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Testing Unemployment–Entrepreneurship Nexus in Namibia Using the Schumpeterian Approach

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Abstract: This study uses time series data from the World Bank database to examine the relationship between unemployment and entrepreneurship in Namibia. We applied the Augmented Dickey–Fuller and Phillips–Perron tests for unit root testing and found all the variables to be stationary after the first difference. Given that, we employed the Johansen–Juselius test to measure cointegration, which revealed the absence of long-run relationships between the variables. Hence, we performed a Vector Autoregressive model to estimate the short-run relationships and found that Namibia exhibits both the refugee and Schumpeter effects. Finally, we measured the direction of causality using the Pairwise Granger causality test, and the results revealed that none of the variables Granger causes the other, implying that they are all independent of each other. This implies that the significance of entrepreneurship in addressing unemployment in Namibia is limited in the long run, mostly owing to the absence of sustainable business ventures. Therefore, we recommend prioritizing the development of policies to tackle unemployment through sustainable entrepreneurship.

Keywords: entrepreneurship; unemployment; unit root; Johansen–Juselius cointegration; VAR model; OLS; Granger causality; Namibia

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1. Introduction

Unequivocally, the world has been determined to achieve a better and more inclusive and sustainable future, predominately for developing nations, which are more vulnerable to poverty and inequality, inter alia, which is evident in various development plans. For instance, the United Nations Sustainable Development Goals (SDGs), from the global perspective, in particular Goals 1, 8, and 10, seek to end poverty, promote decent work and economic growth, and reduce inequality, respectively, by 2030 [1]. From the national perspective, the Namibian government seeks to reduce poverty and inequality by 2030, as documented in Namibia's Vision 2030 Plan [2].

However, the issue of unemployment continues to be a global critical concern to a large extent in emerging states [3–5], where Namibia is no exception. To break it down, unemployment trends on a global level stood at about 197.7 million, accounting for 5.6% in 2016 and decreasing slightly to 192.7 million in 2017, while in 2018 and 2019, the estimates were 192.3 million and 193.6 million, respectively (International Labor Organization [ILO], 2019), as cited in [6]. From the viewpoint of developing states, unemployment was estimated at 15.6 million in 2017, continuing to rise in 2018 and 2019 to 16.1 million and 16.6 million, respectively (ILO, 2017), as cited in [6]. For Sub-Saharan Africa, unemployment stood at 6.18% in 2019 and 6.17% in 2020 [7,8]. Currently, unemployment in Namibia stands at 34%, with youth unemployment at 47.4% [9].

While unemployment can devastate macroeconomic performance [10], it cannot always be viewed as an obstacle to economic growth in such a manner that it encourages people to venture into business activities. As they grow, they can create more jobs and eventually reduce unemployment [11,12]. However, such businesses suffer various impediments, mainly those associated with funds, which hinder their ability to grow and serve to that effect [10]. On that ground, academic and practical researchers have been indefatigably aspiring to determine the relationship between entrepreneurship and unemployment. Briefly, the policy debate on how to tackle the chronic issue of unemployment revolves around the refugee effect, which perceives unemployment as a push factor for emerging entrepreneurship, and the Schumpeter effect, which supposes entrepreneurship as a notable player in reducing unemployment [13–18].

Nonetheless, previous investigations reveal inconsistent and ambiguous findings [19–21], which indicates a contradictory gap, following the notion of Miles [22] on research gaps. Thus, it remains unclear whether (a) an increase in entrepreneurship leads to a reduction in unemployment, (b) a rise in unemployment accelerates entrepreneurial activities, or (c) a high rate of unemployment slows down entrepreneurial activities. Hence, the relationship between unemployment and entrepreneurship continues to invite further debate among scholars and policymakers [13].

Moreover, the literature documents a paucity of studies, if not none, that addressed the nexus between unemployment and entrepreneurship within the Namibian context, as early studies focused on economies outside Namibian borders. As a result, the findings of these studies cannot be generalized to Namibia, given the differences in entrepreneurial ecosystems and economic status between countries. Based on the taxonomy of Miles [22] on research gaps, this implies an empirical gap. Hence, the essentiality of this study is to analyze the relationship between unemployment and entrepreneurship in terms of business formation within the Namibian context and establish the direct causality using Namibia as a testing hub. The end view is to have constructed a model that defines the nature of the existing relationship between unemployment and entrepreneurship.

In a nutshell, achieving these objectives is expected to aid policymakers in devising evidence-based policies to address the issue of unemployment. That is, to concentrate on lowering regulatory barriers and the cost of business formation if unemployment pushes entrepreneurship or to concentrate on economic success to mitigate the unpleasant consequences of a recession if increased unemployment reduces entrepreneurial chances [23]. Furthermore, the study is also expected to enrich the literature by addressing the twin research gaps of contradiction and empirical gaps, hence the significance of this study. This scholarly work is structured into five sections. The second section that follows this introduction section reviews the literature concerning the theories underpinning the study and empirical evidence. Subsequently, Section 3 describes the data and methodology for empirically estimating the nexus between unemployment and entrepreneurship in terms of business formation. Section 4 analyzes the data, presents the results, and discusses the findings. Finally, Section 5 provides conclusions and recommendations of the study.

