Cover Page

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DETERMINANTS INFLUENCING MARKETING MARGIN OF ARTISANAL AND SMALL-SCALE GOLD MINERS: A CASE OF WEST GUJI ZONE

Angasu Areri Elema
Department of Marketing Management
CBE, Bule Hora University
Ethiopia, Horn of Africa

Abstract

The study explained determinants that influences marketing margin of ASG miners in West Guji zone of selected Woredas and pointed out the implications for improvement of the sector in general and income of ASG mining community in particular. The study used descriptive research design in analyzing demographic data of respondents that is collected through Survey method, interview and observation. Qualitative and quantitative techniques for data analysis were used, descriptive and inferential statistics were also used. The study revealed that ASG Miners loses 870 birr per each gram of gold sold to the middle-men instead of selling directly to National Bank of Ethiopia. Data collection instrument was administered conveniently to the sample of 124 respondents and the response rate was 100%. The data were analyzed through descriptive analysis, correlation and multiple regression models by using SPSS version 23.

Key Words: Marketing Margin, Artisanal and small-scale gold mining, marketing channel, Gold Miners.

1. Introduction

In recent years, artisanal and small-scale mining (ASM) which is defined as low-tech, labor intensive mineral extraction and processing has become an indispensable income earning activity (Hilson et al, 2018). Currently in Ethiopia about 1.3 million people are estimated to be directly involved in ASGM, with 7.5 million livelihoods depending on it (World Gold Council, 2021). Ethiopia's gold export and the amount that is supplied to the national bank of Ethiopia for export declining. The observed gloomy performance of the sector can mainly be attributed to the following three factors. i) The broadening of the parallel market premium that possibly resulted in increased smuggling; ii) Fluctuations in the incentive scheme that was available to suppliers of gold to the NBE; And iii) downward trends in international gold prices which may also have negatively impacted the production and supply of gold to the national bank (Molla & Gebrewolde, 2020).
Therefore, the researcher is interested to investigate why this difficulty is created and how it can be solved in order to achieve the national target and improve the livelihood of Artisanal miners.

1.2 Statement of the Problem

The artisanal and small scale mining activity has become a path for income generation for about 150 million people throughout the world; on the other hand, the sector is being suffered from potential challenges which ultimately impede its performance and contribution (Artisanal Gold Council, 2018).
According to the study by the ministry of mining as cited in (Molla & Gebrewolde, 2020) a large number of artisanal and special small-scale gold miners complain about the lack of support and attention given by the regional mining bureaus. Although these institutions are entrusted to support and promote the sector, there is evidence that they are not helping the sector as much as they should. Specially, miners complain about the lack of material (tools and technologies) as well as trainings that can enhance the productivity, quality standards and health/safety of the mining activity as a major problem.
The vast majority of mining operations in Ethiopia remain informal and implementation of legal reforms is weak at grassroots level. Miners' working conditions are often poor, productivity is low, and extraction methods are outdated and inefficient. The outbreak of hostilities in Tigray has created further challenges. Nonetheless, over time, artisanal mining could make an immense contribution to Ethiopia's economic and social welfare. The sector is reported to create an indirect livelihood for 7.5 million people, generating almost US$303mn in revenue in the last five months of 2020, despite the Covid-19 pandemic (World Gold Council, 2021).

So far, very few research works have been conducted on ASGM in Ethiopia. Among others, impact of artisanal and small scale mining on education (Chala et al., 2020); impacts of artisanal gold mining on the environment (Ture & Merara, 2021) export incentives and artisanal gold export (Molla & Gebrewolde, 2020); youth in artisanal gold mining (Redehey, 2017); Impacts of artisanal gold mining systems on soil and woody vegetation (Meaza et al., 2017). However, contextually, these research works didn't address the

Cover Page

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determinants affecting marketing margin of ASG miners. Moreover, to the best of researcher knowledge there is no research done till to date on the same topic in the study area.
Thus, the main aim of this research paper were thoroughly to assess and identify the determinants affecting marketing margin of the artisanal and small scale miners in the study area and aims to bridge the prevailing knowledge gap on the contextual factors and forward possible solution.

1.3 Objective of the Study

1. To assess the impact of access to market information on marketing margin of artisanal and small scale gold miners.
2. To assess the impact of access to credit service on marketing margin of artisanal and small scale gold miners.
3. To analyze the effect of gold marketing channel on marketing margin of artisanal and small scale gold miners and its limitation.

To analyze the impact of institutional support on the marketing margin of artisanal and small scale gold miners.

