Research Article

Effects of Labour Costs on Different Branches of Service Production in Benin

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ABSTRACT

Context and objectives : Labour costs are a complex and multifaceted element that can have a significant impact on employment, business competitiveness and worker well-being. It is important to note that the impact of labour costs on employment can vary according to specific economic contexts, the policies in place and the characteristics of different sectors of activity. In other words, the effects of labour costs on employment are complex and depend on many other economic, social and political factors. The aim of the study is to analyse the influence of labour costs on production in industries such as trade, transport and communication, and hotels and restaurants in Benin.

Methods : This study is based on heterogeneous quantitative data from the Direction Générale des Impôts, the Institut National de la Statistique et de la Démographie (INStaD) and the BCEAO website for the period 2014 to 2021. Our base is a sample representing 90% of companies in the formal sector, sorted in descending order according to the company paying the employer's payment on wages (VPS). We performed a descriptive analysis followed by an econometric analysis using Eviews9 and STATA 15 software.

Results : The results of estimating the model show that the labour cost index (LCI) in the three sectors has a significant and positive effect on the value added of companies only in the long term. Labour costs therefore have a positive effect on industry output. However, the labour cost index (LCI) in the three sectors has no significant effect on value added in the short term. With a view to maintaining the evolutionary trend of the labour cost index (LCI) on the one hand, and preserving the positive effect of the labour cost index (LCI) on business output on the other, operational recommendations have been made based on the results of our analyses.

Conclusion : An Error Correction Model (ECM) was used to validate the three models for the three industries covered by our study. On the basis of our results, our study has made a number of recommendations, the implementation of which will make it possible to increase the effect of labour costs on production.

Limitations of the study : The study suffers from certain limitations, namely the non-significance of certain variables. Other studies need to be carried out on the same subject in order to identify other factors involved in the design of the labour cost index.

Introduction

Studies carried out by the Organisation for Economic Co-operation and Development (OECD, 2013) evaluate the policies implemented by member countries to promote employment while managing labor costs. This can include measures such as labor market flexibility, vocational training, hiring incentives and so on. They analyze how variations in labor costs can affect employment levels. Some studies examine the effects of minimum wage increases on employment, while others look at differences between countries in terms of employment and unemployment rates. OECD studies have generally found that an increase in labor costs, particularly wages, can have negative effects on employment. This is particularly true for low-skilled jobs and labor-intensive sectors. Companies may reduce their demand for labor or automate certain tasks to compensate for higher costs. The effects of labor costs on employment can vary from country to country, sector to sector and job to job. Some sectors may be more sensitive to labor costs than others, depending on their labor intensity or ability to adjust their production processes. OECD literature emphasizes the importance of labor productivity in mitigating the negative effects of labor costs on employment. Investment in training, technological innovation and improved production processes can help boost productivity, making companies more competitive despite higher labor costs. The OECD highlights the importance of implementing accompanying policies to minimize negative effects on employment. This can include measures such as labor market flexibility, hiring incentives, vocational training and promotion of entrepreneurship. According to (Cahuc & Carcillo, 2011) rigidities in the French labor market, including high labor costs, contribute to persistently high unemployment. They point out that policies aimed at reducing labor costs, such as

reducing employers' social security contributions, can encourage job creation and hiring, particularly for low-skilled workers. If workers are more productive, they can offset higher costs through higher production levels or better product quality. Investing in education, training and technology can help boost productivity. High labor costs can have an impact on employment. If costs are too high, some companies may reduce their workforce or relocate to lower-cost regions. However, the impact on employment also depends on many other factors, such as aggregate demand, the competitiveness of industries, employment protection policies, and so on. The relationship between labor costs and inequality can be complex. Higher labor costs can lead to higher wages and better working conditions for workers, thus reducing inequality. However, it can also lead to the exclusion of low-skilled workers or low-paid jobs.

In recent years, Benin, like many other countries, has consistently implemented policies aimed at improving economic performance. The country is faced with the problem of fully and effectively exploiting the human capital at its disposal, on the one hand, and the cost of labor, on the other. The latter is one of the main reasons why multinationals invest directly in these countries.

In addition to the motivation of conquering new markets, which are difficult to penetrate through exports alone, foreign direct investment is mainly motivated by the reduction of production factor costs, in particular the use of cheaper labor. For the (Fonds Monétaire International, 2015), low labor costs play a role in the decision to produce abroad, then import intermediate or final goods from the subsidiary to the parent company (intra-firm trade). Thus, an indirect effect of labor costs on economic growth through direct investment spending is noted. For every company, it's a question of

making a profit on these expenses, and the wages and benefits associated with employment should be commensurate with the work performed, in a context where the available workforce is constantly increasing. The lower the wage, the more labor employers want to hire, and the higher the wage, the lower the amount of work required. Thus, (Hamermesh, 2014) believes that higher labor costs improve the situation for workers, but they can reduce corporate profits. With the advent of digital technology, the need for manpower is diminishing. That's why this study focuses on this factor in the service sector. The service sector makes the biggest contribution to Benin's economy, accounting for 47.7% of GDP, according to the "Economy" section of AMBASSADE DE LA RÉPUBLIQUE DU BÉNIN. These activities revolve around trade, transport, communications and tourism. It is dominated by trade activities, which account for around 13% of GDP. In a context of globalization, where most of the workforce is concentrated in the secondary and tertiary sectors, the service sector offers the greatest opportunities for the working population. A large proportion of Benin's workforce is employed in this sector. According to the Recensement Général de la Population et de l'Habitation, quatrième phase (RGGPH4) of the Institut National de la Statistique et de la Démographie INStaD (ex-INSAE), services employ nearly 40% of the working population, which is not insignificant if labor is not the most intensive factor in this sector. This raises the question of the evolution of labor costs in the service sector in Benin. Hence our main question : **What are the effects of labor costs on the value added of the various service production branches in Benin ?**

