Structure and determinants of production in Textile-Clothing-Leather-Skins (TCLS) craft industry in Benin: a study based on investigations of the value creation in TCLS sector

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ABBREVIATIONS AND ACRONYMS

Table 1: Abbreviation and Acronyms

MDG	:	Millenium Development Goals
WAEMU	:	West African Economic Monetary Union
SGPR 2011-2015	:	Strategy for Growth and Poverty Reduction 2011-2015
INSAE	:	National Institute of Statistics and Economic Analysis (Benin)
GCC-2	:	General Census of Companies second Edition
SME	:	Small and Medium Enterprise
TCLS	:	Textile-Clothing-Leather-Skins
IPU	:	Informal Production Units
MCA	:	Multiple Correspondence Analysis
SVCC-TCLS	:	Survey on Value Creation in Crafts-TCLS
PCA	:	Principal Components Analysis
DLS	:	Double Least Square

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Abstract

Sustainable economic growth in Benin requires a better understand of the informal sector, which contributes to two-thirds of GDP. Particularly, craft industry and TCLS subsector is one of informal activity sector to be handled. The objectives of this work were to identify the structure and factors that determine the production in TCLS craft industry.

This study was based on a survey carried out in February 2011 on value creation data in craft industry of TCLS in Benin. Lack of data induced by informal activities was circumvented using an imputation method. A Multiple Correspondence Analysis and a classification approach were used to identify the structure the TLCS subsector. A log-linear model taking endogeneity on taxes into account was implemented to determine production underlying factors.This study showed that TCLS sector is structured into small, medium and large firms. The net investment, age of production units, labour and the book-keeping increase the production. The labour (here many apprentices) is not remunerated whereas it constitutes a large asset for the sector. Conclusions and policy implications: Different results suggest initiating training towards companies to explain the importance to keep accounts. Also, policy-makers have to review grids taxes by trade groups following the structure described above.

Key words: Crafts, Endogeneity, instrumental variables, SME, DLS, imputation method, informel sector

Introduction

African countries are full of enormous potential better exploitation of which would be great promise for economic development. Changes that have taken place on the African continent in recent decades have shown the limits of postcolonial state model. The high hopes of 1960s have unraveled leaving a significant economic and social disaster. Alternatives faults proposed development by the public power, a growing number of urban youth find in their own initiatives and ingenuities, the means and resources for their survival. The loss of speed of the central apparatus of the state and the inability of not being able to fulfill these core functions to local communities must take to:

- ✍ develop a true synergy of economic and private projects related to socio-professional organizations, trade unions and NGOs initiatives;
- ✍ promote increased participation of associative movements, deemed more likely to intervene in the social and the improvement of living.

After the successive failures of irrigation development experiences, industrialization attempts and false hopes often placed in cotton as a cash crop whose yield is been declining since 3 years, Benin's economy gives the impression not to take off. The development of micro, small and medium companies present as an alternative to be considered by the authorities to improve the economy.

The vision "Benin Alafia 2025"(Confers Ministère du plan (2000)) resulting prospects long-term studies, the MDGs and strategic documents WAEMU suggest five axes to make Benin a prosperous country on the horizon in 2015. The first axis is the acceleration of sustainable growth and economic transformation. To achieve this goal, Benin must boost all components of its economy and especially to master the informal sector by referring to targets four, five and six of the first axis of SGPR 2011-2015 (Confers Fund (2011)) that are respectively:

- Enterprise Promotion
- Promotion of Small and Medium Enterprises
- Facilitation of access to credit

In Benin, the informal sector contributes to two-thirds of the GDP (INSAE). In 2006, on the set of jobs created, the government provides 9%, the private sector for its part 11% and the informal sector only happens in the lead with 80% (General Census of Companies (GCC-2)) . In the informal sector, the craft sector is preponderant. The informal sector concentrates 98.5 % of companies from the GCC-2 with crafts sector which includes more than 50 % of these companies. The craft sector is part of the decisive struggle against poverty areas and therefore a pool of development. The Beninese state considers the untapped potential that must be taken into account:

- to increase the capacity of Small and Medium enterprise (SME) support institutions;
- to establish guarantee funds for SMEs.

Craft is one of four priority focus to fight poverty. In crafts sector, the most important branch is that of "Textile-Clothing-Leather-Skins (TCLS)"(28% of the craft sector). Sector therefore creates an enthusiasm in its ability to generate wealth and by extension the value added.

This subsector comport 30 % of the labor force of the craft sector. The strong presence of small businesses in the informal sector is a serious handicap for monitoring,

especially during the development of the main macroeconomic aggregates. The number of such institutions in the formal sector is negligible in the informal sector, hence the necessity to better appreciate its weight in the Beninese economy. The estimation methods used so far are based in effect on household surveys (eg Modular Integrated Survey of Living Conditions of Households (EMICoV)) offering significant strong points on household production (mainly consisting of individual companies).

Thus, all these findings, so it is urgent to assess the structure of various companies in the craft sector very promising for economic growth and we will see the determinants of production. Benin as a focal point for a number of. The author certifies that the Beninese crafts presents a rather mixed face. This is because in the first time, this sector with a very interesting potential contributes to

The realization of this work is based on the investigation of the excretion value in craftsmanship TCLS made in February 2010. This will be a spring board to better analyze a sub-sector accounts for one third of the craft sector in terms of production and also its expansion. It will be presented in three parts:

- In the first part, we will present the literature on this type of problem;
- In the second part, we shall underline the associations and similarities of certain variables in our database;
- In the third part, the determinants of production are analyzed in the craft sector TCLS.

CHAPTER 1

Review of empirical and methodological literature

In this chapter we present the empirical question of review in relation to the approach we adopt. Since we have little written about the craft, we present work that is similar to this sector.

Davodoun (2006) considers crafts in the development of the national economy (before the industry where the industrialization attempts were unsuccessful) through various factors such as the recovery raw material, the development of technical skills of human resources, the satisfaction of basic human needs, recycling of solid waste, the absorption of labor etc. But today's bleak conclusion is that this potential is still poorly exploited, which explains among other things, breach of its advantages in terms of development for the country. The author presents the potential of craft sector, followed by exogenous and endogenous problems which undermine the sector. The difficulties which faced the entrepreneur and finally the problems of professional organizations in the world craftsman. As interesting potential, we can mention the contribution of the craft sector in the training of boys and girls by the learning system. This sector, which is a solution to the jobs crisis requires a low capital installation, is a lever for local development. It displays all the cultural expression of Benin and contributes to GDP (12%). Exogenous difficulties in the

sector are those relating to taxation, the obstacle of access to credit, government procurement. I think these difficulties are due to the fact that small-scale units operate without registering which does not allow them to enjoy the privileges of legitimate businesses. The author further notes as important exogenous factors, competition from imported products and extraversion consumption, concerns the supply of electricity and water, which differ according to the implantation areas of production units. As endogenous problems, it will mention the problems of financial and accounting management, of life of the company which is closely linked to that of the entrepreneur because the scale units are mostly sole proprietorships, problems of supply of raw materials, pollution problems. Furthermore, the difficulties faced by the contractor are the problems of cumulation of functions in the company, of literacy, the administration of the company (it does not differentiate between physical and moral persons), of specialization, of prospective vision, of access to credit. It also persists barriers to professional organizations of artisans.

Some authors argue that internal and external factors can play a vital role in the structure of a company. These elements called "contingency factors"show that there is no fixed structure and ideal. Among the writings, the business historian Chandler (1962) highlights the link between strategy and structure from a chronological study of the strategies and structures of four U.S. companies. For this author, the strategy influences the structure (hence the adage "structure follows strategy") and the success of the strategy depends on the adequate choice of the structure. Nevertheless, the author emphasizes that the relationship is not always clear and that the reverse may be true. Burns and Stalker (1961) show that the company adapted its structure to its environment defined in terms of the rate of market trends and technological innovation. Thus, they reveal two types of structures. A mechanism adapted to a stable environment whose evolution is predictable and characterized by a high labor specialization, a centralization of decisions, a formalization of procedures and a hierarchy developed, organic adapted to an unstable environment where all the features are more flexible and decentralized decision-making. Lawrence and Lorsch (1967), which have abounded in the same direction as previous authors show that the company is facing a problem of choice between differentiation and integration: structural differentiation of the various units of the company, which establish an appropriate structure at their sub-environment and integration to ensure coordination and coherence

of the whole, prevent malfunctions and conflicts between different units. For these authors had to pay attention to the quality of cooperation which must prevail in the departments to work together to meet the demands of the environment. As other important elements, Woodward (1958) shows that companies adapt their structure to the type of production technology implementation following analysis of a hundred British companies in different sectors. Also the work of the Aston group have highlighted the importance of the size and age of the production unit on its structure.

