

Finding optimistic correlation (Resource Anxiety Index) between CRMs and energy, agricultural products to expect risk of critical materials by explainable informatics model

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Background

Commodity indices are initially developed by stock investment company, such as Goldman Sachs. There are 3 major commodity index (1) S&P GSCI (Standards and Poor's Goldman Sachs Commodity Index), (2) DJ UBSCI (Dow Jones UBS Commodity Index), (3) Reuters CRB (Commodity Research Bureau Future Price Index) and Korean has (4) CRI (Samsung Commodity Risk Index).

GSCI has 24 commodity items, UBSCI has 20 items and CRB has 17 items, but among these indices GSCI & CRI only included energy trends into the index. But those indices clearly focused on the price fluctuation to capitalize items for the investment, which means only interesting to Y-axis rather than X-axis. It has incoherency with the supply fluctuation from resource uncertainty. Those indices also did not well reflect the relation between resources or sudden change due to their various parameters handling and divided too specific ranges by economic viewpoint. GSCI handled limited relationship among items, energy, livestock, agriculture, industrial metals, and precious metals. CRI handle also limited correlation between energy, metals and agriculture. Even these indices handle metals from LME data, it has not included CRMs but included industrial metals, Cu, Li, Al, Ni Zn and precious metals, Gold, Silver, Platinum. But there is no index showing systematically the correlation between CRMs and energy/agriculture.

Unstable resource markets would cause strong concerns over resource security and supply, which would further aggravate the supply-demand situation of resources (snowball effect). There are three most commonly used commodity futures indices, the Goldman Sachs Commodity Index (GSCI), the Dow Jones-AIG Commodity Index (DJ AIG), the Reuters-Commodity Research Bureau Futures Price Index (CRB) and Samsung Commodity Risk Index (CRI). Those indices showed strong growth, jumping up from the previous side-walking range witnessed up until the late 2010s and created new trends in different price ranges, departing from the patterns in the previous two decades or so far, and respectively recorded historical highs in the later part of the previous decade. However, 2019 pandemic made unexpected situation in the world even in the resource or commodity markets. The CRB and GSCI were designed to understand price fluctuation for the reference of investment which have incoherency with the supply fluctuation from resource uncertainty. Those indices also did not well reflect the relation between resources or sudden change due to their various

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But as zero emission economy and EV popular, Li, Co and REE become also important commodities as one of critical materials.

How is the projection of relational trends of CRMs, Energy, and Agriculture?

How we can know the future of trends?

Each risk interacts with the others, creating resource risks, price changes, and volatility expansion in resource markets. Rather than absolute resource prices, relative prices and volatility increase risks and amplify instability in the market. It is necessary to establish a resource risk system by quantitatively measuring market risks. For instance, we can find the relationship between CRMs and Agriculture (major vol.% grain), Energy through macro viewpoint by new developed RAI (Resource Anxiety Index).

For example grain price increases by COVID due to lack of labor and meanwhile Oil price decreases due to minimize economic activity, probably CRMs demand also decreases following Oil and Grain trends. RAI is representing combining index among Grain, Oil and Mineral. Grain and Oil are well tracked international trade by world trade market. Therefore, this index is introduced to quantitatively measure risks in the resource markets which categorized into 3 sectors: energy, grains, and raw materials and can be computed by combining resource price increase rates and volatility for each quarter. We can suggest more close to realistic and forecastable index to use CRMs fluctuation.

Ex) 2020 Bloomberg's December monthly return of Energy sector is +9.86%, industrial metals is +9.08%, Agriculture is +1.08% and precious metals is -1.31%.

Objective

We will systematic investigate to find correlation among commodity items (CRMs, energy, agriculture) for anticipating future risk of CRMs at interesting regions (Worldwide, US, EU, Asia).

Materials

- DB of Energy, Agriculture, CRMs with price, production, trade amounts.
- Informatics expert to develop algorithm, harvest and connect DBs.
- Commodity index expert to review new CR index's fidelity.