2. RELATED LITERATURE REVIEW

2.1 Theoretical Review

The development of stable and reliable marketing system is an important element in commercialization and specialization of product in any specific sector. To study how markets are functioning, many researchers used the approach known as Structure-Conduct-Performance approach (Kotler and Armstrong, 2021). In the context of ASM, small-scale miners are often more dependent on the prices fixed by local buyers and intermediaries than global market prices and are less vulnerable to international commodity price fluctuations (Siwale & Siwale, 2017). Miners usually need to sell their mineral products quickly with low prices to resolve their immediate problems and they are exploited to intermediaries, brokers and black market hoping to get fair price due to lack of effective protection from the government (Artisanal Gold Council, 2018). In Ethiopia, miners are being affected by low market price and most of are not in a position to take advantage of seasonal price differences because of limited income to cover their financial commitments (Tadesse, 2016). According to (Hilson, 2016) a common means of measuring market efficiency is to examine marketing margins. This is an attempt to evaluate economic or price efficiency. The overall marketing margin is simply the difference between the farm-gate price and the price received on retail sale. That difference can then be considered to be the cost of marketing and all that is entailed in getting the product from the producer to the consumer in the desired form.

2.2 Empirical Review

ASM sector employs 40.5 million people in 2017 in over 80 countries (IGF, 2018) but it is difficult to ascertain the exact number of people in sector due to a host of factors. According to (World Gold Council, 2017) the global average annual production of gold over the past few decades has been approximately 2,400 metric tons. African countries account for 20% of that volume 480 metric tons.
More than sixty shear-zone hosting gold occurrences have been identified in the three main regions of greenstone belts in Ethiopia: Southern (including Adola, Bule Hora and Moyale areas), Western (including the Akobo area), Northern Tigray region (Geological Survey of Ethiopia, 2016).

Artisanal mining operations include traditional techniques of resource localization, reconnaissance and extraction, processing and marketing as a value chain approach. For several years in Ethiopia, the ASG mining extracted gold from both surface as a placer deposits and underground (subsurface) mining while, both surface and underground operations can be taking place by the miners on the same reserve depending on the availability of the gold resources (Geological Survey of Ethiopia, 2016).

However, there is no system that can ensure gold produced by gold miners at each mining site is entirely delivered to the NBE via the delegation of CBE and hence, there is no mechanism that can forbid license holders from participating in illegal transaction (National Bank of Ethiopia, 2017). In the formal market, the price of gold is largely governed by the international market price with defined quality standards and 5% premium (top up) on the international gold price. Moreover, the NBE also provided 30 days' price selection opportunity as an incentive package to those who supply gold to local bank but the intervention hasn't brought changes on gold supply (National Bank of Ethiopia, 2017).
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Cover Page

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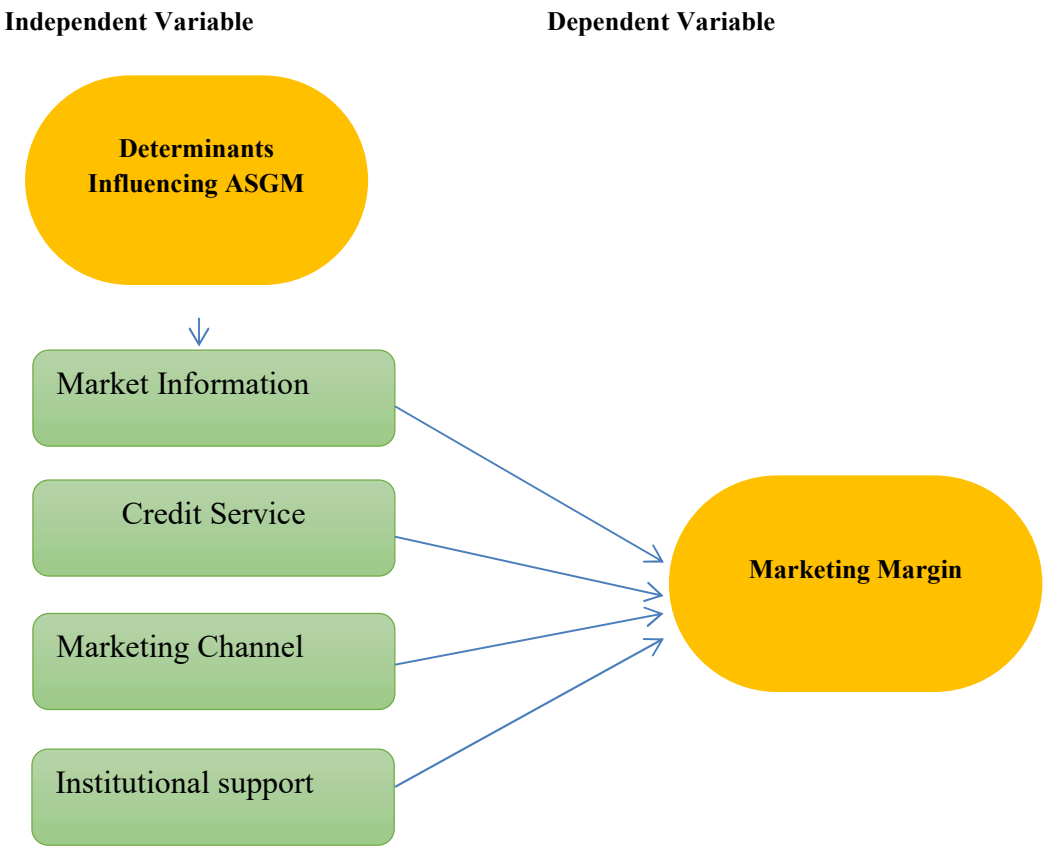
In Ethiopia, 94% of the gold miners are engaged in illegal gold mining and are not licensed (Beyene, 2016). Many ASM have very limited access to credit service for different reasons and hence affects the limits the supply of gold to the formal market (NBE and CBE, 2017).

