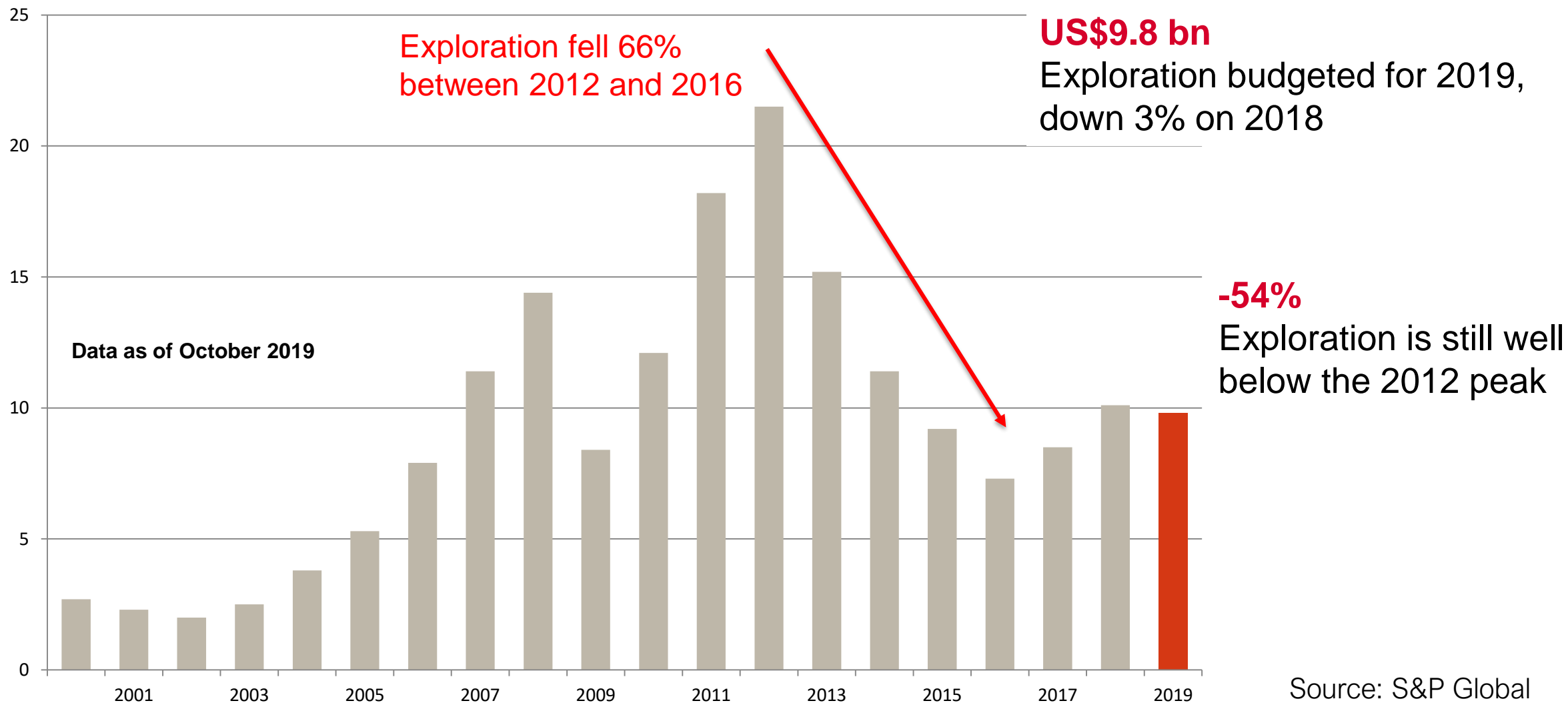
STRIPPING RATIOS (Copper and Gold Open Pits)



Source: S&P Global Market Intelligence

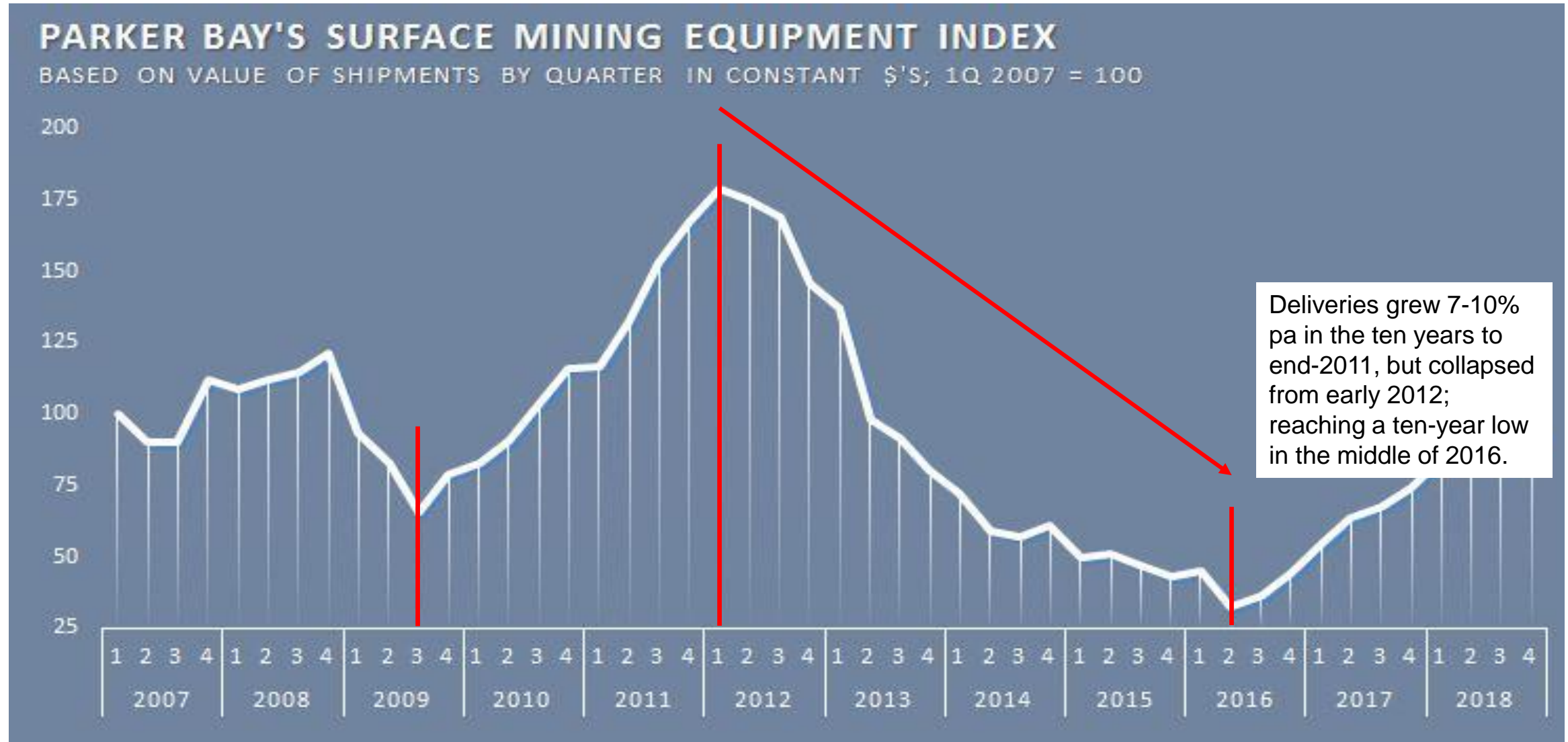
Reaction to the Falling Metals Prices

ii) Lower Exploration Expenditure



Reaction to the Falling Metals Prices

iii) Falling Equipment Orders (large excavators/loaders/trucks)



Source: The Parker Bay Company

Mine Openings (since 2010)

| Name | Primary Metal | Country | LOM Ore (Mt) |
|--------------------|---------------|---------------|--------------|
| 2010 (25) | | | |
| Penasquito | Gold | Mexico | 805.5 |
| Sukari | Gold | Egypt | 314.5 |
| Blagodatnoye | Gold | Russia | 262.7 |
| Essakane | Gold | Burkina Faso | 187.4 |
| Malomir | Gold | Russia | 110.6 |
| Soledad/Dipolos | Gold | Mexico | 77.7 |
| La Zanja | Gold | Peru | 73.3 |
| San Francisco | Gold | Mexico | 67.2 |
| Hidden Valley | Gold | PNG | 50.6 |
| Tongon | Gold | Cote d'Ivoire | 43.2 |
| Duketon Northern | Gold | Australia | 37.6 |
| Anabi | Gold | Peru | 33.4 |
| Aurizona | Gold | Brazil | 29.2 |
| Edna May | Gold | Australia | 26.9 |
| S Laverton-Carozue | Gold | Australia | 25.5 |
| La Libertad | Gold | Nicaragua | 23.4 |
| Novosibirskskoye | Gold | Russia | 21.8 |
| Inata | Gold | Burkina Faso | 19.7 |
| White Dam | Gold | Australia | 7.0 |
| Kensington | Gold | USA | 6.4 |
| Selinsing | Gold | Malaysia | 6.2 |
| Coete | Gold | Brazil | 5.0 |
| El Aguila | Gold | Mexico | 4.6 |
| Turk-Angelis | Gold | Zimbabwe | 3.5 |
| Cerro Bayo | Silver | Chile | 3.2 |

| | | | |
|-------------------|--------|---------------|-------|
| 2011 (30) | | | |
| Copper Mountain | Copper | Canada | 443.3 |
| Canadian Malartic | Gold | Canada | 288.5 |
| Tantahuatay | Gold | Peru | 128.5 |
| La Arena | Gold | Peru | 124.9 |
| Goro | Nickel | New Caledonia | 106.1 |
| Copler | Gold | Turkey | 94.4 |
| Albyn | Gold | Russia | 93.4 |
| Verninskoye | Gold | Russia | 81.2 |
| Barro Alto | Nickel | Brazil | 62.2 |
| Albazino | Gold | Russia | 35.3 |
| Yangshan | Gold | China | 34.8 |
| Toka Tindung | Gold | Indonesia | 34.4 |
| Bisha | Zinc | Eritrea | 23.8 |
| Kipoi | Copper | DRC | 22.7 |
| Timmins | Gold | Canada | 15.8 |
| Nzema | Gold | Ghana | 15.5 |
| Bolivar | Copper | Mexico | 12.0 |
| Santa Elena | Gold | Mexico | 11.8 |
| Mineral Ridge | Gold | USA | 11.4 |
| Jinxing | Gold | China | 9.2 |
| El Valle | Gold | Spain | 6.2 |
| Kaymaz | Gold | Turkey | 6.0 |
| Gold Ridge | Gold | Solomon Is | 5.5 |
| How | Gold | Zimbabwe | 5.1 |
| Guanaco | Gold | Chile | 4.3 |
| Mutanda | Copper | DRC | 2.4 |
| Midas | Gold | USA | 2.3 |
| Pampalo | Gold | Finland | 2.0 |
| King of the Hills | Gold | Australia | 1.9 |
| Ascha | Gold | Russia | 1.3 |

| | | | |
|------------------|--------|------------|-------|
| 2012 (19) | | | |
| Salobo | Copper | Brazil | 853.9 |
| Kevitsa | Nickel | Finland | 174.1 |
| Ambatovy | Nickel | Madagascar | 163.0 |
| Noche Buena | Gold | Mexico | 141.1 |
| Martabe | Gold | Indonesia | 110.6 |
| New Afton | Gold | Canada | 85.7 |
| Edikan | Gold | Ghana | 84.0 |
| Duketon Southern | Gold | Australia | 80.4 |
| Ramu | Nickel | PNG | 77.9 |
| Young-Davidson | Gold | Canada | 53.7 |
| La Colorado | Gold | Mexico | 47.4 |
| Ban Houayxai | Gold | Laos | 39.9 |
| Twangiza | Gold | DRC | 31.3 |
| Songjiagou | Gold | China | 19.6 |
| Mt Magnet | Gold | Australia | 17.6 |
| DeGrussa | Copper | Australia | 16.3 |
| Mercedes | Gold | Mexico | 8.1 |
| Efencukuru | Gold | Turkey | 7.2 |
| Bakoudou | Gold | Gabon | 3.4 |

| | | | |
|------------------|--------|---------------|---------|
| 2013 (26) | | | |
| Oyu Tolgoi | Copper | Mongolia | 1,065.2 |
| Caserones | Copper | Chile | 942.1 |
| Detour Lake | Gold | Canada | 602.8 |
| Bissa | Gold | Burkina Faso | 174.9 |
| Pueblo Viejo | Gold | Dominican Rep | 163.7 |
| Kibali | Gold | DRC | 99.2 |
| Akyem | Gold | Ghana | 93.6 |
| Pucamarca | Gold | Peru | 75.5 |
| Didipio | Gold | Philippines | 55.8 |
| Tucano | Gold | Brazil | 44.1 |
| Nullagine | Gold | Australia | 17.3 |
| Mayskoye | Gold | Russia | 16.6 |
| Olympias | Gold | Greece | 15.5 |
| Mount Carlton | Gold | Australia | 10.1 |
| El Porvenir | Gold | Mexico | 9.4 |
| El Gallo Complex | Gold | Mexico | 8.9 |
| Breapampa | Gold | Peru | 7.1 |
| Cusi | Silver | Mexico | 6.8 |
| Hademen | Gold | China | 6.4 |
| New Luika | Gold | Tanzania | 6.3 |
| La Manchuria | Gold | Argentina | 5.8 |
| Luoning | Gold | China | 3.3 |
| Del Toro | Silver | Mexico | 3.0 |
| Bachelor Lake | Gold | Canada | 1.6 |
| Andy Well | Gold | Australia | 1.3 |
| Ban Phuc | Nickel | Vietnam | 1.1 |

