

Econometric Analysis of Wood Furniture Production in Wolaita Sodo: The Case of Small and Medium Scale Wood Manufacturing Industries

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Abstract

It is essential to understand how the small and medium scale system of wood manufacturing is functioning so that it can contribute to its own sustainable manufacturing competitiveness and support livelihood of the communities. Current study is aimed to examine factors that affect small and medium scale wood furniture (Bed) supply in Wolaita Sodo. The research has used primary and secondary data and descriptive and econometric analysis to obtain the following facts; The variables which were found to be determining the supply of various Beds in the area are quantity produced, access to market information, access to raw material and education level which affected the amount Beds supplied positively and significantly at 0.00, 0.01 and 0.05 and 0.05 significance level, respectively. Thus, government bodies should invest on capacity and performance building of enterprises engaged in furniture manufacturing by using training centers is highly needed to sustain furniture contribution to local as well as global economy.

Keywords: Furniture, manufacturing, factors

1. Introduction

Furniture manufacturing is a big business involving a large number of workers. It has traditionally been a resource and labor-intensive industry that includes both local craft-based firms and large volume producers. Small and medium enterprises (SMEs) play such an important role in the furniture sector that any decrease in trading volume will increase poverty. Conversely, growth in the furniture industry will increase the number of jobs available, and may reduce unemployment. That is increasing value added in the wood furniture industry's value chain would improve the quality of jobs and provide more decision making and participation for workers and small-scale employers. One of the key market drivers in the global timber products industry is growing environmental awareness, primarily in industrialized countries. For most developing countries, this threatens exports because their timber industries have traditionally drawn on indigenous hardwood forests. Wood furniture is big, expanding global business; Production is estimated at over \$200 billion in 2001, Dominated by US and EU (e.g. US, Germany, Italy). World imports of wood furniture and parts reached around \$32.1 billion in 2001 (Kaplinsky *et al*, 2003)

Like that of most developing countries the wood furniture industry in Ethiopia is not well developed. It is very insignificant (0.002%) and most of the products seen are at a very rudimentary level. For example, the Ethiopian processed wood products sector including both small and medium scale wood furniture manufacturing industries accounted for only 0.6 percent of the country's industrial production in 2009/10. Key products for the year were chairs (243,000 pieces), tables (49,000 pieces), doors (300,000 pieces), Beds (49,000 pieces), cabinets (18,000 pieces) and cupboards (51,000 pieces). The sector has attracted only about US\$0.50 million in foreign investment, mainly from China. In Ethiopia, roughly 9,000 firms employing 42,000 people operate in the small and medium scale wooden products and furniture sector. The vast majority of firms in the sector are small and most workers in the industry are male. Wood processing and furniture industry which is an important branch of the processing industry is established based on the long tradition of wood processing in our country Ethiopia (http://laws.dongnai.gov.et/1991_to_2000/2).

Transformations of post '90 brought about several essential phenomena, such as: Naissance of new forms of ownership and administration of forests; increase of illegal felling; transformation of totally centralized enterprises to private businesses; liberalization of wood market; and, liberalization of imports and exports. Passing to the market economy during the transitional period, important changes of both subjective and objective character occurred and these brought about changes in the production chain in this industry and in its structure (Tsegabu, 2006).

The production in this industry has undergone low-paced growth, with the exception of year 2001 in Ethiopia, in which there was a considerable reduction due to power supply crisis. In terms of labor power, this indicator has not increased noticeably in years, and in regard to investments, with the exception of year 2001 (of power supply crisis), the trend is increasing, and in addition, these indicators are lower than in other manufacturing industries. The number of firms in this industry is high, reaching to 786 for year 2002 and is

related with the nature of the production chain, which is broader than in the other sectors. However, the trade balance in this industry is negative in Ethiopia as of 2001 report. The demand for wood products of the country has been met through both local manufacturers and imported products from abroad. The CSA study result of year 2004 on import and export trade indicates that, including the study area Wolaita Sodo has been importing more commodities than its export to other countries on wood products and articles (Tsegabu, 2006). Therefore, it is high time that efficiency and competitiveness of the value chain of manufactured wood products in Ethiopia in general and in Wolaita Sodo in particular should be up graded and made to be efficient and competitive. So this study in Wolaita Sodo intended to assure efficiency and competitiveness of the sector via examining factors that affect wood furniture supply of the industries.