2. Literature Review

Unemployment has long been a worldwide challenge that hits the core of economies, leaving an unfavorable, indelible mark on sectors, society, livelihoods, businesses, and people [24]. Hence, policymakers have been obliged to seek theoretical underpinnings for effective measures to reduce the unemployment rate in developing countries. In that frame of reference, entrepreneurship has been deemed a remedy for economic and social challenges [25,26]. To better understand the relationship between unemployment and entrepreneurship, this study was rooted in the theoretical debate between the simple theory of the refugee effect and the Schumpeter effect. Moreover, the study augmented the arguments of the theoretical literature with empirical evidence from prior studies.

2.1. Theories Underpinning the Study

The relationship between unemployment and entrepreneurship is a topic of vigorous economic debate. This debate stems from the refugee effect, which originated from the Simple Theory of Income Choice and posits that increased unemployment will lead to an increase in entrepreneurship as the opportunity cost of starting a business is less than being unemployed [27–29]. This signifies that unemployed people find entrepreneurship to be a feasible alternative to living in a saturated economy that struggles to absorb job seekers [13,15,30–32]. Hence, this phenomenon is referred to as the recession-push effect [13,17], as it demonstrates the positive relationship between unemployment and entrepreneurship with the direct of causality running from unemployment, making the calamity of unemployment a catalyst for new business ventures.

In the same body of literature, a counterargument contends that unemployed individuals lack the necessary endowments of human capital and entrepreneurial talent that drive business start-ups and their sustainability, implying that high unemployment does not necessarily increase entrepreneurial activities [19,33]. In that context, a languishing economy and perplexity of business formation can also hinder entrepreneurial success [10,34]. Thus, this argument signifies a negative relationship between unemployment and entrepreneurship. As unemployment rises, firms suffer a weaker market demand, which increases the likelihood of business failure, forcing entrepreneurs to withdraw from operations [13,35].

The second theory underpinning the study is the Schumpeter effect (Schumpeter, 1949), as cited in [36], which stems from the Theory of Economic Development (Schumpeter, 1934), as cited in [37]. The Schumpeterian effect implies that the formation of new businesses reduces unemployment [15–17,31,38–42]. This notion is referred to as a prosperity-pull theory, asserting that higher potential returns to entrepreneurial activity result in an increase in new business formation with a high possibility of growth and high chances of hiring more employees, eventually reducing unemployment [17]. Hence, the theory demonstrates a positive relationship between unemployment and entrepreneurship with the direction of causality from entrepreneurship. Nonetheless, this phenomenon is fascinating to economic performance dynamics, as entrepreneurship's success aligns with an economy experiencing strong economic growth [34]. In brief, the refugee effect is present primarily in developing and emerging economies, while the Schumpeter effect is mainly present in developed nations [43–46]. Given that, this study relied on the conceptions of the refugee and Schumpeter effects to determine the direction of causality between unemployment and entrepreneurship in Namibia, which needs to be included in the literature based on our knowledge of exploration.

2.2. Empirical Literature Review

The literature presents several studies on the relationship between unemployment and entrepreneurship. Entrepreneurship generally induces new venture creation and growth [47,48]. Hence, the need for supporting entrepreneurial ecosystems to realize economic growth is essential in developing countries [43]. However, from the global context, [49] argues that while unemployment doubles the likelihood of unemployed people starting new businesses in Canada, its effect on job creation is minimal, whereas the chances of failing are high. Although these results agree with the recession-push theory on a direct nexus between unemployment and entrepreneurship, the possibility of a high failure rate aligns with the critics of the refugee effect that unemployed people do not possess the required resources for successful business start-ups and sustainability. In this context, the fear of failure inhibits entrepreneurial activities [35]. Also supporting the postulation of the recession-push effect is the findings of Payne and Mervar [17], which reveal that an increase in unemployment Granger causes self-employment through entrepreneurship in Croatia.

Furthermore, the findings of Ragmoun [42] also demonstrate that unemployment promotes entrepreneurship in developed countries. Besides that, Cheratian et al. [13] discovered a long-run negative impact of unemployment on entrepreneurial activity in

Iran, which opposes the recession-push effect. This signifies that high unemployment increases the risk of business failure, forcing entrepreneurs to pull out from being self-employed.

Against the refugee effect, Camba [40] reveals that in the short run, an increase in entrepreneurship decreases unemployment in the Philippines. These results indicate the existence of the Schumpeter effect in the short run. In a nutshell, the results are consistent with the findings of previous studies [50], emphasizing entrepreneurship's cruciality in enhancing employment opportunities in developed countries. In the same context, Prasetyo [18] found the validity of the Schumpeter effect in Indonesia, where entrepreneurship addresses the issue of unemployment, while Apergis and Payne [23] reveal a bidirectional causal effect between entrepreneurship and unemployment in the United States.