| | | | |
|-------------------|--------|---------------|-------|
| 2014 (17) | | | |
| Gold Mountain | Gold | China | 109.5 |
| La India | Gold | Mexico | 51.5 |
| Conchenco | Gold | Mexico | 30.3 |
| Riocho d Machados | Gold | Brazil | 29.0 |
| Agata | Nickel | Philippines | 28.1 |
| Belaya Gora | Gold | Russia | 27.3 |
| Longnan Zijin | Gold | China | 22.3 |
| Rysbinovoye | Gold | Russia | 21.1 |
| Agbaou | Gold | Cote d'Ivoire | 20.9 |
| AS Suk | Gold | Saudi Arabia | 16.9 |
| Seruyung | Gold | Indonesia | 12.5 |
| Pilar | Gold | Brazil | 12.0 |
| Jiagantan | Gold | China | 7.0 |
| Tomingley | Gold | Australia | 6.8 |
| Eagle | Nickel | USA | 6.5 |
| Podgolechnoye | Gold | Russia | 1.5 |
| El Roble | Copper | Chile | |

| | | | |
|--------------------|--------|--------------|---------|
| 2015 (21) | | | |
| Las Bambas | Copper | Peru | 1,095.5 |
| Aktogay | Copper | Kazakhstan | 944.0 |
| Sentinel | Copper | Zambia | 938.1 |
| Constancia | Copper | Peru | 653.2 |
| Red Chris | Copper | Canada | 277.9 |
| Otiokoto | Gold | Namibia | 40.8 |
| Aurora | Gold | Guyana | 33.8 |
| Central Murchison | Gold | Australia | 32.1 |
| Pan | Gold | USA | 26.8 |
| Jabal Sayid | Copper | Saudi Arabia | 26.5 |
| Eleonore | Gold | Canada | 23.8 |
| Cam & Motor | Gold | Zimbabwe | 22.4 |
| Bea Mountain | Gold | Liberia | 19.9 |
| Bozymchak | Copper | Kazakhstan | 18.7 |
| Cerro Negro | Gold | Argentina | 16.7 |
| Pickstone Peerless | Gold | Zimbabwe | 9.4 |
| Imaculada | Silver | Peru | 8.3 |
| Kurilgeo | Gold | Russia | 7.6 |
| Karouni | Gold | Guyana | 5.0 |
| Hera | Gold | Australia | 3.2 |
| Tembang | Gold | Indonesia | 1.6 |

Source: S&P Global Market Intelligence

| 2016 (27) | | | |
|------------------|--------|--------------|-------|
| Bozshakol | Copper | Kazakhstan | 623.5 |
| Merian | Gold | Suriname | 154.9 |
| Shahuindo | Gold | Peru | 136.3 |
| Asanko | Gold | Ghana | 109.2 |
| Bouly | Gold | Burkina Faso | 66.0 |
| Boleo | Copper | Mexico | 65.1 |
| Soledad Mountain | Gold | USA | 45.1 |
| El Limon-Guajes | Gold | Mexico | 40.2 |
| Matilda | Gold | Australia | 39.6 |
| Karma | Gold | Burkina Faso | 38.9 |
| Zarshoran | Gold | Iran | 27.7 |
| Ad Duwayhi | Gold | Saudi Arabia | 27.1 |
| Namoya | Gold | DRC | 25.9 |
| Sari Gunay | Gold | Iran | 20.5 |
| Thunderbox | Gold | Australia | 20.2 |
| Pakrut | Gold | Tajikistan | 20.0 |
| El Tranquilo | Gold | Argentina | 17.1 |
| Runruno | Gold | Philippines | 15.2 |
| Nampala | Gold | Mali | 11.8 |
| Svetloye | Gold | Russia | 8.4 |
| Taldy Bulak | Gold | Kyrgyzstan | 6.2 |
| Deflector | Gold | Australia | 3.8 |
| Tambomayo | Gold | Peru | 2.9 |
| Beta Hunt | Gold | Australia | 2.8 |
| Yaramoko | Gold | Burkina Faso | 2.4 |
| Elder-Tagami | Gold | Canada | 0.9 |
| Long Canyon | Gold | USA | |

| 2017 (18) | | | |
|---------------------|--------|--------------|-------|
| Rainy River | Gold | Canada | 131.3 |
| San Agustin | Gold | Mexico | 77.6 |
| Haile | Gold | USA | 58.8 |
| Fekola | Gold | Mali | 56.6 |
| Tujuh Bukit | Gold | Indonesia | 50.5 |
| Kolwezi | Copper | DRC | 40.5 |
| Hounde | Gold | Burkina Faso | 33.0 |
| Brucejack | Gold | Canada | 17.2 |
| Hope Bay | Gold | Canada | 16.6 |
| Davyhurst | Gold | Australia | 16.1 |
| Redwing | Gold | Zimbabwe | 9.0 |
| Taryn | Gold | Russia | 8.2 |
| Ernesto/Pau-a-Pique | Gold | Brazil | 4.6 |
| Fortnum | Gold | Australia | 4.0 |
| Dalny | Gold | Zimbabwe | 3.0 |
| Darlot | Gold | Australia | 2.9 |
| Red Rabbit | Gold | Turkey | 1.5 |
| Encuentro | Copper | Chile | |

| 2018 (18) | | | |
|------------------|--------|---------------|-------|
| Natalka | Gold | Russia | 225.7 |
| Bystrinskoye | Copper | Russia | 221.8 |
| Gross | Gold | Russia | 189.8 |
| Moose River | Gold | Canada | 53.8 |
| Kyzyl | Gold | Kazakhstan | 29.8 |
| Mako | Gold | Senegal | 14.5 |
| Dalgaranga | Gold | Australia | 13.1 |
| Boungou | Gold | Burkina Faso | 11.1 |
| Moss | Gold | USA | 9.3 |
| Leonora | Gold | Australia | 8.8 |
| Yanfolila | Gold | Mali | 8.5 |
| Sissingué | Gold | Cote d'Ivoire | 7.8 |
| Kainantu | Gold | PNG | 5.1 |
| Lamaque | Gold | Canada | 4.2 |
| Dong'an | Gold | China | 3.1 |
| Cerro Moro | Gold | Argentina | 1.9 |
| Chinchillas | Silver | Argentina | |
| Empire State | Zinc | USA | |

| 2019 (12) | | | |
|------------------|--------|--------------|---------|
| Cobre Panama | Copper | Panama | 2,103.3 |
| Dublin Gulch | Gold | Canada | 124.7 |
| Gruyere JV | Gold | Australia | 92.9 |
| Carrapateena | Copper | Australia | 83.4 |
| Banfara | Gold | Burkina Faso | 31.5 |
| Meliadine | Gold | Canada | 30.3 |
| Aurizona | Gold | Brazil | 29.2 |
| Fruta del Norte | Gold | Ecuador | 16.8 |
| Gold Bar | Gold | USA | 14.6 |
| Ada Tepe | Gold | Bulgaria | 6.0 |
| Sugar Zone | Gold | Canada | 3.9 |
| Gamsberg | Zinc | South Africa | |

Total LOM Ore (Mt) for 213 Mines = 19,415

Source: S&P Global Market Intelligence

Mine Startup Years

| Year | All Mines | | | | Gold/Silver Mines | | | | |
|--------------|------------|--------------------------|-------------|-----------------|-------------------|--------------|--------------------------|----------------|----------------------|
| | Number | Exploration Spend (\$bn) | Unknown LOM | LOM* Ore (Mt) | Gold Mines | Silver Mines | Exploration Spend (\$bn) | LOM* Ore (Mt) | Au/Ag Mine Share (%) |
| 2010 | 25 | 12.1 | | 2,246.3 | 24 | 1 | 5.1 | 2,246.3 | 100.0 |
| 2011 | 30 | 18.1 | | 1,693.5 | 23 | | 8.0 | 1,014.9 | 76.7 |
| 2012 | 19 | 21.6 | | 2,015.0 | 14 | | 11.0 | 729.9 | 73.7 |
| 2013 | 26 | 15.2 | | 3,443.4 | 21 | 2 | 6.8 | 1,435.1 | 88.5 |
| 2014 | 17 | 11.3 | 1 (Cu) | 403.2 | 14 | | 4.5 | 368.6 | 82.4 |
| 2015 | 21 | 9.2 | | 4,205.3 | 13 | 1 | 4.0 | 251.5 | 66.7 |
| 2016 | 27 | 7.4 | 1 (Au) | 1,531.7 | 25 | | 3.5 | 843.1 | 92.6 |
| 2017 | 18 | 8.5 | 1 (Cu) | 531.3 | 16 | | 4.0 | 490.8 | 88.9 |
| 2018 | 18 | 10.1 | 2 (Ag,Zn) | 808.5 | 15 | 1 | 4.8 | 586.7 | 88.9 |
| 2019 | 12 | 9.8 | 1 (Zn) | 2,536.5 | 9 | | 4.5 | 349.8 | 75.0 |
| Total | 213 | | 6 | 19,414.7 | 174 | 5 | | 8,316.7 | 84.0 |

* LOM taken as actual and expected production between 2010 and 2040

Source: S&P Global Market Intelligence



Source: S&P Global Market Intelligence

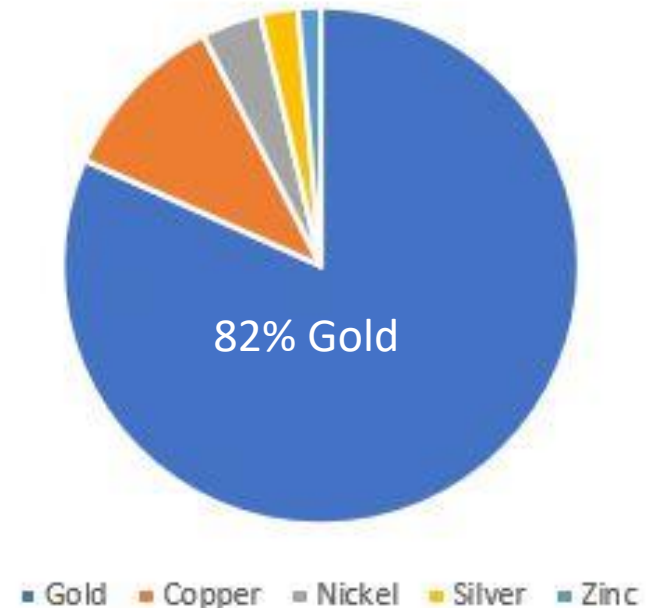
Mine Openings (five metals over past 10 years)

| Commodity | Number | Unknown LOM | Total LOM* Ore (Mt) | Average LOM* Ore (Mt) |
|--------------|------------|-------------|---------------------|-----------------------|
| Gold | 174 | 1 | 8,295.3 | 47.9 |
| Copper | 23 | 2 | 10,455.1 | 497.9 |
| Nickel | 8 | 0 | 619.1 | 77.4 |
| Silver | 5 | 1 | 21.4 | 5.4 |
| Zinc | 3 | 2 | 23.8 | 23.8 |
| Total | 213 | 6 | 19,414.7 | 93.8 |

* LOM taken as actual and expected production between 2010 and 2040

Source: S&P Global Market Intelligence

Mine Openings (by commodity)



Top National Mine Openings (past ten years)

| Top Countries# | All Mines | | Gold/Silver Mines | |
|----------------|-----------|---------------|-------------------|---------------|
| | New Mines | LOM* Ore (Mt) | Au/Ag Mines | LOM* Ore (Mt) |
| Australia | 25 | 571.8 | 23 | 472.1 |
| Canada | 18 | 2,181.9 | 16 | 1,454.7 |
| Russia | 17 | 1,334.8 | 16 | 1,113.0 |
| Mexico | 16 | 1,391.0 | 16 | 1,391.0 |
| Peru | 11 | 2,339.0 | 9 | 590.3 |
| USA | 11 | 181.2 | 9 | 174.7 |

98

Total countries = 23; China only reported 9 openings in past ten years.

* LOM taken as actual and expected production between 2010 and 2040.

★ Top six countries accounted for 46% of the total new mine openings.