From this main question flow the specific questions : What influence does the rise in the labor cost index have on output in the "trade" branch ? What is the effect of the rise in the labor cost index on output in the "transport and communication" branch ? What is the effect of the rising labor cost index on output in the "Hotels and Restaurants" branch ?

Interest in this study was prompted by the service sector's high contribution to the Beninese economy, and by the absence of an indicator for measuring labor costs in Benin.

This article is organized into three parts. The first part presents the literature review and research hypotheses. The second deals with methodological aspects. The third part is devoted to the analysis of empirical results and discussion.

Literature review and formulation of research hypotheses

Labour costs are the total expenses incurred by employers in employing workers. According to the International Labour Office (ILO), employment or labour costs include remuneration for work performed, payments for hours paid but not worked, bonuses and gratuities, the cost of food, drink and other benefits in kind, costs of staff accommodation borne by the employer, social security costs borne by the employer, the cost to the employer of vocational training, social services and various items such as transport of workers, work clothing and recruitment, but also taxes recognised as labour costs. However, this definition is only applied to a partial extent. Its scope differs from country to country due to data availability and country regulations. From these different definitions, we have constructed the labour cost index as several nations have already done, allowing the evolution of labour costs to be tracked over time and enabling economists and analysts to gauge the overall and sectoral impact of labour cost changes in the economy. An index is a business indicator summarising in a single number the overall behaviour of a market or a particular market segment, as a rise or fall in costs usually affects most of the stocks listed on it simultaneously. The employment cost index, also known as the labour cost index, is a short-term indicator that measures the change in hourly costs incurred by employers in hiring labour (Kamal et al., 2001).

In the standard neoclassical theory, full employment is achieved in the equilibrium of the labour market, in the same way as in other markets, since labour is a commodity like any other. This theory dates back to the beginning of the century : it is supported by neoclassical economists such as Arthur Cecil Pigou (1877-1959) and Jacques Rueff (1896-1978). It is based on market mechanisms discovered by classical authors. In this conception, the labour market is

like any other, whose adjustment is based on price flexibility. In this market, the price is the real wage rate. Work is the result of the negotiation of an employment contract and the size of the labour force depends on demographic and social parameters. Competition is assumed to be perfect and labour is considered a commodity. Thus, neoclassicists will decipher the mechanisms of labour supply (workers) and labour demand (employers) to understand how each individual reacts to a variation in the real wage rate. Several authors will implement theories with a critical approach explaining the difficulty of moving towards a labour market equilibrium.

For neoclassical authors, an excessively high labor cost hinders hiring. In fact, according to them, employers will only hire an additional employee if the latter brings in more than he costs, or in other words, they will only hire if marginal productivity (output obtained by the last worker hired) is higher than marginal cost (cost of the last worker hired). The higher the labor cost, the fewer incentives employers have to hire. Moreover, the cost of labour is an essential element of the competitiveness of companies. The higher it is, the more employers will be encouraged to lay off workers, substitute capital for labour or relocate production to countries with cheap labour. For these authors, all this works against employment, especially for unskilled or low-skilled workers, for whom marginal productivity is low, while the cost of labour is high because of the high social charges and the existence of the Minimum Interprofessional Growth Wage (SMIC).

For (Yellen, 1984), the efficiency wage is a theory according to which it is more attractive for firms to set a wage above the equilibrium wage in a perfect labour market because it increases firms' productivity. The idea of the efficiency wage is that a worker's productivity depends on the wage paid to him or her, not the other way around. This reverses the proposition of classical microeconomics that in order to maximise profits ; the employer must pay the worker his marginal productivity, i.e., the extra output that results from his work. This is a key theory of labour economics.

The theory of efficient wages postulates a positive link between employee productivity and wages. The optimal wage is said to be efficient : it is such that its elasticity to the effort is unitary, i.e., the marginal productivity of efficient labour (employment multiplied by productivity) is equal to the wage.

In Benin (Attolou, 2001), a study on the control of labour costs based on the various changes in wages already shows the usefulness of conducting more in-depth studies on labour costs. From independence to the advent of the military government, the permanent crisis of public finances led to a policy of austerity, the main lever of which was the reduction of wages. In 1966, there was a freeze on salaries corresponding to the promotions of civil servants and auxiliary staff in the public and semi-public sectors, followed by a 20% salary reduction. In 1969, there was a reduction in the rate of family allowances, which continued in 1972 with a reduction in family allowances to a uniform monthly rate of 1,000 francs for children born or taken into account after 1 January 1972.