2. Materials and Method

2.1 Description of the Study Area

Wolaita sodo town is located in the center of southern Ethiopia in Wolaita zone at southern nation nationalities and people's regional state. The town is located at 390 km from Addis Ababa the capital city of Ethiopia and 170 km from the regional city, Hawasa. The absolute location of the town is 8° north and 37° east latitude and longitude respectively. (Wolaita sodo town administration, 2014)

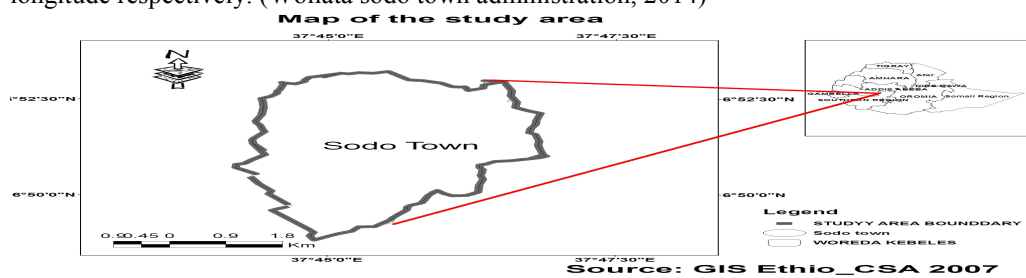


Figure 1: Map of the study area

2.2 Data Types and Collection

The data used for this study collected from both primary and secondary sources. Primary data were collected from all primary data sources through structured questionnaires, group discussion and direct observation. Before entering in to the final data collection task, the data collectors were trained on how to collect necessary data and pilot survey for about three days were carried. Besides the respondents' answers, statistical data characterizing the Wolaita Sodo small and medium scale wood furniture industries were used in order to check whether the picture drawn on the basis of a very restricted sample correlates with the general tendencies in the industry. Secondary data on number of licensed and unlicensed traders of furniture, data on capital the industries own, etc. was collected from different sources, such as: government institutions, the town administrations trade offices, reports, bulletins and websites.

2.3 Sampling size and procedures

CSA categorizes the manufacturing industry among other criteria based on type of ownership, size of employees and size of paid up capital. The category which is based on size of capital was used in this study since it is relatively stable and information on was obtained from trade and industry offices. Based on list obtained then stratification of the industries for small scale, middle scale and large scale based on ownership and size of employee on the first stage were done. From each of both small and meddle scale wood furniture manufacturing industries the sample were proportionately selected, except from large scale industries. Accordingly from the total of 248 small and medium furniture industries 98 respondents were selected.

2.4 Methods of Data Analysis

Both descriptive statistics and econometric methods of data analysis were used. The results of the in-depth, semi-structured interviews with the managers/owners of medium scale wood manufacturing industries producing and trading wood furniture in different parts/sub-cities of Wolaita Sodo provide the empirical base of the paper. The econometric model was used to identify the factors that affect the volume of wood furniture (Bed) supplied to the market.

The quantitative data collected on industry owners/manufacturers demographic and spatial settings were analyzed by using descriptive statistic like means, frequencies, percentages and graphs.

Econometric model were also used to identify factors that affect the volume of wood furniture (Bed) supplied to the market. Therefore, ideally, the OLS model is applicable for this study; because all industry owners participate in the specified wood furniture (Bed) manufacturing and marketing.

Following Green (2003), the multiple linearized regression models is specified as

$$Y_i = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, X_{15})$$

Where, Y_i = quantity of wood furniture (Bed, table and chair) supplied to the market.

X_1 = Sex of the industry owner

X_2 = Age of the industry owner

X_3 = Education level of the industry owner

X_4 = Experience of the industry owner

X_5 = Labor size

X_6 = Size of Industrial zone/land

X_7 = Access to market

X_8 = Access to market information

X_9 = Access to credit

X_{10} = Price of Bed, table and chair in 2014/15

X_{11} = Size of output

X_{12} = Availability (number) of skilled manpower in industry

X_{13} = Income from non – industry sources

X_{14} = Access of quality raw materials

X_{15} = Wage paid for workers in industry

Econometric model specification of supply function in matrix notation is the following.