Source: S&P Global Market Intelligence

Mine Openings (since 2010)

| | | | | | | | | | | DELAYS (in years) | | | | | |
|--|--------------|-------------------|---------------|-----------------|--|-------------------------|----------------|---------------|----------------------|-------------------|---------------------|---------------------------|---------------------|--------------------------------|--|
| Project Name | Startup Year | Primary commodity | Country | Owner (startup) | Owner (current) | LOM Ore production (Mt) | Discovery Year | FEA Completed | Construction Started | Discovery to FEA | FEA to Construction | Discovery to Construction | Construction Period | TOTAL, ie Discovery to Startup | |
| Cobre Panama | 2019 | Copper | Panama | First Quantum | First Quantum 90%; Korea Resources 10% | 2,103.3 | 1969 | 2012 | 2012 | 43 | 0 | 43 | 7 | 50 | |
| Las Bambas | 2015 | Copper | Peru | | MMG Ltd 62.5%; CNIC Corp 22.5% | 1,095.5 | 2005 | 2009 | 2010 | 4 | 1 | 5 | 5 | 10 | |
| Oyu Tolgoi | 2013 | Copper | Mongolia | | Turquoise Hill Resources 66%; Mongolia 34% | 1,065.2 | 2001 | 2007 | 2010 | 6 | 3 | 9 | 3 | 12 | |
| Aktogay | 2015 | Copper | Kazakhstan | | KAZ Minerals Plc | 944.0 | 1935 | 2011 | 2012 | 76 | 1 | 77 | 3 | 80 | |
| Caserones | 2013 | Copper | Chile | | Pan Pacific Copper 77.4%; Mitsui & Co 22.6% | 942.1 | 1988 | 2007 | 2010 | 19 | 3 | 22 | 3 | 25 | |
| Sentinel | 2015 | Copper | Zambia | Hudbay Minerals | First Quantum Minerals Ltd. | 938.1 | 2007 | 2012 | 2012 | 5 | 0 | 5 | 3 | 8 | |
| Salobo | 2012 | Copper | Brazil | | Vale S.A. | 853.9 | 1975 | 2003 | 2009 | 28 | 6 | 34 | 3 | 37 | |
| Penasquito | 2010 | Gold | Mexico | | Newmont Corp; Maverix Metals Inc. | 805.5 | 1992 | 2006 | 2007 | 14 | 1 | 15 | 3 | 18 | |
| Constancia | 2015 | Copper | Peru | Detour Gold | Hudbay Minerals Inc. | 653.2 | 2004 | 2007 | 2012 | 3 | 5 | 8 | 3 | 11 | |
| Bozshakol | 2016 | Copper | Kazakhstan | | KAZ Minerals Plc | 623.5 | 1990 | 2010 | 2011 | 20 | 1 | 21 | 5 | 26 | |
| Detour Lake | 2013 | Gold | Canada | | Detour Gold Corp | 602.8 | 1998 | 2009 | 2010 | 11 | 1 | 12 | 3 | 15 | |
| Copper Mountain | 2011 | Copper | Canada | | Copper Mountain 75%; Mitsubishi Materials 25% | 449.3 | 1970 | 2008 | 2009 | 38 | 1 | 39 | 2 | 41 | |
| Sukari | 2010 | Gold | Egypt | | Centamin Plc | 314.5 | 1997 | 2005 | 2007 | 8 | 2 | 10 | 3 | 13 | |
| Canadian Malartic | 2011 | Gold | Canada | Osisko Mining | Agnico Eagle Mines 50%; Yamana Gold 50% | 288.5 | 1926 | 2008 | 2010 | 82 | 2 | 84 | 1 | 85 | |
| Red Chris | 2015 | Copper | Canada | Imperial Metals | Newcrest Mining 70%; Imperial Metals 30% | 277.9 | 1973 | 2004 | 2012 | 31 | 8 | 39 | 3 | 42 | |
| Blagodatnoye | 2010 | Gold | Russia | Nord Gold SE | PJSC Polyus | 262.7 | 2004 | 2008 | 2008 | 4 | 0 | 4 | 2 | 6 | |
| Natalka | 2018 | Gold | Russia | | PJSC Polyus | 225.7 | 1942 | 2009 | 2010 | 67 | 1 | 68 | 8 | 76 | |
| Bystrinskoye | 2018 | Copper | Russia | | Norilsk Nickel 50%; Natural Resources Fund 36.7% | 221.8 | 1986 | 2011 | 2014 | 25 | 3 | 28 | 4 | 32 | |
| Gross | 2018 | Gold | Russia | | Nord Gold SE | 189.8 | 2009 | 2014 | 2016 | 5 | 2 | 7 | 2 | 9 | |
| Essakane | 2010 | Gold | Burkina Faso | | IAMGOLD Corp 90%; Burkina Faso 10% | 187.4 | 1993 | 2007 | 2008 | 14 | 1 | 15 | 2 | 17 | |
| Bissa | 2013 | Gold | Burkina Faso | Barrick Gold | Nord Gold 90%; Burkina Faso 10% | 174.9 | 1997 | 2011 | 2012 | 14 | 1 | 15 | 1 | 16 | |
| Kevitsa | 2012 | Nickel | Finland | | Boliden AB | 174.1 | 1987 | 2007 | 2009 | 20 | 2 | 22 | 3 | 25 | |
| Pueblo Viejo | 2013 | Gold | Dominican Rep | | Barrick Gold Corp 60%; Newmont 40% | 169.7 | 1960 | 2010 | 2012 | 50 | 2 | 52 | 1 | 53 | |
| Ambatovy | 2012 | Nickel | Madagascar | | Sumitomo 47.7%; Korea Resources 22.5% | 163.0 | 1960 | 2005 | 2007 | 45 | 2 | 47 | 5 | 52 | |
| Merian | 2016 | Gold | Suriname | | Newmont 75%; Suriname Govt 25% | 154.9 | 2005 | 2013 | 2014 | 8 | 1 | 9 | 2 | 11 | |
| Noche Buena | 2012 | Gold | Mexico | Newmont Mining | Fresnillo Plc | 141.1 | 1994 | 2010 | 2011 | 16 | 1 | 17 | 1 | 18 | |
| Shahuindo | 2016 | Gold | Peru | | Pan American Silver Corp | 136.3 | 1995 | 2010 | 2015 | 15 | 5 | 20 | 1 | 21 | |
| Rainy River | 2017 | Gold | Canada | | New Gold Inc. | 131.3 | 1995 | 2015 | 2015 | 20 | 0 | 20 | 2 | 22 | |
| Tantahuatay | 2011 | Gold | Peru | | Southern Copper 44.2%; Buenaventura 40.1% | 128.5 | 1995 | 2008 | 2011 | 13 | 3 | 16 | 0 | 16 | |
| La Arena | 2011 | Gold | Peru | | Pan American Silver Corp | 124.9 | 1996 | 2010 | 2010 | 14 | 0 | 14 | 1 | 15 | |
| Dublin Gulch | 2019 | Gold | Canada | Victoria Gold | Victoria Gold Corp | 124.7 | 1994 | 2016 | 2017 | 22 | 1 | 23 | 2 | 25 | |
| Martabe | 2012 | Gold | Indonesia | | PT Agincourt Resources | 110.6 | 1997 | 2007 | 2008 | 10 | 1 | 11 | 4 | 15 | |
| Malomir | 2010 | Gold | Russia | | Petropavlovsk 98.6% | 110.6 | 1966 | 2008 | 2009 | 42 | 1 | 43 | 1 | 44 | |
| Gold Mountain | 2014 | Gold | China | | Hengxing Gold Holding Co. | 109.5 | 2003 | 2009 | 2013 | 6 | 4 | 10 | 1 | 11 | |
| Asanko | 2016 | Gold | Ghana | | Asanko Gold 45%; Gold Fields 45%; Ghana 10% | 109.2 | 1992 | 2012 | 2014 | 20 | 2 | 22 | 2 | 24 | |
| Goro | 2011 | Nickel | New Caledonia | Asanko Gold | Vale SA 95%; SPMSC 5% | 106.1 | 1983 | 2003 | 2004 | 20 | 1 | 21 | 7 | 28 | |
| Kibali | 2013 | Gold | DRC | | AngloGold Ashanti 45%; Barrick Gold 45% | 99.2 | 1998 | 2007 | 2012 | 9 | 5 | 14 | 1 | 15 | |
| Copler | 2011 | Gold | Turkey | | Alacer Gold 80%; Lidya Madencilik 20% | 94.4 | 2002 | 2006 | 2008 | 4 | 2 | 6 | 3 | 9 | |
| Akyem | 2013 | Gold | Ghana | | Newmont Corp | 93.6 | 1993 | 2002 | 2005 | 9 | 3 | 12 | 8 | 20 | |
| Albyn | 2011 | Gold | Russia | | Petropavlovsk Plc | 93.4 | 1999 | 2009 | 2010 | 70 | 1 | 71 | 1 | 72 | |
| Gruyere JV | 2019 | Gold | Australia | Newmont Mining | Gold Fields 50%; Gold Road 50% | 92.9 | 2013 | 2016 | 2017 | 3 | 1 | 4 | 2 | 6 | |
| New Afton | 2012 | Gold | Canada | | New Gold Inc. | 85.7 | 2001 | 2006 | 2007 | 6 | 1 | 7 | 5 | 12 | |
| Edikan | 2012 | Gold | Ghana | | Perseus Mining 90%; Ghana 10% | 84.0 | 1900 | 2007 | 2010 | 107 | 3 | 110 | 2 | 112 | |
| Carrapateena | 2019 | Copper | Australia | | OZ Minerals Ltd. | 83.4 | 2005 | 2017 | 2017 | 12 | 0 | 12 | 2 | 14 | |
| Verninskoye | 2011 | Gold | Russia | | PJSC Polyus | 81.2 | 1988 | 2005 | 2009 | 17 | 4 | 21 | 2 | 23 | |
| Source: S&P Global Market Intelligence | | | | | | | | | | AVERAGES = | | | | | |
| | | | | | | | | | | 23.9 | 2.0 | 25.9 | 2.8 | 28.7 | |

Annual Delays (largest 45 mines)

(Discovery to start of construction)

| Year | Construction Starts | Average Delay (years) |
|-----------|---------------------|-----------------------|
| 2004 | 1 | 21.0 |
| 2005 | 1 | 12.0 |
| 2006 | - | - |
| 2007 | 4 | 19.8 |
| 2008 | 4 | 9.0 |
| 2009 | 5 | 31.8 |
| 2010 | 9 | 43.9 Worst year |
| 2011 | 3 | 18.0 |
| 2012 | 8 | 31.6 |
| 2013 | 1 | 10.0 |
| 2014 | 3 | 19.7 |
| 2015 | 2 | 20.0 |
| 2016 | 1 | 7.0 |
| 2017 | 3 | 13.0 |
| 45 | | |

Source: S&P Global Market Intelligence

Average Delays

(Largest 45 mines; five metals, 10 years)

| Stage | Years |
|-----------------------------|-------------|
| Discovery to Feasibility | 23.9 |
| Feasibility to Construction | 2.0 |
| Construction Period | 2.8 |
| Total = | 28.7 |

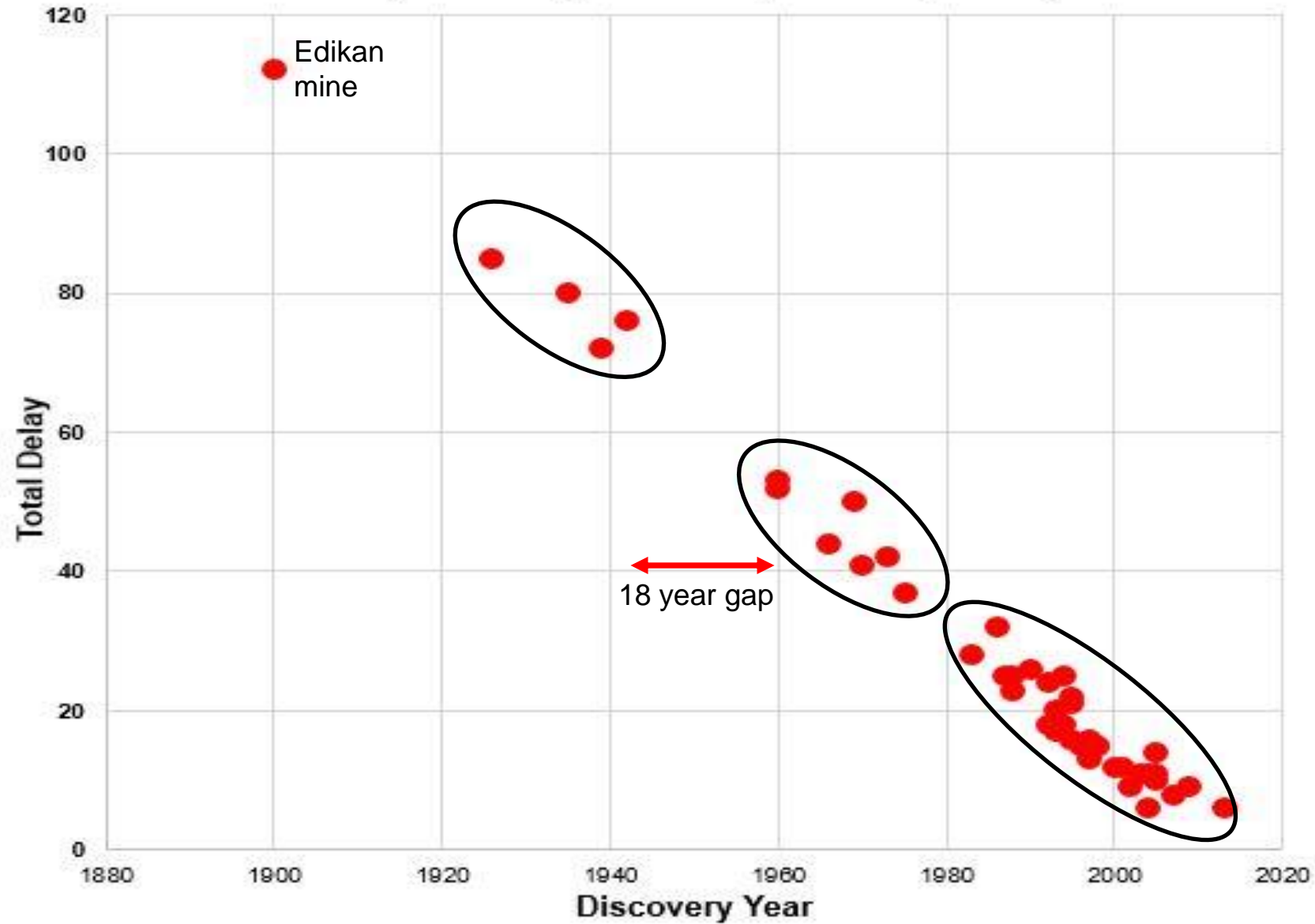
Source: S&P Global Market Intelligence

Large Mine Construction Starts; 2010 (nine)

| Mine | Commodity | Country | Discovery | Delay |
|------------------------------|-----------|----------|-----------|------------|
| Canadian Malartic | Gold | Canada | 1926 | 84 |
| La Arena | Gold | Peru | 1996 | 14 |
| Albyn | Gold | Russia | 1939 | 71 |
| Edikan | Gold | Ghana | 1900 | 110 |
| Oyu Tolgoi | Copper | Mongolia | 2001 | 9 |
| Caserones | Copper | Chile | 1988 | 22 |
| Detour Lake | Gold | Canada | 1998 | 12 |
| Las Bambas | Copper | Peru | 2005 | 5 |
| Natalka | Gold | Russia | 1942 | 68 |
| Total Delay (years) = | | | | 395 |