In recent years, several countries have developed indices that allow them to effectively monitor labour costs and observe their impact on individual industries and the economy. These indices are calculated with a view to measuring the cost of employment. Similarly, addressing the issue of employment to improve economic performance has been at the heart of many studies for decades. It is in this vein that (Okun, 1983b; Okun, 1983a; Okun, 1962; Okun, 1973; Okun, 1974; Cuaresma, 2016), interested in the relationship between growth and employment, formulated a very successful law on growth rate of GDP and the unemployment rate. Using quarterly data for the US economy over the period 1947-1960, Okun was able to show that there is an inverse relationship between unemployment and growth of approximately one :3. In other words, a 1% reduction in the unemployment rate is likely to increase output by 3% and vice versa. Thus, for a stable level of the active population, an increase in output leads to an increase in employment. Okun's analysis plays a critical part in the growth of employment dynamics.

Drawing on this work, (Döpke, 2001), after estimating the different forms of Okun's law, analyses the long-term relationship between

the logarithm of employment and the logarithm of GDP growth for a single country. To do so, he uses time series. After checking the order of integration of the two variables, he tests their cointegration ; the relationship is first estimated with the added values of the variables by simple regressions ; in this order, he captures the exogenous influence of changes in production techniques. (Döpke, 2001) finds that an increase in the service sector leads to an increase in employment elasticity to growth. He finds a negative relationship between the actual labor cost and employment intensity in several countries. He finds that, in general, high labour market flexibility leads to high employment intensity of growth. The relationship of interest to us is the one between labour costs and the service sectors, which, according to the studies, turns out to be negative and explains our hypotheses. An increase in the cost of labour leads to a reduction in employment in the services sector and conversely, a decrease in the cost of labour leads to a direct decrease in the company's production cost. The more critical the labour factor is in the company's production process.

The issue of employment is enormous and addresses several perspectives. It is also at the heart of development policies, enshrined in the Sustainable Development Goals (Nations, 2015). Full and productive employment and decent work are universal challenges for all countries by 2030. It is exhaustive and affects all sectors of activity ; it must be adapted to all structural changes and highlights the issues of skills and workload. For each company, it is a question of making these charges profitable. The salaries and social benefits linked to employment should align with the work carried out in a context where the available workforce is constantly increasing. According to (Hamermesh, 2014), policies that increase labour costs can significantly impact the demand for employment and hours worked, both within companies and in the overall economy. The lower the wage, the more labour employers want to hire ; the higher the wage, the less labour is demanded. (Hamermesh, 2014) Higher labour costs make workers better off but can reduce firms' profits. The reduction in employers' profits leads them to a choice between laying off a non-essential category of jobs and reducing the number of hours worked by each individual.

Indeed, when labour costs rise, an employer's immediate options are to do nothing and absorb the extra cost or to reduce the amount of labour employed. It takes time to change capital investments in machinery, buildings, and technology that could enable more efficient operations. In contrast, changing working hours or the number of workers is quicker and easier. Some studies cited by (Hamermesh, 2014)) show that a 10% increase in labour costs would lead to a 3% decrease in the number of employees or a 3% reduction in hours worked.

From the above, the following assumptions can be made :

Hypothesis (H1) : The rise in the labour cost index impedes the output of the trade sector ;

Hypothesis (H2) : The rise in the labour cost index negatively affects the output of the "transport and communication" branch ;

Hypothesis (H3) : The rise in the labour cost index negatively affects the output of the "Hotels and Restaurants" branch.

Research methodology
Data source

The data used in this study come from the Direction Générale des Impôts (DGI), the Institut National de la Statistique et de la Démographie (INStaD) and the BCEAO website for the period from 2014 to 2021. These are quantitative data collected through periodic population censuses on the one hand, and representative studies of the economy's sectors of activity on the other. In this way, data are collected exhaustively on all formal businesses, while obtaining the maximum amount of information by branch of activity.

Our base is a sample representing 90% of companies in the formal sector, sorted in descending order according to the company paying the employer's payment on wages (VPS). Variable analysis and model estimation were carried out using Eviews9 and STATA 15 software.

Choice and description of variables
Analysis Model

We have to write three models allowing us to measure the effectiveness of the MCI on the

added values of these three branches. The values added are the variables to be explained. They will allow us to see the influence of the cost of labour on the production of the chosen branches of activity.

The endogenous variable

Value added (VA) : This refers to the value newly created due to the exercise of economic activity. It is the value resulting from the difference between the number of sales and resources committed upstream in the production process. The VA, therefore, reflects the gain obtained by an individual or a production unit following an investment.

Our study required three models and, thus, three different dependent variables.
- ✓ VA_{tr_com} : Value added to the transport and communication branch.
- ✓ VA_{com} : Value added to the trade branch.
- ✓ VA_{hot_rest} : Value added to the hotel and restaurant branch.

The identification of the explanatory variables is based on the relationships highlighted by several authors in the literature review between these variables and the value added in the different branches of the services sector. To this end, the explanatory variables chosen for our study are the following :

The Labour Cost Index (LCI) :
- ✓ LCI_{tr_com} : Labour Cost Index for the Transport and Communication Sector
- ✓ LCI_{com} : Labour Cost Index for the Trade Sector
- ✓ $ICMhot\_rest$: Labour cost index for the hotel and restaurant sector

Credit to the economy in the industry (Credit): Credit is all banks and the Central Bank lending to businesses and households. It constitutes a form of investment. Investment is the action of investing, i.e., acquiring new means of production, improving or placing capital in economic activity and a company.
- ✓ $Crédittr\_com$: Credit to the economy in Benin's transport and communication sector.
- ✓ $Credit_{com}$: Credit to the economy in the trade sector in Benin.
- ✓ $Crédithot\_rest$: Economic credit in the hotel and restaurant sector in Benin.