Finally, Grigorescu et al. [16] discovered ambiguous results in Romania, revealing the presence of both the refugee and Schumpeter effects among different groups of unemployed people. This led to the conclusion that although unemployment is an inclusion push factor for entrepreneurship, it could be more effective for others, as self-employment reflects a strong risk aversion and a poor start-up impact. Overall, the ambiguity of these results is reflected in the notion of Halicioglu and Yolac [33], which emphasizes that the nexus between unemployment and entrepreneurship is ambiguous after revealing the presence of both hypotheses of the refugee effects among 28 OECD countries. That is, an increase in entrepreneurial activities due to a rise in the unemployment rate in Belgium, Canada, Sweden, and the United Kingdom and a decline in entrepreneurship because of an increase in the unemployment rate in Greece, Luxembourg, and Portugal in the long run, while the remaining countries did not exhibit a long-run relationship.

From the continental view, Padi and Musah [24] assessed the extent to which entrepreneurship can sufficiently reduce unemployment in Ghana using a systematic literature review approach and found that entrepreneurship alone has the potential to reduce unemployment, predominantly when there is innovation and stable economic prosperity. While the results support the notion of the Schumpeter effect, which presumes entrepreneurship to be a remedy for the unemployment challenge, the outcome is likely to take a minimum of approximately five years to be evident [24]. Moreover, the results also align with the emphasis of Aku-sika [38] that entrepreneurship drives economic growth by addressing social challenges. Thus, it is essential for the government to reform policies for emerging businesses through the implementation of tailored measures that optimize the business climate for domestic entrepreneurs [51]. Aside from that, Feki and Mnif [19] reveal the presence of both the refugee effect and the Schumpeter effect in Tunisia, where an increase in unemployment results in self-employment and an increase in self-employment reduces unemployment. These results support the assertion of other studies, which underscore the ambiguity of the nexus between unemployment and entrepreneurship [10,23]. Nonetheless, the literature documents a need for more evidence from the Namibian context.

2.3. Research Gaps

As emerged from the literature, the evidence presents mixed results, which side with both the refugee and Schumpeter effects regardless of the countries' development category, for instance, the refugee effects observed in developed countries like Canada [49] and Belgium, Sweden, and the United Kingdom [33], inter alia, and the Schumpeter effect in developing states like Ghana [24] and Philippines [40], among others. Overall, this evidence contradicts the assertion of early studies [43–46], which highlight that the refugee effect exists in developing and emerging economies, while the Schumpeter effect is found in developed countries. Furthermore, the existing ambiguous evidence of the nexus between unemployment and entrepreneurship implies a contradictory gap in reference to the taxonomy of Miles [22] on research gaps, which is a call for further investigations.

Finally, the existence of an empirical gap based on the notion of Miles [22] is also evident from a comprehensive review of the literature, given a paucity of evidence from the

Namibian perspective. This study served to bridge these gaps by assessing the relationship between unemployment and entrepreneurship within the Namibian context and providing guidelines to policymakers for evidence-based policy devising and assimilation. Thus, the study hypothesizes the following:

H1: *Unemployment induces entrepreneurship in Namibia.*

3. Data and Methods

Entrepreneurship plays a pivotal role at the individual, corporate, and institutional levels, fostering economic development and progress, making it a vital catalyst for the sustained vitality of the contemporary economy [51–53]. In that context, this study used time series data collected from the World Bank database to investigate the relationship between unemployment and entrepreneurship in Namibia. The variables included unemployment in terms of the annual rate (ILO estimates) and entrepreneurship as the number of yearly business formations. Since entrepreneurs globally encounter several obstacles, such as inefficient regulation [54], we included the cost of business start-up procedures (CBSP) as a percentage of Gross National Income (GNI) per capita. The CBSP indicator measures the procedures, time, cost, and paid-in minimum capital required for a company to start and formally operate [54]. Lastly, we used the data for 11 years, from 2006 to 2016, since the data for business formation as a determinant of entrepreneurship were only available for that period. In that light, we transformed the annual data into quarterly data to meet the sample criterion for quantitative studies, which should be at least 30 [55]. In that context, Table 1 illustrates the variables' descriptive statistics.

Table 1. Descriptive statistics summary of the variable ($2006Q_1$–$2016Q_4$).

Variable	Mean	Std. Dev.	Min	Max
LNUNEMP	3.015622	0.086205	2.819592	3.150597
LNCBSP	2.820446	0.230237	2.406945	3.104587
LNENTRP	6.91484	0.24306	6.487684	7.385851

Source: authors' computation from descriptive analysis (2023).

Given that, the general function of the model specification was specified as

$$\text{UNEMP} = \text{f(ENTRP, CBSP)} \quad (1)$$

where UNEMP is the unemployment rate, ENTRP represents entrepreneurship, while CBSP is the cost of business start-up procedures.

Thus,

$$Z_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \chi_{t+1-i} + \varepsilon_t \quad (2)$$

where Z is Unemployment (UNEMP), χ represents f(Entrepreneurship (ENTRP), Cost of Business Start-up Procedures (CBSP), α_i is the Parameter Estimates, ε is the Stochastic Error Term, while t represents time.