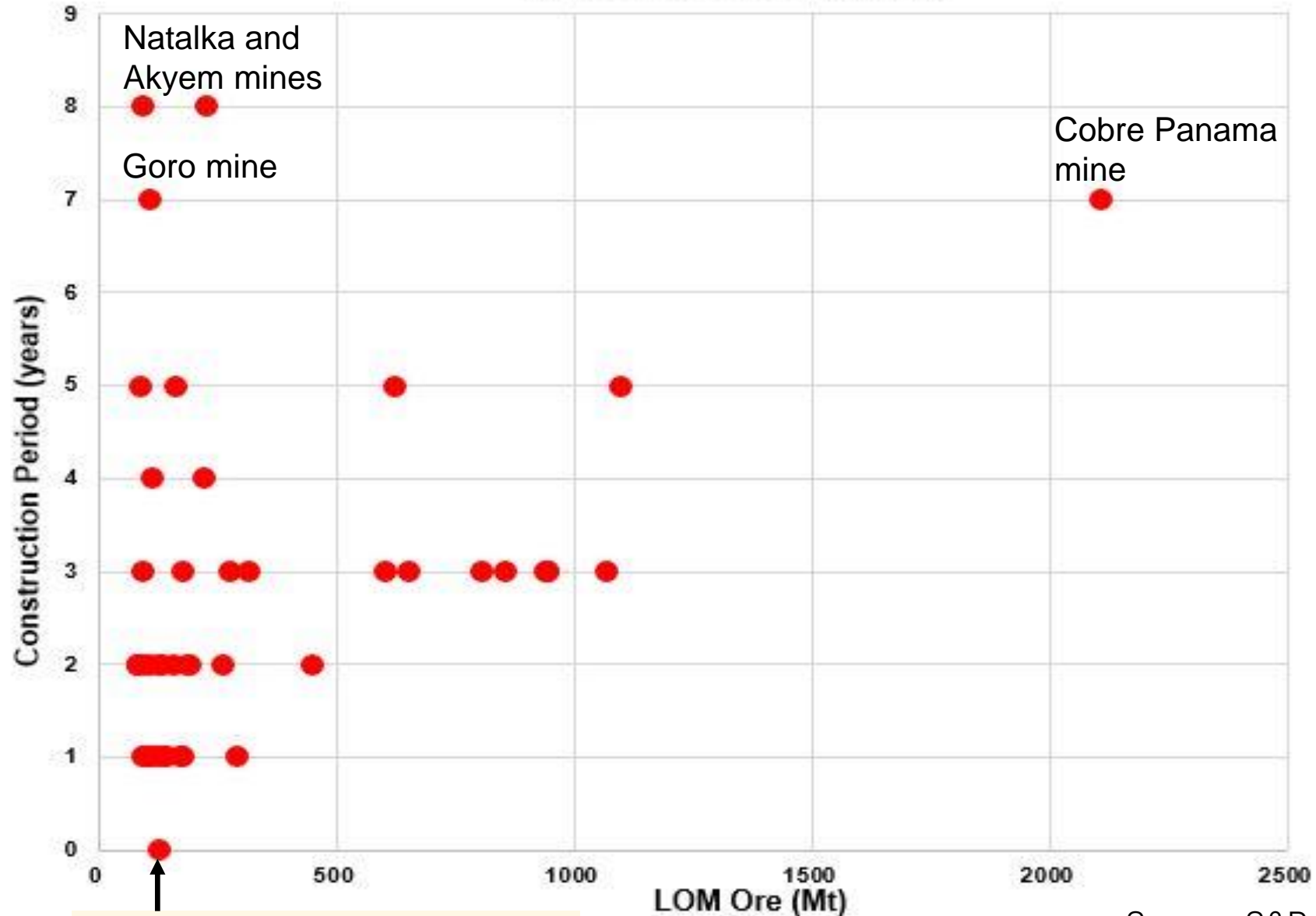
Source: S&P Global Market Intelligence

Delay vs Discovery Year (Mines opened in past 10 years)



Source: S&P Global Market Intelligence

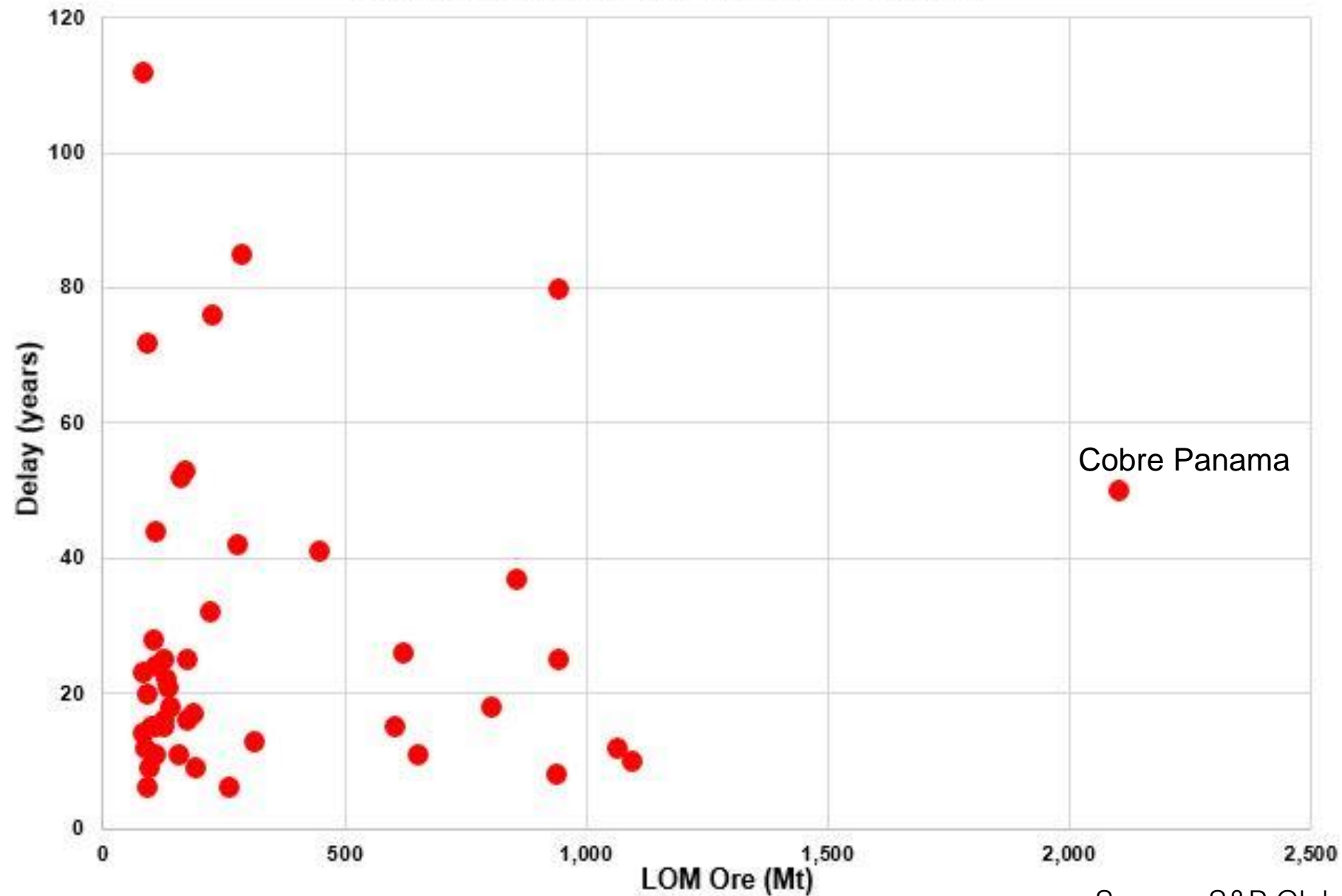
Construction Period (years) vs Size (LOM Ore; Mt)



Southern Copper's
Tantahuatay gold mine in Peru

Source: S&P Global Market Intelligence

Mine's LOM Ore (Mt) vs Delay (years)



Source: S&P Global Market Intelligence

Shortest National Delays

(Largest 45 mines; past 10 years)

| | | | Average Delays (years) | | | |
|----|---------------|---------------|------------------------|--------------------------|-----------------------------|-----------------------|
| | Country | Mines Opening | Total LOM Ore (Mt) | Discovery to Feasibility | Feasibility to Construction | Total to Construction |
| 1 | Zambia (1) | 1 | 938.1 | 5.0 | 0.0 | 5.0 |
| 2 | Turkey (2) | 1 | 94.4 | 4.0 | 2.0 | 6.0 |
| 3 | Australia (3) | 2 | 176.3 | 7.5 | 0.5 | 8.0 |
| 4 | Suriname | 1 | 154.9 | 8.0 | 1.0 | 9.0 |
| 5 | Mongolia | 1 | 1,065.2 | 6.0 | 3.0 | 9.0 |
| 6 | China | 1 | 109.5 | 6.0 | 4.0 | 10.0 |
| 7 | Egypt | 1 | 314.5 | 8.0 | 2.0 | 10.0 |
| 8 | Indonesia | 1 | 110.6 | 10.0 | 1.0 | 11.0 |
| 9 | Peru | 5 | 2,138.4 | 9.8 | 2.8 | 12.6 |
| 10 | DR Congo | 1 | 99.2 | 9.0 | 5.0 | 14.0 |

NOTES:

1. First Quantum's Sentinel copper mine; discovered in 2007, construction started 2012.
2. Alacer Corp's Copler gold mine; discovered in 2002, construction started 2008.
3. Oz Minerals' Carrapateena copper mine (discovered 2005, construction 2017) and Goldfields' Gruyere* gold JV (discovered in 2013, construction 2017).

* Equal shortest delay (only four years), tied with Polyus's Blagodatnoye gold mine in Russia; discovered 2004 and construction started in 2008. Both had two-year construction periods.

Total number of countries = 23

Worst national delays: Dominican Republic (one mine, 52 years), Kazakhstan (two mines averaging 49 years), Ghana (three mines averaging 48 years) and Madagascar (one mine, 47 years).

Source: S&P Global Market Intelligence

Worst Mine Delays (>50 years)

| Mine | Commodity | Country | Developer | Startup | Delay* |
|-------------------|-----------|---------------|-------------------|---------|--------|
| Edikan | Gold | Ghana | Perseus Mining | 2012 | 112 |
| Canadian Malartic | Gold | Canada | Osisko Mining (1) | 2011 | 85 |
| Aktogay | Copper | Kazakhstan | KAZ Minerals | 2015 | 80 |
| Natalka | Gold | Russia | Polyus | 2018 | 76 |
| Albyn | Gold | Russia | Petropavlovsk | 2011 | 72 |
| Pueblo Viejo | Gold | Dominican Rep | Barrick Gold | 2013 | 53 |
| Ambatovy | Nickel | Madagascar | Sherritt Int. (2) | 2012 | 52 |
| Cobre Panama | Copper | Panama | First Quantum | 2019 | 50 |

