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The scramble for battery minerals

Goblin metals

What if China corners the market in the cobalt needed for electric vehicles?

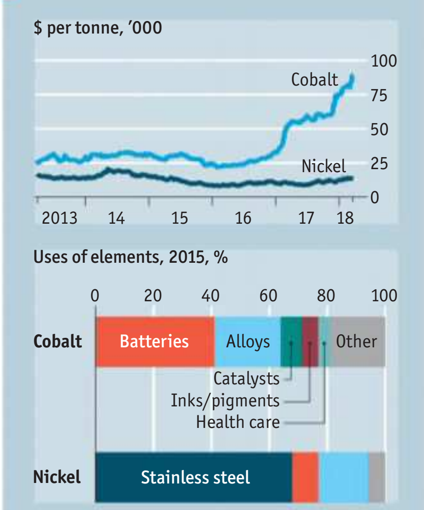
COBALT derives its name from Kobold, a mischievous German goblin who, according to legend, lurks underground. For centuries it vexed medieval miners by looking like a valuable ore that subsequently turned into worthless—and sometimes noxious—rubble. Once again it is threatening to cause trouble, this time in the growing market for batteries for electric vehicles (EVs), each of which uses about 10kg of cobalt. The source of mischief is no longer in Germany, though, but in China.

It is widely known that more than half of the world's cobalt reserves and production are in one dangerously unstable country, the Democratic Republic of Congo. What is less well known is that four-fifths of the cobalt sulphates and oxides used to make the all-important cathodes for lithium-ion batteries are refined in China. (Much of the other 20% is processed in Finland, but its raw material, too, comes from a mine in Congo, majority-owned by a Chinese firm, China Molybdenum.)

On March 14th concerns about China's grip on Congo's cobalt production deepened when GEM, a Chinese battery maker, said it would acquire a third of the cobalt shipped by Glencore, the world's biggest producer of the metal, between 2018 and 2020—equivalent to almost half of the world's 110,000-tonne production in 2017. This is likely to add momentum to a rally that has pushed the price of cobalt up from an average of $26,500 a tonne in 2016 to above $90,000 a tonne.

It is not known whether non-Chinese battery, EV or consumer-electronics manufacturers have done similar, unannounced deals with Glencore. But Sam Jaffe of Cairn Energy Research Advisors, a consultancy, says it will be a severe blow to some firms. He likens the outcome of the deal to a game of musical chairs in which Chinese battery manufacturers have taken all but one of the seats. "Everybody else is frantically looking for that last empty chair."

Cobalt rush



Sources: Thomson Reuters; Nickel Institute; Cobalt Institute

Mr Jaffe doubts the cobalt grab is an effort by Chinese firms to corner or manipulate the market for speculative ends. Instead, he says, they are likely to be driven by a "desperate need" to fulfil China's ambitious plans to step up production of EVs.

Others see it more ominously. George Heppel of CRU, a consultancy, says that, in addition to GEM sweeping up such a sizeable chunk of Glencore's output, China Moly may eventually ship its Congo cobalt home rather than to Finland, giving China as much as 95% of the cobalt-chemicals market. "A lot of our clients are South Korean and Japanese tech firms and it's a big concern of theirs that so much of the world's cobalt sulphate comes from China." Memories are still fresh of a maritime squabble in 2010, during which China restricted exports of rare-earth metals vital to Japanese tech firms. China produces about 85% of the world's rare earths.

Few analysts expect the cobalt market to soften soon. Production in Congo is likely to increase in the next few years, but some investment may be deterred by a recent five-fold leap in royalties on cobalt. Investment elsewhere is limited because cobalt is almost always mined alongside copper or nickel. Even at current prices, the quantities needed are not enough to justify production for cobalt alone.

But demand could explode if EVs surge in popularity. Mr Heppel says that, though most cobalt is currently mined for batteries in smartphones and for superalloys inside jet engines (see chart), its use for EVs could jump from 9,000 tonnes in 2017 to 107,000 tonnes in 2026.

The resulting higher prices would eventually unlock new sources of supply. But already non-Chinese battery manufacturers are looking for ways to protect themselves from potential shortages. Their best an- ▸▸

swer to date is the other "goblin metal" closely associated with cobalt, nickel, whose name comes from a German spirit closely related to Old Nick.

The materials most commonly used for cathodes in EV batteries are a combination of nickel, manganese and cobalt known as NMC, and one of nickel, cobalt and aluminium known as NCA. As cobalt has become pricier and scarcer, some battery makers have produced cobalt-lite cathodes by raising the nickel content—to as much as eight times the amount of cobalt. This allows the battery to run longer on a single charge, but makes it harder to manufacture and more prone to burst into flames. The trick is to get the balance right.

Strangely, nickel has not had anything like cobalt's price rise. Nor do the Chinese appear to covet it. Oliver Ramsbottom of McKinsey, a consultancy, says the reason for this relative indifference dates back to the commodities supercycle in 2000-12, when Indonesia and the Philippines ramped up production of class-2 nickel—in particular nickel pig iron, a lower-cost ingredient of stainless steel—until the bubble burst. The subsequent excess capacity and stock build-up caused nickel prices to plummet from $29,000 a tonne in 2011 to below $10,000 a tonne last year.