Eloi et al. (2011) focused on institutional barriers to formalization of informal production units in major cities of WAEMU member states. In one part of the document they emphasized the ignorance of advantages to working with the State of Informal Production Units (IPU) . The data used are those produced under the statistical program to support the multilateral surveillance in major cities of WAEMU member except Guinea Bissau States. The data used for the writing of this article relate only to those of the survey on the informal sector (Phase 2) of the 1-2-3 survey device. It is important to note that a lot of information has been collected from specialized administrative services in different countries. After a descriptive statistic that led to a Principal Component Analysis (PCA), the authors have used a log-linear model to analyze the determinants of turnover of UPI. Similarly, bivariate probit and probit models polynomial were used to analyze the probability of a IPU to formalize its activity with the administration and the record to be at least one level.

For the implementation of the log-linear model turnover was explained by a number of variables according to socio-demographic characteristics (gender, age, average years of schooling, employment status), socioeconomic characteristics (nature of the activity, the industry, the size of the workforce), managerial strategies IPU, the subjective perception of the head of IPU, the relationship with the state.

We have

$$Log(Caan) = \alpha_0 + \sum_i \alpha_i X_i$$

where Caan is the turnover and X_i corresponds to different characteristics. In order to determine a score ranging from 0 (recorded anywhere) and 5 (recorded at all levels) the authors fully dichotomized variables recording.

$$Z = \begin{cases} 1 \; if \; the \; IPU \; is \; recorded \; at \; one \; level \\ 0 \; Otherwise \end{cases}$$

$$Z = \begin{cases} 1 \; if \; the \; IPU \; is \; ready \; to \; formalize \; its \; activities \; to \; the \; administration \\ 0 \; Otherwise \end{cases}$$

These are the variables that will be used as endogenous in the probit models

At the end of the study it is found that the IPU who agree to be registered are those about the benefits and opportunities they take. This is due to their size and characteristics of production. Instead, those who are less well informed and less well organized, think rightly or wrongly that the formalization of their activities to the administration may encumber their profitability. Finally, the heterogeneity of IPU in relation to their characteristics and their behavior should allow public administrative services to define a more flexible institutional and regulatory framework and better targeted information and incentives to formalize their collaboration with State.

Rakotomanana (2010) used a method of quantile regression (Koenker and Basset, 1978) to account for disparities units in terms of performance in order to analyze the technical efficiency of informal production units in the agglomeration Antananarivo. It is used data from a series of investigations initiated by 1-2-3 DIAL / IRD informal sector conducted in 2001 and 2004 in Greater Antananarivo. For the model, it is the function of Cobb-Douglas was chosen for production functions because the author considers the simple to handle and especially to compare the results of authors who have worked on similar subjects. As the dependent variable in the model, it is retained as value added proxi of production instead of production itself, or profit. Quantile regression method gives better results than Ordinary Least Squares (OLS) because the distribution of errors from estimates may vary not only according to the characteristics, sometimes also because of the economic performance of production units. The variables used by the author are summarized in series on capital, labor, human capital. It has been used:

✍ **Capital intensity**

✍ **For human capital**, it has been used:

- The average number of years of education of dependent workers;
- The average number of years of experience of dependent workers;
- The number of years of education of the head of the production unit;
- The number of years of experience of the head of the production unit.

These variables positively influence the performance of the production unit. As control variables were introduced relating to branches of activity (industry, commerce). As to the identification of the determinants of efficiency, the following variables were introduced in the models it is variable on the characteristics of the production unit:

- A dummy variable if there are employees or not in production units;
- A dummy variable indicating whether the unit is recorded in administrative records;
- The age of the production unit and its square

✍ **And characteristics of the head of the production unit**

- A dummy variable with if the head of the production unit has received professional training of his trade;
- A dummy variable indicating whether the head of the unit is a man;
- Age leader and its square;
- Dummies on the fact that the leader has access to the media or has a positive perception of the administration;

- Variable indicating whether the observation is 2004.

The results show that the level of industry and commerce, there is a negative relationship between efficiency and capital / ratio of the number of hours worked. Professional training followed by the unit head is positively and significantly in the industry sector. The service sector is positively affected by the official record and the existence of employees. The demographic characteristics of the entrepreneur especially age and sex (male) is positive on the effectiveness whatever the branch of activity under consideration.

CHAPTER 2

Data and methodology and model specification

In this chapter, you will be presented the method of imputation, all the data that will be used throughout this study, the methodological approach and specification of our econometric model.

2.1 Data

The data used for this study come from the investigation of the value creation in the handicraft TCLS made by INSAE (Confers INSAE (2014)). The survey was conducted in February 2011. Survey on value creation relates to all companies operating in the field of crafts TCLS. The survey population consists of 20,830 businesses. Of these, 2,000 or about 10 % of them will be interviewed throughout the national territory. It's essentially institutions weavers, spinners, knitters, tailors, embroiderers, etc. The sample design adopted for the selection of firms to be interviewed first performs a division of National Geographic territory four (04) intervention areas consist respectively Cotonou, other locations in south, locations in central and northern communities. The sampling frame consists Business Directory falling within the scope of the investigation. This directory is extracted from the

base of the firms surveyed in the second census of 2008 companies (GCC-2). Data collected were presented in six sections respectively: "address and activities", "general characteristics", "employment, wages and taxes", "production", "intermediate consumption", "capital and investment". Since we are in the business framework which operate in the informal system and in addition they do not keep accounts, the proposed questionnaire is adapted to the situation. Consequently, the data used for future analyzes are determined by the imputation method. So,what is imputation method?

2.1.1 Presentation of the imputation method

It is during the survey to quiz in a certain order a series of questions in order for example to estimate the turnover. To proceed, you may be asked such as:

- ✍ What is the usual pace of your activities? (For each month of the year, see the questionnaire). This question has four categories.

- ✍ How much you estimate your monthly productions services?

- ✍ How much you estimate your monthly production of goods?

After this series of questions, we proceed to estimate the revenue per unit of production through a program SPSS put in appendix.

2.1.2 The limits of the method

The limitations of this method result in general survey results:

- ✍ If the activity is quarterly or bimonthly, in this case it is faced with a problem in the issue of pace of activity;
- ✍ The results provided within subjectivity as they refer to memory;

- ✍ The method does not assess companies on a weekly basis (no monthly measurement below);
- ✍ Economic activity can not have the same pace for the production units.

The imputation method has allowed us to build from the survey the key variables in our study like turnover the net investment result, taxes, age of the production unit, the age of the investment.

2.2 Methodology

Univariate analysis followed a two-dimensional analysis will be conducted to highlight the distribution of UPI for different factors influencing turnover and see any relationships with these factors. It will be conducted an Multiple Correspondence Analysis (MCA) as a prelude to a hierarchical classification already in order to reassure themselves that the proposed classification in terms of number of employees is good. This will assess the variables that play important roles in the formation of classes.
In light of the literature review, empirical work done by several authors, and the nature of our data are cross-sectional data, there will be a linear regression model in order to assess the determinants of production. We also appreciate the determinants of turnover for companies that actually produce and sell goods in comparison to those who are much more in the service.

The choice of variables for the study were as follows:

2.2.1 The MCA and classification

For MCA and classification, we use as variables:

- ✍ Turnover (3 classes);
- ✍ The age of the company (4 classes);
- ✍ The number of apprentice (4 classes) ;

These are quantitative variables and have been classed. We also have qualitative variables such as:

- ✍ The field of employment (6 modalities);
- ✍ Held bookkeeping (2 modalities);
- ✍ Have at least one employee (2 modalities);
- ✍ Paying taxes (2 modalities).