Our data being infra-annual, we started with a seasonality test ; after having removed the season from the variables which presented it, we applied the logarithm to the variable's value-added and credit to the economy in order to reduce the variance ; the ICM is an index, we maintained it thus. After stationarity and cointegration tests according to the branches, we retained an error correction model for the three branches, where the long-term model is as follows.

$$LogVa_{\alpha} = ICM_{\alpha} + LogCredit_{\alpha} + c_{\alpha} + \varepsilon$$ with α the industry

Analysis of empirical results and discussion
Descriptive analysis

Like any analytical method, econometrics is based on several principles that are specific to it. The main ingredients of an econometric model are the variable to be explained and the explanatory variables, the disturbances and the parameters. It is, therefore, essential to become familiar with these variables.

Figure 1 below shows the behaviour of the LCI in the trade sector from January 2014 to September 2021, with a sawtooth pattern, following a linear trend, but with a sharp and considerable increase in February 2018 and March 2021. However, there was a decrease in August 2019, when the Benin-Nigeria borders were closed. This may have had an impact on labour demand in this industry.
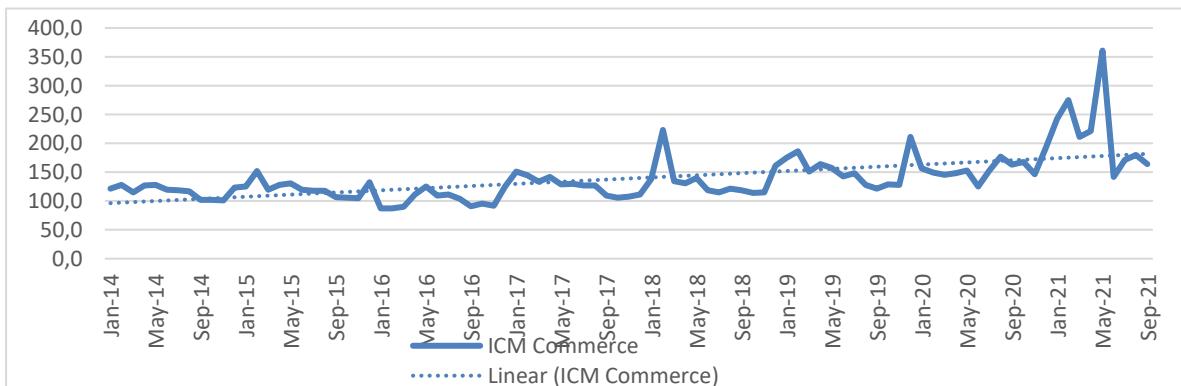
Figure 1.Labour cost index for the trade sector over the period January 2014 to September 2021
<u>*Source*</u> *: Author, 2023*
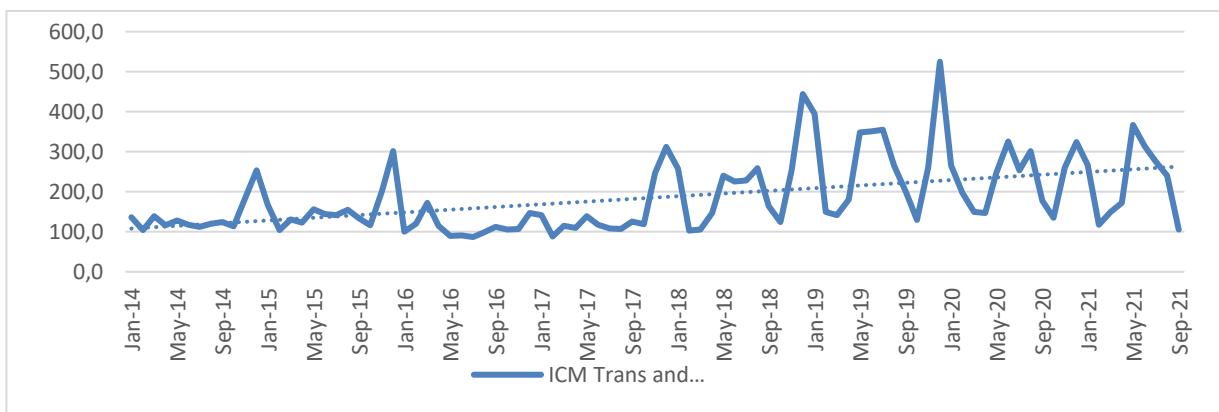
Figure 2. Labour Cost Index for the Transport and Communication sector, January 2014 to September 2021
<u>Source :</u> Author, 2023