As yet, the demand for high-quality nickel suitable for EVs has not boosted production. Output of Class-1 nickel for EVs was only 35,000 tonnes last year, out of total nickel production of 2.1m tonnes. But by 2025 McKinsey expects EV-related nickel demand to rise 16-fold to 550,000 tonnes.

In theory, the best way to ensure sufficient supplies of both nickel and cobalt would be for prices to rise enough to make mining them together more profitable. But that would mean more expensive batteries, and thus electric vehicles. Only a goblin would relish such a conundrum. ■

Buttonwood | CAPE crusaders

Tackling the criticisms of a favoured valuation measure

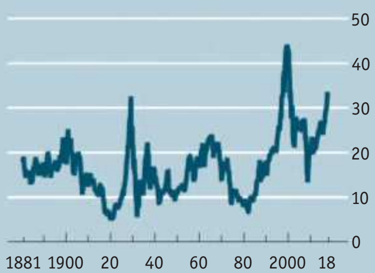
FEW measures of stockmarket valuation are as controversial as the cyclically adjusted price-earnings ratio, or CAPE. American equities have looked expensive on this measure for most of the past 20 years, which is why many bulls tend to dismiss its usefulness. It is pretty clear that the CAPE does not help investors to time the market.

But a new paper* from Research Affiliates, a fund-management group, explains why many criticisms are overblown. The strongest case for the measure is that a higher ratio tends to be associated with lower long-term returns. A study of 12 national markets shows that a 5% increase in the CAPE, from 20 to 21, say, tends on average to reduce the total ten-year expected return by four percentage points.

The attraction of the CAPE is that it smooths out the vicissitudes of the profit cycle. In a recession, profits can plunge even faster than share prices. So if you look only at the ratio of a share price and the previous year's profits, the market can look very expensive. Since it is a moving average of profits over ten years, the CAPE is less volatile. Past peaks have coincided with the top of bull markets, as in 1929 and 2000 (see chart). It is now well above its long-term average.

Triple peaks

US cyclically adjusted price-earnings ratio*



Source: Robert Shiller, irrationalexuberance.com

*Based on inflation-adjusted earnings from previous ten years

Critics say that the high value of the CAPE can be easily explained. One argument is that profits have shifted to a permanently higher level. Accounting standards have changed and modern companies, such as Google and Facebook, have more market power. Another line of argument is that, regardless of the level of profits, valuations should be higher. Demographic changes mean that baby-boomers are piling into equities as they prepare to retire. Low real interest rates mean future profits, when discounted, are worth more today. General economic and financial risks have fallen.

The paper tries to tackle those arguments. The authors accept that the current level of profits is high. But they do not believe that this means future profits growth will necessarily be strong. There is a tendency to revert to the mean. Historically, rapid growth in profits over a ten-year period is associated with slower growth over the next decade. Furthermore, the high level of profits is linked to slow growth in wages. That has led to a populist backlash, which could result in higher taxes on companies or restrictions on trade.

The demographic argument also has its flaws. The baby-boomers are already in the process of retiring, which means they will be running down their savings pots rather than building them up. Furthermore, the ageing population means that the workforce will grow more slowly in future. Other things being equal, that will be bad for both economic growth and profits.

As for the impact of low interest rates, a lot depends on why rates are low. If they are depressed because central banks expect slow economic growth, that is not great for equities. Arguments based on low macroeconomic volatility tend to be hostages to fortune; there was much talk of the "great moderation" in the early 2000s, just before the financial crisis hit.

Finally, other countries also have low interest rates, reduced volatility and ageing populations, without their markets trading on anything like the CAPE that Wall Street does. America's ratio is 32.8, whereas Canada is trading on a CAPE of 20. Germany is on 19 and Britain on 14. All are trading near their historical averages; in contrast, Wall Street is at double its usual level. America may have more powerful companies, but that is a very large gap to attribute to a single factor. Alternative measures of stockmarket valuation, which compare share prices with corporate sales or asset values, also show that Wall Street looks expensive, relative to history, but that other countries (particularly emerging markets) look cheap.

Plenty of sceptics will fail to be convinced by this reasoning. They will point out that the American CAPE has been consistently over 20 since 2011, well above its historic average of 16.8. Yet the markets have continued to perform well, admittedly helped by a huge amount of stimulus from the central banks.

But they should consider what their optimism implies for the future. American pension funds are expecting returns of 7-8% from their portfolios. That would require some combination of decent economic growth, continued low interest rates, a bigger share of profits in GDP and even higher valuations. If you believe in all that, this columnist has some crypto-currencies he would like to sell you.

* "CAPE Fear: why CAPE Naysayers are Wrong" by Rob Arnott, Vitali Kalesnik and Jim Masturzo

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