2.2.2 Econometric Modeling

For econometric modeling, the choice of variables are as follows:

- ✍ Turnover (PRODUCTION)

It represents the dependent variable in our model. As representative of the production, the annual turnover of the various sector units will be used. These include the variable constructed earlier by imputation using data collected on activities (products and services) of the production unit.

The production system

- ✍ Net investments (INVEST_NET)

This variable is approximated by the estimated physical capital production unit total value. This is among other assets realized by the company in terms of machines, buildings, etc.. The net investment realized by the company in 2010 results acquisitions less disposals. This variable serves as a major factor in our study.

✍ The number of apprentices (APPRENTICE)

This variable will be used to support the work factor . What makes it special is that it is not remunerated but it takes a lot in the process of artisanal production . Apprentices are being trained in a type of business but they are an active labor in production.

✍ Have some employees or not (EMPLOYEE)

This variable is a dummy variable will allow us to assess the influence of owning at least one employee or not

Infrastucture / Investments

✍ Taxes paid in 2010 (taxes_2010)

This variable allows us to assess the impact of taxes on production. It should be noted that in general we are in a fashion flat tax . In a normal or simplified tax system is carried out considering the tax revenue of the company. So, we will see what link there is between the production and the tax paid and especially capture the effect of taxation on business performance. This is the tax collected each month throughout the year that are , among other taxes city hall, business license etc.

✍ Intermediate consumption

As intermediate consumption, consumption will be taken here on some key elements involved in the production of electricity, equipment maintenance, rent, coal, oil machine. Other elements such as intermediate inputs in production that we should be of great use are not specified in the database.

Characteristics of the production unit

✍ The age of the company

As emphasized in earlier in the literature review, the age of the company may have a great influence on production in the sense that companies have had time to write off investments and fix most imperfections in the production mechanism.

✍ Dummies of different types of trades and bookkeeping

These different dummies will capture the specific effects of some constraints that it is not known measure. Here we use these dummy variables to assess the significance of the sign and above other factors on production.

Model specification

$$\log(CAannuel) = \alpha_0 + \sum_i \alpha_i \log(X_i) + \sum_i 1_{\{Businesses\_Characteristics\}} + \varepsilon_i$$

With $X_i$the various factors mentioned above, $CAannual$ turnover is the annual turnover of the production units, X_i the different parameters to estimate and ε_i the error term.

CHAPTER 3

State of play of IPU

Here we present a summary of our variables from the survey TCLS

3.1 Distribution of production by type of trades

In view of the table below, we note that on average, it is the mattress makers followed embroiderers who come out on top in terms of sales but we see still a large dispersion around the various production units that could be explained by the great demarcation that is made between large companies producing mattresses, designers who have formal units and employ a workforce that. We note a concentration around the business ”tailors” and ”dressmakers.” this is explained by the fact that we are in the presence of individual companies generally have the same structure (usually apprentices).

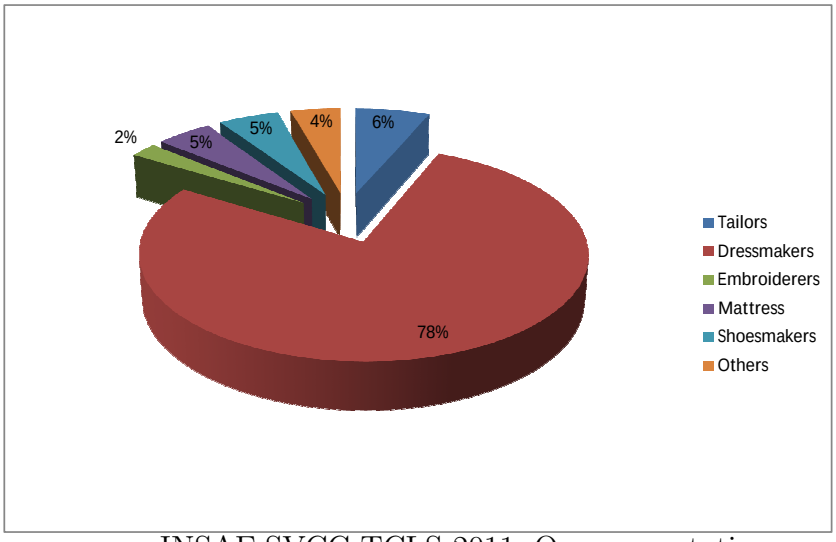
Table 3.1: Distribution of production by type of trades

	TURNOVER				
TRADES	MEANS	STD-DEV	MINIMUM	MAXIMUM	MEDIAN
TAILORS	1 207 300	2 352 870	49 000	26 197 500	622 375
DRESSMAKERS	1 560 500	2 889 760	2600	43 833 500	775 500
EMBROIDERERS	4 246 900	6 981 700	15 000	33 090 000	19 285 000
MATTRESS	5 564 400	6 931 800	48 000	31 500 000	2 597 125
SHOEMAKERS	2 639 800	4 602 490	6 000	28 650 000	1 120 600
OTHERS	3 355 600	4 877 130	10650	32 460 000	1 550 625
ALL	1 917 200	3 630 590	2600	43 833 500	822 250

Source:INSAE, SVCC-TCLS 2011,Our computations

Overall, the average turnover of the order of 1,917,200 which is not far from the average of the "dressmakers"who are much more prominent in the base (78 %).

Figure 3.1: Repartition of units by type of trades



source: INSAE,SVCC-TCLS 2011, Our computations

Based on the results of test of equal mean (appendix 4.5.1), we reject the null hypothesis of equality of means at the 5 %. This means therefore that the average production of different types of trades are statistically equal.

3.2 Distribution of taxes paid by type of trades

We emphasize at the outset that it is the "embroiderers"and "shoemakers"who pay higher taxes. The couturiers pay taxes that are on average not statistically different from all. But the most striking aspect in this table is that for all types of trades, individuals with reference to their average turnover pay very low taxes. This further confirms the informal economy suspicion that we observe in our study (99 % of companies are not included). The results of test of equal mean (Appendix 4.5.2) show that taxes by type of trades are not statistically equal. This suggest that the tax differs by industry. Also it should be noted that the low values of the taxes, confirm the use of standard taxes.

Table 3.2: Distribution of taxes paid by type of trades

	IMPOTS PAYES				
TRADES	MEANS	STD-DEV	MINIMUM	MAXIMUM	MEDIAN
TAILORS	7 410,33	10 218,3	0	62 000	5 750
DRESSMAKERS	10 816,35	16 931,34	0	170 000	5 420
EMBROIDERERS	13 638	16 118,45	0	67 800	6 240
MATTRESS	7 205,66	9 760,14	0	48 000	4 655
SHOEMAKERS	1 2078,56	24 887,31	0	180 000	0
OTHERS	6 304,84	8 752,48	0	50 000	3 750
ENSEMBLE	10 372,37	16 593,38	0	180 000	5 400

Source:INSAE, SVCC-TCLS 2011,Our computations

3.3 Link between the number of apprentice and having an employee or not

It is important to note that in the field of crafts that employed individuals are generally very small. But there is another factor that plays a key role in production: these are apprentices. This corps of individuals is dedicated to learning the profession (this is the goal of training assigned area), but it is an essential factor in production activities, indeed, they are not even paid. In this case, after the survey, we note that we have just 3% of companies have at least one employee. This confirms the hypothesis that the majority of the units in their use apprentice production process.

Economic theory teaches that in every process of production, labor which is the number of employees who are paid is a factor of production. In this context, it would be expected just have the number of employees in the modeling. But since production units that do not have the majority of employees and apprentices are an alternative in the process, we consider it important to introduce them as factors in the production process. It is important to study the link between these two variables have at least one employee and the number of apprentices employed by companies. Through a variance decomposition (Appendix 4.6), the ratio of correlation computed provides a weak bond (0.04) between the number of apprentices and the fact that the company has employees or not.

3.4 Investment effort (v)

V = (Total investment / total production)

We obtain from our computations that v = 0.01. It shows low profit share devoted to investment in our study area. It implies the lack of information of individuals in the sector on the importance of investment.

CHAPTER 4

Presentation and discussions of results

We present in this chapter, the results of our various analyzes. First, we will discuss the findings from the MCA and the classification and on the other hand, the consequences from econometric estimates.