* Discovery to production startup

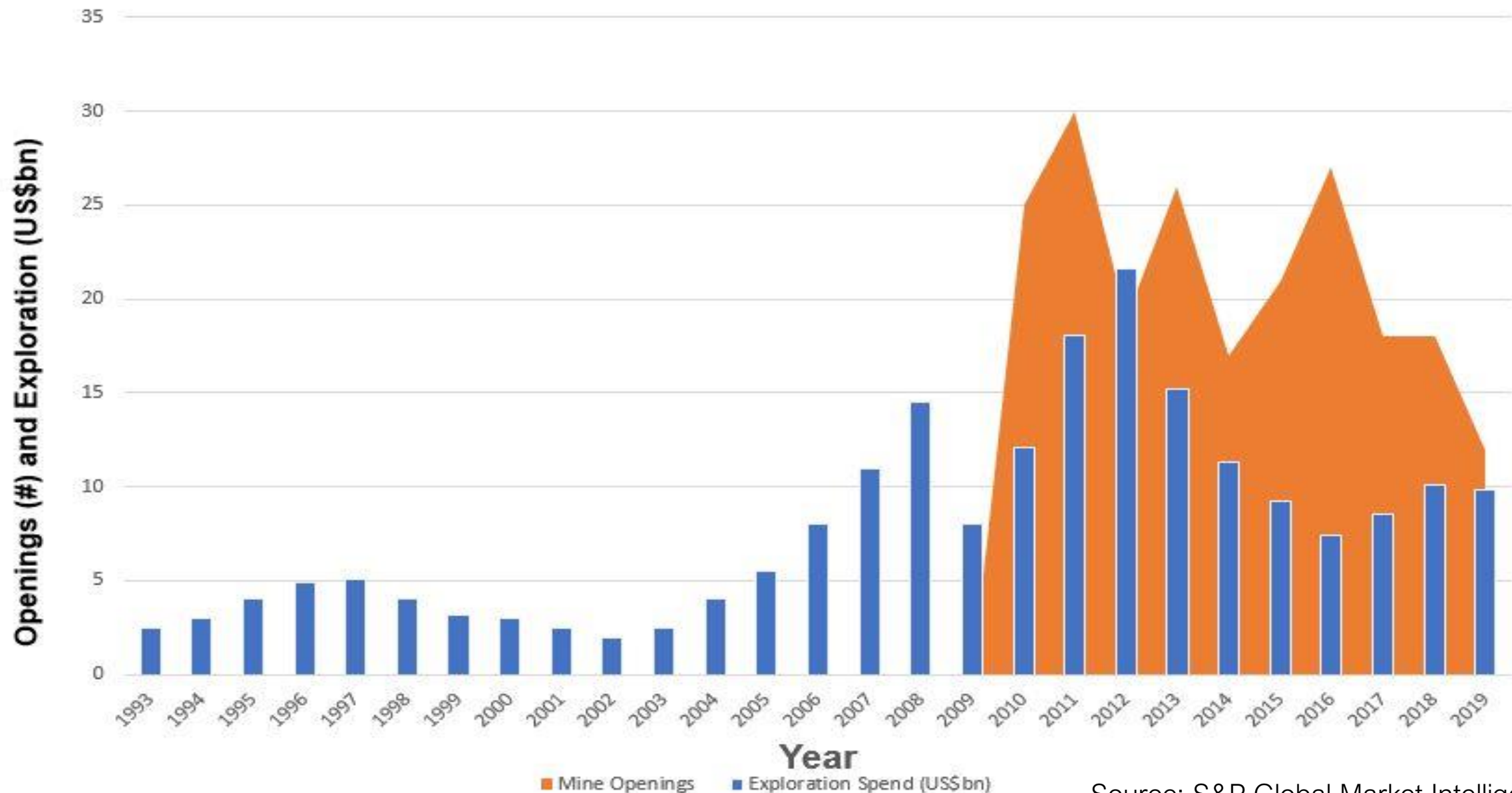
Notes: 1. Now owned by Agnico Eagle Mines (50%)

2. Now owned by Sumitomo Corp (47.7%)

NOTE: The longest construction periods amongst the largest 45 mines opened in the past ten years was eight years for two gold mines (Polyus's Natalka and Newmont's Akyem) and seven years for First Quantum's Cobre Panama copper mine and Vale's Goro nickel mine.

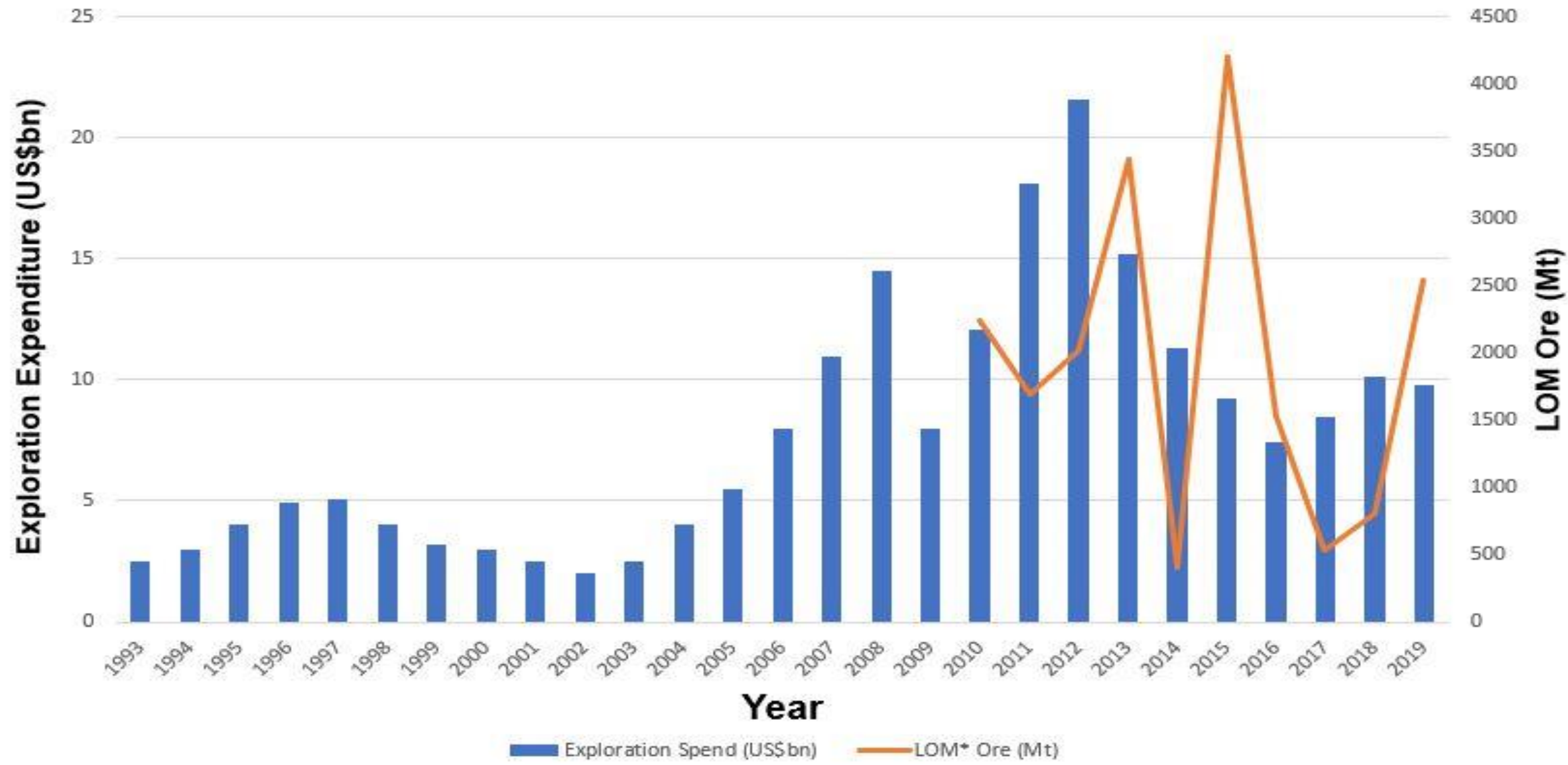
Source: S&P Global Market Intelligence

Exploration Expenditure vs Mine Openings



Source: S&P Global Market Intelligence

Exploration Expenditure vs LOM Openings



Source: S&P Global Market Intelligence

GOLD MINES EXPECTED TO OPEN 2020-2024

Source: S&P Global
Market Intelligence

#1 (of 3)

| Name | Owner(s) | Status | Country | OP/UG | Start Date | Av Output (oz/y) | Total Output ('000oz) |
|----------------|--|----------------------|---------------|-------|------------|------------------|-----------------------|
| Haiyu | Zhaojin Mining 63.8%; Unnamed 36.2% | Construction Planned | China | UG | 2022 | 527,267 | 7,909.0 |
| Goldrush | Barrick Gold 61.5%; Newmont 38.5% | Feasibility Complete | USA | OP/UG | 2023 | 484,375 | 7,750.0 |
| Blackwater | New Gold Inc. | Feasibility Complete | Canada | | 2023 | 442,157 | 7,074.5 |
| Mt Todd | Vista Gold Corp. | Prefeas/Scoping | Australia | OP | 2021 | 408,077 | 5,305.0 |
| Hardrock | Centerra Gold 50%; Premier Gold 50% | Feasibility Complete | Canada | | 2022 | 279,467 | 4,192.0 |
| Namdini | Cardinal Resources Ltd. | Feasibility Complete | Ghana | | 2023 | 283,857 | 3,974.0 |
| Volta Grande | Belo Sun Mining Corp. | Construction Planned | Brazil | OP | 2021 | 206,141 | 3,504.4 |
| Buritica | Continental Gold Inc. | Construction Started | Colombia | UG | 2020 | 237,746 | 3,328.5 |
| Nezhdaninskoye | Polymetal International Plc | Construction Planned | Russia | OP/UG | 2021 | 161,646 | 3,232.9 |
| Horne 5 | Falco Resources Ltd. | Construction Planned | Canada | UG | 2022 | 230,536 | 3,227.5 |
| Salares Norte | Gold Fields Ltd. | Feasibility Complete | Chile | OP | 2023 | 293,180 | 3,225.0 |
| Brookbank | Centerra Gold 50%; Premier Gold 50% | Prefeas/Scoping | Canada | | 2022 | 318,889 | 2,870.0 |
| Skouries | Eldorado Gold Corp. 95%; Ellaktor 5% | Construction Started | Greece | OP/UG | 2023 | 151,922 | 2,734.6 |
| Paul Isnard | Nord Gold 55%; Columbus Gold 45% | Construction Planned | French Guiana | | 2022 | 214,500 | 2,574.0 |
| Valentine Lake | Marathon Gold Corp. | Prefeas/Scoping | Canada | OP/UG | 2022 | 182,831 | 2,376.8 |
| Dugbe 1 | Hummingbird Res' 90%; Gov't Liberia 10% | Feasibility Started | Liberia | OP | 2022 | 124,451 | 2,364.6 |
| Orisyvo | Fresnillo Plc | Prefeas/Scoping | Mexico | | 2022 | 131,111 | 2,360.0 |
| Back River | Sabina Gold & Silver Corp. | Construction Planned | Canada | OP/UG | 2023 | 194,501 | 2,334.0 |
| Amulsar | Lydian International Ltd. | Construction Started | Armenia | OP | 2021 | 224,700 | 2,247.0 |
| Burnstone | Sibanye Gold Ltd. | Construction Started | South Africa | UG | 2022 | 116,694 | 2,217.2 |
| Media Luna | Torex Gold Resources Inc. | Prefeas/Scoping | Mexico | UG | 2022 | 181,948 | 2,183.4 |
| Certej | Eldorado Gold 80.5%; Minvest Rosia 19.3% | Feasibility Complete | Romania | OP | 2021 | 139,316 | 2,089.7 |
| Hot Maden | Lidya Madencilik 70%; Sandstorm 30% | Feasibility | Turkey | UG | 2022 | 184,428 | 2,028.7 |
| Loma Larga | INV Metals Inc. | Feasibility Complete | Ecuador | UG | 2022 | 165,031 | 1,980.4 |
| Magino | Argonaut Gold Inc. | Feasibility Complete | Canada | | 2023 | 115,471 | 1,963.0 |
| Massawa | Barrick Gold 83.3%; Rep. Senegal 10% | Feasibility Complete | Senegal | OP/UG | 2023 | 210,226 | 1,892.0 |
| McPhillamys | Regis Resources Ltd. | Feasibility Started | Australia | OP | 2021 | 177,906 | 1,779.1 |
| Windfall Lake | Osisko Mining Inc. | Prefeas/Scoping | Canada | UG | 2023 | 176,953 | 1,769.5 |
| Coffee | Newmont Corp. | Construction Planned | Canada | | 2023 | 176,694 | 1,766.9 |
| Kekura | Highland Gold Mining Ltd. | Construction Started | Russia | OP/UG | 2023 | 108,972 | 1,743.6 |
| Boto | IAMGOLD 90%; Gov't Senegal 10% | Feasibility Complete | Senegal | OP | 2022 | 132,546 | 1,723.1 |
| Rovina Valley | Euro Sun Mining Inc. | Feasibility | Romania | OP/UG | 2022 | 87,323 | 1,659.1 |
| Ilovitza | Euromax Resources Ltd. | Construction Planned | N Macedonia | OP | 2021 | 85,559 | 1,625.6 |
| Tocantinzinho | Eldorado Gold Corp. | Construction Planned | Brazil | OP | 2023 | 160,640 | 1,606.4 |
| Bombore | Orezone Gold 90%; Gov't Burkina Faso 10% | Construction Planned | Burkina Faso | OP | 2021 | 106,638 | 1,599.6 |
| Wasamac | Monarch Gold Corp. | Feasibility Complete | Canada | UG | 2023 | 141,600 | 1,557.6 |