Figure 2 above shows the evolution of the LCI from January 2014 to September 2021 in the transport and communication branch. It shows a general increase in a linear trend compared to 2014. In addition, December 2017, 2018 and 2019 are distinguished by a sharp and considerable increase. The holiday periods are the focus of intense travel and communication between people worldwide. This requires more workforce.
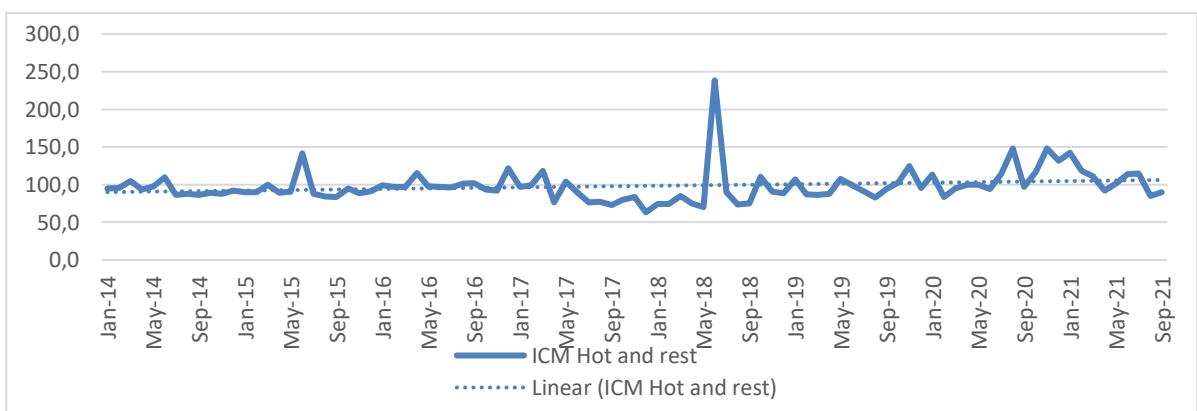
Figure 3. Labour cost trend curve for the Hotels and Restaurants sector over the period January 2014 to September 2021
<u>*Source*</u> *: Author, 2023*

The ICM Hotels and Restaurants measures the evolution of labour costs in Benin's hotels and restaurants sector. It is marked by two periods, each following a trend. It follows a downward trend from January 2014 to May 2018, although sometimes slightly higher values reflect the fall in labour costs due to lower wages and a reduced workforce. From May 2018 onwards, it increases until it reaches a peak in June 2018 with a value of 238.4 months, during which a substantial wage increase is recorded ; it falls again from July onwards and now follows an evolving trend. Increased wages explain the peak in June 2018 due to the high activity during the holiday period.

Analysis of the correlation between the LCI and the value added of industries

The correlation matrix between the value added and the labour cost index in the trade branch reveals that there is a robust correlation between these variables ; the correlation coefficient is 0.8698, which is close to 1 and it shows a strong positive link between these variables ; i.e. an increase in labour costs would induce an increase in value added. The correlation coefficient in the transport and communication branch is lower (0.6146). It is even lower in the hotel and restaurant sector (0.358785). This reflects the derisory nature of the wage in this branch. In other words, when production increases, wages do not increase.

In the end, the positive link between the value-added variables and the labour cost index can be seen, although the intensity of this link varies from one branch to another.

We have carried out the descriptive statistics of the variables seasonally adjusted and linearized concerning the variable's value-added and credit to the economy.

Trade branch
Table 1. Descriptive statistics of variables

	LOGVACOM	LOGCREDITCOM	ICMCOMSA
Average	5.509455	9.839295	138.3523
Median	5.519900	9.708452	129.3645
Maximum	5.793240	10.79604	234.9586
Minimum	5.357877	8.876269	79.61703
Standard deviation	0.108985	0.453053	32.75017
Skewness	0.757474	0.234429	1.276077
Kurtosis	3.401567	2.474450	4.634886
Jarque-Bera	3.172750	0.640705	11.86569
Probability	0.204666	0.725893	0.002651
Sum	170.7931	305.0181	4288.921
Comments	31	31	31

Source : Author, 2023

The characteristics of the variables under study show that they are all Gaussian (follow a normal distribution) at the 5% threshold, except for the labour cost index, which is non-Gaussian because the Jarque-Bera probability is less than 5%. In addition, given the standard deviations, the variable's value-added and credit to the economy do not show much variability. The data for each series are well distributed around their respective means.

Transport and Communication Branch
Table 2. Descriptive statistics of variables

	LOGVATR_COM	LOGCREDITTR_COM	ICMTR_ESA
Average	6.431314	10.10176	186.6038
Median	6.423911	10.38736	181.3284
Maximum	6.664440	11.53984	296.2114

	LOGVATR_COM	LOGCREDITTR_COM	ICMTR_ESA
Minimum	6.228243	7.338238	82.31341
Standard deviation	0.128138	0.931933	59.79422
Skewness	0.215843	-1.622342	0.198280
Kurtosis	2.000857	5.491137	1.942548
Jarque-Bera	1.530158	21.61441	1.647475
Probability	0.465297	0.000020	0.438789
Sum	199.3707	313.1546	5784.717
Comments	31	31	31

Source : Author, 2023

The characteristics of the variables under study show that they are all Gaussian (follow a normal distribution) at the 5% threshold, except for the logarithm of credit to the economy, which is non-Gaussian because the Jarque-Bera probability is less than 5%. In addition, given the standard deviations, the variable's value-added and credit to the economy do not show much variability. The data for each series are well distributed around their respective means.

