



The performance of the mining sector in Ghana: A decomposition analysis of the relative contribution of price and output to revenue growth



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ABSTRACT

For the past decades, the strong performance of the mining industry has been largely attributed to the surging mineral prices. To assess this claim, this paper examines the performance of the mining sector in Ghana over the past 40 years. It basically, provides a historical context of the dynamics and forces driving the strong performance of the mining industry with specific focus on gold mining. Using revenue as the performance metric, we decompose the growth in gold mining revenue into three components: the pure price, pure output (production) and the correlation effects. The analysis shows that although surging gold prices have certainly played a role in driving the strong performance of the sector, even more important a factor is the strong correlation between price and output. Over 70% of the growth in mining revenue resulted from the strong and positive correlation between output and price growth. In addition, given the strong demand for gold at the international market, particularly, from China, the study identifies a combination of complementary forces such as policies, investment flows and improvement in technology as underlying and driving this strong correlation effect. On this basis, the paper recommends that the government should continue to implement policies that promote a good business environment, and attract and sustain investment flow into the mining sector.

1. Introduction

Natural resources have indeed contributed significantly to socio-economic development in most world economies, especially, the resource abundant countries in Africa including Ghana (Mensah et al., 2015). In 2011, the mining sector contributed about 5.7% to Ghana's overall Gross Domestic Product (GDP) and over 40% to its total foreign exchange earnings (Ghana Chamber of Mines Report, 2011). Due to its strategic importance to national development, the mining sector was one of the priority areas in the Economic Recovery Program (ERP) and Structural Adjustment Program (SAP), which was instituted to promote socio-economic development in Ghana in the 1980s (Government of Ghana, 1986; Aryee, 2001; Amankwah and Anim-Sackey, 2003; Domfeh, 2003; Bloch and Owusu, 2012; Mensah et al., 2015). These programs resulted in the promulgation of the Minerals and Mining Law of 1986, which sought to promote investment, particularly, foreign direct investment (FDI) in the sector, along with increased productivity and earnings from mineral exports (Government of Ghana, 1986; Aryee, 2001; Akabzaa and Darimani, 2001; Amankwah and Anim-Sackey, 2003). This law was amended in 1994 with the Minerals and Mining Amendment Act of 1994 (Act 475),

and currently, the sector is governed by the Minerals and Mining Act of 2006, Act 703 (Bloch and Owusu, 2012).

For the past few decades, the mining sector has performed strongly and remains a key driver of economic growth and development in Ghana. This strong performance of the mining sector has been largely attributed to the recent surge in mineral prices, especially, gold. In fact, in its 2014 annual report on the mining sector, the Minerals Commission of Ghana reinforced this traditional notion by attributing the strong performance of the mining industry, exclusively, to surging mineral prices in the international market (Ghana Chamber of Mines, 2014). Whereas there may be some evidence to support this claim, such argument has the tendency to reduce the performance of the sector to a single metric (variable), price, for which the country has little or no control over.

In this paper, we examine the performance of the mining sector in Ghana over the past 40 years and the paper seeks to provide a historical context of the dynamics and forces driving the strong performance of the mining sector and most importantly, to assess the price-driven hypothesis about the performance of the mining sector. We perform this analysis without necessarily conducting an empirical test of hypothesis, which is a major weakness (limitation) of the paper.

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Future research could address this gap by empirically testing the relative strength of the forces identified. For a number of reasons, however, we focused on the gold mining industry. First, gold is the most extensively mined mineral in the country; second, gold alone contributes the largest proportion (over 90%) to the country's gross mineral revenue, foreign exchange earnings and government's gross revenue (Domfeh, 2003; Mensah et al., 2015).

To achieve the study's objective, we decompose the growth in total revenue accrued from gold mining over the past 40 years into its core determinants/component¹: (i) the pure price, (ii) the pure output (production) and (iii) the correlation effects. This methodology, in particular, helps in the determination of the relative contributions of each component to revenue growth. The paper, contributes to the existing literature in several ways. First, while its findings are not necessarily new, the study provides a systematic way of quantifying the relative contributions of price and output (production) to revenue growth. Second, knowledge of the co-movement of price and output (the correlation effect) could be useful for mineral policy design in Ghana. Third, knowledge of the underlying forces driving prices and output could be valuable to investors and policy makers and has the potential of shaping investment decisions and mineral policy direction in Ghana.

The rest of the paper is structured as follows. Section 2 provides a general overview and socio-economic contributions of the mining sector to the national development of Ghana, with particular focus on employment, revenue generation and community development. Section 3 examines the performance of the gold mining industry in Ghana over the past 40 years using revenue growth as the key performance metric. A simple methodology of revenue growth decomposition is presented. Section 4 presents the result of the decomposition analysis along with discussion on the factors driving the strong performance of the mining sector in Ghana. Section 5 provides the conclusion of the paper along with some key policy recommendations.