| Name | Owner(s) | Status | Country | OP/UG | Start Date | Av Output (oz/y) | Total Output ('000oz) |
|-------------------|--|----------------------|---------------|-------|------------|------------------|-----------------------|
| Sanbrado | WA Resources 90%; Gov't Burkina Faso 10% | Construction Started | Burkina Faso | | 2021 | 153,600 | 1,536.0 |
| Buckreef | Tanzanian Gold 55%; Gov't Tanzania 45% | Feasibility Complete | Tanzania | OP/UG | 2023 | 167,094 | 1,503.9 |
| Doup | PT J Resources Asia Pasifik Tbk | Construction Planned | Indonesia | OP | 2024 | 114,406 | 1,487.3 |
| Farley Lake | Alamos Gold Inc. | Feasibility Complete | Canada | | 2023 | 134,555 | 1,480.1 |
| Kalana | Endeavour Mining 80%; Rep' Mali 20% | Feasibility Started | Mali | OP/UG | 2022 | 104,429 | 1,462.0 |
| Carrapateena | OZ Minerals Ltd. | Operating | Australia | | 2020 | 68,069 | 1,361.4 |
| Curraghinalt | Orion Mine Finance | Feasibility Complete | UK | UG | 2023 | 123,182 | 1,355.0 |
| Yaoure | Perseus Mining Ltd. 90%; Cote d'Ivoire 10% | Construction Started | Cote d'Ivoire | OP | 2021 | 149,222 | 1,343.0 |
| Lindero | Fortuna Silver Mines Inc. | Construction Started | Argentina | OP | 2020 | 88,513 | 1,327.7 |
| Mt Bundy | China Hanking Holdings Ltd. | Prefeas/Scoping | Australia | OP/UG | 2021 | 90,987 | 1,273.8 |
| San Gabriel | Cia. de Minas Buenaventura SAA | Feasibility Complete | Peru | UG | 2022 | 67,457 | 1,146.8 |
| C1 Santa Luz | LeaGold Mining Corp. | Feasibility Complete | Brazil | | 2020 | 96,344 | 1,059.8 |
| Borborema | Big River Gold Ltd. | Construction Planned | Brazil | OP | 2022 | 96,115 | 1,057.3 |
| Awak Mas | Nusantara Res' 60%; Indika Energy 40% | Feasibility Complete | Indonesia | OP | 2022 | 88,000 | 1,056.0 |
| Union Reefs | Kirkland Lake Gold Ltd. | Operating | Australia | UG | 2021 | 50,651 | 1,013.0 |
| Goliath | Treasury Metals Inc. | Feasibility Started | Canada | OP/UG | 2022 | 82,498 | 990.0 |
| Mara Rosa | Amarillo Gold Corp. | Feasibility Started | Brazil | OP | 2022 | 123,101 | 984.8 |
| Tulu Kapi | KEFI Minerals Plc 75%; Gov't Ethiopia 25% | Construction Planned | Ethiopia | OP | 2021 | 122,500 | 980.0 |
| Madsen | Pure Gold Mining Inc. | Construction Started | Canada | UG | 2021 | 74,627 | 970.1 |
| La Coipa | Kinross Gold Corp. | Feasibility Started | Chile | OP | 2021 | 135,716 | 950.0 |
| Ixtaca | Almaden Minerals Ltd. | Feasibility Complete | Mexico | OP | 2022 | 85,909 | 945.0 |
| Tri-K | Managem 85%; Gov't Guinea 15% | Construction Started | Guinea | OP | 2020 | 104,087 | 936.8 |
| Agi Dagı | Alamos Gold Inc. | Feasibility Complete | Turkey | | 2023 | 155,667 | 934.0 |
| Ollachea | Minera IRL Ltd. | Construction Planned | Peru | UG | 2022 | 93,000 | 930.0 |
| Bibiani | Resolute Mining Ltd. 90%; Gov't Ghana 10% | Feasibility Complete | Ghana | OP/UG | 2021 | 100,280 | 902.5 |
| Oksut | Centerra Gold Inc. | Operating | Turkey | OP | 2020 | 111,875 | 895.0 |
| Perama Hill | Eldorado Gold Corp. | Feasibility | Greece | OP | 2022 | 109,594 | 876.8 |
| Karlawinda | Capricorn Metals Ltd. | Construction Planned | Australia | OP | 2021 | 82,163 | 821.6 |
| Gediktepe | Lidya Madencilik San. ve Tic. | Feasibility Started | Turkey | OP | 2023 | 70,461 | 775.1 |
| Okvau-Ochung | Emerald Resources NL | Construction Planned | Cambodia | | 2021 | 95,250 | 762.0 |
| Castle Mountain | Equinox Gold Corp. | Construction Started | USA | OP | 2022 | 53,842 | 753.8 |
| Tireo | GoldQuest Mining Corp. | Prefeas/Scoping | Dominican Rep | UG | 2021 | 82,003 | 656.0 |
| Yenipazar | Virtus Mining Ltd. | Feasibility Complete | Turkey | | 2022 | 54,180 | 650.2 |
| Camino Rojo | Orla Mining Ltd. | Feasibility Complete | Mexico | OP | 2022 | 91,768 | 642.4 |
| Glenburgh | Gascoyne Resources Ltd. | Feasibility | Australia | OP/UG | 2022 | 70,217 | 632.0 |
| Krasny | GV Gold 51%; Kopy Goldfields AB 49% | Prefeas/Scoping | Russia | OP | 2022 | 32,357 | 582.4 |
| Dynasty Goldfield | Core Gold Inc. | Operating | Ecuador | | 2022 | 55,989 | 559.9 |

| Name | Owner(s) | Status | Country | OP/UG | Start Date | Av Output (oz/y) | Total Output ('000oz) |
|---------------------|---------------------------------------|----------------------|-------------|-------|------------|------------------|-----------------------|
| Kirazli | Alamos Gold Inc. | Construction Started | Turkey | | 2020 | 89,000 | 534.0 |
| Bau | Besra Gold 93.6%; Gladioli Ent' 6.5% | Feasibility Started | Malaysia | OP | 2024 | 75,197 | 526.4 |
| Relief Canyon | Americas Gold and Silver Corp. | Construction Started | USA | OP | 2020 | 65,725 | 525.8 |
| Siana | Private Company 60%; Red 5 Ltd. 40% | Operating | Philippines | OP | 2023 | 56,000 | 504.0 |
| Commonwealth | Wexford Capital LP | Prefeas/Scoping | USA | | 2022 | 60,000 | 480.0 |
| Back Forty | Aquila Resources Inc. | Feasibility Complete | USA | OP/UG | 2021 | 66,857 | 468.0 |
| Juanicipio | Fresnillo 56%; MAG Silver 44% | Construction Planned | Mexico | UG | 2020 | 44,000 | 440.0 |
| Red Mountain | Ascot Resources Ltd. | Construction Planned | Canada | UG | 2021 | 71,617 | 429.7 |
| Kobada | African Gold Group 90%; Rep. Mali 10% | Feasibility Complete | Mali | OP | 2021 | 46,424 | 417.8 |
| Altan Nar | Erdene Resource Development Corp. | Feasibility Started | Mongolia | OP | 2022 | 45,995 | 414.0 |
| Segilola | Thor Explorations Ltd. | Feasibility Complete | Nigeria | OP | 2021 | 65,583 | 393.5 |
| Quinchia | Metminco Ltd. | Feasibility Complete | Colombia | UG | 2022 | 43,207 | 388.9 |
| Yandal - Bronzewing | Northern Star Resources Ltd. | Feasibility Complete | Australia | OP | 2020 | 77,350 | 386.8 |
| Goldboro | Anaconda Mining Inc. | Feasibility Started | Canada | OP | 2022 | 41,762 | 375.9 |
| Rozino | Velocity Minerals 70%; Gorubso-K' 30% | Prefeas/Scoping | Bulgaria | OP | 2023 | 60,828 | 365.0 |
| Kara-Beldyr | Auriant Mining AB | Feasibility Complete | Russia | OP | 2022 | 32,715 | 359.9 |
| Chaarat | Chaarat Gold Holdings 87.5% | Construction Started | Kyrgyzstan | | 2020 | 89,890 | 359.6 |
| Ulysses | Genesis Minerals Ltd. | Feasibility Started | Australia | UG | 2023 | 89,079 | 356.3 |
| Tuvatu | Lion One Metals Ltd. | Construction Started | Fiji | UG | 2021 | 44,110 | 352.9 |
| Castle Hill | Evolution Mining Ltd. | Commissioning | Australia | OP | 2021 | 58,162 | 290.8 |
| Gum Creek | Horizon Gold Ltd. | Prefeas/Scoping | Australia | OP/UG | 2023 | 48,417 | 290.5 |
| San Luis | SSR Mining Inc. | Feasibility Complete | Peru | UG | 2023 | 68,189 | 272.8 |
| Maverick | Minnova Corp. | Feasibility Complete | Canada | | 2021 | 46,493 | 232.5 |
| Altan Tsagaan Ovoo | Steppe Gold Ltd. | Commissioning | Mongolia | OP | 2020 | 51,913 | 207.7 |
| Cononish | Scotgold Resources Ltd. | Feasibility Complete | UK | UG | 2020 | 19,627 | 196.3 |
| San Albino-Murra | Mako Mining Corp. | Construction Started | Nicaragua | OP/UG | 2021 | 15,753 | 189.0 |
| Green Bay | Maritime Resources Corp. | Prefeas/Scoping | Canada | UG | 2022 | 24,851 | 174.0 |
| Copperstone | Kerr Mines Inc. | Prefeas/Scoping | USA | UG | 2020 | 28,633 | 171.8 |
| Coringa | Serabi Gold Plc | Construction Planned | Brazil | UG | 2020 | 26,721 | 160.3 |
| Singida | Shanta Gold Ltd. | Feasibility Started | Tanzania | | 2021 | 22,528 | 157.7 |
| Makabingui | Bassari Resources 63%; WATIC 27% | Construction Planned | Senegal | | 2020 | 37,525 | 150.1 |
| Mt Carrington | White Rock Minerals Ltd. | Feasibility Started | Australia | OP | 2021 | 29,540 | 147.7 |
| Invicta | Lonely Mountain Resources SAC | Prefeas/Scoping | Peru | UG | 2021 | 13,570 | 81.4 |
| Marymia | Vango Mining Ltd. | Construction Started | Australia | | 2021 | 23,100 | 46.2 |

Total of 107 New Gold Mines in next five years

152,208.9

Source: S&P Global Market Intelligence

Gold Mines Opening in Next Five Years

| Year | Mines Opening | Total Output ('000oz) |
|--------------|------------------|-----------------------------|
| 2020 | 16 | 12,041 |
| 2021 | 31 | 35,799 |
| 2022 | 35 | 55,127 |
| 2023 | 23 | 47,228 |
| 2024 | 2 | 2,014 |
| Total | 107 | 152,209 |

Source: S&P Global Market Intelligence

Type of Gold Mine Opening in Next Five Years

| Type | Mines Opening | Share of Total (%) | Total Output ('000oz) | Share of Total (%) |
|--------------|------------------|-----------------------|-----------------------------|-----------------------|
| Open Pit | 41 | 38.3 | 48,399 | 31.8 |
| OP / UG | 17 | 15.9 | 31,435 | 20.7 |
| Underground | 26 | 24.3 | 35,297 | 23.2 |
| Unknown | 23 | 21.5 | 37,078 | 24.4 |
| Total | 107 | | 152,209 | |

Source: S&P Global Market Intelligence

Location of Gold Mines* in Next Five Years

| Country | Mines Opening | Share of Total (%) | Total Output ('000oz) | Share of Total (%) |
|----------------------|---------------|--------------------|-----------------------|--------------------|
| Canada | 17 | 15.9 | 33,784 | 22.2 |
| Australia | 13 | 12.1 | 13,704 | 9.0 |
| USA | 6 | 5.6 | 10,149 | 6.7 |
| Brazil | 6 | 5.6 | 8,373 | 5.5 |
| Mexico | 5 | 4.7 | 6,571 | 4.3 |
| Russia | 4 | 3.7 | 5,919 | 3.9 |
| Turkey | 6 | 5.6 | 5,817 | 3.8 |
| Senegal | 3 | 2.8 | 3,765 | 2.5 |
| Peru | 4 | 3.7 | 2,431 | 1.6 |
| 9 Countries = | 64 | 59.8 | 90,513 | 59.5 |

* Countries with three, or more, new gold mines

Source: S&P Global Market Intelligence

NEW COPPER MINES* 2020-24

| Name | Total Output 2020-40 (kt) | Location | Status | Start Date |
|---|------------------------------|--------------|--------------|------------|
| Quellaveco | 5,031.4 | Peru | Construction | 2022 |
| Kamoa-Kakula | 4,187.4 | DRC | Construction | 2023 |
| Frieda River | 2,534.4 | PNG | Feasibility | 2023 |
| Rosemont | 1,950.6 | USA | Construction | 2021 |
| Khoemacau | 1,847.9 | China | Construction | 2021 |
| Tia Maria | 1,809.2 | Peru | Construction | 2021 |
| Marcona | 1,650.0 | Peru | Construction | 2021 |
| Casino | 1,535.1 | Canada | Construction | 2023 |
| Carrapateena | 1,331.9 | Australia | Construction | 2020 |
| Santo Domingo | 1,084.0 | Chile | Construction | 2022 |
| Skouries | 585.9 | Greece | Construction | 2023 |
| NorthMet | 580.2 | Peru | Construction | 2021 |
| Musonoi | 527.0 | DRC | Construction | 2022 |
| Asmara | 434.9 | Eritrea | Construction | 2020 |
| El Pilar | 412.0 | Mexico | Feasibility | 2021 |
| Kemess North | 314.0 | Canada | Feasibility | 2023 |
| Pilares | 304.0 | Mexico | Construction | 2020 |
| Rovina Valley | 234.8 | Romania | Feasibility | 2022 |
| Boa Esperanza | 163.7 | China | Feasibility | 2022 |
| Kalongwe | 143.0 | DRC | Construction | 2022 |
| KSK | 135.8 | Indonesia | Feasibility | 2022 |
| Platreef | 106.2 | South Africa | Construction | 2022 |
| Nico | 10.9 | Canada | Feasibility | 2021 |
| 23 New Cu Mines = 26,914.1 (2020-2040) | | | | |