4.1 Presentation of the results of the MCA and classification

4.1.1 Presentation of the results of the MCA

On the table Burt (appendix 4.11.1) is carried out our MCA and it reflected in its analysis that the first two axes provide 18.29 % of the total inertia and we must be considered until the 7th axis for 51.95 % inertia. But since the table is a symmetrical array Burt therefore inertia tris on crossed is counted twice, more sorts flat appear on the diagonal are purely artificial maximum inertia. This implies that the eigenvalues and the percentage of the information are greatly minus. What prompted Benzecri (1979) propose a correction to calculate the inertia ratio from eigenvalues corrected as:

$$\tau(\lambda) = (\frac{s}{s-1})^2(\lambda - \frac{1}{s})^2$$

For $\lambda > \frac{1}{s}$ where s represents the number of active issues, λ represents the proper value from the MCA full disjunctive table.

According correction Benzécri (see Appendix 4.7), the information is explained by the first two axes. These provide 91.26 % of the information. Which strengthens us to realize our analysis by considering the first two factorial axes.

The first axis is formed variable number of apprentices, taxes and age which contribute respectively 30.3 %, 24.6 % and 10.4 % to the formation of this axis. The modalities of these variables which form this axis are "less than one apprentice"to 15.5 % with a squared cosine 0.35 and "More (04) apprentices"to 13.9 % a squared cosine 0.3 for variable the number of apprentices; "pay taxes"to 17.4 % with a squared cosine 0.35 0.4 for the variable tax, "under 5 years"to 6.6 % for the age variable.

The second factorial axis is formed of the variables Production, Occupation, employee who contribute respectively 41 %, 39.7 % and 13.8 % to the formation of this axis. The modalities of these variables that play a key role in the formation of the axis and better represented on the axis are: "More than 1.5 million"to 27.5 % with a cosine squared of 0.52 for the variable production "Mattress makers"at 14.5 % and a cosine 0.2 "Embroiderers"at 0.8 % with a 0.1; "Tailors"at 5.1 % with a cosine squared of 0, 29 for the variable Occupation; "at least one employee"to 13.4 % with a cosine squared of 0.18.

Partial conclusion

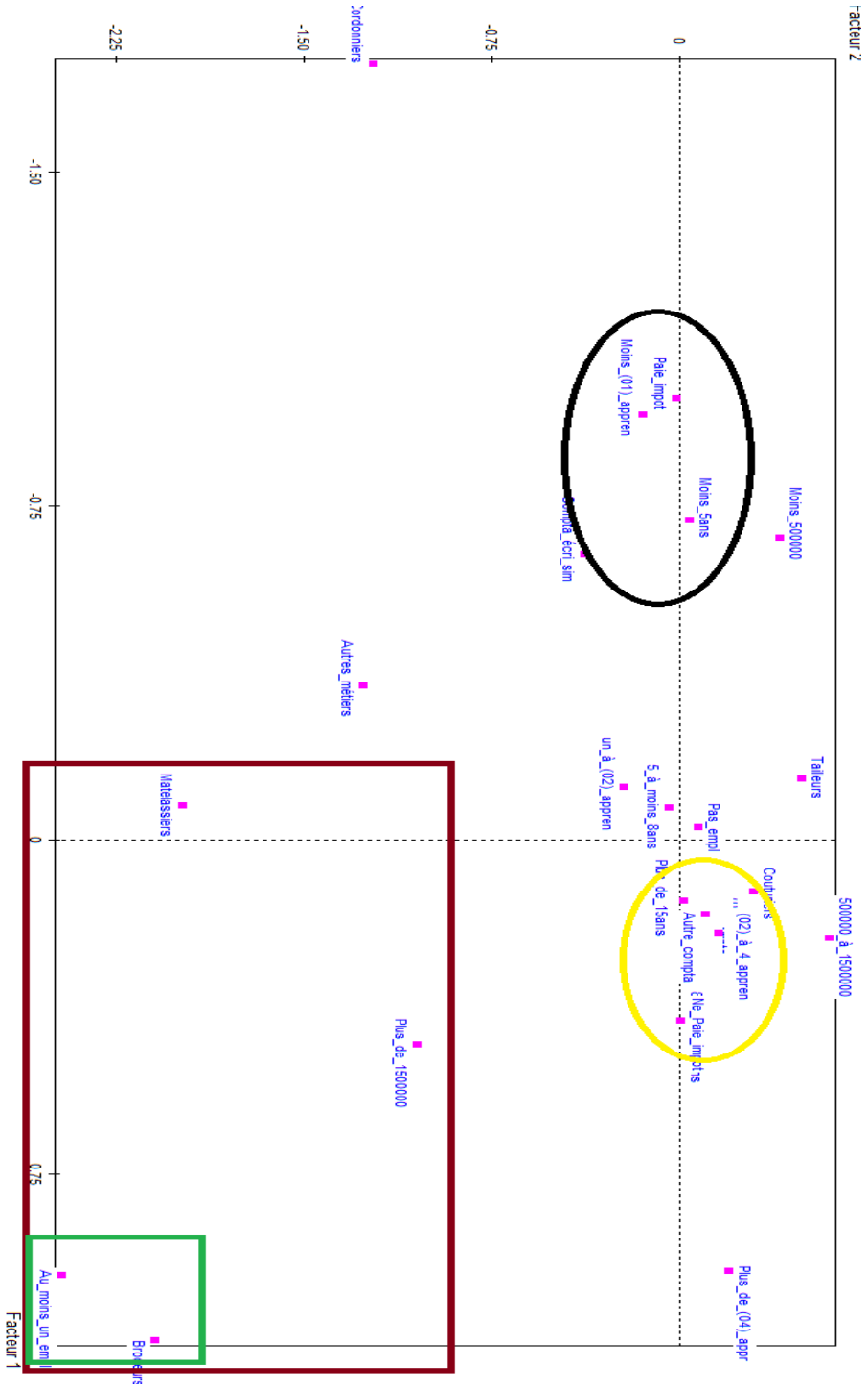
So, the first axis opposes individuals who do not have an apprentice, who pay taxes and whose production units have less than 5 years of existence for companies that have more than four (04) apprentices who do not pay taxes. The second axis opposes Embroiderers who have at least one employee and mattress makers with a turnover of more than 1.5 million to couturiers who do not possess these characteristics.

All these findings are visible on the graph of modalities and may suggest that the factors production, type of job, employee are linked. This could be a sign of the role the job and the number of employees of a firm can have on production. The age of the company also could play production in the sense that over time, the production units have taken

the time to leverage their investments, control technology and therefore enjoy much more profit.

All comments above are found throughout the cloud variables.

Figure 4.1: Cloud variables



source: INSAE,Spad, Our computations

4.2 Interpretation of results from the classification

For classification the optimal number of class we are inspired by the histogram level indices. The index level, by definition, gives the value of the aggregate index of each node. After studying our histogram (see Appendix 4.11.2), we suggest a partition in three (03) classes.

We note that through this graph for these three classes we have made in the first class 66% of individuals, 18% in the second class and in the last class 16% of individuals. To characterize a class of individuals that is to say the key variables that have been played in positioning individuals, we use as indicator the CLASS/MOD ratio which measures the proportion of individuals with a given modality in this class. It was also used the MOD/CLASS ratio which indicates the proportion of individuals in the class with a given modality.

Description of the different classes

For all classes, it is noted here that all the test values are absolute values greater than 2 therefore all terms are taken into account.

Description of the first class (1/3)

This class has 87.18 % of people not paying taxes, 91.25 % are dressmakers, 89.10 % did not keep accounts, 99.62 % having no employees, 45.89 % of production units with a turnover of between 500,000 and 1,500,000.

Conversely, 72.59 % of people not paying taxes, 90.13 % of companies with more than four (04) apprentices are in this class. More than half (50.42 %) individuals with a turnover of more than 1.5 million are included in this class, as well, 69.84 % of production units with between 8 to 15 years and 8.06 % of production units having at least one employee.

Description of the second class (2/3)

This class includes 79.64 % of companies with more than 1,500,000 83.23 % have no employees and 45.21 % have one or two apprentices.

Conversely, 97.12 % of mattress makers are in the class, as well as 90.32 % of companies with at least one employee, 90 % and 65.22 % embroiderers other small trades that have not been categorized.