3.1. Econometric Procedure

To analyze the data, we employed several econometrical analyses. They include the unit root test, Johansen–Juselius test of cointegration, Vector Autoregressive (VAR) model, Pairwise Granger causality test, and the stability test using EViews 9 software. We used the Akaike Information Criterion (AIC) to determine the optimum number of lags for each variable.

3.1.1. Unit Root Test

Often, time series data are non-stationary. However, estimations are likely to be spurious when the analyses are performed on non-stationary data [56]. Accordingly, the unit root test was applied for stationarity testing to show the presence or absence of unit

root in the data. Generally, the absence of unit root in the data indicates applying the VAR model to estimate the short-run relationship between the variables. In contrast, the presence of unit root in the data calls for a cointegration test to determine whether the variables are cointegrated in the long run.

For this study, we applied the widely used Augmented Dickey–Fuller (ADF) test of stationarity [57], as it accounts for serial correlations [58], which we have complemented with the Phillips–Perron (PP) tests of stationarity to ensure the robustness of the results. The null hypothesis for the ADF and PP tests asserts that the data are not stationary (have a unit root). In contrast, the alternative hypothesis states that the null hypothesis is untrue. In that context, the null hypothesis is rejected when the t-statistic exceeds the t-critical value (in absolute values) [58].

3.1.2. Johansen–Juselius Cointegration Test

The cointegration test is essential to determine the suitable model for estimations based on time series data [57]. Thus, we performed the Johansen–Juselius test of cointegration to estimate if there exists a long-run relationship between the variables in the model. The preference of this test lies in its ability to side-step the issue of selecting the dependent variable, its ability to detect multiple cointegration vectors, and its appropriateness for variables integrated of the same order of cointegration I(1) [59]. Following that, the null hypothesis of the Johansen–Juselius cointegration indicates the absence of cointegration, which is a call for the short-run estimations, while the alternative hypothesis asserts the presence of cointegration, which is a call for the long-run estimation. In that context, the null hypothesis is rejected when the values of Trace and Max-Statistics are greater than the critical values at 5% [59].

3.1.3. Vector Autoregressive Model

Based on the cointegration test results, we performed the Vector Autoregressive (VAR) model to estimate the short-run relationships between the variables. In this regard, we specified the VAR model as follows:

$$lnZ_t = \alpha_0 + \sum_{i=1}^{n} \alpha_i ln\chi_{t-1} + \varepsilon_t, \quad (3)$$

Therefore, the VAR equations were

$$lnUNEMP_t = \alpha_0 + \sum_{i-1}^{n} \alpha_1 lnUNEMP_{t-1} + \sum_{i-1}^{n} \alpha_2 lnCBFP\ \varepsilon_t + \sum_{i-1}^{n} \alpha_3 ln\mathrm{ENTRP}_{t-1} \quad (4)$$

$$ln\mathrm{ENTRP}_t = \alpha_0 + \sum_{i-1}^{n} \alpha_1 ln\mathrm{ENTRP}_{t-1} + \sum_{i-1}^{n} \alpha_2 lnCBSP_{t-1} + \sum_{i-1}^{n} \alpha_3 lnUNEMP\ \varepsilon_t \quad (5)$$

$$lnCBSP_t = \alpha_0 + \sum_{i-1}^{n} \alpha_1 lnCBSP_{t-1} + \sum_{i-1}^{n} \alpha_2 ln\mathrm{ENTRP}_{t-1} + \sum_{i-1}^{n} \alpha_3 lnUNEMP\ \varepsilon_t \quad (6)$$

3.1.4. Pairwise Granger Causality Test

We applied Pairwise Granger causality, which determines the causal relationship between the variables [56]. In general, it is said that X Granger causes Y, given that $Y = f(X)$ if the previous data of X help to predict Y [60]. This study applied the pairwise Granger causality test to establish the direction of the relationship between unemployment and entrepreneurship (business formation) in Namibia. Hence, the null hypothesis of the Granger causality demonstrates that X does not Granger cause Y, while the null hypothesis indicates that X Granger causes Y. The null hypothesis is rejected when the probability value is less than 5% (Granger, 1969, as cited in [59,60]). Based on that, Granger causality equations are simplified as follows:

$$Y = \sum_{i=1}^{n} a_i \chi_{t-i} + \sum_{i=1}^{n} \beta Y_{t-j} + \upsilon_{t1} \quad (7)$$

$$\chi_t = \sum_{i=1}^{n} \lambda_i \chi_{t-i} + \sum_{i=1}^{n} \delta Y_{t-j} + v_{t2} \quad (8)$$

where v_{t1} and v_{t2} represent the uncorrelated stochastic terms, while a_i, β_j, λ_j, and δ_j denote the coefficients of the variables.