* With moderate to high probability of opening

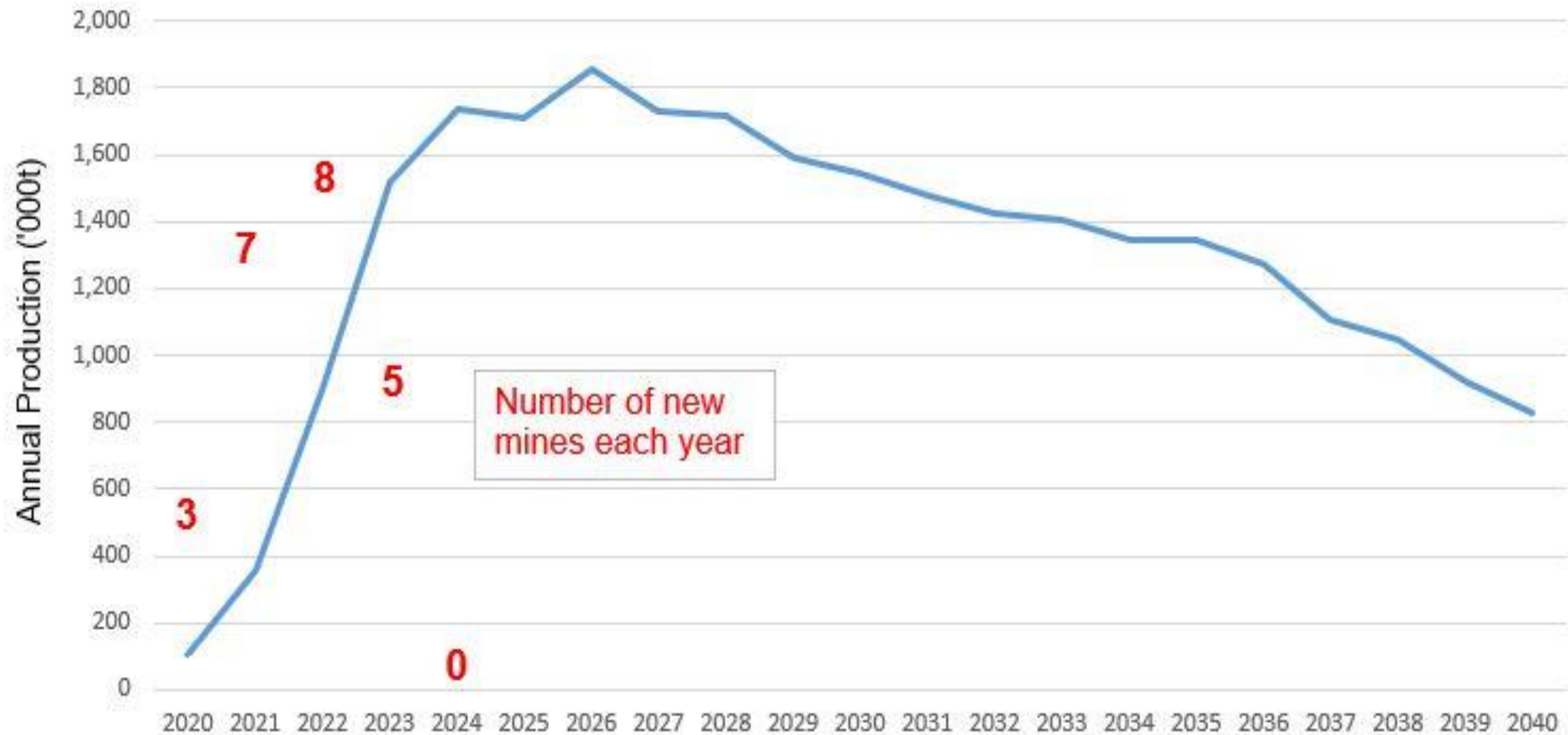
Source: S&P Global Market Intelligence

New Copper Mine Locations

| Country | Number | Total Output ('000t) | Share of Total (%) |
|-------------------|--------|----------------------|--------------------|
| Peru | 4 | 9,070.7 | 33.7 |
| DRC | 3 | 4,857.4 | 18.0 |
| PNG | 1 | 2,534.4 | 9.4 |
| China | 2 | 2,011.6 | 7.5 |
| USA | 1 | 1,950.6 | 7.2 |
| Canada | 3 | 1,860.0 | 6.9 |
| Australia | 1 | 1,331.9 | 4.9 |
| Chile | 1 | 1,084.0 | 4.0 |
| Mexico | 2 | 716.0 | 2.7 |
| Greece | 1 | 585.9 | 2.2 |
| Eritrea | 1 | 434.9 | 1.6 |
| Romania | 1 | 234.8 | 0.9 |
| Indonesia | 1 | 135.8 | 0.5 |
| South Africa | 1 | 106.2 | 0.4 |
| Total = 23 | | 26,914.1 | |

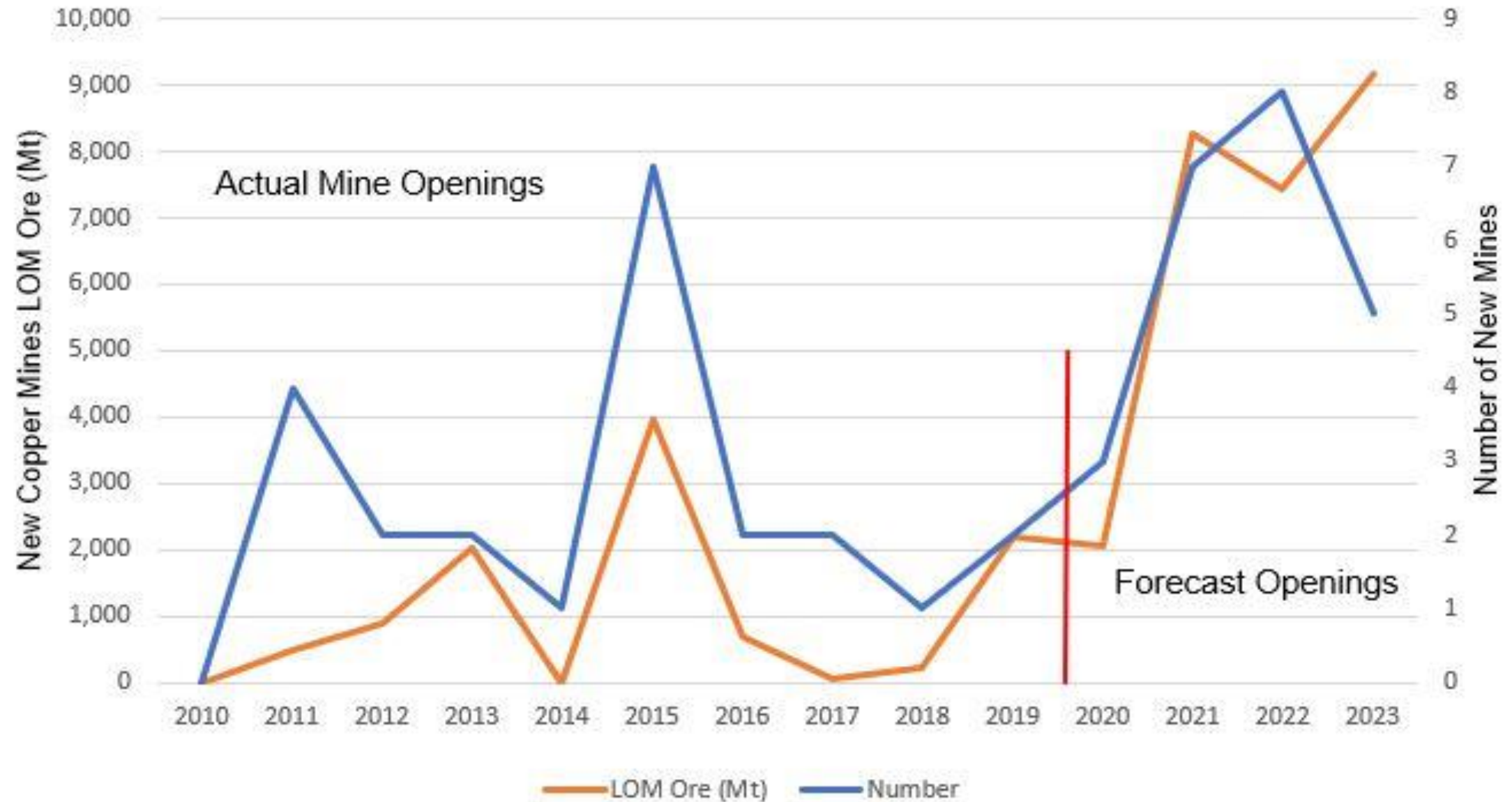
Source: S&P Global Market Intelligence

Annual Output for Copper Mines Opening 2020-24 ('000t)