Description of the third class (3/3)

80.18 % of shoemaking companies are in the classroom. Also 72.58 % of these companies do not have the class of apprentices, 68.89 % pay taxes, 61.51 % of establishments in this category have less than 500,000.

Conversely 66.94 % of companies having no apprentices in the class; 61.15 % of those out there paying taxes, 1.61 % of those with no employees and 41.72 % of the units with less than 5 years are in this class.

Partial conclusion

The classification provides us with the description of the industry TCLS into 3 groups. The first includes couturiers who do not pay taxes, with more than four apprentices, without employees and an annual turnover of between 500,000 and 1,500,000. The second group includes the majority of embroiderers of mattress makers with a turnover of over 1,500,000 and mostly without employees. Finally, the third group largely shoemakers, excluding trainees and whose annual turnover is less than 500,000.

4.3 Presentation and interpretation of results of econometric modeling

4.3.1 Multicollinearity and endogeneity

Econometric analysis has allowed us to highlight the determinants of production crafts Textile-Clothing-Leather and skins. But it is important to note some results before those of the econometric results. Testing multicollinearity and endogeneity of some variables of our model.

Farrar and Glauber test (Bourbonnais (2006))

From Farrar and Glauber test, the determinant of the correlation matrix which is 0.994. Also, the threshold of 5%, chi-Two statistical is less than the calculated chi-Two read 10 degrees of freedom. Therefore we accept the hypothesis of orthogonality of variables. Our results were confirmed by PCA that this explanatory variables in our model almost orthogonal.

4.3.2 Endogeneity test

The two variables that we suspect to be endogenous in our model are investment and monthly tax payments. Classical economic theory teaches us that the investment can affect the production and accelerator effect refers to models that assume that investment is a function of the change in production. As for taxes, they are normally determined by the level of production. Taxes are used to capture the effect of variations on the performance of the company that is to say its result (Vijverberg (1998)).

For the endogeneity test, the test that was chosen is Hausman test

Instruments were selected to perform endogeneity tests and test validity Sargan which is a test of over-identification in case it would in the presence of an endogeneity problem. Instruments variables are as follows:

Investment

For the variable investment, we chose relative to our base:

✍ The investment of the previous year

It is important to note that the investment made in previous years may have a great influence on future investment which leads us to choose the variable which is linked to our investment variable but not the residue.

✍ The age of capital already invested

The age of capital is a key determinant of investment needs. This variable was also chosen as the instrument variable in our model and will be used primarily for testing Sargent validity of instruments.

Taxes

For the variable tax, it was chosen as instruments variables:

✍ Taxes paid in the previous year

As we are in the craft area and that one year apart , the status , the size of most of the companies did change relative to our base, we have taken this variable is highly correlated with our variable and not with the error term of the model.

✍ The leave-out mean (average tax the industry)

Following Ravallion and Wodon (2000) , we consider the instrument as "leave-out mean"imposition of the activity to which the company belongs branch. This is the average of the tax industry, the calculation being made by excluding the company itself. Ravallion and Wodon (2000) show that such variable is usually a good instrument. Both authors consider that this variable is clearly correlated with the tax since it takes into account the taxation of other companies in its geographical and economic environment.

Based on the results of the Hausman test (see Kpodar (2005)), the hypothesis of endogeneity of the investment is rejected whereas at tax this hypothesis is accepted. The endogeneity test in two steps Nakamura Nakamura (1998)(see Kpodar (2005)) made for the tax variable confirms the result.

Validity Test of instruments

Sargan N*R-sq test 3.191 Chi-sq(1) P-value = 0.0819

At 5%, we cannot reject the null hypothesis of validity of instruments

4.4 Interpretation of econometric results

4.4.1 Summary of estimates with Double least squares (DLS)

Following the econometric method DLS estimates, it appears that the 5 % threshold, investment, intermediate consumption of enterprises, the number of apprentices, are crucial

for the production factors. This confirms the economic theory for the first two. The third factor which is the number of apprentices confirms our suspicions that it plays the role of labor in this sector where it is dominant. When investment increases by 1 % production increases, to 0.0406 %, very slightly. This result confirms the fact that the effort investment in the sector is very low. (Confers table below and appendix 4.9.1)

Table 4.1: Summary of estimates with DLS

Logarithm of turnover	**Coefficient**	**P>|t|**
Factors of production		
Investsment	.04066635	0.000**
Consumption	.2462959	0.000**
Apprentice number	.1783476	0.000**
Other factors		
The age of company	.0695265	0.065***
Taxes	.072129	0.000**
Factors not know how to measure		
1. Trades		
Other trades (ref)		
tailors	-.8012992	0.000**
dressmakers	-.859546	0.000**
embroiderers	-.4439842	0.084***
Mattress	.5147347	0.009**
shoemakers	-.0657565	0.741
2. Employee		
No employee (ref)		
At least one employee	1.195512	0.000**
3. Keep accounts		
Yes (ref)		
not	.2047521	0.003**
Constant	10.26428	0.000
Number of observations (2206)		

source: INSAE,Our Computation,SVCC-TCLS 2011

At 5 % level, the age of the company is not a factor influencing production. This is explained by the fact that for this estimate, the majority of companies (87.76 %) operate in the sector of service. These companies do not change their production techniques because they perform all the time the same tasks. If taxes increase by 1 % increases the production of 0.072129 %. We expected that firms lower their labor and therefore their production. But in the craft sector, companies do not lower their labor which are apprentices who

play a big role in the production. In addition, the fact that companies are mostly a flat tax regime appears to be an explanatory factor. When companies have at least one employee production is brought to increase to 3.3 times. The bookkeeping acts positively on production and increases her to 1.23 times. The sign obtained as expected, it shows that the head of the company the difference between the assets of the company and his own heritage. This distinction allows him to make investments and to grow its production could become formal. Dressmakers, tailors act negatively on production while positively mattress makers.

4.4.2 Results just estimates for companies producing goods

At this estimate, the exogeneity tests showed a no endogeneity problem for both taxes for investment. The results are as follows:

Table 4.2: Results just estimates for producing companies

Logarithm of turnover	**Coefficient**	**P>|t|**
Factors of production		
Investment	.0406912	0.022**
Consumption	.1378683	0.025**
Apprentice number	.3481739	0.001**
Other Factors		
The age of company	.2219423	0.044**
Taxes	.0091952	0.612
Factors not know how to measure		
1.Trades		
Other trades (réf)		
tailors	-.7438845	0.000**
dressmakers	-.1886316	0.344
embroiderers	1.586866	0.004**
Mattress	.413661	0.124
shoemakers	.4055127	0.101
2. Employee		
No employee (ref)		
At least one employee	1.467458	0.000**
3. Keep accounts		
Yes (ref)		
not	.4248932	0.053***
Constant	11.73364	0.000
Number of observations (270)		

source: INSAE,Our Computations,SVCC-TCLS 2011

As before, we note at the 5% that factors considered as production factors such as age are significant and positively affect production. If age increases by 1 % production increases 0.2219 % this confirms the fact that the producing companies have had time to control the entire production chain and also had time to improve. Have at least one employee increases 4 times the production and we see that the profession "embroiderer"acts positively on the production. This confirms the results of the MCA and classification where we noticed that the embroiderers have at least one employee. At 10 % threshold, keep accounts as previously positively affects production.

Both models discussed above are generally significant and user tests performed allow us to accept our estimates. Also, the RESET test of Ramsey attached in an appendix indicates that our model does not suffer from omitted variable problem. In other words, the model is well specified. The p-value of this test is greater than 5 %.

Conclusion and recommendations

The objectives of this work were to identify the structure and factors that determine the production in Textile-Clothing-Leather-Skins (TCLS) craft industry. This study was based on a survey carried out in February 2011 on value creation data in craft industry of TCLS in Benin. Lack of data induced by informal activities was circumvented using an imputation method. A Multiple Correspondence Analysis and a classification approach were used to identify the structure the TLCS subsector. A log-linear model taking endogeneity on taxes into account was implemented to determine production underlying factors.