3.1.5. Diagnostic and Model Efficacy Tests

We next had to ensure the efficacy of the model, notably its error term with respect to serial correlation, heteroskedasticity, and normality tests. In detail, we used the Breusch–Godfrey test for serial correlation to determine if the model suffers from serial correlation. The null hypothesis of this test indicates the absence of serial correlation, and it is rejected when the p-value falls below 5% [61]. Moreover, we also applied the heteroskedasticity test to measure whether there is constant variance around the error term (homoskedasticity). The null hypothesis of heteroskedasticity states that there is no heteroskedasticity (there is homoskedasticity), while the alternative hypothesis suggests the presence of heteroskedasticity. The null hypothesis is rejected when the probability value is less than a 5% significance level [61]. Finally, we have also measured the normality of the data using the Jarque—Bera test of normality. The null hypothesis of the Jarque-Bera test of normality indicates that the data are not normally distributed, while the alternative hypothesis states that the null hypothesis is not valid. In that view, the null hypothesis is rejected when the p-value is less than 5% [62].

4. Results and Discussion

4.1. Lag Length Criteria

Generally, choosing the appropriate lag length is crucial in ensuring accuracy in the model. Thus, it was necessary to determine the optimum lags in the models before the estimations, as portrayed in Table 2.

Table 2. Lag length selection.

Lag	LogL	LR	FPE	AIC	SC
0	72.03974	NA	4.81×10^{-6}	−3.731878	−3.601263
1	268.9539	351.2523	1.87×10^{-10}	−13.88940	−13.36694
2	316.3443	76.84925 *	2.37×10^{-11} *	−15.96456 *	−15.05025 *
3	318.7466	3.506039	3.48×10^{-11}	−15.60792	−14.30177
4	322.5940	4.991224	4.85×10^{-11}	−15.32940	−13.63141

Source: authors' compilation (2023).

We selected the lags using the Vector Autoregressive model to determine the criterion for the lag section, where the criterion with the lowest value is used, according to the rule of thumb. The VAR results reveal that the Akaike Information Criterion (AIC) was the lowest from the analysis. Therefore, the study used the AIC to determine the optimum number of lags, which is denoted by the asterisk (*). As shown in Table 2, the asterisk is on lag 2, indicating that the optimum number of lags is two (2). In that light, all the analyses were based on two (2) lags.

4.2. Unit Root Test Results

Firstly, we transformed the data into their logged form to assume linearity and reduce wider variation. After that, we applied both the Augmented Dickey–Fuller test (ADF) and Phillips–Perron (PP) test of a unit root for accuracy in testing whether the data are stationary or non-stationary. Table 3 presents the unit root test results.

Table 3. Unit root test results.

Variable	Test	Level Form		First Difference		Integration Order
		t-Stat	t-Critic at 5%	t-Stat	t-Critic at 5%	
LNUNEMP	ADF	0.363 *	−1.950	−2.007 *	−1.950	I(1)
	PP	0.241 *	−1.949	−2.156 *	−1.950	I(1)
LNCBSP	ADF	−1.472 **	−1.950	−2.331 **	−1.950	I(1)
	PP	−1.299 *	−1.949	−2.394 *	−1.950	I(1)
LNENTRP	ADF	1.355 *	−1.950	−1.959 *	−1.950	I(1)
	PP	1.782 **	−1.949	−2.076 **	−1.950	I(1)

Note: ADF and PP tests were tested with constant and trend. * indicates significance at a 5% level of significance. ** indicates significance at 1% level of significance. Source: authors' compilation (2023).

As shown in Table 2, the results indicate that all the variables were not stationary in level forms for both the ADF and PP tests. Nonetheless, all the variables became stationary after differentiation. Hence, we rejected the null hypotheses of the unit root test for all the variables to indicate the absence of a unit root in the data after the first difference. Since the result indicates that all the variables exhibit the same order of integration [1(1)], we tested cointegration using the Johansen–Juselius test of cointegration.

4.3. Johansen–Juselius Cointegration Test Results

We relied on the Trace statistic and the Maximum Eigen statistic, presented in Tables 4 and 5, respectively, to determine whether there is cointegration among the equations. The asterisk denotes the number of cointegrated equation(s) (CE(s)).

Table 4. Unrestricted cointegration rank test (Trace).

No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value (5%)	Prob. *
None	0.333819	26.8148	29.79707	0.1062
At most 1	0.17503	10.97323	15.49471	0.2131
At most 2	0.085114	3.46929	3.841466	0.0625

Trace test indicates no cointegration at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level. Source: authors' compilation (2023).

Table 5. Unrestricted cointegration rank test (Maximum Eigenvalue).

No. of CE(s)	Eigenvalue	Max-Eigen Statistic	Critical Value	Prob. *
None	0.333819	15.84157	21.13162	0.2342
At most 1	0.17503	7.503941	14.2646	0.4314
At most 2	0.085114	3.46929	3.841466	0.0625

Max-eigenvalue test indicates no cointegration at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level. Source: authors' compilation (2023).

As displayed in Table 4, results show that the Trace statistic and Max-statistics values are all less than their critical values at 5%, as portrayed in Tables 4 and 5, respectively. This signifies the absence of cointegration in all the equations. Thus, we failed to reject the null hypothesis to signify that there exist no long-run relationships between the variables. On that basis, we performed the Vector Autoregressive (VAR) model to estimate the short-run relationship between the variables.

