



Discussion Paper

## The By-Product Effect on Metal Markets - New Insights to the Price Behavior of Minor Metals

by

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# The By-Product Effect on Metal Markets – New Insights to the Price Behavior of Minor Metals

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Abstract

We will examine price dependencies between primary products and co-products from metal markets. First, we develop an optimization model to determine the profit-maximizing extraction behavior of mining companies. With this model, we analyze how the companies optimally react to exogenous demand shocks on the metal markets, and how the prices of metallic primary products and their co-products are related to each other. This approach enables us to determine the basic conditions leading to price relationships. Second, we validate our theoretical findings on monthly metal prices from June 2009 to January 2013. We apply a linear regression model to analyze the price relationships of the primary products and their co-products and finally compare the results of our analysis to our model forecasts.

**Key Words**

metal prices, price dependencies, joint production, by-product, co-product, empirical test, minor metals, commodity price driver

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