2.3 Conceptual Framework

Figure 2.1 conceptual framework of the study



Source: Author's own design, 2022

3. RESEARCH METHODOLOGY

Figure 3.1 Map of the study area

Cover Page

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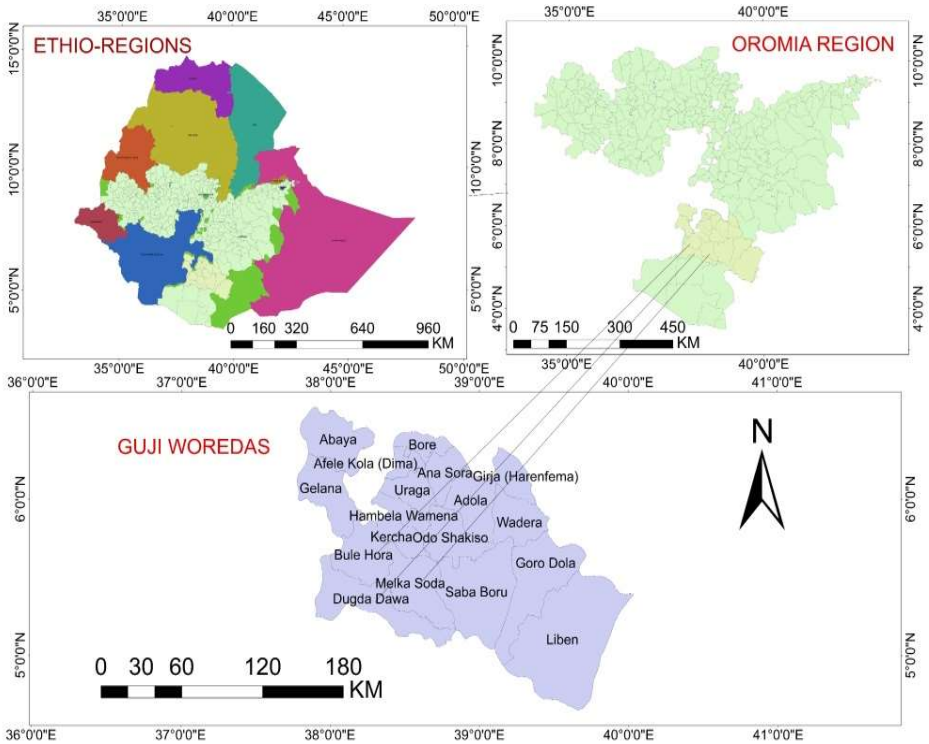

Source: ArcGIS, 2022

3.1. Research Design and Approach

This research has used descriptive and explanatory research design to achieve its objective. Descriptive research attempts to describe systematically a situation, problem, phenomenon, or provides information about an issue. The explanatory type of research design helped to focuses on explaining the aspects of the study in a detailed manner identify and evaluate the causal relationships between the different variables under consideration. The study employed mixed research approach. As (Creswell & Creswell, 2018) stated mixed methods research design is a procedure for collecting, analyzing and "mixing" both quantitative and qualitative research and methods in a single study to understand a research problem.

3.1.1 Population of the study

According to year 2021 West Guji zone mineral development office report, currently there are 607 legal gold miners with renewed license. This ASGM are formed in cooperatives in their respective Woredas of Malka Sodda, Bule Hora and Dugda Dawa were the gold mining activity are profoundly present (WGZMDO, 2021). The study target population is 607 miners who have artisanal and small scale gold mining license.