4.4. Vector Autoregressive (VAR) Model Results

Table 6 presents the short-run estimation results of the Vector Autoregressive (VAR) model, where C represents the constants, while the values in the brackets represent the t-values. In that frame of reference, a t-value (in absolute values) greater than 1.96 implies that the relationship is statistically significant at 1 and/or 5% levels of significance,

while a t-value equal to or less than 1.96 indicates that the relationship is not statistically significant [63].

Table 6. VAR results.

	D(LNUNEMP)	D(LNCBSP)	D(LNENTRP)
D(LNUNEMP(−1))	0.843912 **	−0.001552 *	0.134336 *
	[6.62347]	[3.00556]	[2.33873]
D(LNUNEMP(−2))	0.036617 *	−0.001884 *	0.102864 *
	[−2.15536]	[2.25448]	[−2.25631]
D(LNCBSP(−1))	0.002624 *	0.784444 **	−0.031787 *
	[3.14774]	[5.50062]	[2.41394]
D(LNCBSP(−2))	0.001231 *	0.064545 *	−0.03941 *
	[4.00706]	[−3.30876]	[4.13269]
D(LNENTRP(−1))	−0.005701 *	0.053587 *	0.814889 **
	[3.05127]	[2.40209]	[6.30374]
D(LNENTRP(−2))	−0.009765 *	0.048402 *	0.183337 *
	[2.86567]	[−3.35800]	[−2.95444]
C	0.006887 *	−0.005101 *	−0.001805 *
	[−2.24626]	[−2.18220]	[3.76265]
R-squared (R^2)	0.979835	0.99609	0.991204
Adjusted (R^2)	0.976054	0.995357	0.989555
Observations	44	44	44

Note: * denotes statistically significant at the 0.05 level. ** denote statistically significant at the 0.01 level. Source: authors' compilations (2023).

In terms of significance, each variable was found to be statistically significant to the model itself at a 1% level of significance in lag 1, given the absolute t-values all greater than 1.96 (LNUNEMP, 6.62347 > t-value 1.96; LNCBSP, 5.50062 > t-value 1.96; and LNENTRP, 6.30374 > t-value 1.96). Regarding the measure of impacts, the past realization of unemployment is associated with an 84.39% increase in unemployment on average, ceteris paribus. Moreover, the past realization of the cost of business start-up procedures accounts for an average 78.44% increment in the cost of business start-up procedures, holding other factors constant. Lastly, the past realization of entrepreneurship (business formation) is associated with an increase of 81.49% on average, ceteris paribus.

Apart from these significant impacts at 1%, the rest of the effects were found to be statistically significant at a 5% level of significance. In detail, a 1% increase in entrepreneurship in lag 1 and 2, respectively, accounts for a rise of 5.36% and 4.84% in the cost of business formation procedures, keeping everything else unchanged, as well as a reduction of 0.57% and 0.98% in lag 1 and lag 2 of unemployment, respectively. Similarly, a 1 percent increase in unemployment leads to a rise of 13.43% and 10.29% in entrepreneurship in lag 1 and lag 2, respectively, as well as a reduction of 0.16% and 0.19% in lag 1 and lag 2 of cost of business start-up procedures, respectively. Finally, an increase of 1% in the cost of business start-up procedures reduces entrepreneurship by 3.18% in lag 1 and 3.94% in lag 2, as well as a fall of 0.26% and 0.12% in lag 1 and lag 2 of unemployment, respectively. In a nutshell, the short-run relationships between the variables are summarized in the following equations.

$$\begin{aligned} D(LNUNEMP) = {} & 0.006887 + 0.843912[D(LNUNEMP(-1))]\ 0.036617[D(LNUNEMP(-2))] \\ & + 0.002624[D(LNCBSP(-1))] + 0.001231[D(LNCBSP(-2))] - 0.005701 \\ & [D(LNENTRP(-1))] - 0.009765[D(LNENTRP(-2))] + \varepsilon_t \end{aligned}$$

$$\begin{aligned} D(LNCBSP) = {} & -0.005101 + 0.784444[D(LNUCBSP(-1))] + 0.064545[D(LNCBSPP(-2))] \\ & -0.001552[D(LNUNEMP(-1))] - 0.001884[D(LNUNEMP(-2))] + \\ & 0.053587[D(LNENTRP(-1))] + 0.048402[D(LNENTRP(-2))] + \varepsilon \end{aligned}$$

$$D(LNENTRP) = -0.001805 + 0.814889[D(LNENTRP(-1))] + 0.183337[D(LNENTRP(-2))] - 0.031787\ [D(LNUCBSP(-1))] - 0.03941\ [D(LNCBSPP(-2))] + 0.134336[D(LNUEMP(-1))] + 0.102864[D(LNUNEMP(-2))] + \varepsilon_t$$

4.5. Diagnostics and Model Efficacy Test Results

Table 7 presents the diagnostics and model's efficacy results from the Breusch–Godfrey LM autocorrelation test, White's heteroskedasticity test of homoskedasticity, and the Jarque–Bera normality test.