$$Y_i = \beta_i X_i + U_i$$

Where: Y_i = furniture (Bed) supplied to the market

β_i = a vector of estimated coefficient of the explanatory variables

X_i = a vector of explanatory variables

U_i = disturbance term

3. Results and Discussion

3.1. Socio-Economic Characteristics of respondents

From total number, 98 sampled small and medium scale enterprises considered in this study, all of the sampled respondents were male owners/managers (100%) as shown in Table 1. The reason might be due to differences in gender related culture. Even though the current Ethiopian constitution calls for affirmative action to allow women to participate equally with men in political, economic, and social fields, in the past four decades, the government has failed to adequately address the plight of women entrepreneurs (Bekele & Jacobs 2008). Bekele and Jacobs (2008) provide a longitudinal analysis of entrepreneurs in Ethiopia between 1996-2001. According to the study, 78% of all failed businesses (that were included in the study) were owned or operated by women - this number is indicative of the level of support, or the absence thereof, to female entrepreneurs. The main concern expressed by women entrepreneurs in the study was lack of adequate financing (69%). Furthermore, female entrepreneurs displayed higher levels of poor managerial skills (72%), shortage of technical skills (74%) and lower levels of education (55%) when compared to their male counterparts.

According to Nichter and Glodmark, (2005), women entrepreneurs face a constrained business environment where culture dictates access to market, education and business skills. Similarly, Gomez, (2009), found that disproportionate domestic obligations limit competitiveness of women entrepreneurs to enjoy benefits of additional growth opportunities such as visiting multiple markets to purchase cheaper inputs and tap market demand. Satisfying their and their families' daily consumption needs is their business goals and economic shocks of any kind can force them to remain subsistent forever. In order to facilitate their full contribution to poverty reduction, relevant support services for the promotion of women entrepreneurship should, therefore, be identified and supported.

With regard to, the age of owners/managers the average furniture industry owner age was 45.5, the minimum and maximum age being 30 and 70. The average year of production experience of the furniture enterprises owners/managers was 10, the minimum and maximum production experience of the medium and large scale furniture manufacturing owners/managers were 3 and 20 respectively. An empirically rigorous study of high-growth entrepreneurs provides telling insights about the importance of skills and business contacts gained during past employment (Tiruneh, 2011). Among Latin American and East Asian entrepreneurs, contacts were found to be a key benefit of work experience, helpful in identifying business opportunities, obtaining financing and other resources, and alleviating management challenges (Brown *et al.*, 2004). Capelleras and Rabetino (2008) in their study found no relationship between prior MSE experience and firm growth. The same is true for the medium and large scale furniture manufacturing in Wolaita Sodo. As the results of the study showed that, the previous experience of the medium and large scale furniture manufacturing owners/managers

had no contribution on the marketable supply of Bed.

Table 1: Socio-Economic Characteristics of respondents in average

Indicator	N	Minimum	Maximum	Mean	Std. Deviation
Age (years)	98	30	60	45.49	8.722
Sex(M or F)	98	1	1	1.00	.000
Experience in years	98	3	20	10.20	11.425

The educational level of owner/manager of medium and large furniture manufacturing enterprises/ industries revealed in below(table 2), the result showed that (10.2%) had primary school education; (14.48%) had secondary school education (18.36%) had 10+2, (20.4%) had TVET Diploma, (18.36%) other Diploma, (18.36%) were Degree holders.

The educational role on enterprise success is explained through its effect on exposure to new information and processing of this new information, which has an ultimate positive impact on production and/or distribution of goods and services. Bates (1990) advocates the positive impacts of education through its effect on making good business judgments, exposure to new technology, exploiting opportunities well and thereby contributing to business endurance and success. Therefore, more than half of the respondents were diploma and degree holders.

Table 2: Education levels of respondents in percent.

Education level	Frequency	Percentage
Elementary	10	10.2
12 th Complete	14	14.28
10+2	18	18.36
TVET Diploma	20	20.4
Other Diploma	18	18.36
Degree	18	18.36
Total	98	100

3.2. Econometric Analysis

3.2.1. Determinants of Beds market supply

The data were assessed to see whether there was a problem of multicollinearity among the continuous variables and high degree of association among the hypothesized categorical explanatory variables. To this effect the four continuous explanatory variables were checked for multicollinearity using variance inflation factors (VIF) (see appendix 1). All VIF values are less than 10. According to the results; no significant problems of multicollinearity was observed (Appendix 1).

To determine the best subset of explanatory variables that are good predictors of the dependent variable, the multiple linear regressions were used and all of the variables were entered. Six explanatory variables were hypothesized to determine the owner/manager level marketable supply of Beds. Among these variables quantity produced, access to market information, access to raw material and education level affected the amount Beds supply positively and significantly.

