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Gold exploitation and socioeconomic outcomes: The case of Burkina Faso

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ABSTRACT

In the early 2000s, Burkina Faso launched several legal reforms aimed at increasing gold production. This resulted in a gold mining boom, making gold the main export product and the main source of economic growth of the country. We hypothesize that gold extraction improved population living standards. This paper investigates how the gold boom in Burkina Faso which began in 2007 has affected socioeconomic outcomes. We use a simple theoretical model to motivate the testing of several hypotheses regarding these impacts. Employing a difference-in-differences strategy as well as panel data models, we estimate the impacts using data from household surveys undertaken in 2003 and 2009 and administrative data. Consistent with our model, the results suggest that areas hosting gold extraction have better average living standards in terms of headcount ratios, poverty gaps and household expenditures than do areas without gold. However, the gold boom is also shown to have potentially increased local inequality and child labor in areas with these income gains. These results demonstrate the importance of proactive government policy in mitigating negative welfare impacts.

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1. Introduction

Burkina Faso has been long considered an agricultural economy, and agriculture remains the main sector of employment. Authorities have attempted to increase productivity in this sector by improving the irrigation of land. However, as of 2011, only 10% of land has been reached by these irrigation initiatives. As a result, the country still needed to find other means of fostering economic development. Authorities then made the decision to develop the mining sector through mineral extraction to sustain growth. This sector is mainly consisting of gold production and plays an increasingly important role in the economy of Burkina Faso. Despite its strong and growing contribution to output, socioeconomic impacts at the local level are poorly understood. Studying the recent mining developments in Burkina Faso provides important new evidence about the relationship between mining extraction and living standards.

In this paper, we focus on gold mining extraction in Burkina Faso using poverty, inequality and expenditure as socioeconomic

outcomes to assess its impacts on local communities. Previous studies on the local impact of resources also focused on similar indicators in their analyses.¹ Using district-level data, [Loayza and Rigolini \(2016\)](#) find that mining activity in Peru leads to an increase in average expenditure, and a decrease in poverty rates. However, this positive effect is mitigated by an increase in inequality. Based on municipalities in Brazil, [Caselli and Michaels \(2013\)](#) study the effect of oil revenues on several measures of living standards, including poverty, household income and housing. They report that oil-rich municipalities benefited from the oil windfalls in general. But there is no statistical evidence of a decline in poverty. Similarly, [Aragon and Rud \(2013\)](#) observe that gold exploitation in Peru increases local real incomes despite increases in the local prices of non-tradable goods. [Fisher, Mwaipopo, Mutagwaba, Nyange, and Yaron \(2009\)](#) examined artisanal mining (specifically gold and diamonds) in Tanzania. They showed that the sector contributes to poverty reduction inside the population of mine workers. However, the non-regularity of mining activity may result in insecure living standards. Using panel data from Indonesia's provinces, [Bhattarcharya and](#)

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E-mail addresses: zabagnes@yahoo.fr (A. Zabsonré), agbomaxime@gmail.com (M. Agbo), juste.some@yahoo.fr (J. Somé).¹ This topic has generated much interest in the literature. For a more extensive survey on studies of local and regional effects of natural resource extraction, see for example [Cust and Poelhekke \(2015\)](#).

Resosudarmo (2015) found that growth in non-mining sectors significantly reduced poverty and inequality whereas growth acceleration in mining sectors increased poverty. This finding contrasts with the above-mentioned literature.

Specific to the Burkinabè context, this research also pays particular attention to investigating the impact of gold extraction on schooling and child labor, two outcomes which are relatively little-discussed in existing investigations of the local resource impacts. The idea behind these additional outcomes is motivated by the government's attempt to identify gold extraction as being the major cause of low school attendance and child labor. A few existing studies have also tried to investigate this question. They find that natural resource exploitation has negative impacts on schooling and is associated with a greater presence of child labor (see Kruger, 2007; Santos, 2014). Although all of these microeconomic studies analyzed the effects of natural resource booms on living standard indicators, none has investigated the link between natural resources, on the one hand, and socioeconomic outcomes including poverty rates, inequality, average expenditure, schooling and child labor, on the other. Most other studies have been based on the analysis of large datasets with a single observation for each country and year (Ross, 2015). Such datasets suffer from uneven data quality. Clearly, however, the existence of multiple rounds of microeconomic survey data in Burkina Faso opens up new avenues for relevant research questions and permits more subtle hypotheses to be tested. Household income, poverty, inequality, schooling, child labor, investment, infrastructure creation, can be used as economic performance indicators.²