This study showed that TCLS sector is structured into small, medium and large firms. The net investment, age of production units, labor and the book-keeping increase the production. The labor (here many apprentices) is not remunerated whereas it constitutes a large asset for the sector. This study also revealed the non-link between the numbers of apprentices and have an employee. Different results suggest initiating training towards companies to explain the importance to keep accounts.

At the end of our study we recommend the following recommendations:

At the place of researchers

We suggest that in studies in Africa south of the Sahara and especially in Benin, to analyze the performance of companies that are mostly in the informal sector especially in the craft, it will have to consider labor as the number of apprentices, and family support. This hand is not pay but play a very important role in the production process.

At the place of policymakers

- ✍ They make policies targeting each job because dissimilarity between different job is important;
- ✍ Requires that the government can put a lot more emphasis on investment to raise a little time is the elasticity of production with respect to the investment that we noticed very low. Indeed, for a large production we must rely on investment directed to the sector. it will go through the facilitations offered each trade;
- ✍ Initiate training to explain the rationale for these companies to keep accounts;
- ✍ That the government to review the grid taxes according to the different groups. This will bring the majority of these firms in the formal mainly by providing certain facilities such as access to credit, access to some programs that will help them become more competitive;
- ✍ Develop a true synergy of economic projects and private initiatives related to socio-professional organizations, trade unions and NGOs;
- ✍ Promote increased participation of associative movements, found more likely to intervene in the social, and the improvement of life.

At the place of heads of production units

- ✍ Hire some employees to help them keep their accounts in order to avoid confusion between their own income and income from the production unit for future investment.
- ✍ Learn to control with age, production technology and even try to improve.

At the place of INSAE

The organization of the survey on the creation of value in industry craft TCLS as repeated surveys facilitate the achievement of studies in panel or pseudo-panel to understand trends time of enterprise through their mode of production, investment, etc.. These kinds of studies would eventually set up an indicator for measuring and monitoring the performance of the sector.

Furthermore, the results will guide the actions of policymakers to revise taxation in the crafts, learning the importance of business formalization and proper targeting of development policies in that sector.

Appendixes

4.5 Appendixes 1:Equality tests

4.5.1 Equality test of means for production by businesses

Table 4.3: Equality test of means for production by businesses

	Statistical	ddl1	ddl2	Sig.
Welch	7,634	5	232,542	0
Brown-Forsythe	4,253	5	292,211	0,001

Source:INSAE,Our computations

4.5.2 Equality test of means for taxes by businesses

Table 4.4: Equality test of means for taxes by businesses

	Statistical	ddl1	ddl2	Sig.
Welch	7,634	5	232,542	0
Brown-Forsythe	4,253	5	292,211	0,001

Source:INSAE,Our computations

4.6 Appendixes 2:Variance decomposition of apprentices based in qualitative variable or have not used

Table 4.5: Decomposition of the variance of the number of apprentices

	Sum of squares	ddl	Mean squares	F	Signification
Between-groups	27,513	1	27,513	3,279	0,07
Within-groups	18492,093	2204	8,39		
Total	18519,607	2205			

Source:INSAE,Our Computations

4.7 Appendix 3: Benzecri Correction

Table 4.6: Benzecri Correction

Before Benzecri Correction				After Benzecri correction		
Number	Eigenvalue	Percentage	Cumulative percentage	Eigenvalue corrected	Percentage	Cumulative percentage
1	0,2342	10,25	10,25	0,01135546	76,01799583	76,0179958
2	0,1838	8,04	18,29	0,00227731	15,24522347	91,2632193
3	0,1689	7,39	25,68	0,000924636	6,189885879	97,4531052
4	0,1554	6,80	32,48	0,000215023	1,439450879	98,8925561
5	0,1510	6,61	39,08	9,04718E-05	0,60565448	99,4982105
6	0,1502	6,57	45,65	7,32679E-05	0,490484621	99,9886952
7	0,1440	6,30	51,95	1,6887E-06	0,011304836	100
8	0,1420	6,21	58,17			
9	0,1395	6,10	64,27			
10	0,1361	5,95	70,22			
11	0,1339	5,86	76,08			
12	0,1265	5,53	81,61			
13	0,1192	5,21	86,82			
14	0,1138	4,98	91,80			
15	0,1024	4,48	96,29			
16	0,0849	3,71	100,00			

Source:INSAE, Our Computations

4.8 Appendix 4 : Hausman test of endogeneity

4.8.1 For investsment

	Coefficients (b) eq1	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
linves	.0640636	.0418843	.0221793	.008794
lconso	.2746044	.2810729	-.0064684	.0033517
limpot	.0497006	.0493749	.0003257	.0005242
lage	.1104312	.1063791	.0040521	.0034164
tailleurs	-.7885756	-.7959544	.0073788	.0134879
couturiers	-.8405814	-.7967675	-.0438138	.0202856
brodeurs	-.425311	-.3639926	-.0613184	.0298202
matelassiers	.4743511	.5097692	-.0354181	.0198072
cordonniers	-.1060589	-.1024751	-.0035838	.0139622
comptabilite	-.2796798	-.254614	-.0250658	.0112613
class_empl~e	1.190544	1.218121	-.0275765	.0167276

b = consistent under Ho and Ha; obtained from ivreg
B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 6.36
Prob>chi2 = 0.8482

4.8.2 Taxes

	Coefficients (b) eq1	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
limpot	.072129	.0421957	.0299333	.0054287
lapprenti	.1783476	.2116125	-.0332649	.0070196
linves	.0406635	.0399999	.0006636	.0005973
lconso	.2462959	.2620487	-.0157527	.0039087
lage	.0695265	.0886868	-.0191603	.005085
class_empl~e	1.195512	1.204874	-.0093622	.0157321
tailleurs	-.8012992	-.8098412	.008542	.0163246
couturiers	-.859546	-.8536607	-.0058853	.0130586
brodeurs	-.4439842	-.4374623	-.0065219	.0214401
matelassiers	.5147347	.5389542	-.0242196	.0178133
cordonniers	-.0657565	-.0827443	.0169878	.0174157
comptabilite	-.2047521	-.226047	.0212949	.0076223

b = consistent under Ho and Ha; obtained from ivreg
B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

chi2(12) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 30.40
Prob>chi2 = 0.0024

4.9 Appendixes 5: Regressions

4.9.1 DLS

Instrumental variables (2SLS) regression

Number of obs	= 2206
F(12, 2193)	= 43.67
Prob > F	= 0.0000
R-squared	= 0.2010
Root MSE	= 1.1375

lprod	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
limpot	.072129	.0085052	8.48	0.000	.0554498	.0888082
lconso	.2462959	.0569297	4.33	0.000	.1346543	.3579376
lapprenti	.1783476	.0351171	5.08	0.000	.1094813	.247214
linves	.0406635	.0056897	7.15	0.000	.0295057	.0518213
lage	.0695265	.0376706	1.85	0.065	-.0043474	.1434003
class_empl~e	1.195512	.1428801	8.37	0.000	.9153176	1.475706
tailleurs	-.8012992	.156783	-5.11	0.000	-1.108758	-.4938404
couturiers	-.859546	.1422689	-6.04	0.000	-1.138542	-.5805501
brodeurs	-.4439842	.2567848	-1.73	0.084	-.947551	.0595827
matelassiers	.5147347	.1959805	2.63	0.009	.1304079	.8990615
cordonniers	-.0657565	.1991382	-0.33	0.741	-.4562758	.3247628
comptabilite	-.2047521	.0700433	-2.92	0.003	-.3421103	-.0673939
_cons	10.46903	.6624898	15.80	0.000	9.16986	11.76821

Instrumented: limpot
Instruments: lconso lapprenti linves lage class_employe tailleurs couturiers brodeurs matelassiers cordonniers comptabilite limpots_2009