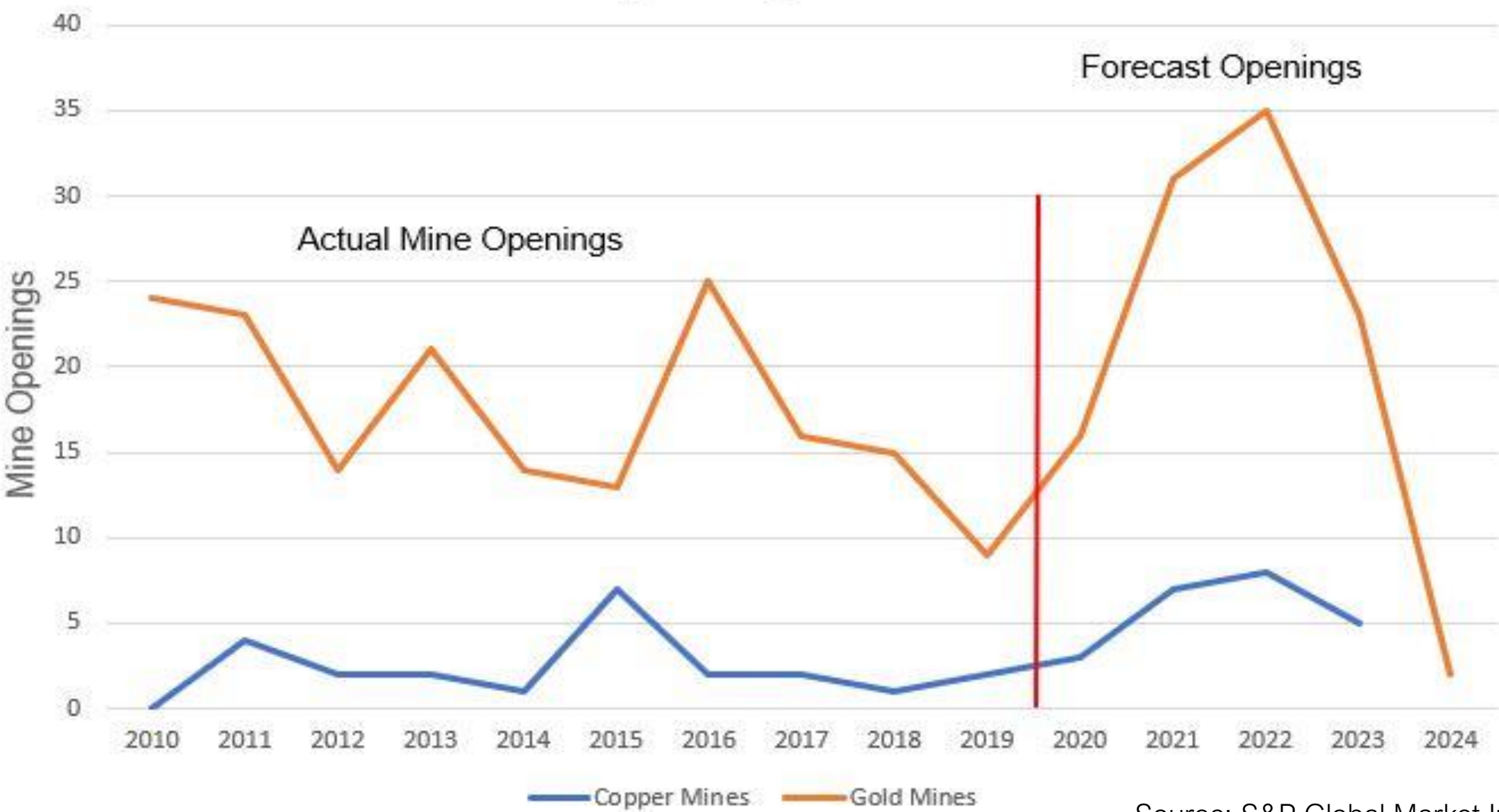
Source: S&P Global Market Intelligence

New Copper Mines Opening



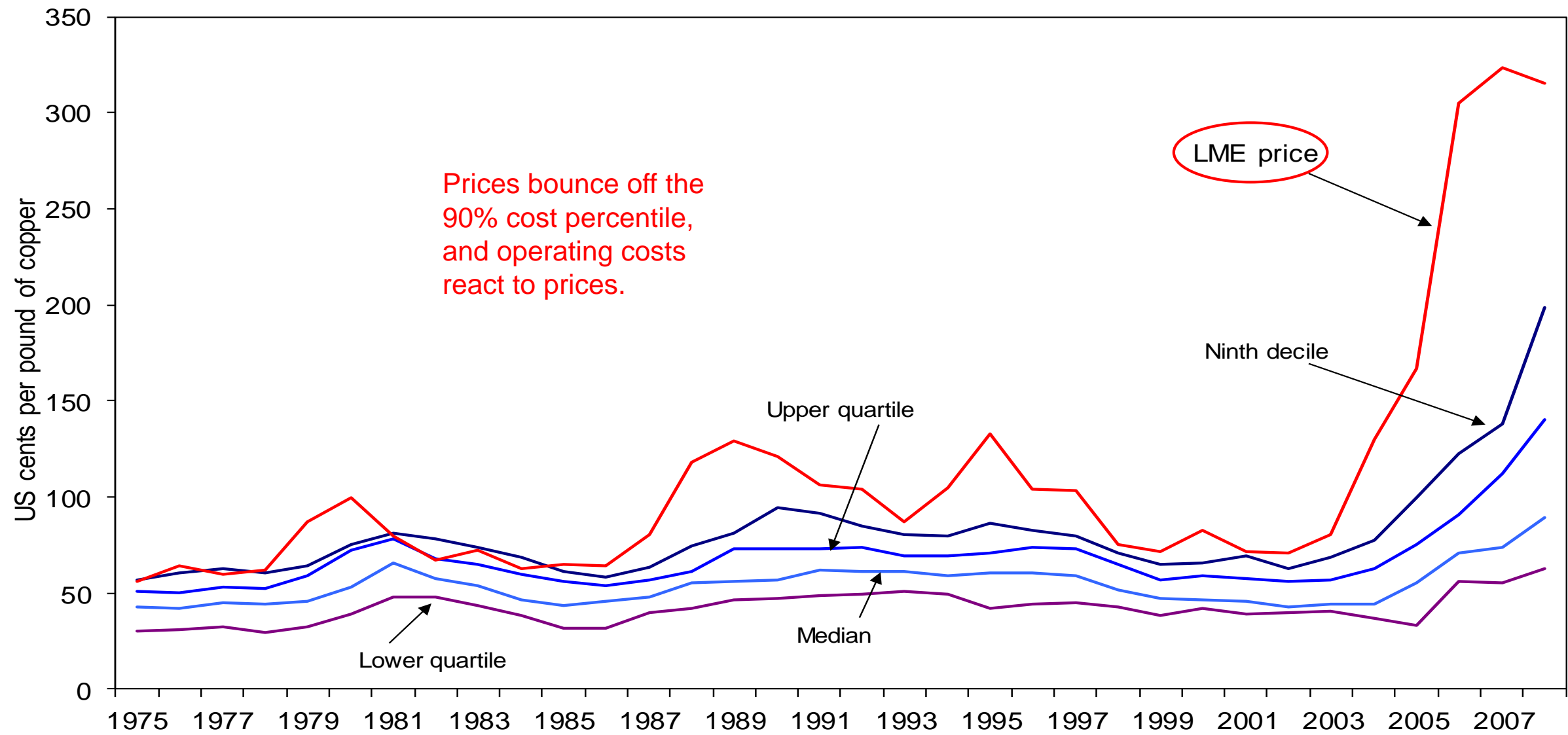
Source: S&P Global Market Intelligence

Mine Openings 2010-24



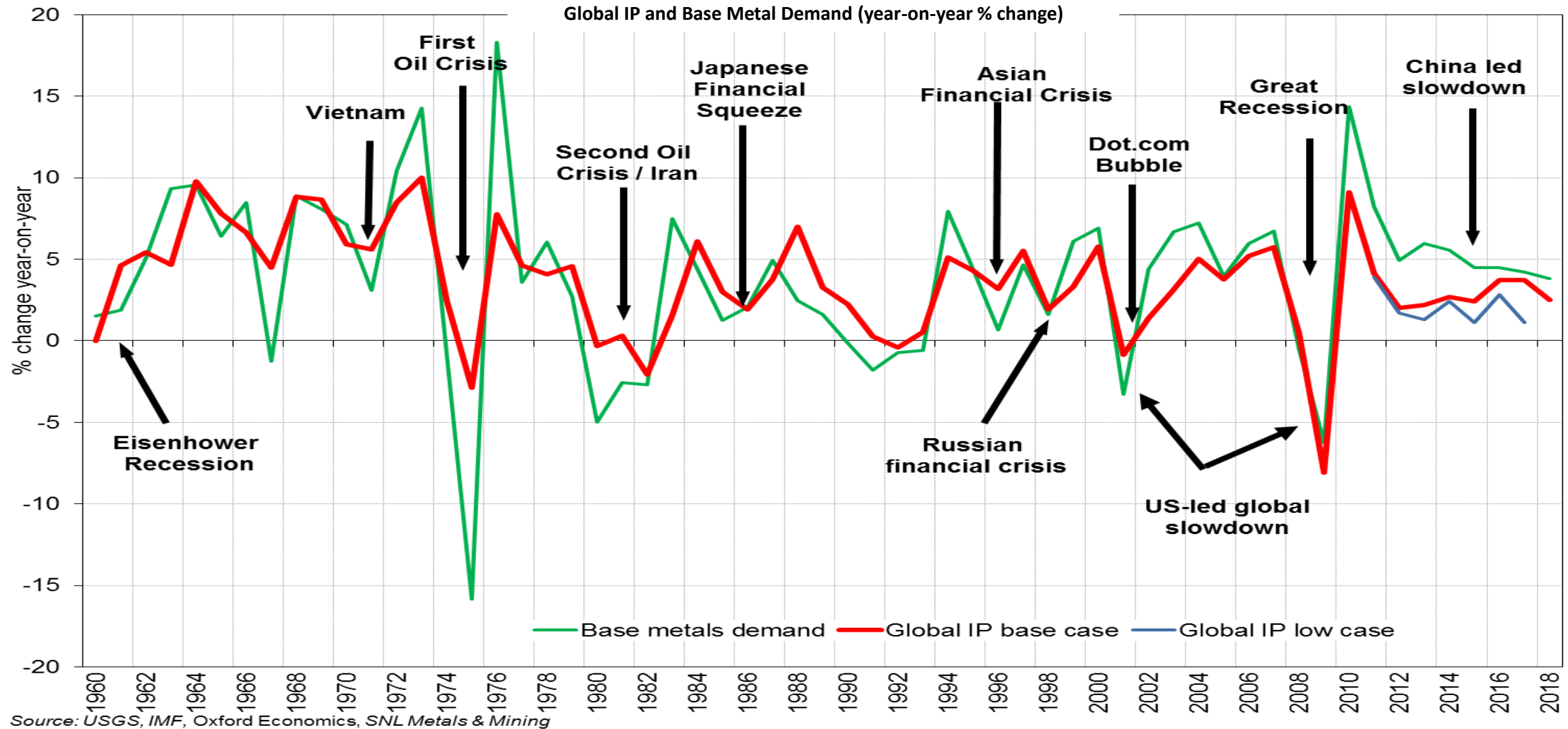
Source: S&P Global Market Intelligence

Mineral Economics 101; Price-Cost Relationship

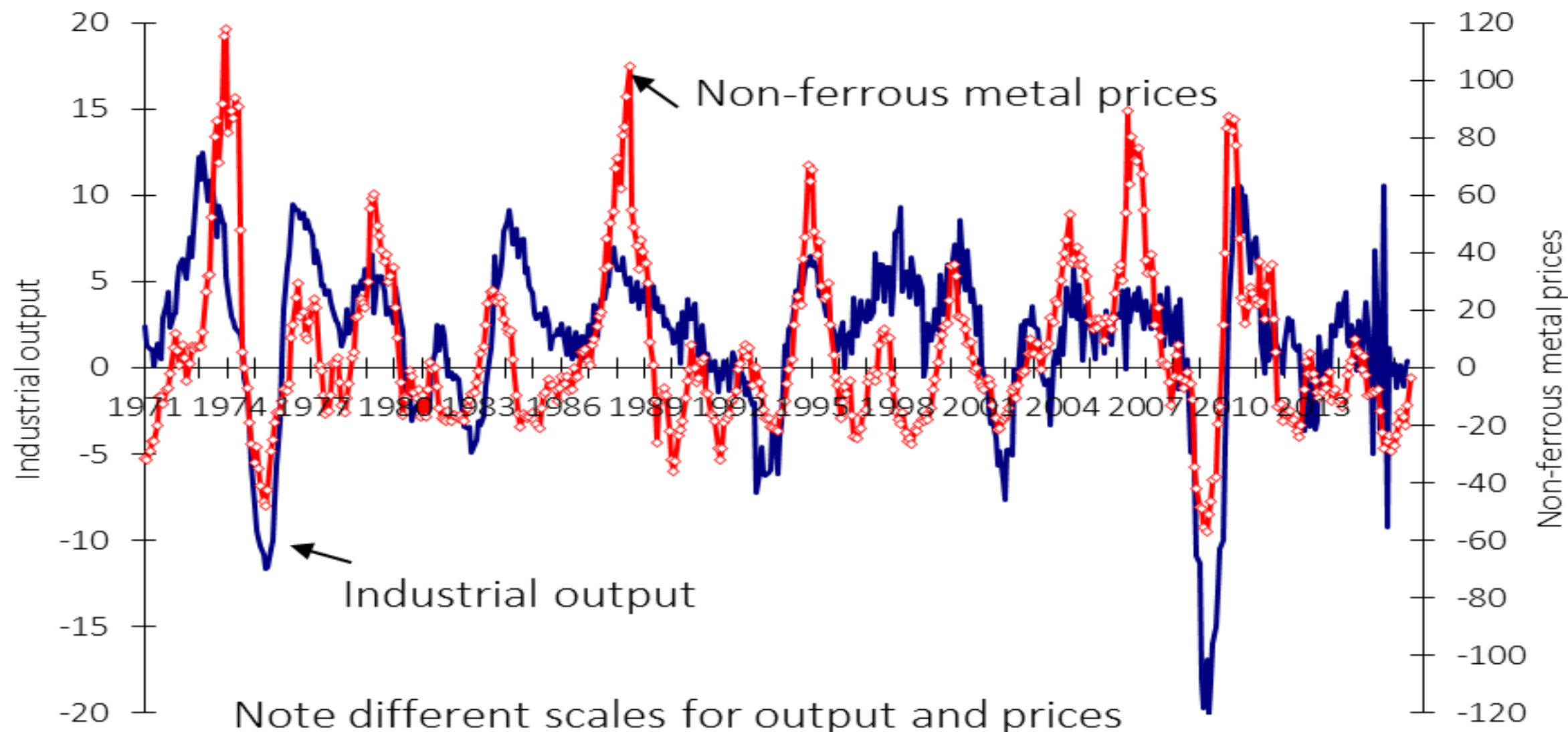


Courtesy Professor Phillip Crowson 2010

Reminder: Demand is Cyclical

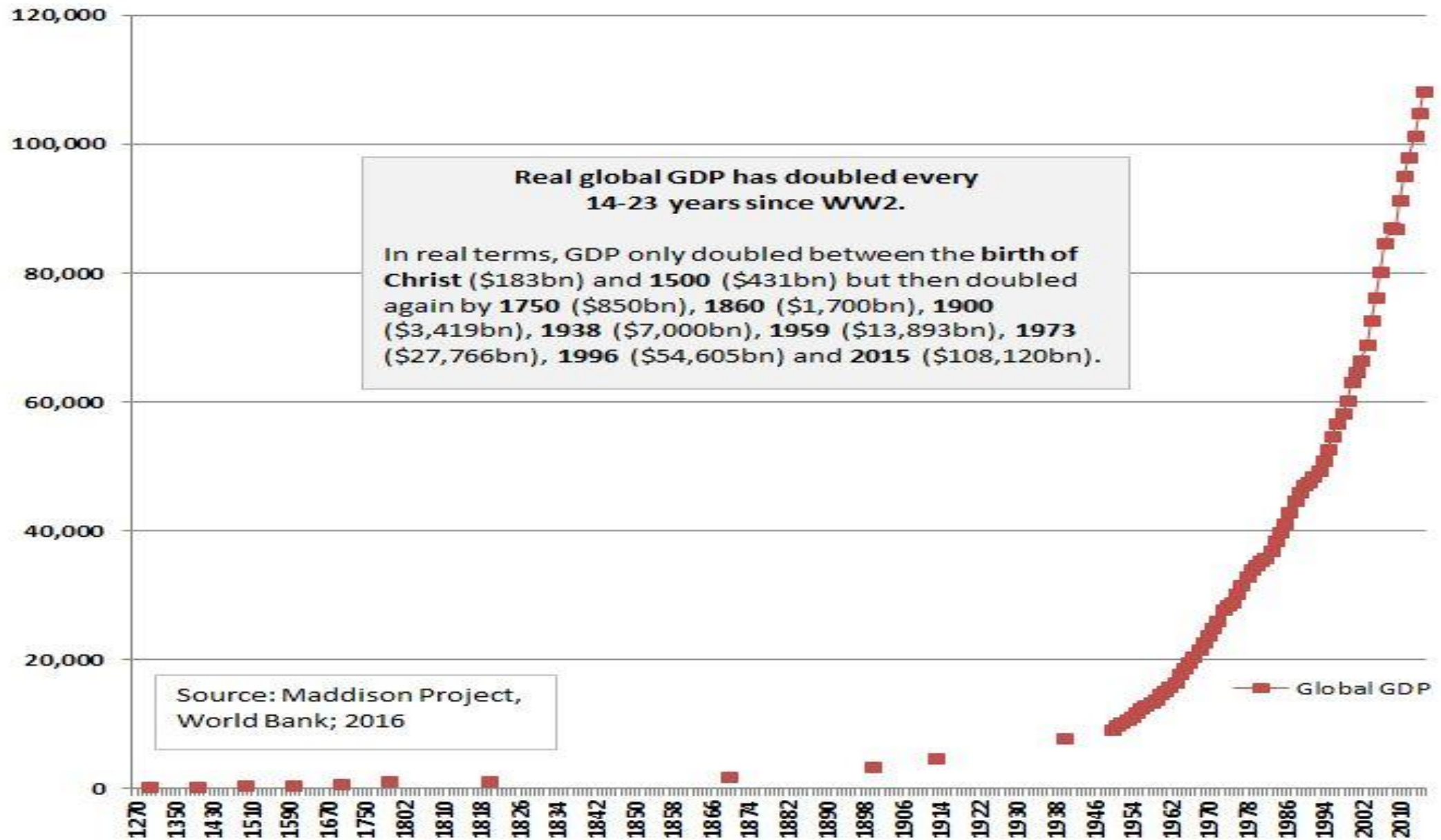


OECD Output vs. Metal Prices



Source: Professor Phillip Crowson; end-2015

Global GDP (US\$ billion; 2011 dollars)



Thank You

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