3.1.2 Sample Size

Sample size is determined using a simplified formula provided by (Yamane, 1967) and computed as follows: -

$$n = \frac{\mathbf{N}}{\mathbf{1 + N}(e)^2}$$

Where 'n' is the sample size, N is the population size and 'e' is the level of precision. The conventional confident level of 92% will be used to ensure a more accurate result from the sample. Based on this, the error term would equal to 8%. Using the total population of 607 the sample size is calculated as follows.

$$n = \frac{\mathbf{607}}{\mathbf{1 + 607\ (0.08)^2}} = \mathbf{124}$$

Therefore, the data collection instrument was administered conveniently to the sample of 124 respondents.

Cover Page

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3.2 Data Analysis and Interpretation

The statistical packaging for social science (SPSS) version 23 was utilized to analyze the data obtained from primary sources. To summarize demographic data of respondents, frequency and percentages was used. The data was analyzed using descriptive statistics like frequency, mean and standard deviation and inferential statistics such as correlation, and multiple regressions. Descriptive statistics allow presenting the data acquired in a structured, accurate and summarized manner by tabulation and measures of central tendency (mean and standard deviation). The descriptive statistics which was utilized in the study to analyses the data includes mean, standard error and standard deviations. To ascertain whether a statistically significant relationship exists between two variables, the Pearson Correlation Coefficient was used. Multiple linear regression analysis was also used to identify the dominant factor among the independent variable that has stronger relationship with Marketing Margin and to test the hypothesis. Additionally, Mendeley reference management software was also used to effectively record all the secondary data sources.

The model can be specified as follows:

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \varepsilon$

Where,

Y is the dependent variable MM (marketing margin)

$\beta 0$- Constant (Coefficient of Intercept)

$\beta 1 \ldots \beta 4$- Regression Coefficient of Independent Variables

X1= AMI (access to market information)

X2= ACS (access to credit service)

X3= MC (marketing channel)

X4= IS (institutional support)

ε= error term

The intercept ($\boldsymbol{\beta}0$) is the point on the vertical axis where the regression line crosses the Y axis.

3.3 Reliability and Validity Test

3.3.1 Validity Test

As stated by (Sarstedt & Mooi, 2021) validity of a research questionnaire can be measured in terms of face validity, content validity, construct validity, and criterion validity.

This study has employed face validity, content validity and criterion validity. In constructing the questionnaire both empirical and theoretical literature was reviewed. All conceivable efforts were exercised to make the data collection instruments easily understandable by the respondents so that the intended information can be collected thereby increasing credibility of the ultimate findings. After the questionnaire was constructed, pre-testing was done with individuals who have knowledge of the area by allowing them to read and comment on it. Constructive comments were collected from the individuals and the questionnaire was adjusted accordingly. Then, validation of the instrument was given by academic advisors prior to the data collection.

3.3.2 Reliability Test

Reliability is the measure of internal consistency of the construct in the study. A construct is reliable if the Alpha (α) value is greater than 0.70 (George & Mallery, 2020). Construct reliability was assessed using Cronbach's Alpha. The result showed that access to market information scale with five item (α = .855), access to credit service scale with eight items (α = .807), marketing channels scale with five item (α = .752), institutional support scale with six items (α = .896) and marketing margin scale with five item (α = .940). Reliability results are summarized in table 4.2.

Table 3.1 Reliability statistics

Constructs	No. of items	Alpha (α)
AMI	5	.855
ACS	8	.807
MC	5	.752
IS	6	.896
MM	5	.940

Source: Survey results, 2022

Cover Page

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4. RESULTS AND DISCUSION

4.1 Descriptive Statistical Analysis

According to (Pimentel, 2010), the five- point Likert scale is considered an interval scale. The Mean is important in clarifying and understanding the outcome we obtain from the survey analysis. The interpretation of the result of the mean can be presented as follows in the table down below.

Mean	Interpretation
1 to 1.8	Strongly disagree
1.81 to 2.60	Disagree
2.61 to 3.40	Neutral
3.41 to 4.20	Agree
4.21 to 5	Strongly disagree

The standard deviation was used as a measure of how representative the mean was of the observed data. Small standard deviations represent a scenario in which most data points are closer to the mean, a large standard deviation represents a situation in which data points are widely spread from the mean. The standard deviation between sample means would give a measure of how much variability there is between the means of different samples. The standard deviation of sample means is known as the standard error of the mean (SE). Therefore, the standard error could be calculated by taking the difference between each sample mean and the overall mean, squaring these differences, adding them up, and then dividing by the number of samples. Finally, the square root of this value would need to be taken to get the standard deviation of sample means, the standard error (Field, 2018). The standard error is the standard deviation of sample means.