2. Overview and socio-economic contributions of the mining sector in Ghana

2.1. Overview of the Ghanaian mining industry

Mining activities in Ghana can be broadly classified into two types: large-scale and small-scale. Large-scale mining is usually undertaken on a large scale and requires large capital investment and sophisticated technology for its exploration. Government approval in terms of licensing is also required (Amponsah-Tawiah and Dartey-Baah, 2011). Hence, only large corporations participate in it. Major players in the industry include AngloGold Ashanti Ltd (formerly Obuasi Gold Mine), Gold Fields Ghana Ltd., Golden Star, Newmont Mining Corporation, Ghana National Manganese Corporation and Ghana Consolidated Diamonds Ltd. Other players include the Chirano Gold Mines, Central African Gold, the Golden Star Resources Ltd., Red Back Mining, Adamus Resources Ltd, Alcoa Inc. and Alcan Aluminum Ltd (Aryee, 2001; Amponsah-Tawiah and Dartey-Baah, 2011; Bloch and Owusu, 2012). The Obuasi Gold Mine (currently AngloGold Ashanti) is by far the oldest mining company in Ghana² and by production volume, Goldfield Ghana Limited is currently the largest, accounting for about 40% (0.83 million oz.) of the country's gold production (Amponsah-Tawiah and Dartey-Baah, 2011; Bloch and Owusu, 2012).

Individuals or smaller groups of artisans, on the other hand, mostly operate small-scale mining. It is predominantly surface mining due to

its low cost, capital and technical skill requirements. Prior to 1989, small-scale mining was deemed illegal. However, as part of the policy to modernize and formalize the sector, small-scale artisans are now required to obtain a permit in order to operate legally. Despite these reforms, only a few small-scale mining artisans are registered (Akabzaa and Darimani, 2001). This has led to two forms of small-scale mining artisans in Ghana: the semi-formal registered (legal) and informal unregistered (illegal) artisans (Bloch and Owusu, 2012). The dominance of the largely unregistered artisans makes it hard to determine the precise size of this sub-sector. Hilson (2004) estimates that over 200,000 individuals are directly engaged in small-scale mining, while current estimates by the United Nations Economic Commission for Africa as reported by Teschner (2012) put this number at about one million.

2.2. Socio-economic contributions of the mining sector

Traditionally, the mining sector of Ghana has been one of the major contributors to national development and recently, the growth of this sector has outperformed most traditionally dominant sectors such as agriculture (Aryee, 2001; Amponsah-Tawiah and Dartey-Baah, 2011). This section examines the socio-economic contributions of the mining sector in Ghana with respect to government and mining revenue, employment, GDP growth and host communities.

Table 1 presents the contribution of the mining sector to government revenue, value added and employment from 1960 to 2010. The analysis shows strong contribution of the sector to aggregate value added (14.4% to the country's gross domestic product) and in particular, government total revenue. The sector contributed over GHC³ 1 billion in revenue to Ghana Revenue Authority's (GRA's) domestic collections. This represents an equivalent of 27.6% of the total GRA domestic collections in 2011, up from its level of 13.7% in 2010. Thus, the mining sector has also been a major contributor to revenue generation in Ghana. The strong contribution of mining to government revenue has largely been driven by higher mineral prices that translates into higher revenue to the mining companies in general, and higher corporate taxes and royalty payments to the government in particular. For example, the revenue accrued to the mining companies from export⁴ of minerals increased by almost 30% from its level of \$3.72 billion in 2010 to \$4.78 billion in 2011. At the same time, taxes from mining companies as a percentage of total corporate income tax to government has been on the rise in recent years, rising to about 38.3% in 2011 from its level of 13.3% in 2008 and 24.1% in 2010 (Chamber of mines, 2011).

Aside its impact on revenue growth, the mining sector has also stimulated economic activities. In 2011 for instance, the sector contributed over 40% to total mechanized export and 75% to the country's total foreign exchange earnings. Also, the proportion of minerals revenue returned to the country from export activities to boost domestic spending increased from 68% in 2010 to 75% in 2011 (Ghana Chamber of Mines, 2011). However, as with most enclave industries, the impact of the sector on employment has been minimal.⁵ The sector directly employs less than 2% of the country's total labor force and less than 10% of industrial employment. As a result, agriculture continues to be a dominant sector of the economy in terms of employment capacity, employing over 40% of the country's total labor force (Timmer et al., 2014).

Socio-economically, the mining sector has been a major contributor to the development of human resources and infrastructure in Ghana. The sector has contributed immensely to education, health, electricity

¹ Detailed description of the methodology is presented in Section 3.2. and appendix of the paper.

² In past, Obuasi Gold Mines (now AngloGold Ashanti) used to be the largest mining company by production volume. However, recent data by Bloch and Owusu (2012) puts Gold Fields (Tarkwa) as the largest with production level 0.66 million oz. This is followed by Newmont (0.53 million oz.) and then Obuasi Gold Mines.

³ GHC is the symbol for Ghana cedis, the currency of Ghana.

⁴ This also include revenue from small-scale mining industry by the Precious Minerals Marketing Company (PMMC).

⁵ This has been the problem with the enclave industries that operate at high productivity yet employ fewer people.

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