Table 7. Diagnostics and model efficacy test results.

Problem	Test	*p*-Value
Autocorrelation	Breusch–Godfrey LM	0.775
Heteroskedasticity	White's	0.4131
Normality	Jarque–Bera	0.0028

Source: author' compilation (2023).

As displayed in Table 6, the *p*-values for Breusch–Godfrey LM White's heteroskedasticity tests exceed 5% at 0.775 and 0.4131, respectively. Hence, we failed to reject the null hypotheses of these tests to demonstrate the absence of autocorrelation and heteroskedasticity (indicating the presence of homoskedasticity). Finally, we rejected the hull hypothesis of the normality test given the Jarque–Bera of 0.0028, which is less than 5%, to illustrate that the data follow a normal distribution. Briefly, these results indicate the goodness of fit for our model to the data and interpretation.

4.6. Granger Causality Test Results

Table 8 depicts the results from the pairwise Granger Causality test that was applied to establish the direction of a causal relationship between entrepreneurship in terms of business formation (LNENTRP) and cost of business start-up procedures (LNCBSP), LNENTRP and unemployment (LNUNEMP), and LNCBSP and LNUNEMP.

Table 8. Pairwise Granger causality test results.

Null Hypothesis:	Obs	F-Statistic	Prob.
D(LNCBSP) does not Granger Cause D(LNENTRP)	38	0.50642	0.6073
D(LNENTRP) does not Granger Cause D(LNCBSP)		0.10592	0.8998
D(LNUNEMP) does not Granger Cause D(LNENTRP)	38	0.07498	0.0279
D(LNENTRP) does not Granger Cause D(LNUNEMP)		1.12409	0.3371
D(LNUNEMP) does not Granger Cause D(LNCBSP)	38	0.13851	0.8712
D(LNCBSP) does not Granger Cause D(LNUNEMP)		0.23186	0.7943

Source: Authors' compilation (2023).

Table 8 shows no evidence of Granger causality between the variables, given that the probability values are all greater than 0.05 significance level. Hence, the study failed to reject all the null hypotheses, signifying that the cost of business start-up procedures and entrepreneurship (business formation) are independent of each other, just as much as business formation and unemployment, as well as unemployment and cost of business start-up procedures.

4.7. Discussions

The results of this study demonstrate that Namibia does not exhibit a long-term relationship between unemployment and entrepreneurship, which contradicts the findings of [13] in Iran, where a long-run (negative) nexus was observed between unemployment and entrepreneurial activity. As depicted in Table 6, the short-run estimation results show that entrepreneurship increases with unemployment, demonstrating the recession-push

effect in the Namibian economy. These results support previous studies' findings, such as [11,30], which underscore the positive impact of unemployment on entrepreneurship from the global perspective. Besides that, our results also present evidence of the prosperity-pull effect, given a reduction in unemployment due to an increase in entrepreneurship, although the effect is very minimal. These results agree with the findings from the global perspective [15,31,45], where entrepreneurship emerged as a remedy for unemployment. Furthermore, our results are consistent with the findings of Galindo da Fonseca [49], which indicate the minimal effect of start-ups on job creation in Canada.

Overall, our results suggest that the Namibian economy exhibits both the refugee and Schumpeter effects, conforming to the ambiguity of the nexus between unemployment and entrepreneurship in other countries beyond the African borders [16,18,33]. Similarly, the results are consistent with the findings of Feki and Mnif [19], which reveal the presence of both the refugee and Schumpeter effects in Tunisia. Finally, we have also discovered the impact of business start-up procedures on the relationship between unemployment and entrepreneurship in Namibia. The more unemployment increases, the more the procedures of starting businesses are eased. Thus, an increase in the number of individuals engaging in entrepreneurial activities, however, leads to the complexity of executing the formal processes of business start-ups.

Lastly, our Granger causality test results reveal that none of our variables Granger causes the other. This evidence contradicts the findings of Cheratian et al. [13], which found a unidirectional short-run causal relationship from entrepreneurship to unemployment in some provinces in Iran and a unidirectional short-run causal relationship from unemployment to entrepreneurship in other provinces and bidirectional causality between unemployment and entrepreneurship in the United States [23].

4.8. Namibia's Unemployment–Entrepreneurship Short-Run Nexus Model

Figure 1 illustrates the relationship between entrepreneurship and unemployment, where entrepreneurship is determined by the number of yearly business formations (ENTRP), and unemployment is the annual unemployment rate. The graph plots unemployment on the vertical axis, while entrepreneurship is on the horizontal axis, with point 0 indicating the origin. Moreover, equilibrium represents the intersection of entrepreneurship (ENTRP) and unemployment (UNEMP) curves.