4.1.1 Access to Market Information

Table 4.1 Descriptive statistics of access to market information variable

Descriptive Statistics				
Variables	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Miners have access to adequate information concerning market situation	124	2.35	.114	1.270
Government office provides market information	124	2.06	.093	1.038
Market information can be accessed from Media (Radio and TV)	124	2.16	.091	1.015
Market information can be accessed through Friend and self-observation	124	2.94	.113	1.261
Intermediaries may provide market information to artisanal miners	124	2.85	.106	1.176
Grand Mean/Standard Deviation	**2.48**		**1.15**	

Source: Survey results, 2022

Market information is important to lessen information gaps and uncertainties that exist in the ASG miners. As shown on Table 4.3 access to market information contain five statements which each statement is all about the importance of market information for ASGM when selling Gold. With mean value of 2.35 respondents disagree that miners do not have adequate information regarding

Cover Page

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market situation. Since most of the mining sites are remotely located government office do not provide market information to the ASGM, this were confirmed by respondents with a mean value of 2.06. Regarding the question concerning source of market information respondent rated friend and self-observation high with mean value of 2.94, and rated media and intermediaries with a mean value of 2.16 and 2.85 respectively. The grand mean of 2.48 and standard deviation of 1.15 there is lack of access to market information.

4.1.2 Access to Credit Service

Table 4.2 Descriptive statistics of access to credit service

Descriptive Statistics				
Variables	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Miners have access to sufficient credit service	124	2.55	.103	1.143
ASGM have access to formal credit service	124	2.51	.099	1.101
ASGM have access to informal credit service	124	3.15	.116	1.294
The main source of credit service is government organization	124	2.40	.089	.987
The Main source of credit service is private organization	124	2.26	.098	1.089
Local lenders are source of credit service for the miners	124	2.94	.108	1.205
Payback period of credit service is fair	124	2.81	.111	1.234
Interest rate level of credit service is reasonable	124	2.85	.113	1.260
Grand Mean/Standard Deviation	**2.68**		**1.16**	

Source: Survey results, 2022

As indicated in Table 4.4 below though miners do not think they have sufficient access to credit service (mean 2.55) they rated informal credit service higher than formal credit service as a provision of financial service with a mean value of 3.15 and 2.15 respectively. This also indicates that government and private organizations are not primary source of credit service for ASGM and it is confirmed by mean value of 2.40 and 2.26 respectively. Respondents consider local lenders as informal source of credit service as indicated by 2.94 mean values. Regarding the fairness of payback period and interest rate their rate is neutral with mean value of 2.81 and 2.85 respectively. Additionally, Grand mean of 2.68 and Standard Deviation of 1.16 shows that the responses of respondents are neutral.

4.1.3 Marketing Channel

Table 4.3 Descriptive statistics of marketing channel variable

Descriptive Statistics				
Variables	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Miners are aware of the available marketing channels in the area	124	2.44	.116	1.296
Miners satisfied with the existing local gold marketing channel	124	2.36	.108	1.205
Miners receive a fair price for Gold when sold to local buyers	124	1.90	.090	1.007

Cover Page

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Miners receive a fair price for Gold when sold to Wholesalers	124	2.85	.118	1.313
Miners receive a fair price for Gold when sold in town market	124	2.96	.121	1.352
Grand Mean/Standard Deviation	**2.5**		**1.23**	

Source: Survey results, 2022

ASGM receive a fair price when they sell their gold in town market as compared to wholesalers and local buyers that are based in mining site area as indicated by mean value of 2.96, 2.85 and 1.90 respectively. Furthermore, Table 4.5 indicates that ASG Miners neither aware of the available marketing channel nor satisfied with the existing channel as confirmed with mean value of 2.44 and 2.36 respectively. The respondents confirmed with response of Grand mean of 2.5 and Standard deviation of 1.23 that market channel affects the marketing of their gold.