4.9.2 Linear regression for producing companies

Linear regression

Number of obs	= 270
F(12, 257)	= 22.57
Prob > F	= 0.0000
R-squared	= 0.3392
Root MSE	= 1.0992

lprod	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lconso	.1378683	.0612984	2.25	0.025	.0171572	.2585793
limpot	.0091952	.018128	0.51	0.612	-.0265031	.0448934
lapprenti	.3481739	.1067305	3.26	0.001	.1379961	.5583517
linves	.0406912	.0176174	2.31	0.022	.0059984	.0753841
lage	.2219423	.1098229	2.02	0.044	.0056749	.4382097
class_empl~e	1.467358	.368424	3.98	0.000	.7418438	2.192873
tailleurs	-.7438845	.1985205	-3.75	0.000	-1.134819	-.3529505
couturiers	-.1886316	.1988438	-0.95	0.344	-.5802021	.202939
brodeurs	1.586866	.5436018	2.92	0.004	.5163852	2.657347
matelassiers	.413661	.2680332	1.54	0.124	-.11416	.941482
cordonniers	.4055127	.2462237	1.65	0.101	-.0793603	.8903858
comptabilite	.4248932	.2189629	1.94	0.053	-.0062967	.8560831
_cons	11.73364	.7502078	15.64	0.000	10.25631	13.21098

4.10 Appendixes 6: Variables for AMC and classification

Table 4.7: Variables for AMC and classification

Variables	Modalities
Legal status	**1-Individual company** **2-Collective society** 3-Economic grouping 4-Cooperative 5-Others Companies
Accounting	1-Keep accounts 2-Not keep accounting
Turnover	1-Less 500,000 2-50,000 to 1,500,000 3-More than 1,500,000
Age	1-Less 5 years 2-5 years throw 8 years 3-8 years throw 15 years 4- More than 15 years
Employee	1-Not employee 2-At least 1 employee
Occupation	1-Tailors 2- Dressmakers 3-Embroiderers 4-Mattress 5-Shoemaker 6-Others trade
Class of apprentices	1-Not apprentices 2-One throw two apprentices 3- Two throw four apprentices 4- More than four apprentices
Taxes	1- Not pay taxes 2- pay taxes

Source:INSAE, Survey et GCC-2

4.11 Appendixes 7:Results of AMC and classification

4.11.1 Appendixes for AMC

Table 4.8: Coordinates, square cosine contribution and active methods

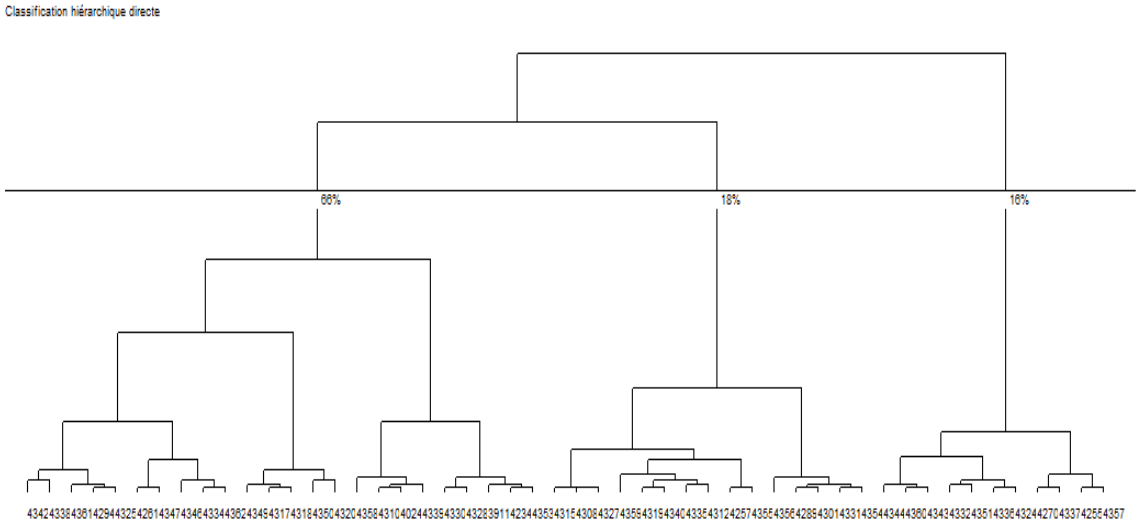
AXES 1 A 5

IDEN - LIBELLE	P.REL	DISTO	COORDONNEES 1	2	3	4	5	CONTRIBUTIONS 1	2	3	4	5	COSINUS CARRES 1	2	3	4	5
2 . comptabilité																	
- Compta_écri_sim	2.93	3.87	-0.64	-0.38	0.74	-0.66	-0.74	5.2	2.4	9.4	8.3	10.5	0.11	0.04	0.14	0.11	0.14
- Autre_compta	11.35	0.26	0.17	0.10	-0.19	0.17	0.19	1.3	0.6	2.4	2.1	2.7	0.11	0.04	0.14	0.11	0.14
CONTRIBUTION CUMULEE =			6.5	3.0	11.9	10.4	13.3										
3 . CLASS_PROD																	
- Moins_500000	4.71	2.03	-0.68	0.39	-0.09	0.19	0.08	9.3	4.0	0.2	1.1	0.2	0.23	0.08	0.00	0.02	0.00
- 500000_à_1500000	5.01	1.85	0.22	0.59	0.05	-0.30	-0.16	1.0	9.5	0.1	3.0	0.8	0.03	0.19	0.00	0.05	0.01
- Plus_de_1500000	4.57	2.12	0.46	-1.05	0.04	0.14	0.09	4.1	27.5	0.1	0.6	0.3	0.10	0.52	0.00	0.01	0.00
CONTRIBUTION CUMULEE =			14.4	41.0	0.3	4.6	1.3										
4 . CLASS_AGE																	
- Moins_5ans	3.01	3.74	-0.72	0.04	-0.36	-0.46	0.26	6.6	0.0	2.3	4.1	1.3	0.14	0.00	0.04	0.06	0.02
- 5_à_moins_8ans	3.30	3.33	-0.07	-0.05	-0.37	0.12	-1.04	0.1	0.0	2.7	0.3	23.7	0.00	0.00	0.04	0.00	0.33
- 8_à_moins_15ans	4.90	1.92	0.40	0.00	-0.01	-0.27	0.52	3.4	0.0	0.0	2.4	8.6	0.09	0.00	0.00	0.04	0.14
- Plus_de_15ans	3.08	3.63	0.14	0.01	0.77	0.76	0.04	0.2	0.0	10.9	11.5	0.0	0.01	0.00	0.16	0.16	0.00
CONTRIBUTION CUMULEE =			10.4	0.1	15.9	18.3	33.6										
5 . CLASS_EMPL																	
- Pas_empl	13.88	0.03	-0.03	0.07	-0.03	0.08	0.01	0.0	0.4	0.1	0.6	0.0	0.03	0.18	0.03	0.24	0.00
- Au_moins_un_empl	0.40	34.58	0.98	-2.48	0.93	-2.91	-0.26	1.6	13.4	2.1	21.8	0.2	0.03	0.18	0.03	0.24	0.00
CONTRIBUTION CUMULEE =			1.7	13.8	2.1	22.4	0.2										
6 . CLASS_METIER																	
- Tailleurs	0.89	14.99	-0.14	0.48	-1.66	-0.69	0.97	0.1	1.1	14.5	2.8	5.6	0.00	0.02	0.18	0.03	0.06
- Couturiers	11.08	0.29	0.11	0.29	0.19	-0.03	-0.15	0.6	5.1	2.4	0.1	1.6	0.05	0.29	0.13	0.00	0.08
- Brodeurs	0.32	43.12	1.12	-2.10	0.12	-1.32	1.11	1.7	7.8	0.0	3.6	2.7	0.03	0.10	0.00	0.04	0.03
- Matelassiers	0.67	20.21	-0.08	-1.99	-1.47	1.81	-1.44	0.0	14.5	8.6	14.1	9.3	0.00	0.20	0.11	0.16	0.10
- Cordonniers	0.72	18.87	-1.74	-1.23	0.92	-0.01	-0.10	9.3	5.9	3.6	0.0	0.0	0.16	0.08	0.04	0.00	0.00
- Autres_métiers	0.60	22.98	-0.35	-1.27	-0.57	0.26	2.44	0.3	5.2	1.1	0.3	23.5	0.01	0.07	0.01	0.00	0.26
CONTRIBUTION CUMULEE =			12.1	39.7	30.3	20.8	42.7										
7 . CLASS_APPRENTI																	
- Moins_(01)_appren	4.00	2.58	-0.95	-0.15	0.49	0.47	0.33	15.5	0.5	5.7	5.6	2.8	0.35	0.01	0.09	0.08	0.04
- un_à_(02)_appren	2.93	3.88	-0.12	-0.23	-1.17	0.05	-0.26	0.2	0.8	23.8	0.0	1.3	0.00	0.01	0.35	0.00	0.02
- (02)_à_4_appren	3.89	2.68	0.21	0.15	-0.21	-0.74	-0.31	0.7	0.5	1.0	13.5	2.5	0.02	0.01	0.02	0.20	0.04
- Plus_de_(04)_appr	3.48	3.11	0.97	0.19	0.65	0.25	0.19	13.9	0.7	8.8	1.4	0.8	0.30	0.01	0.14	0.02	0.01
CONTRIBUTION CUMULEE =			30.3	2.5	39.3	20.5	7.4										
8 . Paie_impôt																	
- Paie_impot	4.15	2.44	-0.99	-0.02	0.06	-0.28	0.20	17.4	0.0	0.1	2.1	1.1	0.40	0.00	0.00	0.03	0.02
- Ne_Paie_impot	10.13	0.41	0.41	0.01	-0.02	0.11	-0.08	7.1	0.0	0.0	0.9	0.4	0.40	0.00	0.00	0.03	0.02
CONTRIBUTION CUMULEE =			24.6	0.0	0.1	2.9	1.5										