Hotels and Restaurants
Table 3. Descriptive statistics of variables

	LOGVAHOT_REST	LOGCREDIT_HOT_REST	ICM_HOTSA
Average	4.094775	9.452215	98.13308
Median	4.096727	9.276409	95.63955
Maximum	4.432100	10.73498	131.2448
Minimum	3.938117	7.948385	74.66181
Standard deviation	0.123247	0.814760	13.29058
Skewness	1.217982	0.120813	0.868796
Kurtosis	4.446200	1.844773	3.582760
Jarque-Bera	10.36616	1.799205	4.338499
Probability	0.005611	0.406731	0.114263
Sum	126.9380	293.0187	3042.126
Comments	31	31	31

Source : Author, 2023

The characteristics of the variables under study show that they are all Gaussian (follow a normal distribution) at the 5% threshold, except for the logarithm of value-added, which is non-Gaussian because the Jarque-Bera probability is less than 5%. In addition, given the standard deviations, the variable's value-added and credit to the economy do not have a high variability, while that of the LCI is a little high. The data for each series are well distributed around their respective means.

Econometric analysis
Model estimation and validation
Trade branch
In order to determine the best model for our estimation, we estimated Ordinary Least Squares (OLS), an Error Correction Model (ECM), a Vector Autoregressive (VAR) and a Vector Error Correction Model (VECM) and we retained the model for which the Schwarz SC criterion was minimal. This is an ECM.

Table 4. Model selection

Model	Schwarz criterion SC
MCO	-2,751731
MCE	-3,430823
VAR	-3,28954
VECM	-3,309167

Source : Author, 2023

Estimation of an Error Correction Model (ECM)

The estimation of an ECM through the Engle-Granger method is done in two steps: the estimation of a long-term model and the estimation of a short-term model.

Estimation of the long-term model

The results of the estimation are summarised in the following table :

Table 5: Estimation results of the long-term model for the Trade sector

Explanatory variables	Coefficients	T-Statistic	Prob
ICM_{com}	0,0029	9,593905	0,0000
$LogCredit_{com}$	0,0106	0,481482	0,6339
Constant	5,001026	22,34079	0,0000
R² Adjusted			0,7502
Prob(F-Statistic)			0,0000

Source : Author, 2023

The long-term model is as follows :

$$LogVa_{com} = 0.0029ICM_{com} + 0.0106\ LogCredit_{com} + 5.001026 + \varepsilon$$

Validation tests of the long-term model :
- Fisher test: Prob (F-statistic) = 0.000000 < 0.05. It can be deduced that the model is globally significant at the 5% level ;
- The coefficient of determination, R² Adjusted, is 0.750192. This value is close to 1, which shows that the linear fit is good ;
- Breusch-Godfrey residual autocorrelation test : Prob. F (5,23) = 0.0916 > 0.05, so there is no autocorrelation of errors;
- Breusch-Godfrey test for heteroscedasticity of errors : Prob. F (2,28) = 0.0521 > 0.05, so the errors are not heteroscedastic but homoscedastic.
- Jarque-Bera normality test for residuals : *JB* = 1.435071 < 5.99 or *Prob* = 0.487953 > 0.05, so the residuals follow a normal distribution.

These various tests allow us to validate the long-term model. The stationarity of the residuals from the estimation of the long-term model is verified using the ADF test. The residuals being stationary, they are recovered and delayed by one period, then inserted in the estimation of the short-term model.

Estimation of the short-term model

The results of the estimation of the short-term model are summarised in the following table :

Table 6: Estimation results of the short-term model for the Trade sector

Explanatory variables	Coefficients	T-Statistic	Prob
$dICM_{com}$	0,000997	2,465450	0,0206
$LogCredit_{com}$	0,035991	1,988043	0,0574
Residmce(-1)	-0,069612	-0,477251	0,6372

Explanatory variables	Coefficients	T-Statistic	Prob
Constant	-0,356119	-1,999672	0,0561
	R² Adjusted		0,134191
	Prob (F-statistic)		0,081828

Source : Author, 2023

The short-term model is as follows :
ResidlogVacom =0.000997ICM_{com} +0.035991 LogCredit_{com} -0.069612Residmce-0.356119+ ε

Validation tests of the short-term model
- The coefficient of determination, R² Adjusted, is 0.14966. This value is far from 1, which shows that the linear fit is not good ;
- Fisher test: Prob (F-statistic) = 0.081828> 0.05. We deduce that the model is not globally significant at the 5% threshold ;
- Breusch-Godfrey residual autocorrelation test : Prob. F (3,23) = 0.0792 > 0.05, we reject the null hypothesis that there is an autocorrelation of the errors at the 5% threshold ;
- Breusch-Godfrey error heteroscedasticity test : Prob. F (3,26) = 0.2873 > 0.05, so the errors are not heteroscedastic but homoscedastic ;
- Jarque-Bera normality test for residuals : *JB* = 4.120032 < 5.99 or *Prob* = 0.127452 > 0.05, so the residuals follow a normal distribution.

These tests allow us to validate the short-term model at the 5% threshold.

Transport and communication branch
The variables : "value-added," "labour cost index," and "credit to the economy" are integrated into order 1. All our variables being integrated into order one, we immediately thought of a VAR, but our variable of interest was insignificant ; we then estimated all the models and retained the one whose Akaike AIC and Schwarz SC criteria were minimal.