4.1.4 Institutional Support

Table 4.4 Descriptive statistics of institutional support variable

Descriptive Statistics				
	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Miners get institutional support	124	2.40	.108	1.202
Miners get institutional support from Zonal Mining development office	124	2.32	.099	1.101
Miners get institutional support from Woreda Administration	124	2.27	.097	1.085
Miners get technical and training support	124	2.22	.096	1.071
Miners get material support	124	2.43	.096	1.068
Miners get financial support	124	2.30	.104	1.155
Grand Mean/Standard Deviation	**2.49**		**1.10**	

Source: Survey results, 2022

As indicated on table 4.6 below respondents have clearly stated that they do not get institutional support whether it is from zonal mining development office or from woreda administration office with a mean value of 2.40, 2.32 and 2.27 respectively. In addition, mean value of 2.22, 2.43 and 2.30 indicates that miners do not receive technical and training support, material support and financial support. Additionally, the Grand mean of 2.49 and Standard deviation of 1.10 shows that there is lack of institutional support for Artisanal miners in the study area.

4.1.5 Marketing Margin

Table 4.5 Descriptive statistics of marketing margin variable

Descriptive Statistics				
	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
The price at which miners sell gold is fair	124	2.44	.112	1.251
Miners are satisfied with the price they get in the village	124	2.51	.114	1.272
Miners are satisfied with the price they get at mining site	124	2.19	.098	1.092
Miners are satisfied with the price they get at Kebele market	124	2.65	.116	1.288
Miners are satisfied with the price they get at woreda level market	124	2.79	.122	1.363
Grand Mean/Standard Deviation	**2.5**		**1.25**	

Source: Survey results, 2022

Cover Page

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ASG miners are satisfied with woreda level market than weekly market, village market or mining site market as indicated in table 4.7 with a mean value of 2.79, 2.65, 2.51 and 2.19 respectively. Moreover, mean value of 2.44 indicates, as ASGM work is very strenuous respondents do not consider the price at which they sell their gold is fair. In General, Grand mean of 2.5 and standard deviation of 1.25 indicates that the artisanal miners are affected by the marketing margin.

4.1.6 Interview results

Data computed from the interview questions shows that there are seven market points namely; Mining site market, Village market, Kebelle market, Woreda market, Awassa market, Addis Ababa market and National Bank of Ethiopia. Total Gross Marketing Margin (TGMM) is always related to the final price paid by the end buyer and is expressed as percentage (Mendoza, 1995).

$$TGMM = \frac{end\ buyer\ price - first\ seller\ price}{end\ buyer\ price} x100$$

Table 4.6 Marketing margins of gold in different market

No.	Market place	Average price per gram (ETB)	Marketing margin (ETB)	TGMM
1	Mining site market	3,200	100	3.03%
2	Village market	3,300	100	2.94%
3	Kebele market	3,400	300	8.10%
4	Woreda Market	3,700	150	3.89%
5	Awassa Market	3,850	100	2.53%
6	Addis Ababa Market	3,950	100	2.94%
7	National Bank of Ethiopia	4,070	-	-

Source: Survey Data, 2022

As shown in Table 4.8 As described, long marketing channels in the ASG mining sector exist and it leads to the formation of high marketing margins. The marketing margin ranges from 100 ETB to 300 ETB per gram of gold with Total gross marketing margin ranging from 2.53% up to 8.10%. Miners lose 870 birr per gram of gold by selling at the mining site instead of selling directly to NBE which account of 21.37 % of marketing margin. According to West Guji Zone mineral development office report in year 2021, 200 kg of gold that was mined through ASGM from West Guji zone was sold to NBE of which 125 kg are from Malka Soda, Bule Hora and Gugda Dawa Woreda (WGZMDO, 2022) Hence the 67.7 % of ASG miners who sold their gold in mining site market in year 2021 collectively lost marketing margin of 73,623,750 ETB.

Table 4.7 Gold Market Channels for ASG Miners

Where do you sell your gold?				
Marketing Channels		Frequency	Percent	Valid Percent
	Mining Site Market	84	67.7	67.7
	Village Market	19	15.3	15.3
	Kebele Market	8	6.5	6.5
	Woreda Market	6	4.8	4.8
	Awassa Market	2	1.6	1.6
	Addis Ababa Market	2	1.6	1.6
	National Bank of Ethiopia	3	2.4	2.4
	Total	124	100.0	100.0

Source: Survey Data, 2022

Cover Page

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As shown in the Table 4.9 Above, 84 (67.7%) of respondents sell their gold in mining site market and 19 (15.3%) of respondents sell gold in village market. Respondents who sell gold in Kebele market, Woreda Market, Awassa Market, Addis Ababa Market, and NBE market are few in number and they are 6.5%, 4.8%, 1.6% and 1.6%, respectively.

4.2 Inferential Statistics

This segment of the study presents the process of testing the proposed hypothesis to answer research questions concerning relationship between the variables of access to market information (AMI), access to credit service (ACS), marketing channel (MC), institutional support (IS), and marketing margin (MM). Correlation and multiple regression analysis were carried out to identify the relationships. The purpose was to show the association of the constructs with each other.

