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The rapid evolution of speculative investment in the REE market before, during, and after the rare earth crisis of 2010–2012

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ABSTRACT

The purpose of this study is to examine the rate of investment capital that flowed into the rare earth element (REE) junior mining market, to assess the key factors that affected this investment rate, before, during and after the Rare Earth Crisis of 2010–2012, and to determine the result of the total capital invested. The time period chosen for the study was 2006–2015. From the approximately 400 junior mining companies that were pursuing REE during this time period, 28 companies were chosen to represent the market for this study. During the time period, these 28 companies raised a total of $5,924,554,171, with $4,254,272,520 of this amount being raised during the Crisis time period of 2010–2012. Critical factors that affected money flowing into the rare earth junior mining companies were newsletter articles, media coverage, Chinese rare earth policies, government announcements and reports, the initial public offering of Molycorp, Inc., rare earth element prices, World Trade Organization decisions, and junior mining company stock prices. Of the 28 companies, only Lynas Corporation Ltd. and Molycorp, Inc. achieved commercial REE production. Capital flowing into REE junior mining companies declined rapidly from 2013 to 2015, as the market found other solutions and the Crisis subsided.

1. Introduction

The rare earth element (REE)[1] industry was not well known to the junior mining investment community in 2006. There was very little coverage by analysts, and almost no mention of the importance of rare earths for use in technology, green energy, communications, and defense applications. The public media were very limited in their coverage of anything specifically related to the rare earths during the time before the Crisis, and there was nothing imminently captivating about the REE market for most investors. A substantial hindrance for investors looking at the REE market was that it was very difficult to understand relative to other popular commodities such as gold, silver, or base metals. The learning curve was very steep for rare earth elements, with little perceived payoff for the effort to become educated. Understanding complex mineralogy, complicated processing, and how the fifteen separate elements made their way through the global supply chain was too much for many investors to feel comfortable taking the risk and placing large amounts of capital in the sector. This began to change as a clear narrative began to emerge regarding China's control of these elements and the critical role of these elements in modern society.

There are many factors that have influenced investment in the rare earth market, and there are many additional aspects that could have been included in this study. The specific factors chosen were selected for the impact they had on the rare earth investment community before the Crisis, during the Crisis, and after it subsided. The authors attended many meetings, industry conferences, and investment events and were directly involved in the rare earth sector and the investment community during each year of the period covered in the study. There were numerous interactions by the authors with junior mining companies, investors, end users and institutions during the time period.

Prior to the Rare Earth Crisis of 2010–2012, eighteen of the 28 junior mining companies in the study were pursuing rare earth elements. Of these, only four companies were solely focused on the development of rare earths, while others were involved in exploring for a variety of other elements such as: zirconium, hafnium, niobium, tantalum, iron, copper, zinc, gold, phosphate, uranium, silver, molybdenum, lithium, beryllium, and gallium.

During the Crisis of 2010–2012, many investors—both retail and

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[1] **Rare earth elements (REE)** are defined for this study as the elements lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb), lutetium (Lu), and yttrium (Y). Promethium (Pm) is not included because it is not found in nature. Scandium (Sc) is not included because it is generally not associated with REE and it is extracted as a byproduct of mining non-rare earth bearing minerals, and has a supply chain that is separate from the other rare earths. Light rare earth elements (LREE) are defined as La, Ce, Pr, and Nd.

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institutional—poured speculative capital into the sector. 72% of the capital invested between 2006 and 2015 was invested during the three years of the Crisis. Investor expectations were set very high by optimistic junior mining companies, but it was difficult to meet these expectation. For example, Nicholas Curtis, President and CEO of Lynas Corporation stated in 2001, "We expect to be mining 100,000 t of ore by 2004 and to be selling 10,000 t of REO under our brand by that date", and in a Lynas presentation at the Metal Pages conference in 2008 it was stated that initial production would begin in 2009 (Lynas, 2001, 2008). However, it was not until 2013 that Lynas actually produced REE product for the market. As REE prices began to decline, many investors lost patience with the sector as many junior companies failed to meet expectations.

In 2015, after the Crisis had subsided, sixteen of the 28 companies were still pursuing REEs as a core focus, six companies had mothballed their REE projects or ceased pursuit of REEs, four companies were working on REEs and other elements, and two companies were bankrupt. Only one company, Lynas Corporation, was in production at the close of 2015, but it had not yet achieved profitability.