Table 3: Determinants of Single Bed size (90cm by 190cm) quantities supplied to the market.

Variables	Single Bed size (90cm by 190cm)		
	Coefficients	Std. Error	p-value
(Constant)	-9.230	1.824	.000
EXPERIENCE	.011	.017	.519
MINFO	2.777	.592	.000***
QPRD1	1.073	.027	.000***
ACRM	1.474	.413	.003**
AGE	-.030	.022	.197

Note: Dependent variable is amount of Single Bed size (90cm by 190cm) sold in piece.

*** and ** are statistically significant at 1% and 5% level respectively.

Access to Market Information (MINFO): It affected market supply of Single Bed size (90cm by 190cm) positively and significantly (p=0.01). On average if Bed manufactures got market information, then the amount of Bed supplied to the market increased by approximately 3 pieces. The implication is that obtaining market information helps to supply more quantity of Beds to market. The general idea is that maintaining a competitive advantage requires a sound business plan. Again, business decisions are based on dynamic

information such as consumer needs and market trends. This requires due attention to new market opportunities, changing needs of the consumer and how market trends influence buying (CIAT, 2004).

Access to raw materials (ACRM): It affected marketed supply of single Bed size (90cm by 190cm) positively and significantly ($p=0.05$). On average when Beds manufactures got raw materials, the amount of Bed supplied to the market increased by 1.5 pieces. The suggestion is that obtaining raw materials helps to supply more quantity of Beds to market.

Education level (ELEVEL): Education has showed positive significant ($p=0.05$) effect on Single Bed size (90cm by 190cm) quantity sold. On average, the amount of Single Bed size (90*190) supplied to the market increases by 0.22 pieces if educational level of Bed manufacturer was increased by number of years or level of education. This is in line with the findings of Thapa *et al.* (2008) who found that the education of owners has positive effect on entrepreneurial and small business success. Similarly, according to Nichter and Goldmark, (2005), owners/ managers with better educational background tend to be more productive and formal education enables them enhance their production, management, and marketing skills. Nichter and Glodmark (2005) further explained that the overall educational level in developing countries and the very educational characteristic feature of small firm owners happens to dictate firm growth. This suggests that education improves level of sales that affects the marketable surplus.

Table 4: Determinants of Medium Bed size (120cm by 190cm) quantities supplied to the market.

Variables	Medium Bed size (120cm by 190cm)		p-value
	Coefficients	Std. Error	
(Constant)	-11.060	4.675	.025
ELEVEL	-.011	.338	.974
EXPERIENCE	-.023	.058	.697
MINFO	-3.760	2.572	.155
QPRD1	.920	.025	.000***
ACRM	4.833	2.439	.058**
AGE	.169	.080	.043

Note: Dependent variable is amount of Medium Bed size (120cm by 190cm) sold in piece. *** and **are statistically significant at $p=0.01$ and $p=0.05$ respectively.

Access to raw materials (ACRM): It affected marketed supply of Single Bed size (90*190) and Medium Bed size (120cm by 190cm) positively and significantly ($p=0.05$). On average if Beds manufactures gets quality raw materials, the amount of Bed supplied to the market increased approximately by 5 pieces. The suggestion is that obtaining quality raw materials helps to supply more quantity of Beds to market.

Table 5: Determinants of Double size (150cm by 190cm) quantities supplied to the market.

Variables	Double size (150cm by 190cm)		p-value
	Coefficients	Std. Error	
(Constant)	-9.230	1.824	.000***
ELEVEL	.180	.127	.168
EXPERIENCE	.034	.023	.144
MINFO	1.929	.731	.013**
QPRD1	.990	.012	.000***
ACRM	1.718	.518	.002**
AGE	.001	.029	.963

Note: Dependent variable is amount of Double size (150cm by 190cm) sold in piece. *** and **are statistically significant at 1% and 5% respectively.

Quantity produced (QPRD): The result indicated that a producer who had produced more amount of Bed had also supplied more amount of Bed to the Market than those who had produced less amount of Bed. The value of the coefficient for production of double Bed size (150cm by 190cm) implies that an increase in production of Double Bed size (150cm by 190cm) by one unit resulted in an increase in marketable supply of Bed by proximately by 1 piece. This is in line with Abay (2007); Adugna (2009) and Ayelech (2011) who illustrated an increase of tomato, mango, avocado and papaya production by farming households has augmented marketable supply of the commodities significantly.