4.2.1 Correlation Analysis

According to (Mooi and Sarstedt, 2019) absolute correlation coefficients below 0.30 indicates a weak effect, coefficients between 0.30 and 0.49 indicate a moderate effect, and values of 0.50 and higher indicate a strong effect.

Table 4.8 Correlation matrix of variables

Correlations						
		AMI	ACS	MC	IS	MM
AMI	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	124				
ACS	Pearson Correlation	.761**	1			
	Sig. (2-tailed)	.000				
	N	124	124			
MC	Pearson Correlation	.689**	.724**	1		
	Sig. (2-tailed)	.000	.000			
	N	124	124	124		
IS	Pearson Correlation	.758**	.700**	.697**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	124	124	124	124	
MM	Pearson Correlation	.754**	.737**	.761**	.733**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	124	124	124	124	124
**. Correlation is significant at the 0.01 level (2-tailed).						

Source: SPSS output of the survey, 2022

As indicated in Table 4.8 marketing margins correlation coefficient were positively correlated and statistically significant with access to market information (r= .754, p< .001), access to credit service (r= .737, p< .001), marketing channel (r= .761, p< .001), institutional support (r= .733, p< .001). Marketing channel has the highest positive correlation coefficient with marketing margin.

The strength of correlation coefficient of all independent variables with dependent variable is high and the direction of the relationship is positive with statistically significant p value.

4.2.2 Regression Analysis

Multiple regression analysis is an extension of simple linear regression. It is used when we want to predict the value of a variable based on the value of two or more other variables. The variable we want to predict is called the dependent variable or occasionally, the outcome, target or criterion variable.

The variables we are using to predict the value of the dependent variable are called the independent variables or occasionally, the predictor, explanatory or regressor variables. Accordingly, multiple linear regressions was performed in order to determine the explanatory power of the independent variables (access to market information, access to credit service, marketing channel, and

Cover Page

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institutional support) to identify the correlation and to determine the highly influential variables that influenced dependent variable (marketing margin). Accordingly, the model summary of the regression analysis is presented in table 4.10 below.

Table 4.9 Model Summary

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.841[a]	.708	.698	.62005	1.746
a. Predictors: (Constant), IS, MC, ACS, AMI b. Dependent Variable: MM					

Source: SPSS output of the survey, 2022

Multiple correlation coefficient R = .841 shows that the linear combination of the four independent variables (access to market information, access credit service, marketing channels, and institutional support) strongly predicted the dependent variable (marketing margin). R^2 = .708 depict that the model explains 70.8% of the variance in marketing margin. The result also shows, the difference for the final model R^2 and adjusted R^2 (.708− .698 = .01) which is about 1%. This means if the model were derived from the population rather than a sample, there would be about 1% less variance in the result.

Table 4.10 ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	110.903	4	27.726	72.117	.000[b]
	Residual	45.751	119	.384		
	Total	156.654	123			
a. Dependent Variable: MM b. Predictors: (Constant), IS, MC, ACS, AMI						

Source: SPSS output of the survey, 2022

The regression model overall fit can be examined with the help of ANOVA. Accordingly, Table 4.11 above shows that the value of R and R^2 found from the model summary is statistically significant at (F=72.117, P < .001) and it can be said that regression analysis demonstrated the presence of a good predictive degree between the variables.

Table 4.11 Regression Coefficient matrix

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.551	.206		-2.669	.009		
	AMI	.303	.109	.247	2.789	.006	.313	3.191
	ACS	.261	.127	.176	2.061	.041	.336	2.975
	MC	.421	.101	.328	4.167	.000	.396	2.524
	IS	.243	.103	.194	2.346	.021	.358	2.792
a. Dependent Variable: MM								

Source: SPSS output of the survey, 2022

Cover Page

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Standardized Beta Coefficient

The standardized coefficients are the coefficients which can explain the relative importance of explanatory variables. These coefficients are obtained from regression analysis after all the explanatory variables are standardized. As it can be seen from table 4.12 above, the standardized coefficient of marketing channel has the largest beta score followed by access to marketing information. Institutional support and access to credit service assumes ranks of third and fourth respectively. The larger the standardized coefficient, the higher is the relative effect of the factors on marketing margin.

The significance tests of the four explanatory variables indicate that all of the variables are statistically significant with (P< .05) for predicting marketing margin of artisanal and small scale miners.