As depicted in Figure 1, the equilibrium is a point that indicates the state where total unemployment equates to the total business formation in the economy. That is, entrepreneurial activities fully absorb the unemployment rate within a given period of time. As unemployment rises above the equilibrium, unemployed people begin to venture into entrepreneurial activities from point E to point A. For that reason, new businesses start to penetrate the market and business formation increases above the equilibrium from point E to point B, which demonstrates the refugee effect [10,12,23–25]. Due to an increase in business formation, unemployment reduces below the equilibrium level from point E to point C, which illustrates the Schumpeter effect [12–14,29–31,33,47]. However, over time, the market becomes saturated to the extent that business formation reaches the maximum point of acceleration and begins to diminish, as shown at point B, while unemployment keeps declining until it becomes exhausted over time, where it starts to pick up, as indicated at point C. Overall, the model demonstrates that the relationship between entrepreneurship and unemployment is short-run, where entrepreneurship can only address the issue of unemployment in the short run.

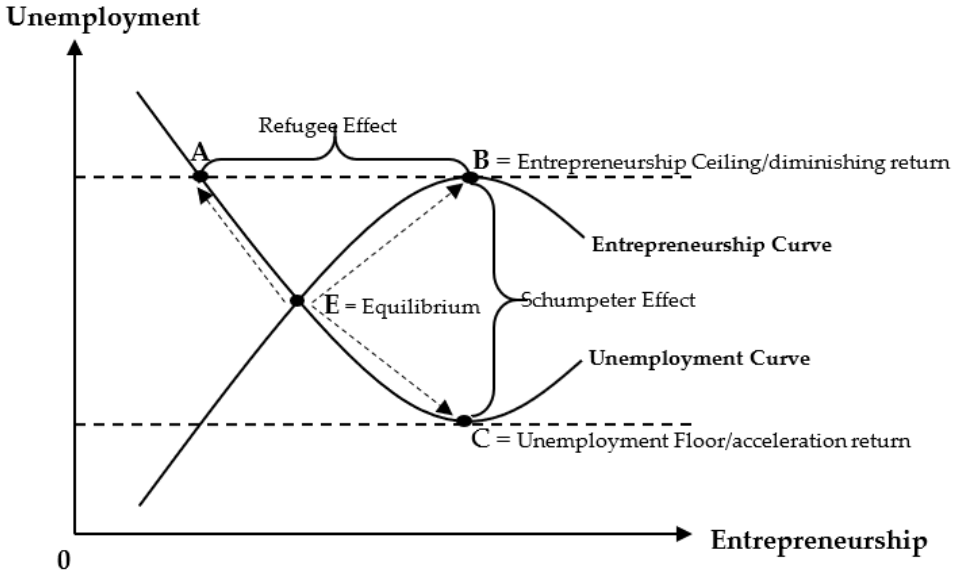

Figure 1. The nexus between entrepreneurship and unemployment. Source: authors' construction (2023).

5. Conclusions and Recommendations

This study intended to analyze the nexus between unemployment and entrepreneurship within the Namibian economy using several econometrical analyses. From the unit root test, all the variables were stationary at the first difference I(1). This led to a further cointegration analysis, measured using the Johansen–Juselius test to determine whether the variables are cointegrated in the long run. Nevertheless, the Johansen–Juselius test did not find any cointegrating equation. Hence, we performed the Vector Autoregressive (VAR) model to estimate the short-run relationship between the variables.

Based on the findings of the VAR analysis, it can be inferred that each variable, namely entrepreneurship, cost of business start-up procedures, and unemployment, is strongly and positively endogenous, ceteris paribus. However, other weakly and positively endogenous and strongly exogenous impacts may result in a heightened level of complexity in business start-up procedures because of increased entrepreneurship. Simultaneously, the presence of unemployment exerts further impetus on individuals to engage in entrepreneurial endeavors. Hence, it may be inferred that Namibia demonstrates the presence of both the refugee effect and the Schumpeter effect. Lastly, the study applied a pairwise Granger causality test to measure the direction of causality between the variables. The results indicate that none of the variables Granger causes the other. Hence, we rejected all the null hypotheses of the Granger causality test to conclude that entrepreneurship and cost of business start-up procedures, entrepreneurship and unemployment, as well as unemployment and cost of business start-up procedures are independent of each other. Based on these findings, it can be concluded that the significance of entrepreneurship in addressing unemployment in Namibia is limited in the long run, mostly owing to the absence of sustainable business ventures. Therefore, we recommend prioritizing the development of policies to tackle unemployment through sustainable entrepreneurship. It is also vital to simultaneously streamline business start-up procedures to promote sustainable entrepreneurial activities in Namibia. This approach has the potential to address broader macroeconomic challenges beyond unemployment.

Nonetheless, the question of what are the best practices and lessons of sustainable entrepreneurship that can be applied in Namibia remains unanswered. Thus, the study suggests that future studies use panel analysis on the success and impact of sustainable entrepreneurship initiatives in Namibia with those in other developing countries with similar economic contexts to identify best practices and lessons that can be applied in Namibia. By addressing this important area in future research, policymakers and keen stakeholders can gain better understanding of how sustainable entrepreneurship can

effectively contribute to reducing unemployment and other macroeconomic challenges in Namibia.

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