Table 7: Choice of model for the transport and communication sector

	Akaike AIC	Schwarz SC
MCO	-1,768921	-1,630148
MCE	-2,79387	-2,607044
VAR	-2,637197	-2,448605
VECM	-2,536085	-2,300344

Source : Author, 2023

The model chosen is an ECM.
Estimating an MCE
The estimation of an ECM through the Engle-Granger method is done in two steps: the estimation of a long-term model and the estimation of a short-term model.

Estimation of the long-term model
The results of the estimation are summarised in the following table :
Table 8. Estimation results of the long-term model of the transport and communication sector

Explanatory variables	Coefficients	T-Statistic	Prob
ICMtr_ com	0,00115	3,641119	0,0011
LogCrédittr_ com	0,038458	1,897415	0,0681
Constant	5,828184	30,56011	0,0000
R² Adjusted			0,445264
Prob (F-statistic)			0,00099

Source : Author, 2023

The long-term model is as follows :
LogVatr_com= 0.00115ICM tr_com +0.038458LogCredit tr_com +5.828184+ ε

Validation test of the long-term model
- Fisher's test: Prob (F-statistic) = 0.00099 < 0.05. This indicates that the model is globally significant at the 5% level ;
- Jarque-Bera normality test for residuals : JB = 2.519105 < 5.99 or Prob = 0.283781 > 0.05 so the residuals follow a normal distribution ;

- Breusch-Godfrey residual autocorrelation test : Prob. F (10,18) = 0.0577 > 0.05, the null hypothesis that there is an autocorrelation of the errors at the 5% threshold is rejected ;
- Breusch-Godfrey error heteroscedasticity test : Prob. F (2,28) = 0.1333 > 0.05, so the errors are not heteroscedastic but homoscedastic.

Given the different results obtained for the model validation tests, the model fulfills the conditions for interpretation.

The short-term model
The results of the estimation of the short-term model are summarised in the following table :
Table 1. Estimation results of the short-term model of the transport and communication sector

Explanatory variables	Coefficients	T-Statistic	Prob
dICMtr_com	0,000276	0,895703	0,3786
dLogCreditittr_com	0,006689	0,489204	0,6288
Residmce(-1)	0,258895	2,174331	0,0390
Constant	-0,00205	-0,19885	0,8439
R² Adjusted			0,103105
Prob (F-Statistic)			0,1232

Source : Author, 2023

The coefficients of the short-term model are not significant and therefore, this model cannot be interpreted.
❖ Hotels and Restaurants Branch
The results of the stationarity tests reveal that all the series are stationary in the first difference (I (1)) except for the labour force series, which is stationary in level (I (0)). These results lead us to carry out a cointegration test on the set formed by the variables I (1), i.e., Log-Vahot_rest and LogCrédithot_rest. The method used here is that of Johansen.

Johansen cointegration test
The trace test applied to the model matrix shows 0 cointegrating relationships between the variables. However, the AIC criterion highlights one cointegrating relationship. We, therefore, have two possible models : a VAR or an ECM. After estimating these two models, we chose the one with the smallest relative values for the AIC and SHWARZ criteria : the Error Correction Model (ECM).

Estimation and validation of the error correction model (ECM)
The estimation of an ECM through the Engle-Granger method is done in two steps : the estimation of a long-term model and the estimation of a short-term model.

Estimation of the long-term model
The results of the estimation are summarised in the following table :
Table 10: Estimation results of the long-term model of the hotel and restaurant sector

Explanatory variables	Coefficients	T-Statistic	Prob
ICMhot_ rest	0,02755	2,0793	0,0468
LogCredithot _rest	-0,0084033	-3,8887	0,0006

Constant	**4,678722**	**18,0626**	**0,0000**
	R² Adjusted		0,4371
	Prob (F-Statistic)		0,0003

The long-term model is as follows :
LogVahot_rest = -0.0084033LlogCredithot_rest + 0.02755 ICMhot_rest + 4.678722+ε

Validation tests of the long-term model
- Fisher test: Prob (F-statistic) = 0.000321 < 0.05. This indicates that the model is globally significant at the 5% level ;
- Breusch-Godfrey residual autocorrelation test : Prob. F (2,37) = 0. > 0.05, so there is no autocorrelation of the residuals ;
- Test for homoscedasticity of errors (ARCH test): Prob. F (1,42) = 0.2925 > 0.05, so the errors are homoscedastic ;

- Jarque-Bera normality test for residuals : JB = 8.627674 > 5.99 or Prob = 0.304634 >0.05, so the residuals do not follow a normal distribution.

The stationarity of the residuals from the estimation of the long-term model is checked using the ADF test. Since the residuals are stationary, they are recovered and lagged by one period, then inserted into the estimation of the short-term model.

Estimation of the short-term model
The results of the estimation are summarised in the following table :

Table 11: Estimation results for the short-term model of the hotels and restaurants sector

Explanatory variables	**Coefficients**	**T-Statistic**	**Prob**
ICMhot_ rest	0,001448	**1,9884**	**0,0574**
LogCredithot _rest	-0,013464	**-0,8272**	**0,4156**
Residu1	-0,002726	**-1,6270**	**0,1158**
Constant	-0,134692	**-1,8860**	**0,0732**
	R² Adjusted		0,2008
	Prob (F-Statistic)		0,1147

The coefficient of our one-period lagged residual is different from zero and is negative but not significant because Prob= 0.1158>0.05. This result does not allow us to validate the short model of our ECM.