Unstandardized Beta Coefficient (β)

As it is defined in chapter three, the unstandardized coefficients ($\boldsymbol{\beta}1$ up to $\boldsymbol{\beta}4$) are the coefficients of the estimated regression model. Hence, the regression model of this study can be written in an equation as follows:

$$Y= \beta 0+\beta 1X1+\beta 2X2+\beta 3X3+\beta 4X4+\varepsilon$$

$$MM =-.551+.303\ (AMI) + .261(ACS) + .421(MC) +.243(IS) + \varepsilon$$

Where,
Y is the dependent variable MM (marketing margin)
$\beta 0$- Constant (Coefficient of Intercept)
$\beta 1\ldots\ \beta 4$- Regression Coefficient of Independent Variables
X1= AMI (access to market information)
X2= ACS (access to credit service)
X3= MC (marketing channel)
X4= IS (institutional support)
ε= error term
The intercept ($\boldsymbol{\beta}0$) is the point on the vertical axis where the regression line crosses the Y axis.

4.3 Hypothesis Testing

Table 10.12 Summary of hypothesis test

Hypothesis	Result	Reason
H1: Access to market information has a significant effect on marketing margin.	H1: Accepted	β=.303, p<0.05
H2: Access to credit service has significant effect on the marketing margin.	H2: Accepted	β=.261, p<0.05
H3: There is a significant relationship between the marketing channels and marketing margin.	H3: Accepted	β=.421, p<0.05
H4: Institutional support has significant effect on the marketing margin.	H4: Accepted	β=.243, p<0.05

Source: Survey results, 2022

Cover Page

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5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The main purpose of this study was to identify determinants affecting marketing margins of ASG miners. Based on the findings presented in the previous section, the following conclusions are drawn.
Through theoretical, and empirical study finding the following four determinants which affects marketing margins of ASG miners were identified and discussed, namely; Access to market information, access to credit service, marketing channels and institutional support.

Upon the analysis the following pressing problems faced by ASG miners when selling their gold were identified and they are; lack of up to date information on the price of gold, lack of access to sufficient formal credit service, Lack of awareness about existing gold marketing channels and long market chain, lack of institutional support which includes technical support, material support, training and financial support.
Of all the four independent variable marketing channels have more impact on the variation existed in the marketing margin of ASG miners. After critical examination of the current market channels, the research have found seven gold Marketing channels from miners up to NBE for miners to sell their gold, namely; mining site market, village market, Kebele market, Woreda market, Awassa Market, Addis Ababa market, and NBE. The study also shows that majority of ASG miners lose 870 ETB per gram of gold they sell to mining site market instead of selling at NBE, merely due to lack of sufficient information and existence of other long market channels. This 870 Birr per gram marketing margin shared among different market intermediaries who have no contribution to production/ mining or value addition.

5.2 Recommendations

The findings of this study have important policy implications. ASG mining sector has critical importance for economic growth but its effectiveness depends on the addressing the major set-back faced by the entire sector.
In line with the above conclusion, the following recommendations are forwarded:

- Reinforce Microfinance institutions to expand their capacity by opening new branches and scaling up their coverage in rural areas especially where ASM activity is largely carried out. Financial empowerment of ASM is a necessity for the achievement of the general development strategy of the sector. This involves the setting up of special financing schemes, such as government as well as donors supported financing programs, revolving credit, direct grant fund, equipment leasing schemes and credit cooperatives.

- Provide financial literacy training which includes saving, investing, budgeting and skills needed to make financial decisions that promote financial stability and self-sufficiency of ASM.

- Establish a direct market channel with National Bank of Ethiopia; this could also be implemented through NBE's Agent such as Commercial Bank of Ethiopia to buy gold from any licensed artisanal miners or traders as that is also supported According to the Mining Operations Proclamation No. 816/2013.

- In order to reduce disproportionate share of the value that is pocketed by the middle men, establish a link between miners and formal supply chains to ensure fair pricing for miners and the legality of subsequent trade, following the principle of fair value distribution.

- The main regulatory body, Ministry of Mines Petroleum and Natural Gas and National Bank of Ethiopia should work along with other government structure on the grassroots level in making the daily gold price information available to all ASGM actors. Disseminate information about the daily world and NBE gold price which also include 10%-29% premium relative to the international bench mark which is added by the bank to incentivize the selling of gold to NBE. The updated daily gold price information could be shared through FM radio and SMS subscription on mobile phone, which also goes hand in hand to providing access to electric city, mobile network coverage, and road access to remote areas.

Cover Page

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- Provide ASG miners with sufficient information about different marketing channels of gold in the area along with adequate trading price.
- Proper modern mining training should be given to Artisanal miners to modernize the old traditional technique of mining.
- Market should be regulated at ASM sites so that miners get the fair price they hardly worked for.

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Cover Page

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