Source:INSAE, Our computations, SPAD

4.11.2 Appendixes for classification

Figure 4.2: Cut the tree into 3 classes



source: INSAE, Our computations, SPAD

Table 4.9: Description of classes from the classification

CARACTERISATION PAR LES MODALITES DES CLASSES OU MODALITES
DE Coupure 'a' de l'arbre en 3 classes

CLASSE 1 / 3

V.TEST	PROBA	POURCENTAGES CLA/MOD	POURCENTAGES MOD/CLA	POURCENTAGES GLOBAL	MODALITES CARACTERISTIQUES	DES VARIABLES	IDEN	POIDS
				59.07	CLASSE 1 / 3		aa1a	1303
20.24	0.000	72.59	87.18	70.94	Ne_Paie_impot	Paie_impôt		1565
18.55	0.000	69.49	91.25	77.56	Couturiers	CLASS_METIER		1711
17.99	0.000	90.13	37.15	24.34	Plus_de_(04)_appr	CLASS_APPRENTI		537
13.35	0.000	66.23	89.10	79.47	Autre_compta	comptabilité		1753
13.07	0.000	77.36	45.89	35.04	500000_à_1500000	CLASS_PROD		773
9.55	0.000	75.17	34.61	27.20	(02)_à_4_appren	CLASS_APPRENTI		600
8.45	0.000	60.54	99.62	97.19	Pas_empl	CLASS_EMPL		2144
7.46	0.000	69.84	40.52	34.27	8_à_moins_15ans	CLASS_AGE		756
3.47	0.000	73.19	7.75	6.26	Tailleurs	CLASS_METIER		138
-3.89	0.000	50.88	17.65	20.49	un_à_(02)_appren	CLASS_APPRENTI		452
-5.60	0.000	50.42	27.32	32.00	Plus_de_1500000	CLASS_PROD		706
-7.29	0.000	44.09	15.73	21.08	Moins_5ans	CLASS_AGE		465
-7.33	0.000	48.01	26.78	32.96	Moins_500000	CLASS_PROD		727
-7.91	0.000	6.00	0.23	2.27	Brodeurs	CLASS_METIER		50
-8.45	0.000	8.06	0.38	2.81	Au_moins_un_empl	CLASS_EMPL		62
-10.27	0.000	8.70	0.61	4.17	Autres_métiers	CLASS_METIER		92
-13.35	0.000	31.35	10.90	20.53	Compta_écri_sim	comptabilité		453
-13.43	0.000	1.80	0.15	5.03	Cordonniers	CLASS_METIER		111
-13.65	0.000	0.00	0.00	4.71	Matelassiers	CLASS_METIER		104
-20.24	0.000	26.05	12.82	29.06	Paie_impot	Paie_impôt		641
-21.99	0.000	22.37	10.59	27.97	Moins_(01)_appren	CLASS_APPRENTI		617

CLASSE 2 / 3

V.TEST	PROBA	POURCENTAGES CLA/MOD	POURCENTAGES MOD/CLA	POURCENTAGES GLOBAL	MODALITES CARACTERISTIQUES	DES VARIABLES	IDEN	POIDS
				15.14	CLASSE 2 / 3		aa2a	334
19.60	0.000	37.68	79.64	32.00	Plus_de_1500000	CLASS_PROD		706
19.47	0.000	97.12	30.24	4.71	Matelassiers	CLASS_METIER		104
13.36	0.000	90.32	16.77	2.81	Au_moins_un_empl	CLASS_EMPL		62
11.86	0.000	90.00	13.47	2.27	Brodeurs	CLASS_METIER		50
11.19	0.000	33.41	45.21	20.49	un_à_(02)_appren	CLASS_APPRENTI		452
11.14	0.000	65.22	17.96	4.17	Autres_métiers	CLASS_METIER		92
2.96	0.002	19.45	29.64	23.07	5_à_moins_8ans	CLASS_AGE		509
-2.45	0.007	7.97	3.29	6.26	Tailleurs	CLASS_METIER		138
-2.60	0.005	11.34	16.17	21.58	Plus_de_15ans	CLASS_AGE		476
-3.66	0.000	10.70	19.76	27.97	Moins_(01)_appren	CLASS_APPRENTI		617
-6.16	0.000	7.26	11.68	24.34	Plus_de_(04)_appr	CLASS_APPRENTI		537
-10.24	0.000	5.17	11.98	35.04	500000_à_1500000	CLASS_PROD		773
-11.33	0.000	3.85	8.38	32.96	Moins_500000	CLASS_PROD		727
-13.36	0.000	12.97	83.23	97.19	Pas_empl	CLASS_EMPL		2144
-21.04	0.000	5.67	29.04	77.56	Couturiers	CLASS_METIER		1711

CLASSE 3 / 3

V.TEST	PROBA	POURCENTAGES CLA/MOD	POURCENTAGES MOD/CLA	POURCENTAGES GLOBAL	MODALITES CARACTERISTIQUES	DES VARIABLES	IDEN	POIDS
				25.79	CLASSE 3 / 3		aa3a	569
26.69	0.000	66.94	72.58	27.97	Moins_(01)_appren	CLASS_APPRENTI		617
23.56	0.000	61.15	68.89	29.06	Paie_impot	Paie_impôt		641
16.43	0.000	48.14	61.51	32.96	Moins_500000	CLASS_PROD		727
14.18	0.000	53.20	42.36	20.53	Compta_écri_sim	comptabilité		453
12.27	0.000	80.18	15.64	5.03	Cordonniers	CLASS_METIER		111
8.48	0.000	41.72	34.09	21.08	Moins_5ans	CLASS_AGE		465
5.12	0.000	26.49	99.82	97.19	Pas_empl	CLASS_EMPL		2144
-3.90	0.000	4.00	0.35	2.27	Brodeurs	CLASS_METIER		50
-5.12	0.000	1.61	0.18	2.81	Au_moins_un_empl	CLASS_EMPL		62
-5.65	0.000	15.71	12.48	20.49	un_à_(02)_appren	CLASS_APPRENTI		452
-6.31	0.000	2.88	0.53	4.71	Matelassiers	CLASS_METIER		104
-6.65	0.000	17.46	23.73	35.04	500000_à_1500000	CLASS_PROD		773
-8.62	0.000	14.95	19.86	34.27	8_à_moins_15ans	CLASS_AGE		756
-9.61	0.000	11.83	12.48	27.20	(02)_à_4_appren	CLASS_APPRENTI		600
-10.68	0.000	11.90	14.76	32.00	Plus_de_1500000	CLASS_PROD		706
-14.18	0.000	18.71	57.64	79.47	Autre_compta	comptabilité		1753
-16.22	0.000	2.61	2.46	24.34	Plus_de_(04)_appr	CLASS_APPRENTI		537
-23.56	0.000	11.31	31.11	70.94	Ne_Paie_impot	Paie_impôt		1565

Source:INSAE,Our computations, SPAD

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