Interpretation
Trade branch
❖ The long-term pattern in the commerce sector is as follows :
$$LogVa_{com} = 0.002921ICM_{com} +0.10598 LogCredit_{com} +5.001026+ ε$$
❖ In the trade sector, in the long term, we can only interpret the LCI variable because only its coefficient is significant. If the LCI increases by 1%, the value added to the trade sector will increase by ***0.002921%***. We can

therefore see that the evolution of the labour cost index in the long term has a positive influence on the value added :
ResidlogVacom =0.000997ICM_{com} +0.035991 LogCredit_{com} -0.069612Residmce-0.356119+ ε

The short-term model is valid, but the recall force is far from 1 and insignificant, indicating the model's weak capacity to adjust and return to equilibrium. In other words, this does not allow us to interpret the short-term model compellingly.

Transport and communication branch
In the transport and communication sector, the long-term model is as follows :

$LogVatr\_com = 0.00115 ICM_{tr\_com} + 0.038458 LogCredit_{tr\_com} + 5.828184 + \varepsilon$

Only the coefficient of the LCI is significant and therefore, only it can be interpreted. It can be seen that a 1% increase in the LCI leads to a 0.00115% increase in the value-added of the transport and communication branch. The evolution of the labour cost index over the long term positively influences the value added of the transport and communication branch.

Hotels and restaurants branch

In the hotel and restaurant sector, the long-term model is as follows :

$LogVahot\_rest = 0.0084033 LlogCredithot\_rest + 0.02755\ ICMhot\_rest + 4.678722 + \varepsilon$

In this model, all the coefficients are significant. It can be seen that when the MCI increases by 1%, the value-added increases by **0.02755%** and when the credit to the economy increases by 1%, the value-added increases by 0.0084033%, which shows that in the long term, the increase in the MCI and the credit to the economy has a positive influence on the value added of production.

Discussions : Synthesis of results and validation of hypotheses

In summary, the LCI in all three industries has a significant and positive effect on the value added of enterprises only in the long run. Labour costs, therefore, have a positive effect on the output of the industries. Our labour cost index depends fundamentally on the number of employees and the level of wages—an increase in the latter leads to an increase in firms' output levels. The theory of wage efficiency states that a high wage level increases the productivity of employees, which explains the positive influence of wage increases on output. The results of our work also go in a direction similar to that of Okun. As mentioned at the beginning of our study, Okun shows a positive link between increased employment and growth. Therefore, if growth can be measured by the total value added of a country, we can easily say that in the trade sector, the increase in the cost of employment leads to an increase in economic growth through the increase in value added.

This study proposed to test three hypotheses, each relating to their respective branches. They are concerned about the relationship between the labour cost index and companies' output. The estimates carried out make it possible to verify each of these hypotheses :

Table 12: Presentation of hypotheses

Hypothèses	Conclusions
The rise in the labour cost index negatively affects the impact on output of the "trade" ts branch.	Nurse
The rise in the labour cost index negatively affects the output of the 'transport and communication' branch.	Nurse
The rise in the labour cost index negatively affects the output of the "Hotels and Restaurants" branch.	Nurse

<u>Source :</u> Author, 2023

Our hypotheses H1, H2 and H3 are invalidated. The labour cost index has a positive influence on the production of services. This could be explained by the theory of wage efficiency, which puts forward a different conception of profit maximisation than that of classical microeconomics. According to this theory, an increase in wages would increase the productivity of the worker, who would be more motivated, thus allowing an increase in production.

Operational recommendations

In light of the different results obtained from this study, it is crucial to formulate recommendations to maintain the evolutionary trend of the labour cost index on the one hand and to preserve the positive effect of the LCI on the

output of companies on the other. Our analysis leads us to make the following suggestions :

- Increase the minimum wage ;
- Preserve the considerable contribution of the trade sector to the Beninese economy by opting for a policy of encouraging efficiency wages, particularly in marketing companies ;
- Harmonise the labour cost index according to regulation ;
- Improve the quality of life of employees to make them more productive ;
- Take a look at the wage regulations in the hotel and restaurant sectors.

Conclusion

The objective of the study is to assess the influence of labour costs on the output of service industries—the results of this study concern descriptive and econometric analyses. Indeed, the descriptive analysis allowed us to see the evolution of our index over the quarters from 2014 to 2021 on the one hand and the behaviour of the two other variables on the other. The econometric analysis allowed us to make the variables stationary and then build the model. An Error Correction Model allowed us to validate the three models relating to the three branches targeted by our study. As a result, we had the foresight to overturn our three primary hypotheses. This reversal can be explained by the theory of wage efficiency, among others. Based on our results, our study has made some recommendations whose implementation will help to raise the effect of labour costs on production. Among other recommendations, we can mention the increase in the minimum wage level and the introduction of an incentive policy for efficiency wages. However, our study sufneedsrtain limitations, namely the non-significance of certain variables. Finally, other studies must be carried out on the same subject in order to identify other elements involved in the design of the labour cost index.

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