2. Study parameters

2.1. The 28 Companies in the study

By the end of the rare earth crisis in 2012, approximately 400 publicly traded junior mining companies[2] claimed to be actively pursuing[3] rare earth elements. The criteria for selecting the 28 junior mining companies in this study were various. First, the company had to be publicly traded on a recognized exchange during the study period. Second, rare earths had to be the primary focus of the company during a portion of the study period. Third, the company had to raise a minimum of US$10,000,000 for the purpose of actively pursuing rare earths during the study period. As there were over 400 junior mining companies to choose from for the study (Cox, private database), many were excluded, but we believe the selected 28 companies to be a representative sample of the REE junior market during the time period. Much of the data used in this study is from publicly available documents, but both background and other data were also drawn from the authors' notes, databases, conversations, and experiences from numerous interactions with junior mining companies, investors, end-users, and institutions as the authors were directly involved in the investment community and attended multiple meetings, industry conferences, and investment events during each year of the study period of 2006–2015.

2.2. Defining capital included in the study

Audited cash flow statements were the basis of the financial numbers used in Table 1 for this study. The cash flow statements were found in publicly available annual reports, annual financial statements, and often described in management discussion and analysis (MD & A) documents. Items that were included in the final numbers for Table 1 of the study were the following: proceeds from issue of shares, proceeds from issue of options, proceeds from exercise of options or warrants, proceeds from issue of convertible notes, and capital contributions. Items that were not included were the following: borrowings, lines of credit, and grants. The financial information was used to track how much money flowed into the 28 company coffers and during the study period.

All financial numbers are expressed in US Dollars (USD). If companies originally reported their financials in Canadian Dollars, Australian Dollars, or Euros these numbers were converted to USD using the exchange rate as of the date the numbers were published, unless otherwise stated (Canadian Dollar exchange rate, Australian Dollar exchange rate, Euro exchange rate).

2.3. Defining the time period

The time period of 2006–2015 was chosen in order to get a sweeping view of the REE junior mining sector over the course of a decade that covered both before and after the REE Crisis of 2010–2012. We define the Rare Earth Crisis as the period of time between 2010 and 2012, when the rare earth industry experienced supply issues and much higher prices for rare earth products, especially for those products being exported from China. The Crisis time period could be defined as 2010–2011, as REE prices peaked and began to decline in 2011, but 2012 is included here because prices for many rare earths had not yet returned to pre-crisis levels until 2012. In fact, for some rare earths—such as Nd, Pr, and Dy—prices did not return to pre-crisis levels even by the end of the study period. The aim of this study is to examine the rate of investment capital that flowed into the rare earth element (REE) junior mining market, to assess key factors that affected this investment rate, and to determine the financial result of the total capital invested. While two juniors achieved production during the study timeframe, none of 28 companies achieved profitability by the conclusion of the study period.

3. Explanation of Table 1: capital raised by 28 junior mining companies

Table 1 shows how much capital flowed into all 28 REE junior companies included in the study during the years 2006–2015.

Table 1 reveals the rapid increase of capital flowing into the REE junior space as the investment community responded to the Rare Earth Crisis during the years 2010–2012. The table also shows how the inflow of capital began to dissipate in 2013, fell more quickly in 2014, and then in 2015 fell back to the level of $102,316,819 which was below the $113,036,828 raised in 2007—before the Crisis began. Dropping below these pre-crisis levels indicates that by 2015 investor interest had lessened considerably—even to levels below that when the REE market was essentially unknown by investors in 2007.

The total capital raised by REE junior mining companies during the study period was $5,924,554,171. Molycorp, Inc. (Molycorp) and Lynas Corporation (Lynas) led the REE junior sector and were the companies that the investment community followed most closely. Their influence on the market featured prominently, as these two companies alone accounted for $4,325,061,336, or over 73%, of all the money raised by REE juniors.

3.1. Impact of Lynas and Molycorp

During the study period, only Lynas and Molycorp were able to achieve production and sale of rare earth products to the general market. Of these two producers, Molycorp struggled to become profitable and entered bankruptcy during the last year of the study, while in 2015 Lynas' "Total comprehensive loss for the year attributable to equity holders of the Company" (Lynas, 2015) was negative $151,332,096. None of the other 26 juniors produced rare earth products for consumption by the general market.

Molycorp accounted for over 55% of the total amount REE juniors raised from 2006 to 2015, as they raised $3,281,300,000 in investment capital. Molycorp's originally stated plan was to produce 19,050 t of REO per annum (tpa) by 2012, expanding to 40,000 tpa REO by 2013,

[2] **Junior mining companies (or Juniors)** are defined as companies seeking to develop natural resource deposits. This study is specifically focused on companies pursuing rare earth element deposits.

[3] **Actively pursuing** is a term used in the study to indicate that a company is currently investigating the economic viability of furthering a rare earth project at the time. The company must go beyond maintaining permits and licenses—it must be drilling holes, conducting laboratory test work, carrying out environmental studies, approaching potential customers, or other such activity that shows an active pursuit in rare earths.