The case study of Burkina Faso is of particular interest as the country newly experiences a gold boom. Indeed, after gold discoveries in the early 2000s, the quantity produced and the revenue generated increased substantially at a time when world gold prices rose strongly. From a production level of 0.8 tons in 2007, output jumped to 5.5 tons in 2008, nearly seven times the 2007 level. In 2009, gold production was 12.1 tons, which amounted to more than US \$400 million of export revenues. Earnings from gold exports represented 67% of all export value and 9.8% of GDP in 2010. Several factors could explain this boom. In 2007, the country implemented three projects and launched many reforms intended to increase gold revenue and to reduce poverty. The major mining reform was the revision of the 2003 Mining Code.³ This had the goal of attracting foreign direct investments into the gold mining sector. Within the context of Africa, even though mining boom may attract foreign direct investments, Campbell (2009) reported many studies in Ghana, Guinea, Madagascar, Mali and other African countries, where mining has failed to support poverty reduction because of corruption, weak institutions, low rate of royalty payments, relative high number of expatriates in companies' staff, social and environmental negative impacts.

Importantly, however, Loayza and Rigolini (2016) discussed several different channels through which mining activity can positively affect socioeconomic outcomes, and our investigation is similar in spirit. The first channel is job creation. This channel may provide households with higher salaries (Chuhan-Pole, Dabalén, Kotsadam, Sanoh, & Tolonen, 2015; Kotsadam &

Tolonen, 2016). Opportunities for direct employment in the gold mining industry may be limited due to high-skill labor and the capital intensive nature of gold mining, but the increase in the production of industrial mining has led to a significant increase in labor supply within the mining sector. Between 2008 and 2009, the number of permanent jobs created by gold mining companies grew by nearly twofold, from 1725 people to 3317 people. This number reached 5535 people in 2012 of which 3698 are occupied by Burkina Faso nationals. It is also well-accepted that artisanal and small-scale mining generate more jobs than does large-scale mining (see for instance Gamu, Le Billon, & Spiegel, 2015). In the case of Burkina Faso, the artisanal and small-scale mining sector accounts for more than 1 million people exploiting gold. The second channel is that of social direct investments of companies in producing areas. These investments may help improve access to some basic and social infrastructure and services particularly in some mining areas. These may include schools, health centers, water, roads and electricity. In general, analyses of these outcomes find some positive impacts that are generally of small magnitude (Ouédraogo, 2011). Pegg (2006) highlights the divergences between the expected positive outcomes of mining extraction and the practical realities on the ground.⁴

Concerning Burkina Faso, gold exploitation has certainly contributed to boost the economy since 2007, but has potentially also had some negative impacts. Adults as well as children migrate periodically towards mining areas. One consequence of this internal migration is the social conflict induced between migrants and local people (Côte, 2013). Another consequence is increased child labor. Many primary school students as young as six are abandoning schools for artisanal mining sites. Whether industrial or artisanal, gold mining negatively affects the environment and can potentially create health-related challenges for the populations close to mining sites. Often-listed concerns in Burkina Faso include deforestation, degradation of agricultural land and the pollution of soil and water.

Our analysis takes into consideration both the positive and negative effects of mining activity. First, we propose a simple theoretical model to show the expected effects of gold exploitation on expenditure, inequality, schooling and child labor. We show that gold exploitation has a positive effect on household's expenditure. It also increases inequality for both industrial and artisanal mining, and there is more inequality in industrial mining than in artisanal mining. This result is in line with Gamu et al. (2015) who report that industrial mining is likely to be more associated with poverty exacerbation while artisanal and small-scale mining has a positive effect on poverty reduction. We also show that gold exploitation increases school dropouts which is consistent with model predictions.

We combine data from household surveys undertaken in 2003 and 2009 with administrative data to test our model. We estimate the impact of gold exploitation on poverty, inequality, expenditure, schooling and child labor. We employ difference-in-differences methods similar to Galiani, Gertler, and Schargrodsky (2005). The findings suggest that areas hosting a gold extraction have better average living standards, including lower poverty rates and higher household expenditures than do their counterparts without gold exploitation. Although the effects are not robustly statistically significant on inequality or on child labor, they are suggestive of positive effects. Gold exploitation may increase inequality and child labor.

² Some have pointed out the poor quality of statistics in Africa, particularly those related to GDP and national-level statistics (Jerven, 2012). However, the statistics we used in this paper are mainly derived from household survey data. These data are more accurate and reliable than national aggregate data. See for example Ross (2015). We thank an anonymous referee for having drawn our attention to this reality.

³ A major goal of the new mining reforms in Burkina Faso was to reorganize artisanal and small-scale mining in order to make it a real instrument of economic development. The objective was not to discourage artisanal mining in contrast to what is observed elsewhere in Africa (Spiegel, 2015). These reforms were conducted by the central government which received the different taxes paid by the gold miners. A percentage of the revenue from taxes is transferred to municipalities and regions.

⁴ His analysis identifies the prerequisites under which mining extraction will meet the promised outcomes. This requires going far enough with the following preconditions: pro-poor public and corporate governance, more effective social and environmental policies, and respect for human rights.

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