Access to Market Information (MINFO): It affected marketed supply of double Bed size (150cm by 190cm) positively and significantly ($p<0.05$). On average if Beds manufactures gets market information, the amount of Bed supplied to the market increased by 2 pieces. Market information is mostly said to be more perishable than the commodity itself. Access to timely and accurate market information is the basic element not only in furniture but also other commodity marketing. Tschirley *et.al* (1995) argued that the existence of

information barriers makes unexploited market opportunities, seasonal gluts and producers with inadequate quality specification and control, inequitable returns to producers, pre-harvest losses and fundamentally poor returns to production and marketing system as a whole. The implication is that obtaining market information helps to supply more quantity of Beds to market.

Access to raw materials (ACRM): It affected marketed supply of double Bed size (150cm by 190cm) positively and significantly ($p=0.05$). On average if Beds manufactures get raw materials, the amount of Bed supplied to the market increased by proximately by 2 pieces. The implication is that obtaining raw materials helps to improve the quantity of Beds supply to the market.

Table 6: Determinants of King Bed size (180cm by 190cm) quantities supplied to the market.

Variables	King Bed size (90cm by 190cm)		p-value
	Coefficients	Std. Error	
(Constant)	-2.727	.867	.009**
ELEVEL	-.180	.041	.071
EXPERIENCE	-.005	.008	.522
MINFO	.516	.133	.003**
QPRD	.961	.032	.000***
ACRM	1.117	.267	.002**
AGE	-.004	.011	.719

Note: Dependent variable is amount of King Bed size (90*190) sold in piece. *** and **are statistically significant at 1% and 5% respectively.

Access to raw materials (ACRM): It affected marketed supply of King Bed size (180cm by 190cm) positively and significantly ($p=0.05$). On average if Bed manufactures have raw materials accessibility then, the amount of Bed supplied to the market increased proximately by 1.5 pieces. This suggests that obtaining raw materials improves level of sales that affects the marketable surplus.

Quantity produced (QPRD): In agreement with the hypothesis, the multiple linear regression result shows that quantity produced significantly ($p=0.01$) affected Medium King Bed size (180cm by 190cm) quantity supplied to the market. The value of the coefficient for production of King Bed size (180cm by 190cm) implies that an increase in production of King Bed size (180cm by 190cm) by one unit resulted in an increase in marketable supply of Bed proximately by 1 piece.

Access to Market Information (MINFO): It affected marketed supply of King Bed size (180cm by 190cm) positively and significantly ($p<0.05$). On average if Beds manufactures gets market information, the amount of Bed supplied to the market increased by 0.516 pieces. Market information is mostly said to be more perishable than the commodity itself. Access to timely and accurate market information is the basic element not only in furniture but also other commodity marketing. Tschirley *et.al* (1995) argued that the existence of information barriers makes unexploited market opportunities, seasonal gluts and producers with inadequate quality specification and control, inequitable returns to producers, pre-harvest losses and fundamentally poor returns to production and marketing system as a whole. The implication is that obtaining market information helps to supply more quantity of Beds to market.

4. Summary and Recommendation

The research result showed the determinants of furniture supply. Based on the study's econometric analysis, the following variables were found to be in determining the supply of various sizes (single, medium, double and king) of Bed in the area: quantity produced, access to market information, access to raw material and education level affected the amount Beds supply positively and significantly at 0.00, 0.01 and 0.05 and 0.05 significance level.

The finding also included challenges and opportunities of small and medium scale furniture manufacturing industries. The challenges are shortage of inputs (such as land and raw material), poor quality of raw materials, lack of modern technology and skilled man power which account 85.7, 87.8 and 94.9 percentage of respondents. The basic opportunities are existence of high market potential in the country and availability of raw martial (forest) resource in the area.

Thus, in design, promotion and implementation of activities related to increase supply of furniture (Beds) in the differences on access to market information, access to raw material, technology and education level should be considered.

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Appendix 1: Variance Inflation Factor for the continuous explanatory variables

Variable	Small size		Medium size		Large size		King size	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
ELEVEL	0.670	1.29	0.780	1.249	0.770	1.218	0.570	1.249
EXPERIENCE	0.656	1.222	0.503	1.322	0.603	1.122	0.503	1.327
QPRD1	0.703	1.422	0.703	1.422	0.703	1.422	0.703	1.422
AGE	0.742	1.347	0.742	1.347	0.742	1.347	0.742	1.347

Appendix 2: Selected pictures

